



Space X Falcon 9 First Stage Landing Prediction

Web scraping Falcon 9 and Falcon Heavy Launches Records from Wikipedia

Estimated time needed: **40** minutes

In this lab, you will be performing web scraping to collect Falcon 9 historical launch records from a

Wikipedia page titled **List of Falcon 9 and Falcon Heavy launches**

https://en.wikipedia.org/wiki/List_of_Fal



Falcon 9 first stage will land successfully

Several examples of an unsuccessful landing are shown here:



More specifically, the launch records are stored in a HTML table shown below:

Objectives

Web scrap Falcon 9 launch records with `BeautifulSoup` :

- Extract a Falcon 9 launch records HTML table from Wikipedia

- Parse the table and convert it into a Pandas data frame

First let's import required packages for this lab

```
In [1]: !pip3 install beautifulsoup4  
!pip3 install requests
```

Requirement already satisfied: beautifulsoup4 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (4.11.1)

Requirement already satisfied: soupsieve>1.2 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from beautifulsoup4) (2.3.2.post1)

Requirement already satisfied: requests in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (2.27.1)

Requirement already satisfied: certifi>=2017.4.17 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests) (2022.5.18.1)

Requirement already satisfied: urllib3<1.27,>=1.21.1 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests) (1.26.9)

Requirement already satisfied: idna<4,>=2.5 in /home/jupyterlab/conda/envs/python/lib/python3.7/site-packages (from requests) (3.3)

Requirement already satisfied: charset-normalizer~=2.0.0 in /home/jupyterlab/conda/envs/python/lib/

python3.7/site-packages (from requests) (2.0.12)

```
In [16]: import sys

import requests
from bs4 import BeautifulSoup
import re
import unicodedata
import pandas as pd
```

and we will provide some helper functions for you to process web scraped HTML table

```
In [17]: def date_time(table_cells):
        """
        This function returns the date
        Input: the element of a table
        """
        return [data_time.strip() for

def booster_version(table_cells):
    """
    This function returns the booster version
    Input: the element of a table
    """
    out=''.join([booster_version f
```

```
    return out

def landing_status(table_cells):
    """
    This function returns the landing status of a table
    Input: the element of a table
    """
    out=[i for i in table_cells.st
    return out

def get_mass(table_cells):
    mass=unicodedata.normalize("NFD", table_cells.st)
    if mass:
        mass.find("kg")
        new_mass=mass[0:mass.find("kg")]
    else:
        new_mass=0
    return new_mass

def extract_column_from_header(row):
    """
    This function returns the landing status of a table
    Input: the element of a table
    """
    if (row.br):
        row.br.extract()
    if row.a:
        row.a.extract()
```

```
if row.sup:
    row.sup.extract()

column_name = ' '.join(row.col

# Filter the digit and empty r
if not(column_name.strip().isc
    column_name = column_name.
    return column_name
```

To keep the lab tasks consistent,
you will be asked to scrape the data
from a snapshot of the **List of
Falcon 9 and Falcon Heavy
launches** Wikipage updated on
9th June 2021

In [18]: `static_url = "https://en.wikipedia`

Next, request the HTML page from
the above URL and get a
response object

TASK 1: Request the

Falcon9 Launch Wiki page from its URL

First, let's perform an HTTP GET method to request the Falcon9 Launch HTML page, as an HTTP response.

```
In [23]: # use requests.get() method with t  
data = requests.get(static_url).t  
print(data)
```

```
<!DOCTYPE html>
<html class="client-nojs" lang="en" dir="ltr">
<head>
<meta charset="UTF-8"/>
<title>List of Falcon 9 and Falcon Heavy launches - Wikipedia</title>
<script>document.documentElement.className="client-js";RLCONF={"wgBreakFrames":false,"wgSeparatorTransformTable":["",""],"wgDigitTransformTable":["",""],"wgDefaultDateFormat":"dmy","wgMonthNames":["","January","February","March","April","May","June","July","August","September","October","November","December"],"wgRequestId":"c1da8356-b523-42fa-a53f-d34f265164aa","wgCSPNonce":false,"wgCanonicalNamespace":"","wgCanonicalSpecialPageName":false,"wgNamespaceNumber":0,"wgPageName":"List_of_Falcon_9_and_Falcon_Heavy_launches","wgTitle":"List of Falcon 9 and Falcon Heavy launches","wgCurRevisionId":1089567688,"wgRevisionId":1027686922,"wgArticleId":37574004,"wgIsArticle":true,"wgIsRedirect":false,"wgAction":"view","wg
```

```
UserName":null,"wgUserGroups":  
["*"],"wgCategories":["Source att  
tribution","All articles with dead  
external links","Articles with de  
ad external links from February 2  
021","Articles with permanently d  
ead external links","CS1 Spanish-  
language sources (es)","CS1 Indon  
esian-language sources (id)"  
,"CS1 errors: external links","CS  
1 maint: url-status","CS1 German-  
language sources (de)","CS1 Korea  
n-language sources (ko)","Article  
s with short description","Short  
description is different from Wik  
idata","Use American English from  
January 2021","All Wikipedia arti  
cles written in American Englis  
h","Use dmy dates from January 20  
21","Articles containing potentia  
lly dated statements from March 2  
018","All articles containing pot  
entially dated statements","All a  
rticles with failed verificatio  
n","Articles with failed verifica  
tion from May 2021","Articles con  
taining potentially dated stateme  
nts from April 2020","Pages using  
multiple image with auto scaled i  
mages","Featured lists","Articles
```

```
containing video clips","Falcon 9
and Falcon Heavy launches","Space
X launch vehicles","Lists of rock
et launches"],["wgPageContentLangu
age":"en","wgPageContentModel":"w
ikitext","wgRelevantPageName":"Li
st_of_Falcon_9_and_Falcon_Heavy_l
aunches","wgRelevantArticleId":37
574004,"wgIsProbablyEditable":tru
e,
"wgRelevantPageIsProbablyEditabl
e":true,"wgRestrictionEdit":[],"w
gRestrictionMove":[],"wgFlaggedRe
vsParams":{"tags":{"status":{"lev
els":1}}},"wgVisualEditor":{"page
LanguageCode":"en","pageLanguageD
ir":"ltr","pageVariantFallbacks
":"en"},"wgMFDDisplayWikibaseDesc
riptions":{"search":true,"nearb
y":true,"watchlist":true,"taglin
e":false},"wgWMESchemaEditAttempt
StepOversample":false,"wgWMEPageL
ength":500000,"wgNoticeProjec
t":"wikipedia","wgMediaViewerOnCl
ick":true,"wgMediaViewerEnabledBy
Default":true,"wgPopupsFlags":1
0,"wgULSCurrentAutonym":"Englis
h","wgEditSubmitButtonLabelPublis
h":true,"wgCentralAuthMobileDomai
n":false,"wgULSPosition":"interla
```

```
language", "wgULSisCompactLinksEnabled": true, "wgWikibaseItemId": "Q6570672", "GEHomepageSuggestedEditsEnableTopics": true, "wgGETopicsMatchModeEnabled": false}; RLSTATE={ "ext.globalCssJs.user.styles": "ready", "site.styles": "ready", "user.styles": "ready", "ext.globalCssJs.user": "ready", "user": "ready", "user.options": "loading", "mediawiki.action.styles": "ready", "mediawiki.interface.helpers.styles": "ready", "ext.cite.styles": "ready", "ext.tmh.player.styles": "ready", "skins.vector.styles.legacy": "ready", "jquery.makeCollapsible.styles": "ready", "ext.visualEditor.desktopArticleTarget.noscript": "ready", "ext.wikimediaBadges": "ready", "ext.uls.interlanguage": "ready", "wikibase.client.init": "ready"}; RLPAGEMODULES=[ "ext.cite.ux-enhancements", "ext.tmh.player", "site", "mediawiki.page.ready", "jquery.makeCollapsible", "mediawiki.toc", "skins.vector.legacy.js", "mmv.head", "mmv.bootstrap.autostart", "ext.visualEditor.desktopArticleTarget.init", "ext.visualEditor.targetLoader", "ext.eventLoggi
```

```
ng","ext.wikimediaEvents","ext.na
vigationTiming","ext.cx.eventlogg
ing.campaigns","ext.cx.uls.quick.
actions","ext.centralNotice.geoI
P","ext.centralNotice.startUp","e
xt.gadget.ReferenceTooltips","ex
t.gadget.charinsert","ext.gadget.
extra-toolbar-buttons","ext.gadge
t.refToolbar","ext.gadget.switche
r","ext.centralauth.centralautolo
gin","ext.popups","ext.uls.compac
tlinks",
"ext.uls.interface","ext.growthEx
periments.SuggestedEditSession"];
</script>
<script>(RLQ=window.RLQ||[]).push
(function(){mw.loader.implement
("user.options@1i9g4",function($,
jQuery,require,module){mw.user.to
kens.set({"patrolToken":"+\\","wa
tchToken":"+\\","csrfToken":"+
\\"}));});});</script>
<link rel="stylesheet" href="/w/l
oad.php?lang=en&modules=ext.c
ite.styles%7Cext.tmh.player.style
s%7Cext.uls.interlanguage%7Cext.v
isualEditor.desktopArticleTarget.
noscript%7Cext.wikimediaBadges%7C
jquery.makeCollapsible.styles%7Cm
ediawiki.action.styles%7Cmediawik
```

```
i.interface.helpers.styles%7Cskin
s.vector.styles.legacy%7Cwikibas
e.client.init&amp;only=styles&am
p;skin=vector"/>
<script async="" src="/w/load.ph
p?lang=en&amp;modules=startup&am
p;only=scripts&amp;raw=1&amp;skin
=vector"></script>
<meta name="ResourceLoaderDynamic
Styles" content=""/>
<link rel="stylesheet" href="/w/l
oad.php?lang=en&amp;modules=site.
styles&amp;only=styles&amp;skin=v
ector"/>
<meta name="generator" content="M
ediaWiki 1.39.0-wmf.12"/>
<meta name="referrer" content="or
igin"/>
<meta name="referrer" content="or
igin-when-crossorigin"/>
<meta name="referrer" content="or
igin-when-cross-origin"/>
<meta name="robots" content="noin
dex,nofollow"/>
<meta name="format-detection" con
tent="telephone=no"/>
<meta property="og:image" content
="https://upload.wikimedia.org/wi
kipedia/commons/thumb/0/0e/Falcon
9_rocket_family.svg/1200px-Falcon
```

```
9_rocket_family.svg.png"/>
<meta property="og:image:width" content="1200"/>
<meta property="og:image:height" content="670"/>
<meta property="og:image" content="https://upload.wikimedia.org/wikipedia/commons/thumb/0/0e/Falcon9_rocket_family.svg/800px-Falcon9_rocket_family.svg.png"/>
<meta property="og:image:width" content="800"/>
<meta property="og:image:height" content="446"/>
<meta property="og:image" content="https://upload.wikimedia.org/wikipedia/commons/thumb/0/0e/Falcon9_rocket_family.svg/640px-Falcon9_rocket_family.svg.png"/>
<meta property="og:image:width" content="640"/>
<meta property="og:image:height" content="357"/>
<meta property="og:title" content="List of Falcon 9 and Falcon Heavy launches - Wikipedia"/>
<meta property="og:type" content="website"/>
<link rel="preconnect" href="//upload.wikimedia.org"/>
```



```
<link rel="alternate" media="only
screen and (max-width: 720px)" hr
ef="//en.m.wikipedia.org/wiki/Lis
t_of_Falcon_9_and_Falcon_Heavy_la
unches"/>
<link rel="alternate" type="appli
cation/x-wiki" title="Edit this p
age" href="/w/index.php?title=Lis
t_of_Falcon_9_and_Falcon_Heavy_la
unches&action=edit"/>
<link rel="apple-touch-icon" href
="/static/apple-touch/wikipedia.p
ng"/>
<link rel="shortcut icon" href="/
static/favicon/wikipedia.ico"/>
<link rel="search" type="applicat
ion/opensearchdescription+xml" hr
ef="/w/opensearch_desc.php" title
="Wikipedia (en)"/>
<link rel="EditURI" type="applica
tion/rsd+xml" href="//en.wikipedi
a.org/w/api.php?action=rsd"/>
<link rel="license" href="http
s://creativecommons.org/licenses/
by-sa/3.0/" />
<link rel="canonical" href="http
s://en.wikipedia.org/wiki/List_of
_Falcon_9_and_Falcon_Heavy_launch
es"/>
<link rel="dns-prefetch" href="//
```

```

meta.wikimedia.org" />
<link rel="dns-prefetch" href="//
login.wikimedia.org"/>
</head>
<body class="mediawiki ltr sitedi
r-ltr mw-hide-empty-elt ns-0 ns-s
ubject mw-editable page-List_of_F
alcon_9_and_Falcon_Heavy_launches
rootpage-List_of_Falcon_9_and_Fal
con_Heavy_launches skin-vector ac
tion-view skin-vector-legacy"><di
v id="mw-page-base" class="noprin
t"></div>
<div id="mw-head-base" class="nop
rint"></div>
<div id="content" class="mw-body"
role="main">
    <a id="top"></a>
    <div id="siteNotice"><!--
CentralNotice --></div>
    <div class="mw-indicator
s">
        <div id="mw-indicator-fea
tured-star" class="mw-indicator">
<a href="/wiki/Wikipedia:Featured
_lists" title="This is a featured
list. Click here for more informa
tion."></a></div>
</div>
<h1 id="firstHeading" class="firstHeading mw-first-heading">List of Falcon 9 and Falcon Heavy launches</h1>
<div id="bodyContent" class="vector-body">
    <div id="siteSub" class="noprint">From Wikipedia, the free encyclopedia</div>
    <div id="contentsub"><div class="mw-message-box-warning mw-revision mw-message-box"><div id="mw-revision-info"><p><b>This is an <a href="/wiki/Help:Page_history" title="Help:Page history">old revision</a> of this page, as edited by <span id="mw-r

```

evision-name"><bdi>C-randles</bdi> (talk | contribs) at 11:39, 9 June 2021 (cite refs). The present address (URL) is a permanent link to this revision, which may differ significantly from the current revision.</p><div id="revision-info-plain" style="display: none;">Revision as of 11:39, 9 June 2021 by <a href="/wiki/User:C-ran

```

dles" class="mw-userlink" title
="User:C-randles"><bdi>C-randles
</bdi></a> <span class="mw-userto
ollinks">(<a href="/wiki/User_tal
k:C-randles" class="mw-usertoolli
nks-talk" title="User talk:C-ran
dles">talk</a> | <a href="/wiki/Sp
ecial:Contributions/C-randles" cl
ass="mw-usertoollinks-contribs" t
itle="Special:Contributions/C-ran
dles">contribs</a>)</span> <span
class="comment">(cite refs)</span
></div></div><div id="mw-revision
-nav">(<a href="/w/index.php?titl
e=List_of_Falcon_9_and_Falcon_Hea
vy_launches&diff=prev&old
id=1027686922" title="List of Fal
con 9 and Falcon Heavy launches">
diff</a>) <a href="/w/index.php?t
itle=List_of_Falcon_9_and_Falcon_
Heavy_launches&direction=prev
&oldid=1027686922" title="Lis
t of Falcon 9 and Falcon Heavy la
unches">← Previous revision</a> |
<a href="/wiki/List_of_Falcon_9_a
nd_Falcon_Heavy_launches" title
="List of Falcon 9 and Falcon Hea
vy launches">Latest revision</a>
(<a href="/w/index.php?title=List
_of_Falcon_9_and_Falcon_Heavy_lau

```

```

nches&diff=cur&oldid=1027
686922" title="List of Falcon 9 a
nd Falcon Heavy launches">diff</a
>) | <a href="/w/index.php?title=
List_of_Falcon_9_and_Falcon_Heavy
_launches&direction=next&
oldid=1027686922" title="List of
Falcon 9 and Falcon Heavy launch
es">Newer revision →</a> (<a href
="/w/index.php?title=List_of_Falc
on_9_and_Falcon_Heavy_launches&am
p;diff=next&oldid=1027686922"
title="List of Falcon 9 and Falco
n Heavy launches">diff</a>)</div>
</div></div>

```

```

<div id="contents
ub2"></div>

```

```

<div id="jump-to-
nav"></div>

```

```

<a class="mw-jump
-link" href="#mw-head">Jump to na
vigation</a>

```

```

<a class="mw-jump
-link" href="#searchInput">Jump t
o search</a>

```

```

<div id="mw-conte
nt-text" class="mw-body-content m
w-content-ltr" lang="en" dir="lt
r"><div class="mw-parser-output">

```

```
<div class="shortdescription nomobile noexcerpt noprint searchaux" style="display:none">Wikimedia list article</div>  
<p class="mw-empty-elt">
```

```
</p>  
<div class="thumb tright"><div class="thumbinner" style="width:332px;"><a href="/wiki/File:Falcon9_rocket_family.svg" class="image">  
</a> <div class="thumbcaption"><div class="magnify"><a href="/wiki/File:Falcon9_rocket_family.svg" class="internal" title="Enlarge"></a></div>
```

```
v>Left to right: <a href="/wiki/Falcon_9_v1.0" title="Falcon 9 v1.0">Falcon 9 v1.0</a>, <a href="/wiki/Falcon_9_v1.1" title="Falcon 9 v1.1">v1.1</a>, <a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">v1.2 "Full Thrust"</a>, <a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">Falcon 9 Block 5</a>, <a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a>, and Falcon Heavy Block 5.</div></div></div>
```

```
<p>Since June 2010, rockets from the <a href="/wiki/Falcon_9" title="Falcon 9">Falcon 9</a> family have been launched 158 times, with 156 full mission successes, one partial failure and one total loss of spacecraft. In addition, one rocket and its payload were destroyed on the launch pad during the fueling process before a static fire test.
```

```
</p><p>Designed and operated by private manufacturer <a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>, the <a href="/wiki/Falcon_9" title="Falcon 9">Falcon 9 rocket
```


family includes the retired versions Falcon 9 v1.0, v1.1, and v1.2 "Full Thrust" Block 1 to 4, along with the currently active Block 5 evolution. Falcon Heavy is a heavy-lift derivative of Falcon 9, combining a strengthened central core with two Falcon 9 first stages as side boosters.^{[1]}

</p><p>The Falcon design features reusable first-stage boosters, which land either on a ground pad near the launch site or on

[drone ship](/wiki/Autonomous_spaceport_drone_ship "Autonomous spaceport drone ship") at sea.^{[#91;2#93;](#cite_note-pm20120207-2)} In December 2015, Falcon 9 became the first rocket to [land propulsively](/wiki/VTVL "VTVL") after delivering a payload to orbit.^{[#91;3#93;](#cite_note-3)} This achievement is expected to significantly reduce [launch costs](/wiki/Space_launch_market_competition "Space launch market competition").^{[#91;4#93;](#cite_note-4)} [Falcon family core boosters](/wiki/List_of_Falcon_9_first-stage_boosters "List of Falcon 9 first-stage boosters") have successfully landed 121 times in 132 attempts. A total of 30 boosters have flown multiple missions, with a record of ten missions by the same booster.

Falcon 9's typical missions include [Space logistics](/wiki/Space_logistics "Space logistics") cargo delivery and [Human spaceflight](/wiki/Human_spaceflight "Human spaceflight") crewed flights to the [International Space Station](/wiki/International_Space_Station "International Space Station") (ISS) with the [Dragon capsule](/wiki/Dragon_capsule "Dragon capsule") and [Dragon 2 capsules](/wiki/SpaceX_Dragon_2 "SpaceX Dragon 2"), launch of [communications satellites](/wiki/Communications_satellites "Communications satellites") and [Earth observation satellites](/wiki/Earth_observation_satellites "Earth observation satellites") to [geostationary transfer orbits](/wiki/Geostationary_transfer_orbit "Geostationary transfer orbit") (GTO), and [low Earth orbits](/wiki/Low_Earth_orbit "Low Earth orbit")

(LEO), some of them at polar inclinations. The heaviest payload launched to a LEO are a batch of 60 [Starlink](/wiki/Starlink "Starlink") satellites weighing a total 15,600#160;kg (34,400#160;lb) which SpaceX flies regularly, to a roughly 290#160;km (180#160;mi) orbit.^{#91;5#93;} The heaviest payload launched to a geostationary transfer orbit (GTO) was Intelsat 35e with 6,761#160;kg (14,905#160;lb).^{#91;a#93;} Launches to higher orbits have included the Deep Space Climate Observatory (DSCOVR) probe to the Sun-

Earth

[Lagrange point L₁](/wiki/Lagrange_point#L1 "Lagrange point"), the [Transiting Exoplanet Survey Satellite](/wiki/Transiting_Exoplanet_Survey_Satellite "Transiting Exoplanet Survey Satellite") (TESS) space telescope on a lunar flyby trajectory, and the [Falcon Heavy test flight](/wiki/Falcon_Heavy_test_flight "Falcon Heavy test flight") which launched [Elon Musk's Tesla Roadster](/wiki/Elon_Musk%27s_Tesla_Roadster "Elon Musk's Tesla Roadster") into a [heliocentric orbit](/wiki/Heliocentric_orbit "Heliocentric orbit") extending beyond the orbit of [Mars](/wiki/Mars "Mars").

</p>

<div id="toc" class="toc" role="navigation" aria-labelledby="mw-to-c-heading"><input type="checkbox" role="button" id="toctogglecheckbox" class="toctogglecheckbox" style="display:none" /><div class="toctitle" lang="en" dir="ltr"><h2

```
id="mw-toc-heading">Contents</h2>
<span class="toctogglespan"><label class="toctogglelabel" for="toc
togglecheckbox"></label></span></div>
<ul>
<li class="toclevel-1 tocsection-1"><a href="#Launch_statistics"><
span class="tocnumber">1</span> <
span class="toctext">Launch stati
stics</span></a>
<ul>
<li class="toclevel-2 tocsection-2"><a href="#Rocket_configuration
s"><span class="tocnumber">1.1</s
pan> <span class="toctext">Rocket
configurations</span></a></li>
<li class="toclevel-2 tocsection-3"><a href="#Launch_sites"><span
class="tocnumber">1.2</span> <s
pan class="toctext">Launch sites</s
pan></a></li>
<li class="toclevel-2 tocsection-4"><a href="#Launch_outcomes"><sp
an class="tocnumber">1.3</span> <
span class="toctext">Launch outco
mes</span></a></li>
<li class="toclevel-2 tocsection-5"><a href="#Booster_landings"><s
pan class="tocnumber">1.4</span>
```

```
<span class="toctext">Booster lan  
dings</span></a></li>  
</ul>  
</li>  
<li class="toclevel-1 tocsection-  
6"><a href="#Past_launches"><span  
class="tocnumber">2</span> <span  
class="toctext">Past launches</sp  
an></a>  
<ul>  
<li class="toclevel-2 tocsection-  
7"><a href="#2010_to_2013"><span  
class="tocnumber">2.1</span> <spa  
n class="toctext">2010 to 2013</s  
pan></a></li>  
<li class="toclevel-2 tocsection-  
8"><a href="#2014"><span class="t  
ocnumber">2.2</span> <span class  
="toctext">2014</span></a></li>  
<li class="toclevel-2 tocsection-  
9"><a href="#2015"><span class="t  
ocnumber">2.3</span> <span class  
="toctext">2015</span></a></li>  
<li class="toclevel-2 tocsection-  
10"><a href="#2016"><span class  
="tocnumber">2.4</span> <span cla  
ss="toctext">2016</span></a></li>  
<li class="toclevel-2 tocsection-  
11"><a href="#2017"><span class  
="tocnumber">2.5</span> <span cla
```

```
ss="toctext">2017</span></a></li>
<li class="toclevel-2 tocsection-
12"><a href="#2018"><span class
="tocnumber">2.6</span> <span cla
ss="toctext">2018</span></a></li>
<li class="toclevel-2 tocsection-
13"><a href="#2019"><span class
="tocnumber">2.7</span> <span cla
ss="toctext">2019</span></a></li>
<li class="toclevel-2 tocsection-
14"><a href="#2020"><span class
="tocnumber">2.8</span> <span cla
ss="toctext">2020</span></a></li>
<li class="toclevel-2 tocsection-
15"><a href="#2021"><span class
="tocnumber">2.9</span> <span cla
ss="toctext">2021</span></a></li>
</ul>
</li>
<li class="toclevel-1 tocsection-
16"><a href="#Future_launches"><s
pan class="tocnumber">3</span> <s
pan class="toctext">Future launch
es</span></a>
<ul>
<li class="toclevel-2 tocsection-
17"><a href="#2021_2"><span class
="tocnumber">3.1</span> <span cla
ss="toctext">2021</span></a></li>
<li class="toclevel-2 tocsection-
```



```
18"><a href="#2022"><span class
="tocnumber">3.2</span> <span cla
ss="toctext">2022</span></a></li>
<li class="toclevel-2 tocsection-
19"><a href="#2023"><span class
="tocnumber">3.3</span> <span cla
ss="toctext">2023</span></a></li>
<li class="toclevel-2 tocsection-
20"><a href="#2024_and_beyond"><s
pan class="tocnumber">3.4</span>
<span class="toctext">2024 and be
yond</span></a></li>
</ul>
</li>
<li class="toclevel-1 tocsection-
21"><a href="#Notable_launches"><
span class="tocnumber">4</span> <
span class="toctext">Notable laun
ches</span></a>
<ul>
<li class="toclevel-2 tocsection-
22"><a href="#First_flight_of_Fal
con_9"><span class="tocnumber">4.
1</span> <span class="toctext">Fi
rst flight of Falcon 9</span></a>
</li>
<li class="toclevel-2 tocsection-
23"><a href="#COTS_demonstration_
flights"><span class="tocnumber">
4.2</span> <span class="toctext">
```

```
COTS demonstration flights</span>
</a></li>
<li class="toclevel-2 tocsection-
24"><a href="#CRS-1"><span class
="tocnumber">4.3</span> <span cla
ss="toctext">CRS-1</span></a></li
>
<li class="toclevel-2 tocsection-
25"><a href="#Maiden_flight_of_v
1.1"><span class="tocnumber">4.4
</span> <span class="toctext">Mai
den flight of v1.1</span></a></li
>
<li class="toclevel-2 tocsection-
26"><a href="#Loss_of_CRS-7_missi
on"><span class="tocnumber">4.5</
span> <span class="toctext">Loss
of CRS-7 mission</span></a></li>
<li class="toclevel-2 tocsection-
27"><a href="#Full-thrust_version
_and_first_booster_landings"><spa
n class="tocnumber">4.6</span> <s
pan class="toctext">Full-thrust v
ersion and first booster landings
</span></a></li>
<li class="toclevel-2 tocsection-
28"><a href="#Loss_of_Amos-6_on_t
he_launch_pad"><span class="tocnu
mber">4.7</span> <span class="toc
text">Loss of Amos-6 on the launc
```

```
h pad</span></a></li>
<li class="toclevel-2 tocsection-
29"><a href="#Inaugural_reuse_of_
the_first_stage"><span class="toc
number">4.8</span> <span class="t
octext">Inaugural reuse of the fi
rst stage</span></a></li>
<li class="toclevel-2 tocsection-
30"><a href="#Zuma_launch_controv
ersy"><span class="tocnumber">4.9
</span> <span class="toctext">Zum
a launch controversy</span></a></
li>
<li class="toclevel-2 tocsection-
31"><a href="#Falcon_Heavy_test_f
light"><span class="tocnumber">4.
10</span> <span class="toctext">F
alcon Heavy test flight</span></a
></li>
<li class="toclevel-2 tocsection-
32"><a href="#Maiden_flight_Crew_
Dragon_and_first_crewed_flight"><
span class="tocnumber">4.11</span
> <span class="toctext">Maiden fl
ight Crew Dragon and first crewed
flight</span></a></li>
<li class="toclevel-2 tocsection-
33"><a href="#Booster_reflight_re
cords"><span class="tocnumber">4.
12</span> <span class="toctext">B
```

```

ooster reflight records</span></a
></li>
</ul>
</li>
<li class="toclevel-1 tocsection-
34"><a href="#See_also"><span cla
ss="tocnumber">5</span> <span cla
ss="toctext">See also</span></a>
</li>
<li class="toclevel-1 tocsection-
35"><a href="#Notes"><span class
="tocnumber">6</span> <span class
="toctext">Notes</span></a></li>
<li class="toclevel-1 tocsection-
36"><a href="#References"><span c
lass="tocnumber">7</span> <span c
lass="toctext">References</span>
</a></li>
</ul>
</div>

```

```

<h2><span class="mw-headline" id
="Launch_statistics">Launch stati
stics</span></h2>
<p>Rockets from the Falcon 9 fami
ly have been launched 158 times o
ver 12&#160;years, resulting in 1
56 full mission successes (<span
data-sort-value="7001987341772151
898♠" style="display:none"></span

```

>99%), one partial success (SpaceX CRS-1 delivered its cargo to the International Space Station (ISS), but a secondary payload was stranded in a lower-than-planned orbit), and one failure (the SpaceX CRS-7 spacecraft was lost in flight). Additionally, one rocket and its payload Amos-6 were destroyed before launch in preparation for an on-pad static fire test.

</p><p>The first rocket version Falcon 9 v1.0 was launched five times from June 2010 to March 2013, its successor Falcon 9

v1.1 15 times from September 2013 to January 2016, and the latest upgrade Falcon 9 Full Thrust 135 times from December 2015 to present, 41 of which using a re-flown first stage booster. Falcon Heavy was launched once in February 2018, incorporating two refurbished first stages as side boosters, and then again in April and June 2019, the June 2019 flight reusing the side booster from the previous flight. The final "Block 4" booster to be produced was flown in April 2018, and the first Block 5 version in May 2018. While Block 4 boosters were only flown twice and required several months of refurbishment, Block 5 versions are designed to sustain 10 flights with just inspections.<sup id="ci

```

te_ref-nsf20180517_7-0" class="reference"><a href="#cite_note-nsf20180517-7">&#91;6&#93;</a></sup>
</p><p>The rocket's first-stage boosters landed successfully in 121 of 132 attempts (<span data-sort-value="700191666666666666♠" style="display:none"></span>92%), with 97 out of 102 (<span data-sort-value="7001950980392156862♠" style="display:none"></span>95%) for the Block 5 version.
</p>
<div>
<table class="multicol" role="presentation" style="border-collapse: collapse; padding: 0; border: 0; background:transparent; width: 100%;">

<tbody><tr>
<td style="text-align: left; vertical-align: top;">
<h3><span class="mw-headline" id="Rocket_configurations">Rocket configurations</span></h3>
<div style="margin-top:1em;max-width:420px;" class="chart noresize">
<div style="position:relative;min

```

```
-height:320px;min-width:420px;max-width:420px;">  
<div style="float:right;position:relative;min-height:240px;min-width:320px;max-width:320px;border-left:1px black solid;border-bottom:1px black solid;">  
<div style="position:absolute;left:3px;top:224px;height:15px;min-width:18px;max-width:18px;background-color:LightSteelBlue;-webkit-print-color-adjust:exact;border:1px solid LightSteelBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 v1.0;#93;#93;: 2"></div>  
<div style="position:absolute;left:55px;top:224px;height:15px;min-width:18px;max-width:18px;background-color:LightSteelBlue;-webkit-print-color-adjust:exact;border:1px solid LightSteelBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 v1.0;#93;#93;: 2"></div>  
<div style="position:absolute;left:81px;top:232px;height:7px;min-width:18px;max-width:18px;background-color:LightSteelBlue;-webkit-print-color-adjust:exact;border:1p
```



```
x solid LightSteelBlue;border-bottom:none;overflow:hidden;" title
="#91;#91;Falcon 9 v1.0#93;#93;: 1"></div>
<div style="position:absolute;left:81px;top:216px;height:15px;min-width:18px;max-width:18px;background-color:SteelBlue;-webkit-print-color-adjust:exact;border:1px solid SteelBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 v1.1#93;#93;: 2"></div>
<div style="position:absolute;left:107px;top:192px;height:47px;min-width:18px;max-width:18px;background-color:SteelBlue;-webkit-print-color-adjust:exact;border:1px solid SteelBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 v1.1#93;#93;: 6">
</div>
<div style="position:absolute;left:133px;top:192px;height:47px;min-width:18px;max-width:18px;background-color:SteelBlue;-webkit-print-color-adjust:exact;border:1px solid SteelBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 v1.1#93;#93;: 6">
```

```
</div>
<div style="position:absolute;left:159px;top:232px;height:7px;min-width:18px;max-width:18px;background-color:SteelBlue;-webkit-print-color-adjust:exact;border:1px solid SteelBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 v1.1#93;#93;: 1"></div>
<div style="position:absolute;left:133px;top:184px;height:7px;min-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 Full Thrust#93;#93;: 1"></div>
<div style="position:absolute;left:159px;top:176px;height:55px;min-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 Full Thrust#93;#93;: 7"></div>
<div style="position:absolute;left:185px;top:136px;height:103px;mi
```

```
n-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 Full Thrust#93;#93;: 13"></div>  
<div style="position:absolute;left:211px;top:216px;height:23px;min-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="#91;#91;Falcon 9 Full Thrust#93;#93;: 3"></div>  
<div style="position:absolute;left:185px;top:96px;height:39px;min-width:18px;max-width:18px;background-color:CornflowerBlue;-webkit-print-color-adjust:exact;border:1px solid CornflowerBlue;border-bottom:none;overflow:hidden;" title="Falcon 9 FT (reused): 5"></div>  
<div style="position:absolute;left:211px;top:160px;height:55px;min-width:18px;max-width:18px;background-color:CornflowerBlue;-webkit-print-color-adjust:exact;border:1px solid CornflowerBlue;border-b
```

```
ottom:none;overflow:hidden;" title="Falcon 9 FT (reused): 7"></div>
<div style="position:absolute;left:211px;top:112px;height:47px;min-width:18px;max-width:18px;background-color:Teal;-webkit-print-color-adjust:exact;border:1px solid Teal;border-bottom:none;overflow:hidden;" title="&#91;&#91;Falcon 9 Block 5&#93;&#93;: 6"></div>
<div style="position:absolute;left:237px;top:216px;height:23px;min-width:18px;max-width:18px;background-color:Teal;-webkit-print-color-adjust:exact;border:1px solid Teal;border-bottom:none;overflow:hidden;" title="&#91;&#91;Falcon 9 Block 5&#93;&#93;: 3"></div>
<div style="position:absolute;left:263px;top:200px;height:39px;min-width:18px;max-width:18px;background-color:Teal;-webkit-print-color-adjust:exact;border:1px solid Teal;border-bottom:none;overflow:hidden;" title="&#91;&#91;Falcon 9 Block 5&#93;&#93;: 5"></div>
<div style="position:absolute;left:289px;top:232px;height:7px;min-width:18px;max-width:18px;backgro
```

```
und-color:Teal;-webkit-print-colo
r-adjust:exact;border:1px solid T
eal;border-bottom:none;overflow:h
idden;" title="#91;#91;Falcon 9
Block 5#93;#93;: 1"></div>
<div style="position:absolute;lef
t:211px;top:80px;height:31px;min-
width:18px;max-width:18px;backgro
und-color:LightSeaGreen;-webkit-p
rint-color-adjust:exact;border:1p
x solid LightSeaGreen;border-bott
om:none;overflow:hidden;" title
="Falcon 9 B5 (reused): 4"></div>
<div style="position:absolute;lef
t:237px;top:152px;height:63px;min
-width:18px;max-width:18px;backgr
ound-color:LightSeaGreen;-webkit-
print-color-adjust:exact;border:1
px solid LightSeaGreen;border-bot
tom:none;overflow:hidden;" title
="Falcon 9 B5 (reused): 8"></div>
<div style="position:absolute;lef
t:263px;top:32px;height:167px;min
-width:18px;max-width:18px;backgr
ound-color:LightSeaGreen;-webkit-
print-color-adjust:exact;border:1
px solid LightSeaGreen;border-bot
tom:none;overflow:hidden;" title
="Falcon 9 B5 (reused): 21"></div
>
```

```
<div style="position:absolute;left:289px;top:96px;height:135px;min-width:18px;max-width:18px;background-color:LightSeaGreen;-webkit-print-color-adjust:exact;border:1px solid LightSeaGreen;border-bottom:none;overflow:hidden;" title="Falcon 9 B5 (reused): 17"></div>  
<div style="position:absolute;left:211px;top:72px;height:7px;min-width:18px;max-width:18px;background-color:Gold;-webkit-print-color-adjust:exact;border:1px solid Gold;border-bottom:none;overflow:hidden;" title="&#91;&#91;Falcon Heavy&#93;&#93;: 1"></div>  
<div style="position:absolute;left:237px;top:136px;height:15px;min-width:18px;max-width:18px;background-color:Gold;-webkit-print-color-adjust:exact;border:1px solid Gold;border-bottom:none;overflow:hidden;" title="&#91;&#91;Falcon Heavy&#93;&#93;: 2"></div>  
<div style="position:absolute;height:240px;min-width:100px;max-width:100px;">  
<div style="position:absolute;hei
```

```
ght=20px;text-align:right;vertical-align:middle;width:90px;top:190px;padding:0 2px">5</div>  
<div style="position:absolute;height=1px;min-width:5px;top:200px;left:96px;border:1px solid black;"></div>  
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:150px;padding:0 2px">10</div>  
<div style="position:absolute;height=1px;min-width:5px;top:160px;left:96px;border:1px solid black;"></div>  
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:110px;padding:0 2px">15</div>  
<div style="position:absolute;height=1px;min-width:5px;top:120px;left:96px;border:1px solid black;"></div>  
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:70px;padding:0 2px">20</div>  
<div style="position:absolute;height=1px;min-width:5px;top:80px;left:96px;border:1px solid black;">
```

```
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:30px;padding:0 2px">25</div>
<div style="position:absolute;height=1px;min-width:5px;top:40px;left:96px;border:1px solid black;">
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:-10px;padding:0 2px">30</div>
<div style="position:absolute;height=1px;min-width:5px;top:0px;left:96px;border:1px solid black;">
</div>
</div>
<div style="position:absolute;top:240px;left:100px;width:320px;">
<div style="position:absolute;left:5px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2010_to_2013">'10</a></div>
<div style="position:absolute;left:13px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:31px;top:10px;min-width:16px;ma
```



```
x-width:16px;text-align:center;vertical-align:top;"><a href="#2010_to_2013">'11</a></div>
<div style="position:absolute;left:39px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:57px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2010_to_2013">'12</a></div>
<div style="position:absolute;left:65px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:83px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2010_to_2013">'13</a></div>
<div style="position:absolute;left:91px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:109px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2014">'14</a></div>
<div style="position:absolute;left:117px;height:10px;width:1px;border-left:1px solid black;"></div>
```

```
<div style="position:absolute;left:135px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2015">'15</a></div>
```

```
<div style="position:absolute;left:143px;height:10px;width:1px;border-left:1px solid black;"></div>
```

```
<div style="position:absolute;left:161px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2016">'16</a></div>
```

```
<div style="position:absolute;left:169px;height:10px;width:1px;border-left:1px solid black;"></div>
```

```
<div style="position:absolute;left:187px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2017">'17</a></div>
```

```
<div style="position:absolute;left:195px;height:10px;width:1px;border-left:1px solid black;"></div>
```

```
<div style="position:absolute;left:213px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2018">'18</a></div>
```

```
<div style="position:absolute;left
```

```
t:221px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:239px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2019">'19</a></div>
<div style="position:absolute;left:247px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:265px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2020">'20</a></div>
<div style="position:absolute;left:273px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:291px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;"><a href="#2021">'21</a></div>
<div style="position:absolute;left:299px;height:10px;width:1px;border-left:1px solid black;"></div>
</div>
</div>
<div>
<ul style="width:100%;list-style:
```

```
none;column-width:12em;"><li><span style="padding:0 1em;background-color:LightSteelBlue;border:1px solid LightSteelBlue;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> <a href="/wiki/Falcon_9_v1.0" title="Falcon 9 v1.0">Falcon 9 v1.0</a></li>
<li><span style="padding:0 1em;background-color:SteelBlue;border:1px solid SteelBlue;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> <a href="/wiki/Falcon_9_v1.1" title="Falcon 9 v1.1">Falcon 9 v1.1</a></li>
<li><span style="padding:0 1em;background-color:MediumBlue;border:1px solid MediumBlue;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> <a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">Falcon 9 Full Thrust</a></li>
<li><span style="padding:0 1em;background-color:CornflowerBlue;border:1px solid CornflowerBlue;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Falcon 9 FT (reused)</li>
<li><span style="padding:0 1em;ba
```

```

ckground-color:Teal;border:1px solid Teal;margin-right:1em;-webkit-print-color-adjust:exact;">#160;
</span> <a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">Falcon 9 Block 5</a></li>
<li><span style="padding:0 1em;background-color:LightSeaGreen;border:1px solid LightSeaGreen;margin-right:1em;-webkit-print-color-adjust:exact;">#160;
</span> Falcon 9 B5 (reused)</li>
<li><span style="padding:0 1em;background-color:Gold;border:1px solid Gold;margin-right:1em;-webkit-print-color-adjust:exact;">#160;
</span> <a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a></li></ul>
</div>
</div>
<p><br />
</p>
</td>
<td style="text-align: left; vertical-align: top;">
<h3><span class="mw-headline" id="Launch_sites">Launch sites</span></h3>
<div style="margin-top:1em;max-wi

```

```

dth:420px;" class="chart noresiz
e">
<div style="position:relative;min
-height:320px;min-width:420px;max
-width:420px;">
<div style="float:right;position:
relative;min-height:240px;min-wid
th:320px;max-width:320px;border-l
eft:1px black solid;border-botto
m:1px black solid;">
<div style="position:absolute;lef
t:3px;top:224px;height:15px;min-w
idth:18px;max-width:18px;backgrou
nd-color:Goldenrod;-webkit-print-
color-adjust:exact;border:1px sol
id Goldenrod;border-bottom:none;o
verflow:hidden;" title="&#91;&#9
1;Cape Canaveral Space Force Stat
ion&#124;CCSFS&#93;&#93;, &#91;&#
91;Cape Canaveral Space Launch Co
mplex 40&#124;SLC-40&#93;&#93;:
2"></div>
<div style="position:absolute;lef
t:55px;top:224px;height:15px;min-
width:18px;max-width:18px;backgro
und-color:Goldenrod;-webkit-print-
color-adjust:exact;border:1px so
lid Goldenrod;border-bottom:none;
overflow:hidden;" title="&#91;&#9
1;Cape Canaveral Space Force Stat

```

ion|CCSFS]];, [[Cape Canaveral Space Launch Complex 40|SLC-40]]: 2"></div>

<div style="position:absolute;left:81px;top:224px;height:15px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="[[Cape Canaveral Space Force Station|CCSFS]];, [[Cape Canaveral Space Launch Complex 40|SLC-40]]: 2"></div>

<div style="position:absolute;left:107px;top:192px;height:47px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="[[Cape Canaveral Space Force Station|CCSFS]];, [[Cape Canaveral Space Launch Complex 40|SLC-40]]: 6"></div>

<div style="position:absolute;left:133px;top:184px;height:55px;min

```
-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="#91;#91;Cape Canaveral Space Force Station#124;CCSFS#93;#93;, #91;#91;Cape Canaveral Space Launch Complex 40#124;SLC-40#93;#93;:7"></div>
```

```
<div style="position:absolute;left:159px;top:184px;height:55px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="#91;#91;Cape Canaveral Space Force Station#124;CCSFS#93;#93;, #91;#91;Cape Canaveral Space Launch Complex 40#124;SLC-40#93;#93;:7"></div>
```

```
<div style="position:absolute;left:185px;top:232px;height:7px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="#91;#91;Cape Canaveral Space Force Stat
```


ion|CCSFS]], [[Cape Canaveral Space Launch Complex 40|SLC-40]]: 1"></div>

<div style="position:absolute;left:211px;top:144px;height:95px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="[[Cape Canaveral Space Force Station|CCSFS]], [[Cape Canaveral Space Launch Complex 40|SLC-40]]: 12"></div>

<div style="position:absolute;left:237px;top:176px;height:63px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="[[Cape Canaveral Space Force Station|CCSFS]], [[Cape Canaveral Space Launch Complex 40|SLC-40]]: 8"></div>

<div style="position:absolute;left:263px;top:128px;height:111px;mi

```
n-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="#91;#91;Cape Canaveral Space Force Station#124;CCSFS#93;#93;, #91;#91;Cape Canaveral Space Launch Complex 40#124;SLC-40#93;#93;:14"></div>
```

```
<div style="position:absolute;left:289px;top:152px;height:87px;min-width:18px;max-width:18px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="#91;#91;Cape Canaveral Space Force Station#124;CCSFS#93;#93;, #91;#91;Cape Canaveral Space Launch Complex 40#124;SLC-40#93;#93;:11"></div>
```

```
<div style="position:absolute;left:185px;top:136px;height:95px;min-width:18px;max-width:18px;background-color:Chocolate;-webkit-print-color-adjust:exact;border:1px solid Chocolate;border-bottom:none;overflow:hidden;" title="#91;#91;Kennedy Space Center#124;KSC
```

```
&#93;&#93;, &#91;&#91;Kennedy Spa  
ce Center Launch Complex 39A&#12  
4;LC-39A&#93;&#93;: 12"></div>  
<div style="position:absolute;lef  
t:211px;top:120px;height:23px;min  
-width:18px;max-width:18px;backgr  
ound-color:Chocolate;-webkit-prin  
t-color-adjust:exact;border:1px s  
olid Chocolate;border-bottom:non  
e;overflow:hidden;" title="&#91;&  
#91;Kennedy Space Center&#124;KSC  
&#93;&#93;, &#91;&#91;Kennedy Spa  
ce Center Launch Complex 39A&#12  
4;LC-39A&#93;&#93;: 3"></div>  
<div style="position:absolute;lef  
t:237px;top:152px;height:23px;min  
-width:18px;max-width:18px;backgr  
ound-color:Chocolate;-webkit-prin  
t-color-adjust:exact;border:1px s  
olid Chocolate;border-bottom:non  
e;overflow:hidden;" title="&#91;&  
#91;Kennedy Space Center&#124;KSC  
&#93;&#93;, &#91;&#91;Kennedy Spa  
ce Center Launch Complex 39A&#12  
4;LC-39A&#93;&#93;: 3"></div>  
<div style="position:absolute;lef  
t:263px;top:40px;height:87px;min-  
width:18px;max-width:18px;backgro  
und-color:Chocolate;-webkit-print  
-color-adjust:exact;border:1px so
```

```
lid Chocolate;border-bottom:none;
overflow:hidden;" title="#91;#9
1;Kennedy Space Center#124;KSC#
93;#93;, #91;#91;Kennedy Space
Center Launch Complex 39A#124;LC
-39A#93;#93;: 11"></div>
<div style="position:absolute;lef
t:289px;top:96px;height:55px;min-
width:18px;max-width:18px;backgro
und-color:Chocolate;-webkit-print
-color-adjust:exact;border:1px so
lid Chocolate;border-bottom:none;
overflow:hidden;" title="#91;#9
1;Kennedy Space Center#124;KSC#
93;#93;, #91;#91;Kennedy Space
Center Launch Complex 39A#124;LC
-39A#93;#93;: 7"></div>
<div style="position:absolute;lef
t:81px;top:216px;height:7px;min-w
idth:18px;max-width:18px;backgrou
nd-color:MediumPurple;-webkit-pri
nt-color-adjust:exact;border:1px
solid MediumPurple;border-bottom:
none;overflow:hidden;" title="#9
1;#91;Vandenberg Air Force Base#
124;VAFB#93;#93;, #91;#91;Va
ndenberg Space Launch Complex 4#
124;SLC-4E#93;#93;: 1"></div>
<div style="position:absolute;lef
t:159px;top:176px;height:7px;min-
```

```
width:18px;max-width:18px;background-color:MediumPurple;-webkit-print-color-adjust:exact;border:1px solid MediumPurple;border-bottom:none;overflow:hidden;" title="#1;#91;Vandenberg Air Force Base#124;VAFB#93;#93;, #91;#91;Vandenberg Space Launch Complex 4#124;SLC-4E#93;#93;: 1"></div>
<div style="position:absolute;left:185px;top:96px;height:39px;min-width:18px;max-width:18px;background-color:MediumPurple;-webkit-print-color-adjust:exact;border:1px solid MediumPurple;border-bottom:none;overflow:hidden;" title="#1;#91;Vandenberg Air Force Base#124;VAFB#93;#93;, #91;#91;Vandenberg Space Launch Complex 4#124;SLC-4E#93;#93;: 5"></div>
<div style="position:absolute;left:211px;top:72px;height:47px;min-width:18px;max-width:18px;background-color:MediumPurple;-webkit-print-color-adjust:exact;border:1px solid MediumPurple;border-bottom:none;overflow:hidden;" title="#1;#91;Vandenberg Air Force Base#124;VAFB#93;#93;, #91;#91;Vandenberg Space Launch Complex 4#
```

```
124;SLC-4E&#93;&#93;: 6"></div>
<div style="position:absolute;left:237px;top:136px;height:15px;min-width:18px;max-width:18px;background-color:MediumPurple;-webkit-print-color-adjust:exact;border:1px solid MediumPurple;border-bottom:none;overflow:hidden;" title="&#91;&#91;Vandenberg Air Force Base&#124;VAFB&#93;&#93;, &#91;&#91;Vandenberg Space Launch Complex 4&#124;SLC-4E&#93;&#93;: 2"></div>
<div style="position:absolute;left:263px;top:32px;height:7px;min-width:18px;max-width:18px;background-color:MediumPurple;-webkit-print-color-adjust:exact;border:1px solid MediumPurple;border-bottom:none;overflow:hidden;" title="&#91;&#91;Vandenberg Air Force Base&#124;VAFB&#93;&#93;, &#91;&#91;Vandenberg Space Launch Complex 4&#124;SLC-4E&#93;&#93;: 1"></div>
</div>
<div style="position:absolute;height:240px;min-width:100px;max-width:100px;">
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:190
```

```
px;padding:0 2px">5</div>
<div style="position:absolute;hei
ght=1px;min-width:5px;top:200px;l
eft:96px;border:1px solid blac
k;"></div>
<div style="position:absolute;hei
ght=20px;text-align:right;vertica
l-align:middle;width:90px;top:150
px;padding:0 2px">10</div>
<div style="position:absolute;hei
ght=1px;min-width:5px;top:160px;l
eft:96px;border:1px solid blac
k;"></div>
<div style="position:absolute;hei
ght=20px;text-align:right;vertica
l-align:middle;width:90px;top:110
px;padding:0 2px">15</div>
<div style="position:absolute;hei
ght=1px;min-width:5px;top:120px;l
eft:96px;border:1px solid blac
k;"></div>
<div style="position:absolute;hei
ght=20px;text-align:right;vertica
l-align:middle;width:90px;top:70p
x;padding:0 2px">20</div>
<div style="position:absolute;hei
ght=1px;min-width:5px;top:80px;le
ft:96px;border:1px solid black;">
</div>
<div style="position:absolute;hei
```

```
ght=20px;text-align:right;vertical-align:middle;width:90px;top:30px;padding:0 2px">25</div>
<div style="position:absolute;height=1px;min-width:5px;top:40px;left:96px;border:1px solid black;">
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:-10px;padding:0 2px">30</div>
<div style="position:absolute;height=1px;min-width:5px;top:0px;left:96px;border:1px solid black;">
</div>
</div>
<div style="position:absolute;top:240px;left:100px;width:320px;">
<div style="position:absolute;left:5px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'10</div>
<div style="position:absolute;left:13px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:31px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'11</div>
<div style="position:absolute;left
```



```
t:39px;height:10px;width:1px;border-left:1px solid black;"></div>  
<div style="position:absolute;left:57px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'12</div>  
<div style="position:absolute;left:65px;height:10px;width:1px;border-left:1px solid black;"></div>  
<div style="position:absolute;left:83px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'13</div>  
<div style="position:absolute;left:91px;height:10px;width:1px;border-left:1px solid black;"></div>  
<div style="position:absolute;left:109px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'14</div>  
<div style="position:absolute;left:117px;height:10px;width:1px;border-left:1px solid black;"></div>  
<div style="position:absolute;left:135px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'15</div>  
<div style="position:absolute;left:143px;height:10px;width:1px;border-left:1px solid black;"></div>
```

```
<div style="position:absolute;left:161px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'16</div>
<div style="position:absolute;left:169px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:187px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'17</div>
<div style="position:absolute;left:195px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:213px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'18</div>
<div style="position:absolute;left:221px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:239px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'19</div>
<div style="position:absolute;left:247px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:265px;top:10px;min-width:16px;m
```

```

ax-width:16px;text-align:center;v
ertical-align:top;">'20</div>
<div style="position:absolute;lef
t:273px;height:10px;width:1px;bor
der-left:1px solid black;"></div>
<div style="position:absolute;lef
t:291px;top:10px;min-width:16px;m
ax-width:16px;text-align:center;v
ertical-align:top;">'21</div>
<div style="position:absolute;lef
t:299px;height:10px;width:1px;bor
der-left:1px solid black;"></div>
</div>
</div>
<div>
<ul style="width:100%;list-style:
none;column-width:12em;"><li><spa
n style="padding:0 1em;background
-color:Goldenrod;border:1px solid
Goldenrod;margin-right:1em;-webki
t-print-color-adjust:exact;">#16
0;</span> <a href="/wiki/Cape_Can
averal_Space_Force_Station" title
="Cape Canaveral Space Force Stat
ion">CCSFS</a>, <a href="/wiki/Ca
pe_Canaveral_Space_Launch_Complex
_40" title="Cape Canaveral Space
Launch Complex 40">SLC-40</a></li
>
<li><span style="padding:0 1em;ba

```

```
ckground-color:Chocolate;border:1
px solid Chocolate;margin-right:1
em;-webkit-print-color-adjust:exa
ct;">#160;</span> <a href="/wik
i/Kennedy_Space_Center" title="Ke
nnedy Space Center">KSC</a>, <a h
ref="/wiki/Kennedy_Space_Center_L
aunch_Complex_39A" title="Kennedy
Space Center Launch Complex 39A">
LC-39A</a></li>
<li><span style="padding:0 1em;ba
ckground-color:MediumPurple;borde
r:1px solid MediumPurple;margin-r
ight:1em;-webkit-print-color-adju
st:exact;">#160;</span> <a href
="/wiki/Vandenberg_Air_Force_Bas
e" class="mw-redirect" title="Van
denberg Air Force Base">VAFB</a>,
<a href="/wiki/Vandenberg_Space_L
aunch_Complex_4" title="Vandenber
g Space Launch Complex 4">SLC-4E
</a></li></ul>
</div>
</div>
<p>#32;
</p>
</td></tr></tbody></table></div>
<div>
<table class="multicol" role="pre
sentation" style="border-collaps
```

```
e: collapse; padding: 0; border:
0; background:transparent; width:
100%;">
```

```
<tbody><tr>
<td style="text-align: left; vert
ical-align: top;">
<h3><span class="mw-headline" id
="Launch_outcomes">Launch outcome
s</span></h3>
<div style="margin-top:1em;max-wi
dth:480px;" class="chart noresiz
e">
<div style="position:relative;min
-height:320px;min-width:480px;max
-width:480px;">
<div style="float:right;position:
relative;min-height:240px;min-wid
th:380px;max-width:380px;border-l
eft:1px black solid;border-botto
m:1px black solid;">
<div style="position:absolute;lef
t:177px;top:235px;height:4px;min-
width:21px;max-width:21px;backgro
und-color:Black;-webkit-print-col
or-adjust:exact;border:1px solid
Black;border-bottom:none;overflow
:hidden;" title="Loss before lau
nch: 1"></div>
<div style="position:absolute;lef
```

```
t:148px;top:235px;height:4px;min-width:21px;max-width:21px;background-color:DarkRed;-webkit-print-color-adjust:exact;border:1px solid DarkRed;border-bottom:none;overflow:hidden;" title="Loss during flight: 1"></div>
```

```
<div style="position:absolute;left:61px;top:235px;height:4px;min-width:21px;max-width:21px;background-color:Goldenrod;-webkit-print-color-adjust:exact;border:1px solid Goldenrod;border-bottom:none;overflow:hidden;" title="Partial failure: 1"></div>
```

```
<div style="position:absolute;left:3px;top:230px;height:9px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government): 2"></div>
```

```
<div style="position:absolute;left:61px;top:231px;height:4px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:no
```

```
ne;overflow:hidden;" title="Success (commercial and government):
1"></div>
<div style="position:absolute;left:90px;top:226px;height:13px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government):
3"></div>
<div style="position:absolute;left:119px;top:211px;height:28px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government):
6"></div>
<div style="position:absolute;left:148px;top:207px;height:28px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government):
6"></div>
```

```
<div style="position:absolute;left:177px;top:198px;height:37px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government): 8"></div>
```

```
<div style="position:absolute;left:206px;top:154px;height:85px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government): 18"></div>
```

```
<div style="position:absolute;left:235px;top:139px;height:100px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government): 21"></div>
```

```
<div style="position:absolute;left:264px;top:187px;height:52px;min-width:21px;max-width:21px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Success (commercial and government): 24"></div>
```



```
ound-color:ForestGreen;-webkit-pr  
int-color-adjust:exact;border:1px  
solid ForestGreen;border-bottom:n  
one;overflow:hidden;" title="Succ  
ess (commercial and government):  
11"></div>
```

```
<div style="position:absolute;lef  
t:293px;top:182px;height:57px;min  
-width:21px;max-width:21px;backgr  
ound-color:ForestGreen;-webkit-pr  
int-color-adjust:exact;border:1px  
solid ForestGreen;border-bottom:n  
one;overflow:hidden;" title="Succ  
ess (commercial and government):  
12"></div>
```

```
<div style="position:absolute;lef  
t:322px;top:216px;height:23px;min  
-width:21px;max-width:21px;backgr  
ound-color:ForestGreen;-webkit-pr  
int-color-adjust:exact;border:1px  
solid ForestGreen;border-bottom:n  
one;overflow:hidden;" title="Succ  
ess (commercial and government):  
5"></div>
```

```
<div style="position:absolute;lef  
t:264px;top:178px;height:9px;min-  
width:21px;max-width:21px;backgro  
und-color:DarkGreen;-webkit-print  
-color-adjust:exact;border:1px so  
lid DarkGreen;border-bottom:none;
```

```
overflow:hidden;" title="Success
(&#91;&#91;Starlink&#93;&#93;):
2"></div>
<div style="position:absolute;left:
t:293px;top:116px;height:66px;min-
-width:21px;max-width:21px;backgr
ound-color:DarkGreen;-webkit-prin
t-color-adjust:exact;border:1px s
olid DarkGreen;border-bottom:non
e;overflow:hidden;" title="Succes
s (&#91;&#91;Starlink&#93;&#93;):
14"></div>
<div style="position:absolute;left:
t:322px;top:154px;height:61px;min-
-width:21px;max-width:21px;backgr
ound-color:DarkGreen;-webkit-prin
t-color-adjust:exact;border:1px s
olid DarkGreen;border-bottom:non
e;overflow:hidden;" title="Succes
s (&#91;&#91;Starlink&#93;&#93;):
13"></div>
<div style="position:absolute;left:
t:322px;top:63px;height:90px;min-
width:21px;max-width:21px;backgro
und-color:LightBlue;-webkit-print-
color-adjust:exact;border:1px so
lid LightBlue;border-bottom:none;
overflow:hidden;" title="Planned
(commercial and government): 19">
</div>
```

```
<div style="position:absolute;left:351px;top:110px;height:129px;min-width:21px;max-width:21px;background-color:LightBlue;-webkit-print-color-adjust:exact;border:1px solid LightBlue;border-bottom:none;overflow:hidden;" title="Planned (commercial and government): 27"></div>
```

```
<div style="position:absolute;left:322px;top:39px;height:23px;min-width:21px;max-width:21px;background-color:DarkCyan;-webkit-print-color-adjust:exact;border:1px solid DarkCyan;border-bottom:none;overflow:hidden;" title="Planned (&#91;&#91;Starlink&#93;&#93;): 5"></div>
```

```
</div>
```

```
<div style="position:absolute;height:240px;min-width:100px;max-width:100px;">
```

```
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:182px;padding:0 2px">10</div>
```

```
<div style="position:absolute;height=1px;min-width:5px;top:192px;left:96px;border:1px solid black;"></div>
```

```
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:134px;padding:0 2px">20</div>
<div style="position:absolute;height=1px;min-width:5px;top:144px;left:96px;border:1px solid black;"></div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:86px;padding:0 2px">30</div>
<div style="position:absolute;height=1px;min-width:5px;top:96px;left:96px;border:1px solid black;">
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:38px;padding:0 2px">40</div>
<div style="position:absolute;height=1px;min-width:5px;top:48px;left:96px;border:1px solid black;">
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:-10px;padding:0 2px">50</div>
<div style="position:absolute;height=1px;min-width:5px;top:0px;left
```

```
t:96px;border:1px solid black;">
</div>
</div>
<div style="position:absolute;top:
p:240px;left:100px;width:380px;">
<div style="position:absolute;lef
t:5px;top:10px;min-width:19px;max
-width:19px;text-align:center;ver
tical-align:top;">'10</div>
<div style="position:absolute;lef
t:14.5px;height:10px;width:1px;bo
rder-left:1px solid black;"></div
>
<div style="position:absolute;lef
t:34px;top:10px;min-width:19px;ma
x-width:19px;text-align:center;ve
rtical-align:top;">'11</div>
<div style="position:absolute;lef
t:43.5px;height:10px;width:1px;bo
rder-left:1px solid black;"></div
>
<div style="position:absolute;lef
t:63px;top:10px;min-width:19px;ma
x-width:19px;text-align:center;ve
rtical-align:top;">'12</div>
<div style="position:absolute;lef
t:72.5px;height:10px;width:1px;bo
rder-left:1px solid black;"></div
>
<div style="position:absolute;lef
```

```
t:92px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'13</div>
<div style="position:absolute;left:101.5px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:121px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'14</div>
<div style="position:absolute;left:130.5px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:150px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'15</div>
<div style="position:absolute;left:159.5px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:179px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'16</div>
<div style="position:absolute;left:188.5px;height:10px;width:1px;border-left:1px solid black;"></div>
```

```
v>
<div style="position:absolute;left:208px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'17</div>
<div style="position:absolute;left:217.5px;height:10px;width:1px;border-left:1px solid black;"></div>
v>
<div style="position:absolute;left:237px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'18</div>
<div style="position:absolute;left:246.5px;height:10px;width:1px;border-left:1px solid black;"></div>
v>
<div style="position:absolute;left:266px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'19</div>
<div style="position:absolute;left:275.5px;height:10px;width:1px;border-left:1px solid black;"></div>
v>
<div style="position:absolute;left:295px;top:10px;min-width:19px;max-width:19px;text-align:center;vertical-align:top;">'20</div>
<div style="position:absolute;left
```

```

t:304.5px;height:10px;width:1px;b
order-left:1px solid black;"></di
v>
<div style="position:absolute;lef
t:324px;top:10px;min-width:19px;m
ax-width:19px;text-align:center;v
ertical-align:top;">'21</div>
<div style="position:absolute;lef
t:333.5px;height:10px;width:1px;b
order-left:1px solid black;"></di
v>
<div style="position:absolute;lef
t:353px;top:10px;min-width:19px;m
ax-width:19px;text-align:center;v
ertical-align:top;">'22</div>
<div style="position:absolute;lef
t:362.5px;height:10px;width:1px;b
order-left:1px solid black;"></di
v>
</div>
</div>
<div>
<ul style="width:100%;list-style:
none;column-width:12em;"><li><spa
n style="padding:0 1em;background
-color:Black;border:1px solid Bla
ck;margin-right:1em;-webkit-print
-color-adjust:exact;">&#160;</spa
n> Loss before launch</li>
<li><span style="padding:0 1em;ba

```



```
ckground-color:DarkRed;border:1px
solid DarkRed;margin-right:1em;-w
ebkit-print-color-adjust:exact;">
&#160;</span> Loss during flight
</li>
<li><span style="padding:0 1em;ba
ckground-color:Goldenrod;border:1
px solid Goldenrod;margin-right:1
em;-webkit-print-color-adjust:exa
ct;">&#160;</span> Partial failur
e</li>
<li><span style="padding:0 1em;ba
ckground-color:ForestGreen;borde
r:1px solid ForestGreen;margin-ri
ght:1em;-webkit-print-color-adjus
t:exact;">&#160;</span> Success
(commercial and government)</li>
<li><span style="padding:0 1em;ba
ckground-color:DarkGreen;border:1
px solid DarkGreen;margin-right:1
em;-webkit-print-color-adjust:exa
ct;">&#160;</span> Success (<a hr
ef="/wiki/Starlink" title="Starli
nk">Starlink</a>)</li>
<li><span style="padding:0 1em;ba
ckground-color:LightBlue;border:1
px solid LightBlue;margin-right:1
em;-webkit-print-color-adjust:exa
ct;">&#160;</span> Planned (comme
rcial and government)</li>
```

```
<li><span style="padding:0 1em;background-color:DarkCyan;border:1px solid DarkCyan;margin-right:1em;-webkit-print-color-adjust:exact;">#160;</span> Planned (<a href="/wiki/Starlink" title="Starlink">Starlink</a>)</li></ul>
</div>
</div>
<style data-mw-deduplicate="TemplateStyles:r1011085734">.mw-parser-output .reflist{font-size:90%;margin-bottom:0.5em;list-style-type:decimal}.mw-parser-output .reflist .references{font-size:100%;margin-bottom:0;list-style-type:inherit}.mw-parser-output .reflist-columns-2{column-width:30em}.mw-parser-output .reflist-columns-3{column-width:25em}.mw-parser-output .reflist-columns{margin-top:0.3em}.mw-parser-output .reflist-columns ol{margin-top:0}.mw-parser-output .reflist-columns li{page-break-inside:avoid;break-inside:avoid-column}.mw-parser-output .reflist-upper-alpha{list-style-type:upper-alpha}.mw-parser-output .reflist-upper-roman{list-style-type:upper-roman}.mw-parser-output .ref
```

```

list-lower-alpha{list-style-type:
lower-alpha}.mw-parser-output .re
flist-lower-greek{list-style-typ
e:lower-greek}.mw-parser-output .
reflist-lower-roman{list-style-ty
pe:lower-roman}</style><div class
="reflist reflist-lower-roman">
</div>
</td>
<td style="text-align: left; vert
ical-align: top;">
<h3><span class="mw-headline" id
="Booster_landings">Booster landi
ngs</span></h3>
<div style="margin-top:1em;max-wi
dth:420px;" class="chart noresiz
e">
<div style="position:relative;min
-height:320px;min-width:420px;max
-width:420px;">
<div style="float:right;position:
relative;min-height:240px;min-wid
th:320px;max-width:320px;border-l
eft:1px black solid;border-botto
m:1px black solid;">
<div style="position:absolute;lef
t:211px;top:232px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:Goldenrod;-webkit-print
-color-adjust:exact;border:1px so

```

```
lid Goldenrod;border-bottom:none;
overflow:hidden;" title="Ground-p
ad failure: 1"></div>
<div style="position:absolute;left:
t:133px;top:224px;height:15px;min-
-width:18px;max-width:18px;backgr
ound-color:DarkRed;-webkit-print-
color-adjust:exact;border:1px sol
id DarkRed;border-bottom:none;ove
rflow:hidden;" title="Drone-ship
failure: 2"></div>
<div style="position:absolute;left:
t:159px;top:216px;height:23px;min-
-width:18px;max-width:18px;backgr
ound-color:DarkRed;-webkit-print-
color-adjust:exact;border:1px sol
id DarkRed;border-bottom:none;ove
rflow:hidden;" title="Drone-ship
failure: 3"></div>
<div style="position:absolute;left:
t:211px;top:224px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:DarkRed;-webkit-print-c
olor-adjust:exact;border:1px soli
d DarkRed;border-bottom:none;over
flow:hidden;" title="Drone-ship f
ailure: 1"></div>
<div style="position:absolute;left:
t:237px;top:232px;height:7px;min-
width:18px;max-width:18px;backgro
```

```
und-color:DarkRed;-webkit-print-c
olor-adjust:exact;border:1px soli
d DarkRed;border-bottom:none;over
flow:hidden;" title="Drone-ship f
ailure: 1"></div>
<div style="position:absolute;lef
t:263px;top:224px;height:15px;min
-width:18px;max-width:18px;backgr
ound-color:DarkRed;-webkit-print-
color-adjust:exact;border:1px soli
d DarkRed;border-bottom:none;ove
rflow:hidden;" title="Drone-ship
failure: 2"></div>
<div style="position:absolute;lef
t:289px;top:232px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:DarkRed;-webkit-print-c
olor-adjust:exact;border:1px soli
d DarkRed;border-bottom:none;over
flow:hidden;" title="Drone-ship f
ailure: 1"></div>
<div style="position:absolute;lef
t:81px;top:232px;height:7px;min-w
idth:18px;max-width:18px;backgrou
nd-color:Black;-webkit-print-colo
r-adjust:exact;border:1px solid B
lack;border-bottom:none;overflow:
hidden;" title="Ocean test failur
e: 1"></div>
<div style="position:absolute;lef
```

```
t:107px;top:232px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:Black;-webkit-print-col
or-adjust:exact;border:1px solid
  Black;border-bottom:none;overflo
w:hidden;" title="Ocean test fail
ure: 1"></div>
<div style="position:absolute;lef
t:3px;top:224px;height:15px;min-w
idth:18px;max-width:18px;backgrou
nd-color:DimGrey;-webkit-print-co
lor-adjust:exact;border:1px solid
DimGrey;border-bottom:none;overfl
ow:hidden;" title="Parachute test
failure: 2"></div>
<div style="position:absolute;lef
t:133px;top:216px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:ForestGreen;-webkit-pri
nt-color-adjust:exact;border:1px
  solid ForestGreen;border-bottom:
none;overflow:hidden;" title="Gro
und-pad success: 1"></div>
<div style="position:absolute;lef
t:159px;top:208px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:ForestGreen;-webkit-pri
nt-color-adjust:exact;border:1px
  solid ForestGreen;border-bottom:
none;overflow:hidden;" title="Gro
```

```
und-pad success: 1"></div>
<div style="position:absolute;left:185px;top:192px;height:47px;min-width:18px;max-width:18px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Ground-pad success: 6"></div>
<div style="position:absolute;left:211px;top:192px;height:31px;min-width:18px;max-width:18px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Ground-pad success: 4"></div>
<div style="position:absolute;left:237px;top:184px;height:47px;min-width:18px;max-width:18px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px solid ForestGreen;border-bottom:none;overflow:hidden;" title="Ground-pad success: 6"></div>
<div style="position:absolute;left:263px;top:192px;height:31px;min-width:18px;max-width:18px;background-color:ForestGreen;-webkit-print-color-adjust:exact;border:1px
```

```
solid ForestGreen;border-bottom:none;overflow:hidden;" title="Ground-pad success: 4"></div>  
<div style="position:absolute;left:159px;top:176px;height:31px;min-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="Drone-ship success: 4"></div>  
<div style="position:absolute;left:185px;top:128px;height:63px;min-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="Drone-ship success: 8"></div>  
<div style="position:absolute;left:211px;top:128px;height:63px;min-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px solid MediumBlue;border-bottom:none;overflow:hidden;" title="Drone-ship success: 8"></div>  
<div style="position:absolute;left:237px;top:112px;height:71px;min-width:18px;max-width:18px;backgr
```



```
ound-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px
solid MediumBlue;border-bottom:none;overflow:hidden;" title="Dron
e-ship success: 9"></div>
<div style="position:absolute;left:263px;top:40px;height:151px;min
-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px
solid MediumBlue;border-bottom:none;overflow:hidden;" title="Dron
e-ship success: 19"></div>
<div style="position:absolute;left:289px;top:96px;height:135px;min
-width:18px;max-width:18px;background-color:MediumBlue;-webkit-print-color-adjust:exact;border:1px
solid MediumBlue;border-bottom:none;overflow:hidden;" title="Dron
e-ship success: 17"></div>
<div style="position:absolute;left:107px;top:216px;height:15px;min
-width:18px;max-width:18px;background-color:Darkgrey;-webkit-print-color-adjust:exact;border:1px so
lid Darkgrey;border-bottom:none;overflow:hidden;" title="Ocean tes
t success: 2"></div>
<div style="position:absolute;left
```

```
t:133px;top:208px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:Darkgrey;-webkit-print-
color-adjust:exact;border:1px sol
id Darkgrey;border-bottom:none;ov
erflow:hidden;" title="Ocean test
success: 1"></div>
<div style="position:absolute;lef
t:185px;top:120px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:Darkgrey;-webkit-print-
color-adjust:exact;border:1px sol
id Darkgrey;border-bottom:none;ov
erflow:hidden;" title="Ocean test
success: 1"></div>
<div style="position:absolute;lef
t:211px;top:120px;height:7px;min-
width:18px;max-width:18px;backgro
und-color:Darkgrey;-webkit-print-
color-adjust:exact;border:1px sol
id Darkgrey;border-bottom:none;ov
erflow:hidden;" title="Ocean test
success: 1"></div>
<div style="position:absolute;lef
t:55px;top:224px;height:15px;min-
width:18px;max-width:18px;backgro
und-color:Gainsboro;-webkit-print-
color-adjust:exact;border:1px so
lid Gainsboro;border-bottom:none;
overflow:hidden;" title="No attem
```

```
pt: 2"></div>
<div style="position:absolute;left:81px;top:216px;height:15px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px solid Gainsboro;border-bottom:none;overflow:hidden;" title="No attempt: 2"></div>
<div style="position:absolute;left:107px;top:192px;height:23px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px solid Gainsboro;border-bottom:none;overflow:hidden;" title="No attempt: 3"></div>
<div style="position:absolute;left:133px;top:184px;height:23px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px solid Gainsboro;border-bottom:none;overflow:hidden;" title="No attempt: 3"></div>
<div style="position:absolute;left:185px;top:96px;height:23px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px so
```

```
lid Gainsboro;border-bottom:none;
overflow:hidden;" title="No attempt: 3"></div>
<div style="position:absolute;left:211px;top:56px;height:63px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px solid Gainsboro;border-bottom:none;overflow:hidden;" title="No attempt: 8"></div>
<div style="position:absolute;left:237px;top:104px;height:7px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px solid Gainsboro;border-bottom:none;overflow:hidden;" title="No attempt: 1"></div>
<div style="position:absolute;left:263px;top:32px;height:7px;min-width:18px;max-width:18px;background-color:Gainsboro;-webkit-print-color-adjust:exact;border:1px solid Gainsboro;border-bottom:none;overflow:hidden;" title="No attempt: 1"></div>
</div>
<div style="position:absolute;height:240px;min-width:100px;max-wid
```

```
th:100px;">
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:190px;padding:0 2px">5</div>
<div style="position:absolute;height=1px;min-width:5px;top:200px;left:96px;border:1px solid black;"></div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:150px;padding:0 2px">10</div>
<div style="position:absolute;height=1px;min-width:5px;top:160px;left:96px;border:1px solid black;"></div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:110px;padding:0 2px">15</div>
<div style="position:absolute;height=1px;min-width:5px;top:120px;left:96px;border:1px solid black;"></div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:70px;padding:0 2px">20</div>
<div style="position:absolute;hei
```

```
ght=1px;min-width:5px;top:80px;left:96px;border:1px solid black;">
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:30px;padding:0 2px">25</div>
<div style="position:absolute;height=1px;min-width:5px;top:40px;left:96px;border:1px solid black;">
</div>
<div style="position:absolute;height=20px;text-align:right;vertical-align:middle;width:90px;top:-10px;padding:0 2px">30</div>
<div style="position:absolute;height=1px;min-width:5px;top:0px;left:96px;border:1px solid black;">
</div>
</div>
<div style="position:absolute;top:240px;left:100px;width:320px;">
<div style="position:absolute;left:5px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'10</div>
<div style="position:absolute;left:13px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left
```

```
t:31px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'11</div>
<div style="position:absolute;left:39px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:57px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'12</div>
<div style="position:absolute;left:65px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:83px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'13</div>
<div style="position:absolute;left:91px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:109px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'14</div>
<div style="position:absolute;left:117px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:135px;top:10px;min-width:16px;max-width:16px;text-align:center;v
```

```
ertical-align:top;">'15</div>
<div style="position:absolute;left:143px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:161px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'16</div>
<div style="position:absolute;left:169px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:187px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'17</div>
<div style="position:absolute;left:195px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:213px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'18</div>
<div style="position:absolute;left:221px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:239px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'19</div>
<div style="position:absolute;left
```



```
t:247px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:265px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'20</div>
<div style="position:absolute;left:273px;height:10px;width:1px;border-left:1px solid black;"></div>
<div style="position:absolute;left:291px;top:10px;min-width:16px;max-width:16px;text-align:center;vertical-align:top;">'21</div>
<div style="position:absolute;left:299px;height:10px;width:1px;border-left:1px solid black;"></div>
</div>
</div>
<div>
<ul style="width:100%;list-style:none;column-width:12em;"><li><span style="padding:0 1em;background-color:Goldenrod;border:1px solid Goldenrod;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Ground-pad failure</li>
<li><span style="padding:0 1em;background-color:DarkRed;border:1px solid DarkRed;margin-right:1em;-webkit-print-color-adjust:exact;">
```

```

    &#160;</span> Drone-ship failure
</li>
<li><span style="padding:0 1em;background-color:Black;border:1px solid Black;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Ocean test failure<sup id="cite_ref-8" class="reference"><a href="#cite_note-8">&#91;i&#93;</a></sup></li>
<li><span style="padding:0 1em;background-color:DimGrey;border:1px solid DimGrey;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Parachute test failure<sup id="cite_ref-9" class="reference"><a href="#cite_note-9">&#91;ii&#93;</a></sup></li>
<li><span style="padding:0 1em;background-color:ForestGreen;border:1px solid ForestGreen;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Ground-padd success</li>
<li><span style="padding:0 1em;background-color:MediumBlue;border:1px solid MediumBlue;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Drone-ship success</li>

```

```

<li><span style="padding:0 1em;background-color:Darkgrey;border:1px solid Darkgrey;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> Ocean test success<sup id="cite_ref-10" class="reference"><a href="#cite_note-10">&#91;iii&#93;</a></sup></li>
<li><span style="padding:0 1em;background-color:Gainsboro;border:1px solid Gainsboro;margin-right:1em;-webkit-print-color-adjust:exact;">&#160;</span> No attempt</li>
</ul>
</div>
</div>
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1011085734"/><div class="reflist reflist-lower-roman">
<div class="mw-references-wrap"><ol class="references">
<li id="cite_note-8"><span class="mw-cite-backlink"><b><a href="#cite_ref-8">^</a></b></span> <span class="reference-text">Controlled descent; ocean touchdown control failed; no recovery</span>
</li>
<li id="cite_note-9"><span class="

```

```

="mw-cite-backlink"><b><a href="#
cite_ref-9">^</a></b></span> <spa
n class="reference-text">Passive
  reentry failed before parachute
  deployment</span>
</li>
<li id="cite_note-10"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-10">^</a></b></span> <sp
an class="reference-text">Control
led descent; soft vertical ocean
  touchdown; no recovery</span>
</li>
</ol></div></div>
<p>#32;
</p>
</td></tr></tbody></table></div>
<h2><span class="mw-headline" id
="Past_launches">Past launches</s
pan></h2>
<h3><span class="mw-headline" id
="2010_to_2013">2010 to 2013</spa
n></h3>
<table class="wikitable plainrowh
eaders collapsible" style="width:
100%;">
<tbody><tr>
<th scope="col">Flight No.
</th>
<th scope="col">Date and<br />tim

```

```

e (<a href="/wiki/Coordinated_Uni
versal_Time" title="Coordinated U
niversal Time">UTC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first
-stage boosters">Version,<br />Bo
oster</a> <sup id="cite_ref-boost
er_11-0" class="reference"><a hre
f="#cite_note-booster-11">&#91;b&
#93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-0" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa

```

```

lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landing tests">Booster<br />landing</a>
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">1
</th>
<td>4 June 2010,<br />18:45
</td>
<td><a href="/wiki/Falcon_9_v1.0" title="Falcon 9 v1.0">F9 v1.0</a>
<sup id="cite_ref-MuskMay2012_13-0" class="reference"><a href="#cite_note-MuskMay2012-13">#91;7#93;
</a></sup><br />B0003.1<sup id="cite_ref-block_numbers_14-0" class="reference"><a href="#cite_note-block_numbers-14">#91;8#93;
</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CC AFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>

```

```

<td><a href="/wiki/Dragon_Spacecraft_Qualification_Unit" title="Dragon Spacecraft Qualification Unit">Dragon Spacecraft Qualification Unit</a>
</td>
<td>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; vertical-align: middle; text-align: center;" class="table-failure">Failure<sup id="cite_ref-ns20110930_15-0" class="reference"><a href="#cite_note-ns20110930-15">
  &#91;9&#93;</a></sup><sup id="cite_ref-16" class="reference"><a href="#cite_note-16">&#91;10&#93;</a></sup><br /><small>(parachute)

```

```

</small>
</td></tr>
<tr>
<td colspan="9">First flight of F
alcon 9 v1.0.<sup id="cite_ref-sf
n20100604_17-0" class="referenc
e"><a href="#cite_note-sfn2010060
4-17">&#91;11&#93;</a></sup> Used
a boilerplate version of Dragon c
apsule which was not designed to
  separate from the second stage.<
small>(<a href="#First_flight_of_
Falcon_9">more details below</a>)
</small> Attempted to recover the
first stage by parachuting it int
o the ocean, but it burned up on
  reentry, before the parachutes e
ven deployed.<sup id="cite_ref-pa
rachute_18-0" class="reference"><
a href="#cite_note-parachute-18">
&#91;12&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">2
</th>
<td>8 December 2010,<br />15:43<s
up id="cite_ref-spaceflightnow_Cl
ark_Launch_Report_19-0" class="re
ference"><a href="#cite_note-spac

```



```

eflightnow_Clark_Launch_Report-1
9">&#91;13&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.0"
title="Falcon 9 v1.0">F9 v1.0</a>
<sup id="cite_ref-MuskMay2012_13-
1" class="reference"><a href="#ci
te_note-MuskMay2012-13">&#91;7&#9
3;</a></sup><br />B0004.1<sup id
="cite_ref-block_numbers_14-1" cl
ass="reference"><a href="#cite_no
te-block_numbers-14">&#91;8&#93;
</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_Dragon"
title="SpaceX Dragon">Dragon</a>
  <a href="/wiki/COTS_Demo_Flight_
1" class="mw-redirect" title="COT
S Demo Flight 1">demo flight C1</
a><br />(Dragon C101)
</td>
<td>

```

```

</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
(<a href="/wiki/International_Space_Station" title="International Space Station">ISS</a>)
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Orbital_Transportation_Services" title="Commercial Orbital Transportation Services">COTS</a>)</li>
<li><a href="/wiki/National_Reconnaissance_Office" title="National Reconnaissance Office">NRO</a></li>
</ul>
</div>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-ns20110930_15-1" class="reference"><a href="#cite_note-ns20110930-15">
&#91;9&#93;</a></sup>
</td>
<td style="background: #FFC7C7; vertical-align: middle; text-align:

```

```

n: center;" class="table-failur
e">Failure<sup id="cite_ref-ns201
10930_15-2" class="reference"><a
href="#cite_note-ns20110930-15">
&#91;9&#93;</a></sup><sup id="cit
e_ref-20" class="reference"><a hr
ef="#cite_note-20">&#91;14&#93;</
a></sup><br /><small>(parachute)
</small>
</td></tr>
<tr>
<td colspan="9">Maiden flight of
<a href="/wiki/Dragon_capsule" c
lass="mw-redirect" title="Dragon
capsule">Dragon capsule</a>, con
sisting of over 3 hours of testin
g thruster maneuvering and reentr
y.<sup id="cite_ref-spaceflightno
w_Clark_unleashing_Dragon_21-0" c
lass="reference"><a href="#cite_n
ote-spaceflightnow_Clark_unleashi
ng_Dragon-21">&#91;15&#93;</a></s
up> Attempted to recover the firs
t stage by parachuting it into th
e ocean, but it disintegrated upo
n reentry, before the parachutes
were deployed.<sup id="cite_ref-
parachute_18-1" class="referenc
e"><a href="#cite_note-parachute-
18">&#91;12&#93;</a></sup> <small

```

```

>(<a href="#COTS_demo_missions">m
ore details below</a>)</small> It
also included two <a href="/wiki/
CubeSat" title="CubeSat">CubeSats
</a>,<sup id="cite_ref-NRO_Taps_B
oeing_for_Next_Batch_of_CubeSats_
22-0" class="reference"><a href
="#cite_note-NRO_Taps_Boeing_for_
Next_Batch_of_CubeSats-22">&#91;1
6&#93;</a></sup> and a wheel of <
a href="/wiki/Brou%C3%A8re" title
="Brouère">Brouère</a> cheese.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">3
</th>
<td>22 May 2012,<br />07:44<sup i
d="cite_ref-BBC_new_era_23-0" cla
ss="reference"><a href="#cite_not
e-BBC_new_era-23">&#91;17&#93;</a
></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.0"
title="Falcon 9 v1.0">F9 v1.0</a>
<sup id="cite_ref-MuskMay2012_13-
2" class="reference"><a href="#ci
te_note-MuskMay2012-13">&#91;7&#9
3;</a></sup><br />B0005.1<sup id
="cite_ref-block_numbers_14-2" cl

```

```

ass="reference"><a href="#cite_note-block_numbers-14">&#91;8&#93;
</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CC AFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_Dragon" title="SpaceX Dragon">Dragon</a>
  <a href="/wiki/Dragon_C2%2B" class="mw-redirect" title="Dragon C2+">demo flight C2+</a><sup id="cite_ref-C2_24-0" class="reference"><a href="#cite_note-C2-24">&#91;18&#93;</a></sup><br />(Dragon C102)
</td>
<td>525&#160;kg (1,157&#160;lb)<sup id="cite_ref-25" class="reference"><a href="#cite_note-25">&#91;19&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
> (<a href="/wiki/International_S

```

```

pace_Station" title="International
Space Station">ISS</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Orbital_Transportation_Se
rvices" title="Commercial Orbital
Transportation Services">COTS</a
>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success<sup id="cite_ref-26" c
lass="reference"><a href="#cite_n
ote-26">&#91;20&#93;</a></sup>
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt
</td></tr>
<tr>
<td colspan="9">Dragon spacecraft
demonstrated a series of tests be
fore it was allowed to approach t
he <a href="/wiki/International_S
pace_Station" title="International
Space Station">International Sp
ace Station</a>. Two days later,

```

it became the first commercial spacecraft to board the ISS.^{[17]} <small>(more details below)</small>

</td></tr>
<tr>
<th scope="row" rowspan="3" style="text-align:center;">4
</th>
<td rowspan="2">8 October 2012,
00:35^{[21]}
</td>
<td rowspan="2">F9 v1.0^{[7]}
B0006.1^{[8]}
</td>

```

<td rowspan="2"><a href="/wiki/Cape_Canaveral_Space_Force_Station"
title="Cape Canaveral Space Force Station">CCAFS</a>,<br /><a href
="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-1"
title="SpaceX CRS-1">SpaceX CRS-
1</a><sup id="cite_ref-sxManifest
20120925_28-0" class="reference">
<a href="#cite_note-sxManifest201
20925-28">&#91;22&#93;</a></sup><
br />(Dragon C103)
</td>
<td>4,700&#160;kg (10,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
> (<a href="/wiki/International_S
pace_Station" title="Internationa
l Space Station">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C

```



```

RS</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background:#ececec; text-align:center;" rowspan="2"><span class="nowrap">No attempt</span>
</td></tr>
<tr>
<td><a href="/wiki/Orbcomm_(satellite)" title="Orbcomm (satellite)">Orbcomm-OG2</a><sup id="cite_ref-Orbcomm_29-0" class="reference"><a href="#cite_note-Orbcomm-29">¶23¶3</a></sup>
</td>
<td>172&#160;kg (379&#160;lb)<sup id="cite_ref-gunter-og2_30-0" class="reference"><a href="#cite_note-gunter-og2-30">¶24¶3</a>
</sup>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>

```

```

<td><a href="/wiki/Orbcomm" title
="Orbcomm">Orbcomm</a>
</td>
<td style="background: #FE9; vert
ical-align: middle; text-align: c
enter;" class="table-partial">Par
tial failure<sup id="cite_ref-nyt
-20121030_31-0" class="referenc
e"><a href="#cite_note-nyt-201210
30-31">&#91;25&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">CRS-1 was success
ful, but the <a href="/wiki/Secon
dary_payload" title="Secondary pa
yload">secondary payload</a> was
  inserted into an abnormally low
  orbit and subsequently lost. Thi
s was due to one of the nine <a h
ref="/wiki/SpaceX_Merlin" title
="SpaceX Merlin">Merlin engines</
a> shutting down during the launc
h, and NASA declining a second re
ignition, as per <a href="/wiki/I
nternational_Space_Station" title
="International Space Station">IS
S</a> visiting vehicle safety rul
es, the primary payload owner is
  contractually allowed to decline
  a second reignition. NASA stated

```

that this was because SpaceX could not guarantee a high enough likelihood of the second stage completing the second burn successfully which was required to avoid any risk of secondary payload's collision with the ISS.^{[\[26\]](#cite_note-OrbcommTotalLoss-32)}^{[\[27\]](#cite_ref-sn20121011_33-0)}^{[\[28\]](#cite_ref-34)}

scope="row" rowspan="2" style="text-align:center;">5	1 March 2013, 15:10
F9 v1.0 ^{[7]} B0007.1 ^{id}	

```

="cite_ref-block_numbers_14-4" class="reference"><a href="#cite_note-block_numbers-14">&#91;8&#93;
</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-2" title="SpaceX CRS-2">SpaceX CRS-2</a><sup id="cite_ref-sxManifest20120925_28-1" class="reference">
<a href="#cite_note-sxManifest20120925-28">&#91;22&#93;</a></sup><br />(Dragon C104)
</td>
<td>4,877&#160;kg (10,752&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N

```

```

ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt
</td></tr>
<tr>
<td colspan="9">Last launch of th
e original Falcon 9 v1.0 <a href
="/wiki/Launch_vehicle" title="La
unch vehicle">launch vehicle</a>,
first use of the unpressurized tr
unk section of Dragon.<sup id="ci
te_ref-sxf9_20110321_35-0" class
="reference"><a href="#cite_note-
sxf9_20110321-35">&#91;29&#93;</a
></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">6

```

```
</th>
<td>29 September 2013,<br />16:00
<sup id="cite_ref-pa20130930_36-
0" class="reference"><a href="#ci
te_note-pa20130930-36">&#91;30&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<sup id="cite_ref-MuskMay2012_13-
5" class="reference"><a href="#ci
te_note-MuskMay2012-13">&#91;7&#9
3;</a></sup><br />B1003<sup id="c
ite_ref-block_numbers_14-5" class
="reference"><a href="#cite_note-
block_numbers-14">&#91;8&#93;</a>
</sup>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/CASSIOPE" titl
e="CASSIOPE">CASSIOPE</a><sup id
="cite_ref-sxManifest20120925_28-
2" class="reference"><a href="#ci
```

```

te_note-sxManifest20120925-28">&#
91;22&#93;</a></sup><sup id="cite
_ref-CASSIOPE_MDA_37-0" class="re
ference"><a href="#cite_note-CASS
IOPE_MDA-37">&#91;31&#93;</a></su
p>
</td>
<td>500&#160;kg (1,100&#160;lb)
</td>
<td><a href="/wiki/Polar_orbit" t
itle="Polar orbit">Polar orbit</a
> <a href="/wiki/Low_Earth_orbit"
title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/Maxar_Technolo
gies" title="Maxar Technologies">
MDA</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success<sup id="cite_ref-pa201
30930_36-1" class="reference"><a
href="#cite_note-pa20130930-36">
&#91;30&#93;</a></sup>
</td>
<td style="background: #FFE3E3; c
olor: black; vertical-align: midd
le; text-align: center;" class="t
able-no2">Uncontrolled<br /><smal

```

```

l>(ocean)</small><sup id="cite_ref-ocean_landing_38-0" class="reference"><a href="#cite_note-ocean_landing-38">&#91;d&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">First commercial mission with a private customer, first launch from Vandenberg, and demonstration flight of Falcon 9 v1.1 with an improved 13-tonne to LEO capacity.<sup id="cite_ref-sxf9_20110321_35-1" class="reference"><a href="#cite_note-sxf9_20110321-35">&#91;29&#93;</a></sup> After separation from the second stage carrying Canadian commercial and scientific satellites, the first stage booster performed a controlled reentry,<sup id="cite_ref-39" class="reference"><a href="#cite_note-39">&#91;32&#93;</a></sup> and an <a href="/wiki/Falcon_9_first-stage_landing_tests" title="Falcon 9 first-stage landing tests">ocean touchdown test</a> for the first time. This provided good test data, even though the booster started rolling as it neared the ocean, leading to the

```


shutdown of the central engine as the roll depleted it of fuel, resulting in a hard impact with the ocean.^{[#91;30#93;](#cite_note-pa20130930_36-2)} This was the first known attempt of a rocket engine being lit to perform a supersonic retro propulsion, and allowed SpaceX to enter a public-private partnership with [NASA](/wiki/NASA "NASA") and its Mars entry, descent, and landing technologies research projects.^{[#91;33#93;](#cite_note-40)} ([more details below](#Maiden_flight_of_v1.1))

scope="row" rowspan="2" style="text-align:center;">7
3 December 2013, 22:41 ^{#91;33#93;}

```

1">&#91;34&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1004
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SES-8" title
="SES-8">SES-8</a><sup id="cite_r
ef-sxManifest20120925_28-3" class
="reference"><a href="#cite_note-
sxManifest20120925-28">&#91;22&#9
3;</a></sup><sup id="cite_ref-spx
-pr_42-0" class="reference"><a hr
ef="#cite_note-spx-pr-42">&#91;35
&#93;</a></sup><sup id="cite_ref-
aw20110323_43-0" class="referenc
e"><a href="#cite_note-aw20110323
-43">&#91;36&#93;</a></sup>
</td>
<td>3,170&#160;kg (6,990&#160;lb)
</td>
<td><a href="/wiki/Geostationary_

```

```

transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-SNMis
sionStatus7_44-0" class="referenc
e"><a href="#cite_note-SNMissionS
tatus7-44">&#91;37&#93;</a></sup>
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<br /><sup id="cite_ref-sf101201312
03_45-0" class="reference"><a href="#cite_note-sf10120131203-45">&
#91;38&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">First <a href="/w
iki/Geostationary_transfer_orbit"
title="Geostationary transfer orb
it">Geostationary transfer orbit
</a> (GTO) launch for Falcon 9,<s
up id="cite_ref-spx-pr_42-1" clas

```

```

s="reference"><a href="#cite_note
-spx-pr-42">&#91;35&#93;</a></sup
> and first successful reignition
of the second stage.<sup id="cite
_ref-46" class="reference"><a href
="#cite_note-46">&#91;39&#93;</a
></sup> SES-8 was inserted into a
<a href="/wiki/Geostationary_tran
sfer_orbit" title="Geostationary
transfer orbit">Super-Synchronou
s Transfer Orbit</a> of 79,341&#1
60;km (49,300&#160;mi) in apogee
with an <a href="/wiki/Orbital_i
nclination" title="Orbital inclin
ation">inclination</a> of 20.55°
to the <a href="/wiki/Equator" t
itle="Equator">equator</a>.
</td></tr></tbody></table>
<h3><span class="mw-headline" id
="2014">2014</span></h3>
<p>With six launches, SpaceX beca
me the second most prolific Ameri
can company in terms of 2014 laun
ches, behind <a href="/wiki/Atlas
_V" title="Atlas V">Atlas V</a> r
ockets.<sup id="cite_ref-47" clas
s="reference"><a href="#cite_note
-47">&#91;40&#93;</a></sup>
</p>
<table class="wikitable plainrowh

```

```
eaders collapsible" style="width:
100%;">
<tbody><tr>
<th scope="col">Flight No.
</th>
<th scope="col">Date and<br />tim
e (<a href="/wiki/Coordinated_Uni
versal_Time" title="Coordinated U
niversal Time">UTC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first
-stage boosters">Version,<br />Bo
oster</a><sup id="cite_ref-booste
r_11-1" class="reference"><a href
="#cite_note-booster-11">&#91;b&#
93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-1" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
```

```

<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">8
</th>
<td>6 January 2014,<br />22:06<su
p id="cite_ref-NASA_Spaceflight_4
8-0" class="reference"><a href="#
cite_note-NASA_Spaceflight-48">&#
91;41&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La

```

```

unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Thaicom_6" tit
le="Thaicom 6">Thaicom 6</a><sup
id="cite_ref-sxManifest20120925_
28-4" class="reference"><a href
="#cite_note-sxManifest20120925-2
8">&#91;22&#93;</a></sup>
</td>
<td>3,325&#160;kg (7,330&#160;lb)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Thaicom" title
="Thaicom">Thaicom</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-sn201
40106_49-0" class="reference"><a
href="#cite_note-sn20140106-49">
&#91;42&#93;</a></sup>
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<b

```

```

r /><sup id="cite_ref-50" class
="reference"><a href="#cite_note-
50">&#91;43&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">The Thai communic
ation satellite was the second <a
href="/wiki/Geostationary_transfe
r_orbit" title="Geostationary tra
nsfer orbit">GTO</a> launch for F
alcon 9. The <a href="/wiki/Unite
d_States_Air_Force" title="United
States Air Force">USAF</a> evalua
ted launch data from this flight
as part of a separate certificat
ion program for SpaceX to qualify
to fly military payloads, but fou
nd that the launch had "unaccepta
ble fuel reserves at engine cutof
f of the stage 2 second burnoff".
<sup id="cite_ref-bloomberg201407
22_51-0" class="reference"><a hre
f="#cite_note-bloomberg20140722-5
1">&#91;44&#93;</a></sup> Thaicom
-6 was inserted into a <a href="/
wiki/Geostationary_transfer_orbi
t" title="Geostationary transfer
orbit">Super-Synchronous Transfe
r Orbit</a> of 90,039&#160;km (5
5,948&#160;mi) in <a href="/wiki/

```



```

Apsis" title="Apsis">apogee</a> w
ith an <a href="/wiki/Orbital_inc
lination" title="Orbital inclinat
ion">inclination</a> of 22.46° to
the <a href="/wiki/Equator" title
="Equator">equator</a>.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">9
</th>
<td>18 April 2014,<br />19:25<sup
id="cite_ref-SFN_LLog_27-1" class
="reference"><a href="#cite_note-
SFN_LLog-27">&#91;21&#93;</a></su
p>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">Cape Canaveral</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">LC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-3"

```

```

title="SpaceX CRS-3">SpaceX CRS-
3</a><sup id="cite_ref-sxManifest
20120925_28-5" class="reference">
<a href="#cite_note-sxManifest201
20925-28">&#91;22&#93;</a></sup><
br />(Dragon C105)
</td>
<td>2,296&#160;kg (5,062&#160;lb)
<sup id="cite_ref-52" class="refe
rence"><a href="#cite_note-52">&#
91;45&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
> (<a href="/wiki/ISS" class="mw-
redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #BFE; vert
ical-align: middle; text-align: c

```

```

enter;" class="partial table-part
ial">Controlled<br /><small>(ocea
n)</small> <sup id="cite_ref-ocea
n_landing_38-1" class="referenc
e"><a href="#cite_note-ocean_land
ing-38">&#91;d&#93;</a></sup><sup
id="cite_ref-auto_53-0" class="re
ference"><a href="#cite_note-auto
-53">&#91;46&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Following second-
stage separation, SpaceX conducte
d a second <a href="/wiki/Falcon_
9_first-stage_landing_tests" titl
e="Falcon 9 first-stage landing t
ests">controlled-descent test</a>
of the discarded booster vehicle
and achieved the first successfu
l controlled ocean touchdown of a
liquid-rocket-engine orbital boos
ter.<sup id="cite_ref-mit20140422
_54-0" class="reference"><a href
="#cite_note-mit20140422-54">&#9
1;47&#93;</a></sup><sup id="cite_
ref-aw20140428_55-0" class="refer
ence"><a href="#cite_note-aw20140
428-55">&#91;48&#93;</a></sup> Fo
llowing the soft touchdown, the f
irst stage tipped over as expecte

```

d and was destroyed. This was the first Falcon 9 booster to fly with extensible landing legs and the first Dragon mission with the [Falcon 9 v1.1](/wiki/Falcon_9_v1.1 "Falcon 9 v1.1") launch vehicle. This flight also launched the [ELaNa 5](/wiki/Educational_Launch_of_Nanosatellites "Educational Launch of Nanosatellites") mission for [NASA](/wiki/NASA "NASA") as a secondary payload.

^{[\[49\]](#cite_note-auto2-56)}
^{[\[50\]](#cite_note-57)}

10	14 July 2014, 15:15
	F9 v1.1
	<a 38="" 685="" 964="" 980"="" data-label="Page-Footer" href="/wiki/Cape_Canaveral</td> </tr> </table> </div> <div data-bbox=">https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true

```

_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">Cape Canaveral</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">LC-40</a>
</td>
<td><a href="/wiki/Orbcomm-OG2" c
lass="mw-redirect" title="Orbcomm
-OG2">Orbcomm-OG2</a>-1<br />(6 s
atellites)<sup id="cite_ref-sxMani
fest20120925_28-6" class="refere
nce"><a href="#cite_note-sxManife
st20120925-28">&#91;22&#93;</a></
sup>
</td>
<td>1,316&#160;kg (2,901&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/Orbcomm" title
="Orbcomm">Orbcomm</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-alig
n: center;" class="table-succes
s">Success<sup id="cite_ref-og2-0

```

```

1_20140714_58-0" class="reference"><a href="#cite_note-og2-01_20140714-58">&#91;51&#93;</a></sup>
</td>
<td style="background: #BFE; vertical-align: middle; text-align: center;" class="partial table-partial">Controlled<br /><small>(ocean)</small><sup id="cite_ref-ocean_landing_38-2" class="reference"><a href="#cite_note-ocean_landing-38">&#91;d&#93;</a></sup><sup id="cite_ref-auto_53-1" class="reference"><a href="#cite_note-auto-53">&#91;46&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Payload included six satellites weighing 172&#160;kg (379&#160;lb) each and two 142&#160;kg (313&#160;lb) mass simulators.<sup id="cite_ref-gunter-og2_30-1" class="reference"><a href="#cite_note-gunter-og2-30">&#91;24&#93;</a></sup><sup id="cite_ref-gunter-og2-sim_59-0" class="reference"><a href="#cite_note-gunter-og2-sim-59">&#91;52&#93;</a></sup> Equipped for the second time with <a href="/wiki/Launch_veh

```

```

icle_landing_gear" class="mw-redirect" title="Launch vehicle landing gear">landing legs</a>, the first-stage booster successfully conducted a <a href="/wiki/SpaceX_Falcon_9_booster_post-mission,_controlled-descent,_test_program" class="mw-redirect" title="SpaceX Falcon 9 booster post-mission, controlled-descent, test program">controlled-descent</a> test consisting of a burn for deceleration from <a href="/wiki/Hypersonic" class="mw-redirect" title="Hypersonic">hypersonic</a> velocity in the upper atmosphere, a <a href="/wiki/Atmospheric_entry" title="Atmospheric entry">reentry</a> burn, and a final landing burn before soft-landing on the ocean surface.<sup id="cite_ref-SpaceX22072014_60-0" class="reference"><a href="#cite_note-SpaceX22072014-60">&#91;53&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">11
</th>
<td>5 August 2014,<br />08:00

```

```

</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">Cape Canaveral</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">LC-40</a>
</td>
<td><a href="/wiki/AsiaSat_8" tit
le="AsiaSat 8">AsiaSat 8</a><sup
id="cite_ref-sxManifest20120925_
28-7" class="reference"><a href
="#cite_note-sxManifest20120925-2
8">&#91;22&#93;</a></sup><sup id
="cite_ref-AsiaSat_SpaceX_61-0" c
lass="reference"><a href="#cite_n
ote-AsiaSat_SpaceX-61">&#91;54&#9
3;</a></sup><sup id="cite_ref-62"
class="reference"><a href="#cite_
note-62">&#91;55&#93;</a></sup>
</td>
<td>4,535&#160;kg (9,998&#160;lb)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation

```



```

ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/AsiaSat" title
="AsiaSat">AsiaSat</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-as8_20140805_63-0" class="reference"><a href="#cite_note-as8_20140805-63">&#91;56&#93;</a></sup>
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<br /><sup id="cite_ref-amspace-20140803_64-0" class="reference"><a href="#cite_note-amspace-20140803-64">&#91;57&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">First time SpaceX managed a launch site turnaround between two flights of under a month (22 days). GTO launch of the large communication satellite from Hong Kong did not allow for propulsive return-over-water and con

```

```

trolled splashdown of the first s
tage.<sup id="cite_ref-ampspace-20
140803_64-1" class="reference"><a
href="#cite_note-ampspace-20140803
-64">&#91;57&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">12
</th>
<td>7 September 2014,<br />05:00
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1011<sup id="cite_ref-bloc
k_numbers_14-6" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">Cape Canaveral</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">LC-40</a>
</td>
<td><a href="/wiki/AsiaSat_6" tit
le="AsiaSat 6">AsiaSat 6</a><sup

```

```

id="cite_ref-sxManifest20120925_28-8" class="reference"><a href="#cite_note-sxManifest20120925-28">&#91;22&#93;</a></sup><sup id="cite_ref-AsiaSat_SpaceX_61-1" class="reference"><a href="#cite_note-AsiaSat_SpaceX-61">&#91;54&#93;</a></sup><sup id="cite_ref-65" class="reference"><a href="#cite_note-65">&#91;58&#93;</a></sup></td>
<td>4,428&#160;kg (9,762&#160;lb)</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a></td>
<td><a href="/wiki/AsiaSat" title="AsiaSat">AsiaSat</a></td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-sdc20140907_66-0" class="reference"><a href="#cite_note-sdc20140907-66">&#91;59&#93;</a></sup></td>
<td style="background: #EEE; vertical-align: middle; white-space:

```

```

        nowrap; text-align: center;" class="table-noAttempt">No attempt
    </td></tr>
<tr>
<td colspan="9">Launch was delayed for two weeks for additional verifications after a malfunction observed in the development of the
<a href="/wiki/F9R_Dev1" class="mw-redirect" title="F9R Dev1">F9R Dev1</a> prototype.<sup id="cite_ref-67" class="reference"><a href="#cite_note-67">&#91;60&#93;</a></sup> GTO launch of the heavy payload did not allow for controlled splashdown.<sup id="cite_ref-68" class="reference"><a href="#cite_note-68">&#91;61&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">13
</th>
<td>21 September 2014,<br />05:52
<sup id="cite_ref-SFN_LLog_27-2" class="reference"><a href="#cite_note-SFN_LLog-27">&#91;21&#93;</a></sup>
</td>

```

```

<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1010<sup id="cite_ref-bloc
k_numbers_14-7" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">Cape Canaveral</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">LC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-4"
title="SpaceX CRS-4">SpaceX CRS-
4</a><sup id="cite_ref-sxManifest
20120925_28-9" class="reference">
<a href="#cite_note-sxManifest201
20925-28">&#91;22&#93;</a></sup><
br />(Dragon <a href="/wiki/Drago
n_C106" title="Dragon C106">C106
</a>.1)
</td>
<td>2,216&#160;kg (4,885&#160;lb)
<sup id="cite_ref-69" class="refe
rence"><a href="#cite_note-69">&#
91;62&#93;</a></sup>

```

```

</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
(<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-nasacrs420140921_70-0" class="reference"><a href="#cite_note-nasacrs420140921-70">&#91;63&#93;</a></sup>
</td>
<td style="background: #FFE3E3; color: black; vertical-align: middle; text-align: center;" class="table-no2">Uncontrolled<br /><small>(ocean)</small><sup id="cite_ref-ocean_landing_38-3" class="reference"><a href="#cite_note-ocean_landing-38">&#91;d&#93;</a></sup>
<sup id="cite_ref-fail-13_71-0" class="reference"><a href="#cite_n

```

```

ote-fail-13-71">&#91;64&#93;</a>
</sup>
</td></tr>
<tr>
<td colspan="9">Fourth attempt of
a soft ocean touchdown,<sup id="c
ite_ref-aw20141016_72-0" class="r
eference"><a href="#cite_note-aw2
0141016-72">&#91;65&#93;</a></sup
> but the booster ran out of liqu
id oxygen.<sup id="cite_ref-fail-
13_71-1" class="reference"><a hre
f="#cite_note-fail-13-71">&#91;64
&#93;</a></sup> Detailed <a href
="/wiki/Thermal_imaging" class="m
w-redirect" title="Thermal imagin
g">thermal imaging</a> infrared s
ensor data was collected however
by NASA, as part of a joint arra
ngement with SpaceX as part of re
search on <a href="/wiki/Superson
ic_retropropulsion" class="mw-red
irect" title="Supersonic retropro
pulsion">retropropulsive decelera
tion technologies</a> for develop
ing new approaches to Martian <a
href="/wiki/Atmospheric_entry" t
itle="Atmospheric entry">atmosphe
ric entry</a>.<sup id="cite_ref-a
w20141016_72-1" class="referenc

```

```

e"><a href="#cite_note-aw20141016-72">&#91;65&#93;</a></sup>
</td></tr></tbody></table>
<h3><span class="mw-headline" id="2015">2015</span></h3>
<p>With 7 launches in 2015, Falcon 9 was the second most launched American rocket behind <a href="/wiki/Atlas_V" title="Atlas V">Atlas V</a>.<sup id="cite_ref-73" class="reference"><a href="#cite_note-73">&#91;66&#93;</a></sup>
</p>
<table class="wikitable plainrowheaders collapsible" style="width:100%;">
<tbody><tr>
<th scope="col">Flight No.
</th>
<th scope="col">Date and<br />time (<a href="/wiki/Coordinated_Universal_Time" title="Coordinated Universal Time">UTC</a>)
</th>
<th scope="col"><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">Version,<br />Booster</a><sup id="cite_ref-booster_11-2" class="reference"><a href=

```



```

="#cite_note-booster-11">&#91;b&#
93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-2" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">14
</th>
<td>10 January 2015,<br />09:47<s

```

```

up id="cite_ref-nasa20150107_74-
0" class="reference"><a href="#ci
te_note-nasa20150107-74">&#91;67&
#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1012<sup id="cite_ref-bloc
k_numbers_14-8" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/SpaceX_CRS-5"
title="SpaceX CRS-5">SpaceX CRS-
5</a><sup id="cite_ref-sxManifest
20130731_75-0" class="reference">
<a href="#cite_note-sxManifest201
30731-75">&#91;68&#93;</a></sup><
br />(Dragon C107)
</td>
<td>2,395&#160;kg (5,280&#160;lb)

```

```

<sup id="cite_ref-76" class="reference"><a href="#cite_note-76">&#
91;69&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-nasac
rs520150110_77-0" class="referenc
e"><a href="#cite_note-nasacrs520
150110-77">&#91;70&#93;</a></sup>
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align: center;" class="table-failur
e">Failure <small><span class="no
wrap">(drone ship)</span></small>
</td></tr>

```

```

<tr>
<td colspan="9">Following second-
stage separation, SpaceX attempte
d to <a href="/wiki/Falcon_9_firs
t-stage_landing_tests" title="Fal
con 9 first-stage landing tests">
return</a> the first stage for th
e first time to a 90&#160;m ×&#16
0;50&#160;m (300&#160;ft ×&#160;1
60&#160;ft) <a href="/wiki/Floati
ng_landing_platform" class="mw-re
direct" title="Floating landing p
latfrom">floating platform</a> –
called the <a href="/wiki/Autono
mous_spaceport_drone_ship" title
="Autonomous spaceport drone shi
p">autonomous spaceport drone shi
p</a>. The test achieved many obj
ectives and returned a large amou
nt of data, but the <a href="/wik
i/Grid_fin" title="Grid fin">grid
-fin</a> control surfaces used fo
r the first time for more precise
reentry positioning ran out of hy
draulic fluid for its control sys
tem a minute before landing, resu
lting in a landing crash.<sup id
="cite_ref-sfn20150110_78-0" clas
s="reference"><a href="#cite_note
-sfn20150110-78">&#91;71&#93;</a>

```

```

</sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">15
</th>
<td>11 February 2015,<br />23:03<
sup id="cite_ref-79" class="referenc
ence"><a href="#cite_note-79">&#9
1;72&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1013<sup id="cite_ref-bloc
k_numbers_14-9" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/DSCOVER" class
="mw-redirect" title="DSCOVER">DSC
OVR</a><sup id="cite_ref-sxManife

```

```

st20130731_75-1" class="reference"><a href="#cite_note-sxManifest
20130731-75">&#91;68&#93;</a></su
p><sup id="cite_ref-80" class="re
ference"><a href="#cite_note-80">
&#91;73&#93;</a></sup>
</td>
<td>570&#160;kg (1,260&#160;lb)
</td>
<td><a href="/wiki/High_Earth_orb
it" title="High Earth orbit">HEO
</a><br />(<a href="/wiki/Lagrang
e_point" title="Lagrange point">S
un-Earth L<sub>1</sub></a> insert
ion)
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/United_Sta
tes_Air_Force" title="United Stat
es Air Force">USAF</a></li>
<li><a href="/wiki/NASA" title="N
ASA">NASA</a></li>
<li><a href="/wiki/NOAA" class="m
w-redirect" title="NOAA">NOAA</a>
</li></ul>
</div>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-alig
n: center;" class="table-succes

```

```

s">Success
</td>
<td style="background: #BFE; vertical-align: middle; text-align: center;" class="partial table-partial">Controlled<br /><small>(ocean)</small><sup id="cite_ref-ocean_landing_38-4" class="reference">
<a href="#cite_note-ocean_landing-38">&#91;d&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">First launch under USAF's <a href="/wiki/List_of_U.S._government_and_military_acronyms#0" title="List of U.S. government and military acronyms">OSP
</a> 3 launch contract.<sup id="cite_ref-spx20121205_81-0" class="reference"><a href="#cite_note-spx20121205-81">&#91;74&#93;</a>
</sup> First SpaceX launch to put a satellite beyond a geostationary transfer orbit, first SpaceX launch into interplanetary space, and first SpaceX launch of an American research satellite. The first stage made a test flight descent to an over-ocean landing within 10&#160;m (33&#160;ft) of its int

```

```

ended target.<sup id="cite_ref-MuskTweet-20150211_82-0" class="reference"><a href="#cite_note-MuskTweet-20150211-82">&#91;75&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">16
</th>
<td>2 March 2015,<br />03:50<sup id="cite_ref-SFN_LLog_27-3" class="reference"><a href="#cite_note-SFN_LLog-27">&#91;21&#93;</a></sup><sup id="cite_ref-patrickafmil02142015_83-0" class="reference"><a href="#cite_note-patrickafmil02142015-83">&#91;76&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1" title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1014<sup id="cite_ref-block_numbers_14-10" class="reference"><a href="#cite_note-block_numbers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">Ca

```



```

pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/ABS-3A" ti
tle="ABS-3A">ABS-3A</a></li>
<li><a href="/wiki/Eutelsat_115_W
est_B" title="Eutelsat 115 West
B">Eutelsat 115 West B</a><sup i
d="cite_ref-sxManifest20130731_75
-2" class="reference"><a href="#c
ite_note-sxManifest20130731-75">&
#91;68&#93;</a></sup></li></ul>
</div>
</td>
<td>4,159&#160;kg (9,169&#160;lb)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Asia_Broad
cast_Satellite" class="mw-redirec
t" title="Asia Broadcast Satellit
e">ABS</a></li>
<li><a href="/wiki/Eutelsat" titl

```

```

e="Eutelsat">Eutelsat</a></li></u>
l>
</div>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<sup id="cite_ref-84" class="reference"><a href="#cite_note-84">&#91;77&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">The launch was Boeing's first conjoined launch of a <a href="/wiki/Boeing_702" title="Boeing 702">lighter-weight dual-commsat stack</a> that was specifically designed to take advantage of the <a href="/wiki/Space_launch_market_competition" title="Space launch market competition">lower-cost</a> SpaceX Falcon 9 launch vehicle.<sup id="cite_ref-aw20140310_85-0" class="referenc

```

```

e"><a href="#cite_note-aw20140310-85">&#91;78&#93;</a></sup><sup id="cite_ref-boeing20141112_86-0" class="reference"><a href="#cite_note-boeing20141112-86">&#91;79&#93;</a></sup> Per satellite, launch costs were less than US$30 million.<sup id="cite_ref-sfn20150302_87-0" class="reference"><a href="#cite_note-sfn20150302-87">&#91;80&#93;</a></sup> The ABS satellite reached its final destination ahead of schedule and started operations on 10 September 2015.<sup id="cite_ref-boeing_88-0" class="reference"><a href="#cite_note-boeing-88">&#91;81&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">17
</th>
<td>14 April 2015,<br />20:10<sup id="cite_ref-SFN_LLog_27-4" class="reference"><a href="#cite_note-SFN_LLog-27">&#91;21&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"

```

```
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1015<sup id="cite_ref-bloc
k_numbers_14-11" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">Cape Canaveral</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">LC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-6"
title="SpaceX CRS-6">SpaceX CRS-
6</a><sup id="cite_ref-sxManifest
20130731_75-3" class="reference">
<a href="#cite_note-sxManifest201
30731-75">&#91;68&#93;</a></sup><
br />(Dragon <a href="/wiki/Drago
n_C108" title="Dragon C108">C108.
1</a>)
</td>
<td>1,898&#160;kg (4,184&#160;lb)
<sup id="cite_ref-89" class="refe
rence"><a href="#cite_note-89">&#
91;82&#93;</a></sup>
</td>
```

```

<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; vertical-align: middle; text-align: center;" class="table-failure">Failure<sup id="cite_ref-90" class="reference"><a href="#cite_note-90">&#91;83&#93;</a></sup><br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">After second-stage separation, a controlled-descent test was attempted with the first stage. After the booster conta

```

cted the ship, it tipped over due to excess lateral velocity caused by a stuck throttle valve that delayed downthrottle at the correct time.^{[91](#cite_note-91)}^{[92](#cite_note-92)}^{[93](#cite_note-93)}

```

Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/T%C3%BCrkmen%C
3%84lem_52%C2%B0E_/_MonacoSAT" ti
tle="TürkmenÄlem 52°E / MonacoSA
T">TürkmenÄlem 52°E / MonacoSAT</
a><sup id="cite_ref-sxManifest201
30731_75-4" class="reference"><a
href="#cite_note-sxManifest20130
731-75">&#91;68&#93;</a></sup><su
p id="cite_ref-turkmen-monaco_94-
0" class="reference"><a href="#ci
te_note-turkmen-monaco-94">&#91;8
7&#93;</a></sup>
</td>
<td>4,707&#160;kg (10,377&#160;l
b)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Turkmenistan_N
ational_Space_Agency" title="Turk
menistan National Space Agency">T

```

```

urkmenistan National<br />Space A
gency</a><sup id="cite_ref-95" cl
ass="reference"><a href="#cite_no
te-95">&#91;88&#93;</a></sup>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<s
up id="cite_ref-96" class="refere
nce"><a href="#cite_note-96">&#9
1;89&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Original intended
launch was delayed over a month a
fter an issue with the helium pre
ssurisation system was identified
on similar parts in the assembly
plant.<sup id="cite_ref-zgn20150
323_97-0" class="reference"><a hr
ef="#cite_note-zgn20150323-97">&#
91;90&#93;</a></sup> Subsequent l
aunch successfully positioned thi
s first Turkmen satellite at 52.

```



```

0°&#160;east.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">19
</th>
<td>28 June 2015,<br />14:21<sup
id="cite_ref-SFN_LLog_27-5" clas
s="reference"><a href="#cite_note
-SFN_LLog-27">&#91;21&#93;</a></s
up><sup id="cite_ref-nasama201505
20_98-0" class="reference"><a hre
f="#cite_note-nasama20150520-98">
&#91;91&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1018<sup id="cite_ref-bloc
k_numbers_14-13" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>

```

```

</td>
<td><a href="/wiki/SpaceX_CRS-7"
  title="SpaceX CRS-7">SpaceX CRS-
7</a><sup id="cite_ref-sxManifest
20130731_75-5" class="reference">
<a href="#cite_note-sxManifest201
30731-75">&#91;68&#93;</a></sup><
br />(Dragon C109)
</td>
<td>1,952&#160;kg (4,303&#160;lb)
<sup id="cite_ref-99" class="refe
rence"><a href="#cite_note-99">&#
91;92&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align:
center;" class="table-failur
e">Failure<sup id="cite_ref-nyt-2

```

```

0150628_100-0" class="reference">
<a href="#cite_note-nyt-20150628-
100">&#91;93&#93;</a></sup><br />
<small>(in flight)</small>
</td>
<td style="background:#ececec; te
xt-align:center;">Precluded<sup i
d="cite_ref-101" class="referenc
e"><a href="#cite_note-101">&#91;
94&#93;</a></sup><br /><small><sp
an class="nowrap">(drone ship)</s
pan></small>
</td></tr>
<tr>
<td colspan="9">Launch performanc
e was nominal until an overpressu
re incident in the second-stage <
a href="/wiki/LOX" class="mw-redi
rect" title="LOX">LOX</a> tank, l
eading to vehicle breakup at T+15
0 seconds. Dragon capsule survive
d the explosion but was lost upon
splashdown as its software did no
t contain provisions for parachut
e deployment on launch vehicle fa
ilure.<sup id="cite_ref-nsf-20150
727_102-0" class="reference"><a h
ref="#cite_note-nsf-20150727-10
2">&#91;95&#93;</a></sup><small>
(<a href="#Loss_of_CRS-7_missio

```

```

n">more details below</a>)</small>
> The drone ship <i>Of Course I S
till Love You</i> was towed out t
o sea to prepare for a landing te
st so this mission was its first
operational assignment.<sup id
="cite_ref-nsf20150618_103-0" cla
ss="reference"><a href="#cite_not
e-nsf20150618-103">&#91;96&#93;</
a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">20
</th>
<td>22 December 2015,<br />01:29<
sup id="cite_ref-orbcomm-og2_104-
0" class="reference"><a href="#ci
te_note-orbcomm-og2-104">&#91;97&
#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a><br />B1019.1<sup id
="cite_ref-flight20-booster_105-
0" class="reference"><a href="#ci
te_note-flight20-booster-105">&#9
1;98&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral

```

```
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/Orbcomm-OG2" c
lass="mw-redirect" title="Orbcomm
-OG2">Orbcomm-OG2</a>-2<br />(11
satellites)<sup id="cite_ref-sxM
anifest20120925_28-10" class="ref
erence"><a href="#cite_note-sxMan
ifest20120925-28">&#91;22&#93;</a
></sup><sup id="cite_ref-orbcomm-
og2_104-1" class="reference"><a h
ref="#cite_note-orbcomm-og2-104">
&#91;97&#93;</a></sup>
</td>
<td>2,034&#160;kg (4,484&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a>
</td>
<td><a href="/wiki/Orbcomm" title
="Orbcomm">Orbcomm</a>
</td>
<td style="background: #9EFF9E; v
```

```

vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-flight20-landing_106-0" class="reference"><a href="#cite_note-flight20-landing-106">91;9993</a></sup><br /><small><span class="nowrap">(ground pad)</span></small>
</td></tr>
<tr>
<td colspan="9">Payload included eleven satellites weighing 172#160;kg (379#160;lb) each,<sup id="cite_ref-gunter-og2_30-2" class="reference"><a href="#cite_note-gunter-og2-30">91;2493</a></sup> and a 142#160;kg (313#160;lb) mass simulator.<sup id="cite_ref-gunter-og2-sim_59-1" class="reference"><a href="#cite_note-gunter-og2-sim-59">91;5293</a></sup> First launch of the upgraded v1.1 version, with a 30% power increase.<sup id="cite_ref-sn20151016_107-0" class="reference"><a

```

[7](#cite_note-sn20151016-107) Orbcom
 m had originally agreed to be the
 third flight of the enhanced-thru
 st rocket,<sup>
 [101]</sup> but the c
 hange to the maiden flight positi
 on was announced in October 2015.
 ^{[100]} SpaceX received a
 permit from the FAA to land the booster
 on solid ground at Cape Canaveral
 ^{[102]} and
 succeeded for the first time.^{<a href="#cite_note-flight20-landing-10}

6">[99]</sup> This booster, serial number B1019, is now on permanent display outside SpaceX's headquarters in Hawthorne, California, at the intersection of Crenshaw Boulevard and Jack Northrop Avenue.^{[98]} <small>(more details below)</small></td></tr></tbody></table>

2016</h3>

<p>With 8 successful launches for 2016, SpaceX equalled Atlas V for most American rocket launches for the year.^{[103]}</p>


```
<table class="wikitable plainrowh  
eaders collapsible" style="width:  
100%;">  
<tbody><tr>  
<th scope="col">Flight No.  
</th>  
<th scope="col">Date and<br />tim  
e (<a href="/wiki/Coordinated_Uni  
versal_Time" title="Coordinated U  
niversal Time">UTC</a>)  
</th>  
<th scope="col"><a href="/wiki/Li  
st_of_Falcon_9_first-stage_booste  
rs" title="List of Falcon 9 first  
-stage boosters">Version,<br />Bo  
oster</a><sup id="cite_ref-booste  
r_11-3" class="reference"><a href  
="#cite_note-booster-11">&#91;b&#  
93;</a></sup>  
</th>  
<th scope="col">Launch site  
</th>  
<th scope="col">Payload<sup id="c  
ite_ref-Dragon_12-3" class="refer  
ence"><a href="#cite_note-Dragon-  
12">&#91;c&#93;</a></sup>  
</th>  
<th scope="col">Payload mass  
</th>  
<th scope="col">Orbit
```

```

</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">21
</th>
<td>17 January 2016,<br />18:42<s
up id="cite_ref-SFN_LLog_27-6" cl
ass="reference"><a href="#cite_no
te-SFN_LLog-27">&#91;21&#93;</a>
</sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1</a>
<br />B1017<sup id="cite_ref-bloc
k_numbers_14-14" class="referenc
e"><a href="#cite_note-block_numb
ers-14">&#91;8&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air

```

```

_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Jason-3" title
="Jason-3">Jason-3</a><sup id="ci
te_ref-sxManifest20130731_75-6" c
lass="reference"><a href="#cite_n
ote-sxManifest20130731-75">&#91;6
8&#93;</a></sup><sup id="cite_ref
-111" class="reference"><a href
="#cite_note-111">&#91;104&#93;</
a></sup>
</td>
<td>553&#160;kg (1,219&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/NASA" titl
e="NASA">NASA</a> (<a href="/wik
i/Launch_Services_Program" title
="Launch Services Program">LSP</a
>)</li>
<li><a href="/wiki/NOAA" class="m

```

```

w-redirect" title="NOAA">NOAA</a>
</li>
<li><a href="/wiki/CNES" title="C
NES">CNES</a></li></ul>
</div>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align: center;" class="table-failur
e">Failure<br /><small>(drone shi
p)</small>
</td></tr>
<tr>
<td colspan="9">First launch of N
ASA and NOAA joint science missio
n under the <a href="/wiki/Launch
_Services_Program" title="Launch
_Services_Program">NLS II</a> lau
nch contract (not related to NASA
CRS or USAF OSP3 contracts) and l
ast launch of the Falcon 9 v1.1 l
aunch vehicle. The <a href="/wik
i/Jason-3" title="Jason-3">Jason-
3</a> satellite was successfully
deployed to target orbit.<sup id

```

```

="cite_ref-gw20160117_112-0" class="reference"><a href="#cite_note-gw20160117-112">&#91;105&#93;</a></sup> SpaceX attempted for the first time to recover the first-stage booster on its new Pacific autonomous drone ship, but after a soft landing on the ship, the lockout on one of the landing legs failed to latch and the booster fell over and exploded.<sup id="cite_ref-113" class="reference"><a href="#cite_note-113">&#91;106&#93;</a></sup><sup id="cite_ref-wp20160118_114-0" class="reference"><a href="#cite_note-wp20160118-114">&#91;107&#93;</a></sup></td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">22
</th>
<td>4 March 2016,<br />23:35<sup id="cite_ref-SFN_LLog_27-7" class="reference"><a href="#cite_note-SFN_LLog-27">&#91;21&#93;</a></sup>
up>
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thru

```

```

st">F9 FT</a><br />B1020.1<sup id
="cite_ref-skyrocket_1.2_115-0" c
lass="reference"><a href="#cite_n
ote-skyrocket_1.2-115">&#91;108&#
93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/SES-9" title
="SES-9">SES-9</a><sup id="cite_r
ef-sxManifest20130731_75-7" class
="reference"><a href="#cite_note-
sxManifest20130731-75">&#91;68&#9
3;</a></sup><sup id="cite_ref-spa
cenews20140410_116-0" class="refe
rence"><a href="#cite_note-spacen
ews20140410-116">&#91;109&#93;</a
></sup><sup id="cite_ref-nsf20160
208_117-0" class="reference"><a h
ref="#cite_note-nsf20160208-117">
&#91;110&#93;</a></sup>
</td>
<td>5,271&#160;kg (11,621&#160;l

```

```

b)
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/SES_S.A." title="SES S.A.">SES</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; vertical-align: middle; text-align: center;" class="table-failure">Failure<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Second launch of the enhanced <a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">Falcon 9 Full Thrust</a> launch vehicle.<sup id="cite_ref-sn20151016_107-2" class="reference"><a href="#cite_note-sn20151016-107">&#91;100&#93;</a></sup> SpaceX attempted for the first

```

time to recover a booster from a GTO launch to a [Autonomous spaceport drone ship](/wiki/Autonomous_spaceport_drone_ship "Autonomous spaceport drone ship").^{[bi20160223_118-0](#cite_ref-bi20160223_118-0)} Successful landing was not expected due to low fuel reserves^{[sxPressKit20160223_119-0](#cite_ref-sxPressKit20160223_119-0)} and the booster "landed hard".^{[musk-tweet-20160305_120-0](#cite_ref-musk-tweet-20160305_120-0)} But the controlled-descent, atmospheric re-entry and navigation to the drone ship were successful and returned significant test data on bringing back high-energy Falcon 9 boosters.^{[sn20160304_121-0](#cite_ref-sn20160304_121-0)}


```

<th scope="row" rowspan="2" style
="text-align:center;">23
</th>
<td>8 April 2016,<br />20:43<sup
id="cite_ref-SFN_LLog_27-8" clas
s="reference"><a href="#cite_note
-SFN_LLog-27">&#91;21&#93;</a></s
up>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a><br /><a href="/wik
i/List_of_Falcon_9_first-stage_bo
osters" title="List of Falcon 9 f
irst-stage boosters">B1021.1</a><
sup id="cite_ref-nsf-20170330_122
-0" class="reference"><a href="#c
ite_note-nsf-20170330-122">&#91;1
15&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/SpaceX_CRS-8"

```

```

title="SpaceX CRS-8">SpaceX CRS-
8</a><sup id="cite_ref-sxManifest
20130731_75-8" class="reference">
<a href="#cite_note-sxManifest201
30731-75">&#91;68&#93;</a></sup><
sup id="cite_ref-nsf20160208_117-
1" class="reference"><a href="#ci
te_note-nsf20160208-117">&#91;110
&#93;</a></sup><br />(Dragon C11
0.1)
</td>
<td>3,136&#160;kg (6,914&#160;lb)
<sup id="cite_ref-123" class="ref
erence"><a href="#cite_note-123">
&#91;116&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:

```

```

n: center;" class="table-succes
s">Success<sup id="cite_ref-crs-8
-webcast_124-0" class="referenc
e"><a href="#cite_note-crs-8-webc
ast-124">&#91;117&#93;</a></sup>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-125"
class="reference"><a href="#cite
_note-125">&#91;118&#93;</a></sup>
<br /><small>(drone ship)</small>
>
</td></tr>
<tr>
<td colspan="9">Dragon carried ov
er 1,500&#160;kg (3,300&#160;lb)
of supplies and delivered the in
flatable <a href="/wiki/Bigelow_E
xpandable_Activity_Module" title
="Bigelow Expandable Activity Mod
ule">Bigelow Expandable Activity
Module</a> (BEAM) to the ISS for
two years of in-orbit tests.<sup
id="cite_ref-126" class="referen
ce"><a href="#cite_note-126">&#9
1;119&#93;</a></sup> The rocket's
first stage landed smoothly on Sp
aceX's <a href="/wiki/Autonomous_

```

spaceport_drone_ship" title="Autonomous spaceport drone ship">autonomous spaceport drone ship at 9 minutes after liftoff, making this the first successful landing of a rocket booster on a ship at sea from an orbital launch.^{[120]} The first stage B1021 later became the first orbital booster to be reused when it launched SES-10 on 30 March 2017.^{[115]} A month later, the Dragon spacecraft returned a downmass containing astronaut's Scott Kelly biological samples from his year-long mission on ISS.^{[121]}<small>more details be

```

low</a>)</small>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">24
</th>
<td>6 May 2016,<br />05:21<sup id
="cite_ref-SFN_LLog_27-9" class
="reference"><a href="#cite_note-
SFN_LLog-27">&#91;21&#93;</a></su
p>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a><br />B1022.1<sup id
="cite_ref-nsf20170325_129-0" cla
ss="reference"><a href="#cite_not
e-nsf20170325-129">&#91;122&#93;
</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/SKY_Perfect_JS

```

```

AT" title="SKY Perfect JSAT">JCSA
T-14</a><sup id="cite_ref-130" cl
ass="reference"><a href="#cite_no
te-130">&#91;123&#93;</a></sup>
</td>
<td>4,696&#160;kg (10,353&#160;l
b)<sup id="cite_ref-131" class="r
eference"><a href="#cite_note-13
1">&#91;124&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/SKY_Perfect_JS
AT" title="SKY Perfect JSAT">SKY
Perfect JSAT Group</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
">Success<br /><small>(drone shi
p)</small>
</td></tr>
<tr>

```

```

<td colspan="9">First time SpaceX
launched a Japanese satellite, an
d first time a booster landed suc
cessfully after launching a paylo
ad into a GTO.<sup id="cite_ref-1
32" class="reference"><a href="#c
ite_note-132">&#91;125&#93;</a></
sup> As this flight profile has a
smaller margin for the booster re
covery, the first stage re-entere
d Earth's atmosphere faster than
  for previous landings, with five
times the heating power.<sup id
="cite_ref-133" class="referenc
e"><a href="#cite_note-133">&#91;
126&#93;</a></sup><sup id="cite_r
ef-134" class="reference"><a href
="#cite_note-134">&#91;127&#93;</
a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">25
</th>
<td>27 May 2016,<br />21:39<sup i
d="cite_ref-135" class="referenc
e"><a href="#cite_note-135">&#91;
128&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Full_

```

```

Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">B1023.1</a><sup id="cite_ref-nsf-20170425_136-0" class="reference"><a href="#cite_note-nsf-20170425-136">&#91;129&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">Cape Canaveral</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">LC-40</a>
>
</td>
<td><a href="/wiki/Thaicom_8" title="Thaicom 8">Thaicom 8</a><sup id="cite_ref-sn20140430_137-0" class="reference"><a href="#cite_note-sn20140430-137">&#91;130&#93;</a></sup><sup id="cite_ref-138" class="reference"><a href="#cite_note-138">&#91;131&#93;</a></sup>
>
</td>
<td>3,100&#160;kg (6,800&#160;lb)

```



```

<sup id="cite_ref-139" class="reference"><a href="#cite_note-139">
&#91;132&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Thaicom" title="Thaicom">Thaicom</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-140"
class="reference"><a href="#cite_note-140">&#91;133&#93;</a></sup>
<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Second successful return from a GTO launch,<sup id="cite_ref-141" class="reference"><a href="#cite_note-141">&#91;

```

134]</sup> after launching Thaicom 8 towards 78.5° east.^{[135]} Later became the first booster to be reflown after being recovered from a GTO launch. THAICOM 8 was delivered to a Super-Synchronous Transfer Orbit of 91,000 km (57,000 mi).^{[136]}</td></tr><tr><th scope="row" rowspan="2" style="text-align:center;">26</th><td>15 June 2016,
14:29^{[21]}</td><td><a href="/wiki/Falcon_9_Full_

```

Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br />B1024.1<sup id="cite_ref-skyrocket_1.2_115-1" class="reference"><a href="#cite_note-skyrocket_1.2-115">&#91;108&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">Cape Canaveral</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">LC-40</a>
>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/ABS_(satellite_operator)" title="ABS (satellite operator)">ABS-2A</a></li>
<li><a href="/wiki/Eutelsat" title="Eutelsat">Eutelsat 117 West B</a><sup id="cite_ref-sxManifest20130731_75-9" class="reference"><a href="#cite_note-sxManifest20130731-75">&#91;68&#93;</a></sup></li></ul>
</div>
</td>
<td>3,600&#160;kg (7,900&#160;lb)

```

```

</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Asia_Broad
cast_Satellite" class="mw-redirec
t" title="Asia Broadcast Satellit
e">ABS</a></li>
<li><a href="/wiki/Eutelsat" titl
e="Eutelsat">Eutelsat</a></li></u
l>
</div>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align: center;" class="table-failur
e">Failure<sup id="cite_ref-fail-
13_71-2" class="reference"><a href="#cite_note-fail-13-71">&#91;64
&#93;</a></sup><br /><small>(dron
e ship)</small>
</td></tr>
<tr>

```

<td colspan="9">One year after pi
 oneering this technique on Flight
 16, Falcon again launched two <a
 href="/wiki/Boeing_702" title="B
 oeing 702">Boeing 702SP <a hr
 ef="/wiki/XIPS-25" title="XIPS-2
 5">gridded ion thruster satel
 lites at 1,800 kg (4,000
 0;lb) each,<sup id="cite_ref-144"
 class="reference"><a href="#cite_
 note-144">[137]</sup>
 <sup id="cite_ref-145" class="ref
 erence">
 [138]</sup> in a dual
 -stack configuration, with the tw
 o customers sharing the rocket an
 d mission costs.<sup id="cite_ref
 -boeing_88-1" class="reference"><
 a href="#cite_note-boeing-88">	
 1;81]</sup> First-stage l
 anding attempt on drone ship fail
 ed due to low thrust on one of th
 e three landing engines;<sup id
 ="cite_ref-146" class="referenc
 e">[
 139]</sup> a sub-optimal
 path led to the stage running ou
 t of propellant just above the de
 ck of the landing ship.<sup id="c
 ite_ref-147" class="reference"><a

```

href="#cite_note-147">&#91;140&#9
3;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">27
</th>
<td>18 July 2016,<br />04:45<sup
id="cite_ref-SFN_LLog_27-11" cla
ss="reference"><a href="#cite_not
e-SFN_LLog-27">&#91;21&#93;</a></
sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a><br />B1025.1<sup id
="cite_ref-nsf-20170425_136-1" cl
ass="reference"><a href="#cite_no
te-nsf-20170425-136">&#91;129&#9
3;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>

```

```

<td><a href="/wiki/SpaceX_CRS-9"
  title="SpaceX CRS-9">SpaceX CRS-
9</a><sup id="cite_ref-sxManifest
20130731_75-10" class="referenc
e"><a href="#cite_note-sxManifest
20130731-75">&#91;68&#93;</a></su
p><sup id="cite_ref-spn-20160224_
148-0" class="reference"><a href
="#cite_note-spn-20160224-148">&#
91;141&#93;</a></sup><br />(Drago
n C111.1)
</td>
<td>2,257&#160;kg (4,976&#160;lb)
<sup id="cite_ref-149" class="ref
erence"><a href="#cite_note-149">
&#91;142&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v

```

```

vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">Cargo to ISS included an <a href="/wiki/International_Docking_Adapter" title="International Docking Adapter">International Docking Adapter</a> (IDA-2) and total payload with reusable Dragon Capsule was 6,457&#160;k g (14,235&#160;lb). Second successful <a href="/wiki/Falcon_9_first-stage_landing_tests" title="Falcon 9 first-stage landing tests">first-stage landing</a> on a ground pad.<sup id="cite_ref-150" class="reference"><a href="#cite_note-150">&#91;143&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">28

```



```
</th>
<td>14 August 2016,<br />05:26
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br />B1026.1<sup id="cite_ref-skyrocket_1.2_115-2" class="reference"><a href="#cite_note-skyrocket_1.2-115">#91;108&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">Cape Canaveral</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">LC-40</a>
>
</td>
<td><a href="/wiki/JCSAT-16" title="JCSAT-16">JCSAT-16</a>
</td>
<td>4,600&#160;kg (10,100&#160;lb)
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
```

```

<td><a href="/wiki/SKY_Perfect_JS
AT_Group" class="mw-redirect" tit
le="SKY Perfect JSAT Group">SKY P
erfect JSAT Group</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small>(drone shi
p)</small>
</td></tr>
<tr>
<td colspan="9">First attempt to
  land from a ballistic trajectory
  using a single-engine landing bur
  n, as all previous landings from
  a ballistic trajectory had fired
  three engines on the final burn.
  The latter provides more braking
  force but subjects the vehicle to
  greater structural stresses, whil
  e the single-engine landing burn
  takes more time and fuel while a
  llowing more time during final de
  scent for corrections.<sup id="ci

```

```

te_ref-151" class="reference"><a
  href="#cite_note-151">&#91;144&#
93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">N/A <sup id
="cite_ref-152" class="referenc
e"><a href="#cite_note-152">&#91;
e&#93;</a></sup>
</th>
<td>3 September 2016,<br />07:00<br />(planned)<sup id="cite_ref-1
53" class="reference"><a href="#c
ite_note-153">&#91;145&#93;</a></
sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a> <br />B1028.1<sup i
d="cite_ref-skyrocket_1.2_115-3"
class="reference"><a href="#cite
_note-skyrocket_1.2-115">&#91;108
&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_

```

```

Complex_40" title="Cape Canaveral
Space Launch Complex 40">LC-40</a
>
</td>
<td><a href="/wiki/Amos-6" class
="mw-redirect" title="Amos-6">Amo
s-6</a><sup id="cite_ref-154" cla
ss="reference"><a href="#cite_not
e-154">&#91;146&#93;</a></sup>
</td>
<td>5,500&#160;kg (12,100&#160;l
b)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Spacecom" titl
e="Spacecom">Spacecom</a>
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-alig
n: center;" class="table-failur
e">Precluded<br /><small>(failure
pre-flight)</small>
</td>
<td style="background:#ecec; te
xt-align:center;">Precluded<br />
<small><span class="nowrap">(dron
e ship)</span></small>

```

```
</td></tr>
<tr>
<td colspan="9">The rocket and the Amos-6 payload were lost in a launch pad explosion on 1 September 2016 during propellant filling procedures prior to a <a href="/wiki/Static_fire" class="mw-redirect" title="Static fire">static fire</a> test.<sup id="cite_ref-155" class="reference"><a href="#cite_note-155">&#91;147&#93;</a></sup> The pad was clear of personnel, and there were no injuries.<sup id="cite_ref-156" class="reference"><a href="#cite_note-156">&#91;148&#93;</a></sup> SpaceX released an official statement in January 2017 indicating that the cause of the failure was a buckled liner in several of the <a href="/wiki/Composite_overwrapped_pressure_vessel" title="Composite overwrapped pressure vessel">Composite overwrapped pressure vessel</a> (COPV) (used to store helium which pressurize the stage's propellant tanks), causing perforations that allowed liquid and/or solid oxygen to accumulate underneath t
```

he lining, which was ignited by friction.^{[^](#cite_note-auto1-157)} Following the explosion, SpaceX has switched to performing static fire tests only without attached payloads.([more details below](#Loss_of_Amos-6_on_the_launch_pad))

2017

With 18 launches throughout 2017, SpaceX had the most prolific yearly launch manifest of all rocket families.^{[^](#cite_note-158)}

Flight No.	Date and time
	(<a 38="" 686="" 964="" 980"="" data-label="Page-Footer" href="/wiki/Coordinated_Uni</td> </tr> </tbody> </table> </div> <div data-bbox=">https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true

```

versal_Time" title="Coordinated U
niversal Time">UTC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first
-stage boosters">Version,<br />Bo
oster</a><sup id="cite_ref-booste
r_11-4" class="reference"><a href
="#cite_note-booster-11">&#91;b&#
93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-4" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"

```

```

title="Falcon 9 first-stage landing tests">Booster<br />landing</a>
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">29
</th>
<td>14 January 2017,<br />17:54
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">B1029.1</a><sup id="cite_ref-NSF-2017-01-17_159-0" class="reference"><a href="#cite_note-NSF-2017-01-17-159">&#91;151&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect" title="Vandenberg Air Force Base">VAFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Iridium_NEXT"

```



```

class="mw-redirect" title="Iridium NEXT">Iridium NEXT</a>-1<br />
(10 satellites)<sup id="cite_ref-sdc20100616_160-0" class="reference"><a href="#cite_note-sdc20100616-160">&#91;152&#93;</a></sup><sup id="cite_ref-161" class="reference"><a href="#cite_note-161">&#91;153&#93;</a></sup>
</td>
<td>9,600&#160;kg (21,200&#160;l
b)
</td>
<td><a href="/wiki/Polar_orbit" title="Polar orbit">Polar</a> <a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/Iridium_Communications" title="Iridium Communications">Iridium Communications</a>
>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align:

```

```

n: center;" class="table-succes
s">Success<sup id="cite_ref-162"
  class="reference"><a href="#cite
_note-162">&#91;154&#93;</a></sup
><br /><small>(drone ship)</small
>
</td></tr>
<tr>
<td colspan="9">Return-to-flight
  mission after the loss of <a href="/wiki/Amos-6" class="mw-redire
ct" title="Amos-6">Amos-6</a> in
  September 2016. This was the fir
st launch of a series of Iridium
  NEXT satellites intended to repl
ace the <a href="/wiki/Iridium_sa
tellite_constellation" title="Iri
dium satellite constellation">ori
ginal Iridium constellation</a> l
aunched in the late 1990s. Each F
alcon 9 mission carried 10 satell
ites, with a goal of 66 plus 9 sp
are<sup id="cite_ref-Iridiumrides
harePR_163-0" class="reference"><
a href="#cite_note-Iridiumridesha
rePR-163">&#91;155&#93;</a></sup>
satellites constellation by mid-2
018.<sup id="cite_ref-sfn_164-0"
  class="reference"><a href="#cite
_note-sfn-164">&#91;156&#93;</a>

```

</sup>^{[157]} Following the delayed launch of the first two Iridium units with a Dnepr rocket from April 2016, Iridium Communications decided to launch the first batch of 10 satellites with SpaceX instead.^{[158]} Payload comprised ten satellites weighing 860 kg (1,900 lb) each plus a 1,000 kg (2,200 lb) dispenser.^{[159]}

</td></tr>

<tr>
 <th scope="row" rowspan="2" style="text-align:center;">30
 </th>
 <td>19 February 2017,
14:39
 </td>
 <td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thru

```

st">F9 FT</a><br />B1031.1<sup id
="cite_ref-block_numbers_14-15" c
lass="reference"><a href="#cite_n
ote-block_numbers-14">&#91;8&#93;
</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-10"
title="SpaceX CRS-10">SpaceX CRS-
10</a><sup id="cite_ref-spn-20160
224_148-1" class="reference"><a h
ref="#cite_note-spn-20160224-14
8">&#91;141&#93;</a></sup><br />
(Dragon C112.1)
</td>
<td>2,490&#160;kg (5,490&#160;lb)
<sup id="cite_ref-168" class="ref
erence"><a href="#cite_note-168">
&#91;160&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
> (<a href="/wiki/ISS" class="mw-
redirect" title="ISS">ISS</a>)

```

```

</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small>(ground pa
d)</small>
</td></tr>
<tr>
<td colspan="9">First Falcon 9 fl
ight from the historic <a href="/
wiki/Kennedy_Space_Center_Launch_
Complex_39A" title="Kennedy Space
Center Launch Complex 39A">LC-39A
</a> launchpad at <a href="/wiki/
Kennedy_Space_Center" title="Kenn
edy Space Center">Kennedy Space C
enter</a>, and first uncrewed lau
nch from LC-39A since <a href="/w
iki/Skylab" title="Skylab">Skylab

```

```

-1</a>.<sup id="cite_ref-:10_169-0" class="reference"><a href="#cite_note-:10-169">&#91;161&#93;</a></sup> The flight carried supplies and materials to support ISS Expeditions <a href="/wiki/Expedition_50" title="Expedition 50">50</a> and <a href="/wiki/Expedition_51" title="Expedition 51">51</a>, and third return of first stage booster to landing pad at <a href="/wiki/Cape_Canaveral" title="Cape Canaveral">Cape Canaveral</a> <a href="/wiki/Landing_Zones_1_and_2" title="Landing Zones 1 and 2">Landing Zone 1</a>.<sup id="cite_ref-170" class="reference"><a href="#cite_note-170">&#91;162&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">31
</th>
<td>16 March 2017,<br />06:00
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br />B1030.1<sup id="cite_ref-171" class="referenc

```

```

e"><a href="#cite_note-171">&#91;
163&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/EchoStar_23" c
lass="mw-redirect" title="EchoSta
r 23">EchoStar 23</a>
</td>
<td>5,600&#160;kg (12,300&#160;l
b)<sup id="cite_ref-172" class="r
eference"><a href="#cite_note-17
2">&#91;164&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/EchoStar" titl
e="EchoStar">EchoStar</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success

```

```
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<br /><sup id="cite_ref-expendable_173-0" class="reference"><a href="#cite_note-expendable-173">#91;165#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">First uncrewed non-station launch from LC-39A since <a href="/wiki/Apollo_6" title="Apollo 6">Apollo 6</a>.<sup id="cite_ref-:10_169-1" class="reference"><a href="#cite_note-:10-169">#91;161#93;</a></sup> Launched a communications satellite for broadcast services over <a href="/wiki/Brazil" title="Brazil">Brazil</a>.<sup id="cite_ref-spn-echostar_174-0" class="reference"><a href="#cite_note-spn-echostar-174">#91;166#93;</a></sup> Due to the payload size launch into a GTO, the booster was expended into the <a href="/wiki/Atlantic_Ocean" title="Atlantic Ocean">Atlantic Ocean</a> and did not feature
```



```

landing legs and grid fins.<sup id="cite_ref-175" class="reference"><a href="#cite_note-175">#91;
167#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">32
</th>
<td>30 March 2017,<br />22:27
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a> <abbr title="Flight proven booster">ꠔ</abbr><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">B1021.2</a><sup id="cite_ref-nsf-20170330_122-2" class="reference"><a href="#cite_note-nsf-20170330-122">#91;115#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>

```

```

<td><a href="/wiki/SES-10" title
="SES-10">SES-10</a><sup id="cite
_ref-spacenews20140410_116-1" cla
ss="reference"><a href="#cite_not
e-spacenews20140410-116">&#91;109
&#93;</a></sup><sup id="cite_ref-
ses-date-sfn_176-0" class="refere
nce"><a href="#cite_note-ses-date
-sfn-176">&#91;168&#93;</a></sup>
</td>
<td>5,300&#160;kg (11,700&#160;l
b)<sup id="cite_ref-airbusds-pr20
140220_177-0" class="reference"><
a href="#cite_note-airbusds-pr201
40220-177">&#91;169&#93;</a></sup
>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-theve
rgeflight32_178-0" class="referen
ce"><a href="#cite_note-thevergef

```

```

light32-178">&#91;170&#93;</a></s
up>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small>(drone shi
p)</small>
</td></tr>
<tr>
<td colspan="9">First payload to
  fly on a reused first stage, B10
  21, previously launched with <a href="/wiki/SpaceX_CRS-8" title="S
  paceX CRS-8">CRS-8</a>, and first
  to land intact a second time.<sup
  id="cite_ref-179" class="referenc
  e"><a href="#cite_note-179">&#91;
  171&#93;</a></sup><sup id="cite_r
  ef-thevergeflight32_178-1" class
  ="reference"><a href="#cite_note-
  thevergeflight32-178">&#91;170&#9
  3;</a></sup> Additionally, this f
  light was the first reused rocket
  to fly from LC-39A since <a href
  ="/wiki/STS-135" title="STS-135">
  STS-135</a> and for the first tim
  e the <a href="/wiki/Payload_fair
  ing" title="Payload fairing">payl
  oad fairing</a>, used to protect

```

the payload during launch, remained intact after a successful [splashdown](/wiki/Splashdown "Splashdown") achieved with thrusters and a steerable parachute.^{[\[172\]](#cite_note-180)}^{[\[173\]](#cite_note-181)}([more details below](#Inaugural_reuse_of_the_first_stage))

33	1 May 2017, 11:15
	F9 FT B1032.1 ^{[129]} [129]
	<a 38="" 685="" 964="" 980"="" data-label="Page-Footer" href="/wiki/Kennedy_Space_ </td> </tr> </table> </div> <div data-bbox="> https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true

```

Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/List_of_NRO_la
unches" title="List of NRO launch
es">NROL-76</a><sup id="cite_ref-
nrol-76_182-0" class="reference">
<a href="#cite_note-nrol-76-182">
&#91;174&#93;</a></sup>
</td>
<td data-sort-value="" style="bac
kground: #ecec; color: #2C2C2C;
vertical-align: middle; text-alig
n: center;" class="table-na">Clas
sified
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a>
<sup id="cite_ref-183" class="re
ference"><a href="#cite_note-18
3">&#91;175&#93;</a></sup>
</td>
<td><a href="/wiki/National_Recon
naissance_Office" title="National
Reconnaissance Office">NRO</a>
</td>
<td style="background: #9EFF9E; v

```

```

vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">First launch under SpaceX's 2015 certification for national security space missions, which allowed SpaceX to contract launch services for classified payloads,<sup id="cite_ref-184" class="reference"><a href="#cite_note-184">&#91;176&#93;</a></sup> and thus breaking the monopoly <a href="/wiki/United_Launch_Alliance" title="United Launch Alliance">United Launch Alliance</a> (ULA) held on classified launches since 2006.<sup id="cite_ref-185" class="reference"><a href="#cite_note-185">&#91;177&#93;</a></sup> For the first time, SpaceX offered continuous livestream of first stage booster from liftoff to lan

```

```

ding, but omitted second-stage speed and altitude telemetry.<sup id="cite_ref-186" class="reference"><a href="#cite_note-186">&#91;178&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">34
</th>
<td>15 May 2017,<br />23:21
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br />B1034.1<sup id="cite_ref-187" class="reference"><a href="#cite_note-187">&#91;179&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Inmarsat" title="Inmarsat">Inmarsat-5 F4</a><sup id="cite_ref-spacenews20140702_188-0" class="reference"><a href=

```

```

="#cite_note-spacenews20140702-18
8">&#91;180&#93;</a></sup>
</td>
<td>6,070&#160;kg (13,380&#160;l
b)<sup id="cite_ref-gunter-inmars
at5_189-0" class="reference"><a h
ref="#cite_note-gunter-inmarsat5-
189">&#91;181&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Inmarsat" titl
e="Inmarsat">Inmarsat</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<br />
<sup id="cite_ref-expendable_
173-1" class="reference"><a href
="#cite_note-expendable-173">&#9
1;165&#93;</a></sup>
</td></tr>

```



```

<tr>
<td colspan="9">The launch was originally scheduled for the Falcon Heavy, but <a href="/wiki/Falcon_9_Full_Thrust#Modifications_from_Falcon_9_v1.1" title="Falcon 9 Full Thrust">performance improvements</a> allowed the mission to be carried out by an expendable Falcon 9 instead.<sup id="cite_ref-sn_190-0" class="reference"><a href="#cite_note-sn-190">¶182¶93;</a></sup> Inmarsat-5 F4 is Inmarsat's "largest and most complicated communications satellite ever built".<sup id="cite_ref-191" class="reference"><a href="#cite_note-191">¶183¶93;</a></sup> Inmarsat 5 F4 was delivered into an arcing <a href="/wiki/Supersynchronous_orbit" title="Supersynchronous orbit">"supersynchronous" transfer orbit</a> of 381&#160;km ×&#160;68,839&#160;km (237&#160;mi ×&#160;42,775&#160;mi) in altitude, tilted 24.5° to the <a href="/wiki/Equator" title="Equator">equator</a>.<sup id="cite_ref-192" class="reference"><a href="#cite_note-192">¶184¶93;</

```

```

a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">35
</th>
<td>3 June 2017,<br />21:07
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a><br />B1035.1<sup id
="cite_ref-nsf-20170528_193-0" cl
ass="reference"><a href="#cite_no
te-nsf-20170528-193">&#91;185&#9
3;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-11"
title="SpaceX CRS-11">SpaceX CRS-
11</a><sup id="cite_ref-spn-20160
224_148-2" class="reference"><a h
ref="#cite_note-spn-20160224-14
8">&#91;141&#93;</a></sup><br />
(Dragon C106.2 ⚡)

```

```


</td>
<td>2,708&#160;kg (5,970&#160;lb)
<sup id="cite_ref-194" class="ref
erence"><a href="#cite_note-194">
&#91;186&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
> (<a href="/wiki/ISS" class="mw-
redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small>(ground pa
d)</small>
</td></tr>
<tr>
<td colspan="9">This mission deli

```

[Neutron Star Interior Composition Explorer](/wiki/Neutron_Star_Interior_Composition_Explorer "Neutron Star Interior Composition Explorer") (NICER),^{[187](#cite_ref-nasa-nicer-manifest_195-0)} Multiple User System for Earth Sensing Facility (MUSES),^{[188](#cite_ref-196)} [Roll Out Solar Array](/wiki/Roll_Out_Solar_Array "Roll Out Solar Array") (ROSA),^{[189](#cite_ref-197)} an [Advanced Plant Habitat](/w/index.php?title=Advanced_Plant_Habitat&action=edit&redlink=1 "Advanced Plant Habitat (page does not exist)") to the ISS,^{[190](#cite_ref-workshop-matsew20160517_198-0)}

^{class="reference">[191]} and Birds-1 payloads. This mission launched for the first time a refurbished Dragon capsule,^{[192]} serial number C106, which had flown in September 2014 on the SpaceX CRS-4 mission,^{[185]} and was the first time since 2011 a reused spacecraft arrived at the ISS.^{[193]} Five cubesats were included in the payload, the first satellites from the countries of Ban</sup>

```

gladesh</a> (<i><a href="/wiki/BRAC_Onnesha" title="BRAC Onnesha">BRAC Onnesha</a></i>), <a href="/wiki/Ghana" title="Ghana">Ghana</a> (<i><a href="/wiki/GhanaSat-1" title="GhanaSat-1">GhanaSat-1</a></i>), and <a href="/wiki/Mongolia" title="Mongolia">Mongolia</a> (<i><a href="/wiki/Mazaalai_(satellite)" title="Mazaalai (satellite)">Mazaalai</a></i>).<sup id="cite_ref-Amsat_202-0" class="reference"><a href="#cite_note-Amsat-202">&#91;194&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">36
</th>
<td>23 June 2017,<br />19:10
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a>  <br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">B1029.2</a>
<sup id="cite_ref-sfn-20170505_203-0" class="reference"><a href="#cite_note-sfn-20170505-203">&#91;

```

```

195&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/BulgariaSat-1" title="BulgariaSat-1">BulgariaSat-1</a><sup id="cite_ref-ssloral20140908_204-0" class="reference"><a href="#cite_note-ssloral20140908-204">&#91;196&#93;</a></sup>
</td>
<td>3,669&#160;kg (8,089&#160;lb)
<sup id="cite_ref-205" class="reference"><a href="#cite_note-205">&#91;197&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Bulsatcom" title="Bulsatcom">Bulsatcom</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align:

```

```

n: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small>(drone shi
p)</small>
</td></tr>
<tr>
<td colspan="9">Second time a boo
ster was reused, as <a href="/wik
i/List_of_Falcon_9_first-stage_bo
osters" title="List of Falcon 9 f
irst-stage boosters">B1029</a> ha
d flown the Iridium mission in Ja
nuary 2017.<sup id="cite_ref-sfn-
20170505_203-1" class="referenc
e"><a href="#cite_note-sfn-201705
05-203">&#91;195&#93;</a></sup> T
his was the first commercial Bulg
arian-owned communications satell
ite.<sup id="cite_ref-sfn-2017050
5_203-2" class="reference"><a href="#cite_note-sfn-20170505-203">&
#91;195&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">37

```



```
</th>
<td>25 June 2017,<br />20:25
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br />B1036.1<sup id="cite_ref-nsf-20170624_206-0" class="reference"><a href="#cite_note-nsf-20170624-206">#91;198#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect" title="Vandenberg Air Force Base">VAFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Iridium_NEXT" class="mw-redirect" title="Iridium NEXT">Iridium NEXT</a>-2<br />(10 satellites)
</td>
<td>9,600#160;kg (21,200#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
>
```

```

</td>
<td><a href="/wiki/Iridium_Communications" title="Iridium Communications">Iridium Communications</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Second Iridium constellation launch of 10 satellites, and first flight using <a href="/wiki/Titanium" title="Titanium">titanium</a> (instead of <a href="/wiki/Aluminium" title="Aluminium">aluminium</a>) grid fins to improve control authority and better cope with heat during re-entry.<sup id="cite_ref-207" class="reference"><a href="#cite_note-207">&#91;199&#93;</a></sup>

```

```

</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">38
</th>
<td>5 July 2017,<br />23:38
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a><br />B1037.1<sup id
="cite_ref-nsf-20170629_208-0" cl
ass="reference"><a href="#cite_no
te-nsf-20170629-208">&#91;200&#9
3;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Intelsat_35e"
title="Intelsat 35e">Intelsat 35
e</a><sup id="cite_ref-sfn-201608
30_209-0" class="reference"><a hr
ef="#cite_note-sfn-20160830-209">
&#91;201&#93;</a></sup>
</td>
<td>6,761&#160;kg (14,905&#160;l

```

```

b)<sup id="cite_ref-210" class="reference"><a href="#cite_note-210">#91;202#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Intelsat" title="Intelsat">Intelsat</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<br /><sup id="cite_ref-expendable_173-2" class="reference"><a href="#cite_note-expendable-173">#91;165#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Originally expected to be flown on a <a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a>,<sup id="cit

```

e_ref-211" class="reference">[203]</sup> improvements to the Merlin engines meant that the heavy satellite could be flown to GTO in an expendable configuration of Falcon 9.^{[204]} The rocket achieved a supersynchronous orbit peaking at 43,000 km (27,000 mi), exceeding the minimum requirements of 28,000 km (17,000 mi).^{[205]} Intelsat 35e is the largest Intelsat's currently active satellite.^{[206]}

</td></tr>

<tr>

<th scope="row" rowspan="2" style="text-align:center;">39

</th>

```
<td>14 August 2017,<br />16:31
</td>
<td><a href="/wiki/Falcon_9_Block_4" class="mw-redirect" title="Falcon 9 Block 4">F9 B4</a><br />B1039.1<sup id="cite_ref-nsf-20170814_215-0" class="reference"><a href="#cite_note-nsf-20170814-215">
&#91;207&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-12" title="SpaceX CRS-12">SpaceX CRS-12</a><sup id="cite_ref-spn-20160224_148-3" class="reference"><a href="#cite_note-spn-20160224-148">
&#91;141&#93;</a></sup><br />
(Dragon C113.1)
</td>
<td>3,310&#160;kg (7,300&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
> (<a href="/wiki/ISS" class="mw-
```

```

redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">Dragon carried 2,
349&#160;kg (5,179&#160;lb) of pressurized and 961&#160;kg (2,119&#160;lb) unpressurized mass, including the <a href="/wiki/Cosmic_Ray_Energetics_and_Mass_Experiment" title="Cosmic Ray Energetics and Mass Experiment">Cosmic Ray Energetics and Mass Experiment</a> (CREAM) detector.<sup id="cite_r

```

```

ef-workshop-matsew20160517_198-1"
class="reference"><a href="#cite_
note-workshop-matsew20160517-19
8">&#91;190&#93;</a></sup> First
flight of the upgrade known info
rmally as "Block 4", which increa
ses thrust from the main engines
and includes other small upgrade
s,<sup id="cite_ref-nsf-20170814_
215-1" class="reference"><a href
="#cite_note-nsf-20170814-215">&#
91;207&#93;</a></sup> and last fl
ight of a newly built Dragon caps
ule, as further missions are plan
ned to use refurbished spacecraf
t.<sup id="cite_ref-nsf-20170726_
216-0" class="reference"><a href
="#cite_note-nsf-20170726-216">&#
91;208&#93;</a></sup> Also launch
ed the <a href="/wiki/Educational
_Launch_of_Nanosatellites" title
="Educational Launch of Nanosatel
lites">Educational Launch of Nano
satellites</a> ELaNa 22 mission.<
sup id="cite_ref-auto2_56-1" clas
s="reference"><a href="#cite_note
-auto2-56">&#91;49&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style

```



```
= "text-align:center;">40
</th>
<td>24 August 2017,<br />18:51
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a><br />B1038.1<sup id="cite_ref-nsf-20170819_217-0" class="reference"><a href="#cite_note-nsf-20170819-217">&#91;209&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect" title="Vandenberg Air Force Base">VAFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Formosat-5" title="Formosat-5">Formosat-5</a><sup id="cite_ref-eoportal-formosat5_218-0" class="reference"><a href="#cite_note-eoportal-formosat5-218">&#91;210&#93;</a></sup><sup id="cite_ref-Formosat5_homepage_219-0" class="reference"><a href="#cite_note-Formosat5_homepage-219">&#91;211&#93;</a></sup>
```

```

</td>
<td>475&#160;kg (1,047&#160;lb)<sup id="cite_ref-gunter-formosat5_220-0" class="reference"><a href="#cite_note-gunter-formosat5-220">&#91;212&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronous_orbit" title="Sun-synchronous orbit">SSO</a>
</td>
<td><a href="/wiki/National_Space_Organization" title="National Space Organization">NSPO</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">First <a href="/wiki/Earth_observation_satellite" title="Earth observation satelli

```

te">Earth observation satellite developed and constructed by Taiwan. The payload was much under the rocket's specifications, as the Spaceflight Industries SHERPA space tug had been removed from the cargo manifest of this mission,^{[213]} leading to analyst speculations that with discounts due to delays, SpaceX lost money on the launch.^{[214]}

</td></tr>

<tr>

<th scope="row" rowspan="2" style="text-align:center;">41

</th>

<td>7 September 2017,
14:00<sup id="cite_ref-223" class="refe

```

rence"><a href="#cite_note-223">&
#91;215&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a><br />B1
040.1<sup id="cite_ref-skyrocket_
1.2_115-4" class="reference"><a h
ref="#cite_note-skyrocket_1.2-11
5">&#91;108&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Boeing_X-37" t
itle="Boeing X-37">Boeing X-37B</
a> <a href="/wiki/USA-277" title
="USA-277">OTV-5</a>
</td>
<td>4,990&#160;kg (11,000&#160;l
b)<sup id="cite_ref-224" class="r
eference"><a href="#cite_note-22
4">&#91;216&#93;</a></sup><br /><
small>+ OTV payload</small>
</td>
<td><a href="/wiki/Low_Earth_Orbi

```

```

t" class="mw-redirect" title="Low
Earth Orbit">LEO</a>
</td>
<td><a href="/wiki/United_States_
Air_Force" title="United States A
ir Force">USAF</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small>(ground pa
d)</small>
</td></tr>
<tr>
<td colspan="9">Due to the classi
fied nature of the mission, the s
econd-stage speed and altitude te
lemetry were omitted from the lau
nch webcast. Notably, the primary
contractor, <a href="/wiki/Boein
g" title="Boeing">Boeing</a>, had
launched the X-37B with ULA, a Bo
eing partnership and a SpaceX com
petitor.<sup id="cite_ref-cnbc_20
17_06_06_225-0" class="referenc

```

```

e"><a href="#cite_note-cnbc_2017_06_06-225">&#91;217&#93;</a></sup>
> Second flight of the <a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">Falcon 9 Block 4</a> upgrade.<sup id="cite_ref-nsf-20170607_226-0" class="reference"><a href="#cite_note-nsf-20170607-226">&#91;218&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">42
</th>
<td>9 October 2017,<br />12:37
</td>
<td><a href="/wiki/Falcon_9_Block_4" class="mw-redirect" title="Falcon 9 Block 4">F9 B4</a><br />B1041.1<sup id="cite_ref-nsf-20170925_227-0" class="reference"><a href="#cite_note-nsf-20170925-227">&#91;219&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect" title="Vandenberg Air Force Base">VAFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_


```

```

4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Iridium_NEXT"
  class="mw-redirect" title="Iridi
um NEXT">Iridium NEXT</a>-3<br />
(10 satellites)<sup id="cite_ref-
sdc20100616_160-1" class="referen
ce"><a href="#cite_note-sdc201006
16-160">&#91;152&#93;</a></sup>
</td>
<td>9,600&#160;kg (21,200&#160;l
b)
</td>
<td><a href="/wiki/Polar_orbit" t
itle="Polar orbit">Polar</a> <a h
ref="/wiki/Low_Earth_orbit" title
="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/Iridium_Communi
cations" title="Iridium Communic
ations">Iridium Communications</a
>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v

```

```

vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Third flight of the <a href="/wiki/Falcon_9_Block_4" class="mw-redirect" title="Falcon 9 Block 4">Falcon 9 Block 4</a> upgrade, and the third launch of 10 Iridium NEXT satellites.<sup id="cite_ref-nsf-20170925_227-1" class="reference"><a href="#cite_note-nsf-20170925-227">#91;219&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">43
</th>
<td>11 October 2017,<br />22:53:00
</td>
<td><a href="/wiki/Falcon_9_Full_Thrust" title="Falcon 9 Full Thrust">F9 FT</a>  <br />B1031.2<sup id="cite_ref-ses11-reuse_228-0" class="reference"><a href="#cite_note-ses11-reuse-228">#91;220&#9

```



```
3;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/List_of_SES_satellites" title="List of SES satellites">SES-11</a> / <a href="/wiki/EchoStar" title="EchoStar">EchoStar 105</a>
</td>
<td>5,200&#160;kg (11,500&#160;lb)
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/SES_S.A." title="SES S.A.">SES S.A.</a></li>
<li><a href="/wiki/EchoStar" title="EchoStar">EchoStar</a></li></ul>
</div>
```

```

</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Third reuse and recovery of a previously flown first-stage booster, and the second time the contractor SES used a reflown booster.<sup id="cite_ref-ses11-reuse_228-1" class="reference"><a href="#cite_note-ses11-reuse-228">&#91;220&#93;</a></sup> The large satellite is shared, in
    "<a href="/wiki/CondoSat" title="CondoSat">CondoSat</a>" arrangement between SES and <a href="/wiki/EchoStar" title="EchoStar">EchoStar</a>.<sup id="cite_ref-229" class="reference"><a href="#cite_note-229">&#91;221&#93;</a></sup>
    >

```

```
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">44
</th>
<td>30 October 2017,<br />19:34
</td>
<td><a href="/wiki/Falcon_9_Block
_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a><br />B1
042.1<sup id="cite_ref-nsf-201709
25_227-2" class="reference"><a hr
ef="#cite_note-nsf-20170925-227">
&#91;219&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Koreasat_5A" t
itle="Koreasat 5A">Koreasat 5A</a>
<sup id="cite_ref-spacenews20140
512_230-0" class="reference"><a h
ref="#cite_note-spacenews20140512
-230">&#91;222&#93;</a></sup>
</td>
<td>3,500&#160;kg (7,700&#160;lb)
```

```

</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/KT_Corporatio
n" title="KT Corporation">KT Corp
oration</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small>(drone shi
p)</small>
</td></tr>
<tr>
<td colspan="9">First SpaceX laun
ch of a South Korean satellite, p
laced in GEO at 113.0° east.<sup
id="cite_ref-koreasat5a_231-0" c
lass="reference"><a href="#cite_n
ote-koreasat5a-231">&#91;223&#93;
</a></sup> It was the third launc
h and land for SpaceX in three we
eks, and the 15th successful land


```

```

ing in a row.<sup id="cite_ref-23
2" class="reference"><a href="#ci
te_note-232">&#91;224&#93;</a></s
up> A small fire was observed und
er the booster after it landed, l
eading to speculations about dama
ges to the engines which would pr
eclude it from flying it again.<s
up id="cite_ref-233" class="refer
ence"><a href="#cite_note-233">&#
91;225&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">45
</th>
<td>15 December 2017,<br />15:36<
sup id="cite_ref-234" class="refe
rence"><a href="#cite_note-234">&
#91;226&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a> ⚡ <br />B1035.2<sup
id="cite_ref-nsf-20171111_235-0"
class="reference"><a href="#cite
_note-nsf-20171111-235">&#91;227&
#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral

```

```

_Space_Force_Station" title="Cape
Canaveral Space Force Station">Ca
pe Canaveral</a>,<br /><a href="/
wiki/Cape_Canaveral_Space_Launch_
Complex_40" title="Cape Canaveral
Space Launch Complex 40">SLC-40</
a>
</td>
<td><a href="/wiki/SpaceX_CRS-13"
title="SpaceX CRS-13">SpaceX CRS-
13</a><sup id="cite_ref-spn-20160
224_148-4" class="reference"><a h
ref="#cite_note-spn-20160224-14
8">#91;141#93;</a></sup><br />
(Dragon C108.2 )
</td>
<td>2,205#160;kg (4,861#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
> (<a href="/wiki/ISS" class="mw-
redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v

```

```

vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">First launch to take place at the refurbished pad at Cape Canaveral after the 2016
<a href="/wiki/Amos-6" class="mw-redirect" title="Amos-6">Amos-6</a> explosion, and the 20th successful booster landing. Being the second reuse of a Dragon capsule (previously flown on <a href="/wiki/SpaceX_CRS-6" title="SpaceX CRS-6">SpaceX CRS-6</a>) and fourth reuse of a booster (previously flown on <a href="/wiki/SpaceX_CRS-11" title="SpaceX CRS-11">SpaceX CRS-11</a>) it was the first time both major components were reused on the same flight.<sup id="cite_ref-236" class="reference"><a href="#cite_note-236">&#91;

```

```

228&#93;</a></sup><sup id="cite_r
ef-nsf-20171111_235-1" class="ref
erence"><a href="#cite_note-nsf-2
0171111-235">&#91;227&#93;</a></s
up>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">46
</th>
<td>23 December 2017,<br />01:27<
sup id="cite_ref-sfn_iridium4_237
-0" class="reference"><a href="#c
ite_note-sfn_iridium4-237">&#91;2
29&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a> ⚡ <br />B1036.2<sup
id="cite_ref-nsf-20171111_235-2"
class="reference"><a href="#cite
_note-nsf-20171111-235">&#91;227&
#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch

```



```

Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Iridium_NEXT"
  class="mw-redirect" title="Iridi
um NEXT">Iridium NEXT</a>-4<br />
(10 satellites)<sup id="cite_ref-
sdc20100616_160-2" class="referen
ce"><a href="#cite_note-sdc201006
16-160">&#91;152&#93;</a></sup>
</td>
<td>9,600&#160;kg (21,200&#160;l
b)
</td>
<td><a href="/wiki/Polar_orbit" t
itle="Polar orbit">Polar</a> <a h
ref="/wiki/Low_Earth_orbit" title
="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/Iridium_Communi
cations" title="Iridium Commun
ications">Iridium Communications</a
>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-Iridi
um_NEXT-4_SN_238-0" class="refere
nce"><a href="#cite_note-Iridium_
NEXT-4_SN-238">&#91;230&#93;</a>

```

```

</sup>
</td>
<td style="background: #BFE; vertical-align: middle; text-align: center;" class="partial table-partial">Controlled<br /><small>(ocean)</small><sup id="cite_ref-ocean_landing_38-5" class="reference">
<a href="#cite_note-ocean_landing-38">&#91;d&#93;</a></sup><sup id="cite_ref-Iridium_NEXT-4_SN_238-1" class="reference">
<a href="#cite_note-Iridium_NEXT-4_SN-238">&#91;230&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">In order to avoid delays and convinced of no increased risks, Iridium Communications accepted the use of a recovered booster for its 10 satellites, and became the first customer to fly the same first-stage booster twice (from the second Iridium NEXT mission).<sup id="cite_ref-239" class="reference">
<a href="#cite_note-239">&#91;231&#93;</a></sup><sup id="cite_ref-nsf_iridium_240-0" class="reference">
<a href="#cite_note-nsf_iridium-240">&#91;2

```

SpaceX chose not to attempt recovery of the booster, but did perform a soft ocean touchdown.^{[\[233\]](#cite_note-241)} The launch occurred during sunset, which caused a [twilight effect](/wiki/Twilight_phenomena "Twilight phenomena") where sunlight reflected from the rocket plumes at high altitude, causing "jaw-dropping views" across [Southern California](/wiki/Southern_California "Southern California") and surrounding regions.^{[\[234\]](#cite_note-242)}

2018

In November 2017, [Gwynne Shotwell](/wiki/Gwynne_Shotwell "Gwynne Shotwell") expected to increase launch cadence in 2018 by about 50% compared to 2017, leveling out at a rate of about 30 to 40 per year, not inclu

ding launches for the planned SpaceX satellite constellation [Starlink](/wiki/Starlink "Starlink").^{[235](#cite_note-243)} The actual launch rate increased by 17% from 18 in 2017 to 21 in 2018, giving SpaceX the second most launches for the year for a rocket family, behind China's [Long March \(rocket family\)](/wiki/Long_March_(rocket_family) "Long March (rocket family)").^{[236](#cite_ref-244)} [Falcon Heavy](/wiki/Falcon_Heavy "Falcon Heavy") made its first flight.

</p>

<table class="wikitable plainrowheaders collapsible" style="width: 100%;">

<tbody><tr>

<th scope="col">Flight No.

</th>

<th scope="col">Date and
time (<a href="/wiki/Coordinated_Universal_Time" title="Coordinated U

```

niversal Time">UTC</a>)
</th>
<th scope="col"><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">Version,<br />Booster</a><sup id="cite_ref-boosters_11-5" class="reference"><a href="#cite_note-boosters-11">#91;b&#93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="cite_ref-Dragon_12-5" class="reference"><a href="#cite_note-Dragon-12">#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outcome
</th>
<th scope="col"><a href="/wiki/Falcon_9_first-stage_landing_tests" title="Falcon 9 first-stage landi

```

```

ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">47
</th>
<td>8 January 2018,<br />01:00<su
p id="cite_ref-245" class="refere
nce"><a href="#cite_note-245">&#9
1;237&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 B4</a><br />B1043.1<sup id
="cite_ref-zuma_246-0" class="ref
erence"><a href="#cite_note-zuma-
246">&#91;238&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a><br />
</td>
<td><a href="/wiki/Zuma_(satellit
e)" title="Zuma (satellite)">Zuma
</a><sup id="cite_ref-zuma_246-1"

```

```

class="reference"><a href="#cite_
note-zuma-246">&#91;238&#93;</a>
</sup><sup id="cite_ref-247" clas
s="reference"><a href="#cite_note
-247">&#91;239&#93;</a></sup><sup
id="cite_ref-248" class="referenc
e"><a href="#cite_note-248">&#91;
240&#93;</a></sup>
</td>
<td data-sort-value="" style="bac
kground: #ecec; color: #2C2C2C;
vertical-align: middle; text-alig
n: center;" class="table-na">Clas
sified
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/Northrop_Grumm
an" title="Northrop Grumman">Nort
hrop Grumman</a> <sup id="cite_re
f-249" class="reference"><a href
="#cite_note-249">&#91;f&#93;</a>
</sup><sup id="cite_ref-zuma_246-
2" class="reference"><a href="#ci
te_note-zuma-246">&#91;238&#93;</
a></sup>
</td>
<td style="background: #9EFF9E; v


```

```

vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-250" class="reference"><a href="#cite_note-250">&#91;241&#93;</a></sup>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">The mission had been postponed by nearly two months. Following a nominal launch, the recovery of the first-stage booster marked the 17th successful recovery in a row.<sup id="cite_ref-zuma-presskit2_251-0" class="reference"><a href="#cite_note-zuma-presskit2-251">&#91;242&#93;</a></sup> Rumors appeared that the payload was lost, as the satellite might have failed to separate from the second stage<sup id="cite_ref-ZumaVerge2_252-0" class="reference"><a href="#cite_note-ZumaVerge2-252">&#91;243&#93;</a></sup>

```


due to a fault in the Northrop Grumman-manufactured payload adapter, to which SpaceX announced that their rocket performed nominally.^{[91;243](#cite_ref-ZumaVerge2_252-1)} The classified nature of the mission means that there is little confirmed information.([more details below](#Zuma_launch_controversy))

scope="row" rowspan="2" style="text-align:center;">48	31 January 2018, ^{91;244}
F9 FT  ^{91;245}	

```

</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SES-16" title="SES-16">GovSat-1</a> (SES-16)<sup id="cite_ref-ses20150225_255-0" class="reference"><a href="#cite_note-ses20150225-255">&#91;246&#93;</a></sup>
</td>
<td>4,230&#160;kg (9,330&#160;lb)
<sup id="cite_ref-256" class="reference"><a href="#cite_note-256">&#91;247&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/SES_S.A." title="SES S.A.">SES</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align:

```

```

n: center;" class="table-succes
s">Success<sup id="cite_ref-Govsa
t_SN_257-0" class="reference"><a
href="#cite_note-Govsat_SN-257">
&#91;248&#93;</a></sup>
</td>
<td style="background: #BFE; vert
ical-align: middle; text-align: c
enter;" class="partial table-part
ial">Controlled<br /><small>(ocea
n)</small><sup id="cite_ref-ocean
_landing_38-6" class="reference">
<a href="#cite_note-ocean_landing
-38">&#91;d&#93;</a></sup><sup id
="cite_ref-Govsat_SN_257-1" class
="reference"><a href="#cite_note-
Govsat_SN-257">&#91;248&#93;</a>
</sup>
</td></tr>
<tr>
<td colspan="9">Reused booster fr
om the classified <a href="/wiki/
List_of_NRO_launches" title="List
of NRO launches">NROL-76</a> miss
ion in May 2017.<sup id="cite_ref
-sfn-20180111_254-1" class="refer
ence"><a href="#cite_note-sfn-201
80111-254">&#91;245&#93;</a></sup
> Following a successful experime
ntal soft ocean landing that used

```

three engines, the booster unexpectedly remained intact. Recovery was talked about and a [Craigslist](/wiki/Craigslist "Craigslist") ad believed to be made by Elon Musk jokingly said the booster was for sale at US\$9.9 million if the buyer brought their own [tugboat](/wiki/Tugboat "Tugboat").^{[\[249\]](#cite_note-258)} Despite this, recovery was not attempted, and the booster was subsequently destroyed.^{[\[250\]](#cite_note-259)} GovSat-1 satellite was put into a high-energy [Supersynchronous Transfer Orbit](/wiki/Supersynchronous_orbit "Supersynchronous orbit") of 250,000 km × 51,500 km (160,000 mi × 32,000 mi).^{[\[251\]](#cite_note-260)}^{[\[252\]](#cite_note-261)}

```

</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="4" style
="text-align:center;"><a href="/w
iki/Falcon_Heavy_test_flight" tit
le="Falcon Heavy test flight">FH
  1</a>
</th>
<td rowspan="3">6 February 2018,<
br />20:45<sup id="cite_ref-262"
  class="reference"><a href="#cite
_note-262">&#91;253&#93;</a></sup
>
</td>
<td><a href="/wiki/Falcon_Heavy"
  title="Falcon Heavy">Falcon Heav
y</a><br />B1033.1 <small>(core)
</small><sup id="cite_ref-nsf-201
70425_136-3" class="reference"><a
href="#cite_note-nsf-20170425-13
6">&#91;129&#93;</a></sup>
</td>
<td rowspan="3"><a href="/wiki/Ke
nnedy_Space_Center" title="Kenned
y Space Center">KSC</a>,<br /><a
  href="/wiki/Kennedy_Space_Center
_Launch_Complex_39A" title="Kenne
dy Space Center Launch Complex 39
A">LC-39A</a>

```

```

</td>
<td rowspan="3"><a href="/wiki/Elon_Musk%27s_Tesla_Roadster" title="Elon Musk&#39;s Tesla Roadster">Elon Musk's Tesla Roadster</a>
<sup id="cite_ref-263" class="reference"><a href="#cite_note-263">
&#91;254&#93;</a></sup><sup id="cite_ref-264" class="reference"><a href="#cite_note-264">&#91;255&#93;</a></sup>
</td>
<td rowspan="3">~1,250&#160;kg
  (2,760&#160;lb)<sup id="cite_ref-teslaorbit_265-0" class="reference"><a href="#cite_note-teslaorbit-265">&#91;256&#93;</a></sup>
</td>
<td rowspan="3"><a href="/wiki/Heliocentric_orbit" title="Heliocentric orbit">Heliocentric</a><br />
0.99–1.67 AU<sup id="cite_ref-teslaorbit_265-1" class="reference"><a href="#cite_note-teslaorbit-265">&#91;256&#93;</a></sup><br />
/>(close to <a href="/wiki/Mars_transfer_orbit" class="mw-redirect" title="Mars transfer orbit">Mars transfer orbit</a>)
</td>

```

```

<td rowspan="3"><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td>
<td rowspan="3" style="background-color: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-NYT_Heavy_266-0" class="reference"><a href="#cite_note-NYT_Heavy-266">&#91;257&#93;</a></sup>
</td>
<td style="background-color: #FFC7C7; vertical-align: middle; text-align: center;" class="table-failure">Failure<sup id="cite_ref-NYT_Heavy_266-1" class="reference"><a href="#cite_note-NYT_Heavy-266">&#91;257&#93;</a></sup><br /><small>(drone ship)</small>
</td></tr>
<tr>
<td><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">B1023.2</a><sup id="cite_ref-block_numbers_14-16" class="reference"><a href="#cite_note-block_numbers-14">&#91;8&#93;</a></sup>
<small>(side)</small> ↻
</td>

```

```

<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td>B1025.2<sup id="cite_ref-block_numbers_14-17" class="reference"><a href="#cite_note-block_numbers-14">8</a></sup> <small>(side)</small>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">Maiden flight of
  <a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a>, using two <a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">recovered Falcon 9 cores</a> as side boosters (from the <a href="/wiki/Thaicom_8" title="Thaicom 8">Thaicom 8</a><sup id="

```



d="cite_ref-267" class="reference">[258]</sup> and SpaceX CRS-9^{[129]} missions), as well as a modified Block 3 booster reinforced to endure the additional load from the two side boosters. The static fire test, held on 24 January 2018, was the first time 27 engines were tested together.^{[259]} The launch was a success, and the side boosters landed simultaneously at adjacent ground pads.^{[257]} Drone ship landing of the central core failed due to TEA

[TEB](/wiki/Triethylborane "Triethylborane") chemical igniter running out, preventing two of its engines from restarting; the landing failure caused damage to the nearby drone ship.^{[\[260\]](#cite_note-269)}^{[\[261\]](#cite_ref-middle-booster_270-0)} Final burn to heliocentric Earth-Mars orbit was performed after the second stage and payload cruised for 6 hours through the [Van Allen radiation belts](/wiki/Van_Allen_radiation_belt "Van Allen radiation belt").^{[\[262\]](#cite_ref-271)} Later, Elon Musk tweeted that the third burn was successful,^{[\[263\]](#cite_ref-272)} and [JPL](/wiki/JPL_Horizons_On-Line_Ephemeris_System "JPL Horizons On-Line Ephemeris System")

L Horizons On-Line Ephemeris System

showed the second stage and payload in an orbit with an [aphelion](/wiki/Perihelion_and_aphelion "Perihelion and aphelion") of 1.67 [AU](/wiki/Astronomical_unit "Astronomical unit").^{[[264]](#cite_note-horizons-273)} The live webcast proved immensely popular, as it became the second most watched livestream so far on [YouTube](/wiki/YouTube "YouTube"), reaching over 2.3 million concurrent views.^{[[265]](#cite_note-274)} Over 100,000 visitors are believed to have come to the [Space Coast](/wiki/Space_Coast "Space Coast") to watch the launch in person.^{[[266]](#cite_note-floridatoday.com-275)}([https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true](#Falcon_Heavy_test_f</small></p>
</div>
<div data-bbox=)

```

light">more details below</a>)</small>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">49
</th>
<td>22 February 2018,<br />14:17<
sup id="cite_ref-276" class="refe
rence"><a href="#cite_note-276">&
#91;267&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">F9 FT</a> <br />B1038.2<sup
id="cite_ref-gunter-f9_277-0" cl
ass="reference"><a href="#cite_no
te-gunter-f9-277">&#91;268&#93;</
a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Paz_(satel

```

```

lite)" title="Paz (satellite)">Pa
z</a><sup id="cite_ref-paz_278-0"
class="reference"><a href="#cite_
note-paz-278">&#91;269&#93;</a></
sup></li>
<li><a href="/wiki/Starlink" titl
e="Starlink">Tintin A and Tintin
  B</a><sup id="cite_ref-gunter-mi
crosat2_279-0" class="reference">
<a href="#cite_note-gunter-micros
at2-279">&#91;270&#93;</a></sup>
</li></ul>
</div>
</td>
<td>2,150&#160;kg (4,740&#160;lb)
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Hisdesat"
  title="Hisdesat">Hisdesat</a></l
i>
<li><a href="/wiki/ExactEarth" ti
tle="ExactEarth">exactEarth</a></
li>
<li><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a></li></ul>
</div>

```

```

</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-Paz_SN_280-0" class="reference"><a href="#cite_note-Paz_SN-280">&#91;271&#93;</a></sup>
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<br /><sup id="cite_ref-Paz_SN_280-1" class="reference"><a href="#cite_note-Paz_SN-280">&#91;271&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Last flight of a
  <a href="/wiki/Falcon_9_Block_3" class="mw-redirect" title="Falcon 9 Block 3">Block 3</a> first stage. Reused the booster from the <a href="/wiki/Formosat-5" title="Formosat-5">Formosat-5</a> mission.
  <sup id="cite_ref-gunter-f9_277-1" class="reference"><a href="#cite_note-gunter-f9-277">&#91;268&#93;</a></sup> Paz (peace) is Spai

```

n's first spy satellite^{[\[272\]](#cite_note-281)} that will be operated in a constellation with the German SAR fleet [TSX](/wiki/TerraSAR-X "TerraSAR-X") and [TDX](/wiki/TanDEM-X "TanDEM-X").^{[\[269\]](#cite_note-paz_278-1)} In addition, the rocket carried two SpaceX test satellites for their forthcoming [communication](/wiki/Starlink_(satellite_constellation) "Starlink (satellite constellation)")s network in low Earth orbit.^{[\[273\]](#cite_note-nsf-20180211-282-0)}^{[\[270\]](#cite_note-gunter-microsat2_279-1)} This core flew without landing legs and was expended at sea.^{[\[282\]](#cite_note-nsf-20180211-282-1)}

```

href="#cite_note-nsf-20180211-28
2">&#91;273&#93;</a></sup> It als
o featured an upgraded payload fa
iring 2.0 with a first recovery a
ttempt using the <i><a href="/wik
i/Mr._Steven" class="mw-redirect"
title="Mr. Steven">Mr. Steven</a>
</i> crew boat equipped with a ne
t. The fairing narrowly missed th
e boat, but achieved a soft water
landing.<sup id="cite_ref-283" cl
ass="reference"><a href="#cite_no
te-283">&#91;274&#93;</a></sup><s
up id="cite_ref-284" class="refer
ence"><a href="#cite_note-284">&#
91;275&#93;</a></sup><sup id="cit
e_ref-Paz_SN_280-2" class="refere
nce"><a href="#cite_note-Paz_SN-2
80">&#91;271&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">50
</th>
<td>6 March 2018,<br />05:33<sup
id="cite_ref-:1_285-0" class="re
ference"><a href="#cite_note-:1-2
85">&#91;276&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block

```



```

_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a><br />B1
044.1<sup id="cite_ref-skyrocket_
1.2_115-5" class="reference"><a h
ref="#cite_note-skyrocket_1.2-11
5">&#91;108&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Hispasat_3
0W-6" title="Hispasat 30W-6">Hisp
asat 30W-6</a><sup id="cite_ref-s
px20150914_286-0" class="referenc
e"><a href="#cite_note-spx2015091
4-286">&#91;277&#93;</a></sup></l
i>
<li>PODSat<sup id="cite_ref-287"
class="reference"><a href="#cite
_note-287">&#91;278&#93;</a></sup
></li></ul>
</div>
</td>
<td>6,092&#160;kg (13,431&#160;l

```

```

b)<sup id="cite_ref-gunter-hispas
at30w6_288-0" class="reference"><
a href="#cite_note-gunter-hispasa
t30w6-288">&#91;279&#93;</a></sup
>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Hispasat"
title="Hispasat">Hispasat</a><su
p id="cite_ref-spx20150914_286-1"
class="reference"><a href="#cite_
note-spx20150914-286">&#91;277&#9
3;</a></sup></li>
<li><a href="/wiki/NovaWurks" tit
le="NovaWurks">NovaWurks</a></li>
</ul>
</div>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-Hispa
sat_SFN_289-0" class="reference">
<a href="#cite_note-Hispasat_SFN-
289">&#91;280&#93;</a></sup>
</td>

```


```

<td style="background:#ecec; text-align:center;">No attempt<br /
><sup id="cite_ref-nsf-20180305_290-0" class="reference"><a href
="#cite_note-nsf-20180305-290">&#
91;281&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">The Spanish comms
at was the largest satellite flow
n by SpaceX as of March&#160;2018
<sup class="plainlinks noexcerpt
noprint asof-tag update" style
="display:none;"><a class="extern
al text" href="https://en.wikiped
ia.org/w/index.php?title=List_of_
Falcon_9_and_Falcon_Heavy_launche
s&amp;action=edit">&#91;update&#9
3;</a></sup>, "nearly the size of
a bus".<sup id="cite_ref-cnbc-201
80306_291-0" class="reference"><a
href="#cite_note-cnbc-20180306-29
1">&#91;282&#93;</a></sup> A dron
e ship landing was planned, but s
crapped due to unfavorable weathe
r conditions.<sup id="cite_ref-ns
f-20180305_290-1" class="referenc
e"><a href="#cite_note-nsf-201803
05-290">&#91;281&#93;</a></sup> S
paceX left the landing legs and t

```

itanium grid fins in place to prevent further delays, after previous concerns with the fairing pressurization and conflicts with the launch of [GOES-S](/wiki/GOES-S "GOES-S").^{[[283]](#cite_note-292)}

The Hispasat 30W-6 satellite was propelled into a supersynchronous transfer orbit.^{[[284]](#cite_note-293)}

scope="row" rowspan="2" style="text-align:center;">51	30 March 2018, 14:14 ^{&#91;285&#93;}
F9 B4  B1041.2 ^{&#91;286&#93;}	

```
f="#cite_note-gunter-f9-277">&#9
1;268&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Iridium_NEXT"
class="mw-redirect" title="Iridi
um NEXT">Iridium NEXT</a>-5<br />
(10 satellites)<sup id="cite_ref-
sdc20100616_160-3" class="referen
ce"><a href="#cite_note-sdc201006
16-160">&#91;152&#93;</a></sup>
</td>
<td>9,600&#160;kg (21,200&#160;l
b)
</td>
<td><a href="/wiki/Polar_orbit" t
itle="Polar orbit">Polar</a> <a h
ref="/wiki/Low_Earth_orbit" title
="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/Iridium_Communi
cations" title="Iridium Communic
ations">Iridium Communications</a>
```

```

>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-Iridium_NEXT_5_NSF_295-0" class="reference"><a href="#cite_note-Iridium_NEXT_5_NSF-295">&#91;286&#93;</a></sup>
</td>
<td style="background:#ecec; text-align:center;">No attempt<br /><sup id="cite_ref-296" class="reference"><a href="#cite_note-296">&#91;287&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Fifth Iridium NEXT mission launch of 10 satellites used the refurbished booster from third Iridium flight. As with recent reflown boosters, SpaceX used the controlled descent of the first stage to test more booster recovery options.<sup id="cite_ref-297" class="reference"><a href="#cite_note-297">&#91;288&#93;</a></sup> SpaceX planned a second recovery attempt of one half of the f


```

```

airing using the specially modified boat <a href="/wiki/Mr._Steven" class="mw-redirect" title="Mr. Steven">Mr. Steven</a>,<sup id="cite_ref-298" class="reference"><a href="#cite_note-298">#91;289#93;</a></sup> but the parafoil twisted, which led to the fairing half missing the boat.<sup id="cite_ref-299" class="reference"><a href="#cite_note-299">#91;290#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">52
</th>
<td>2 April 2018,<br />20:30<sup id="cite_ref-300" class="reference"><a href="#cite_note-300">#91;291#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_4" class="mw-redirect" title="Falcon 9 Block 4">F9 B4</a> ↗<br />B1039.2<sup id="cite_ref-nsf-20180328_301-0" class="reference"><a href="#cite_note-nsf-20180328-301">#91;292#93;</a></sup>
</td>

```

```

<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-14" title="SpaceX CRS-14">SpaceX CRS-14</a><sup id="cite_ref-spn-20160224_148-5" class="reference"><a href="#cite_note-spn-20160224-148">#91;141#93;</a></sup><br />(Dragon C110.2 )
</td>
<td>2,647#160;kg (5,836#160;lb)
<sup id="cite_ref-nsf-20180328_301-1" class="reference"><a href="#cite_note-nsf-20180328-301">#91;292#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title

```



```

="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-302"
class="reference"><a href="#cite
_note-302">&#91;293&#93;</a></sup
>
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<br /><sup id="cite_ref-CRS-14_NSF_
303-0" class="reference"><a href
="#cite_note-CRS-14_NSF-303">&#9
1;294&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">The launch used a
refurbished booster (from <a href
="/wiki/SpaceX_CRS-12" title="Spa
ceX CRS-12">CRS-12</a>) and a ref
urbished capsule (C110 from <a hr
ef="/wiki/SpaceX_CRS-8" title="Sp
aceX CRS-8">CRS-8</a>).<sup id="c
ite_ref-nsf-20180328_301-2" class
="reference"><a href="#cite_note-

```

nsf-20180328-301">[292]</sup> External payloads include a materials research platform Materials International Space Station Experiment (MISSE-FF)^{[295]} phase 3 of the Robotic Refueling Mission (RRM)^{[296]} TSI S,^{[297]} ASIM heliophysics sensor,^{[190]} several crystallization experiments,^{[298]} and the <i>

```

<a href="/wiki/RemoveDEBRIS" titl
e="RemoveDEBRIS">RemoveDEBRIS</a>
</i> system aimed at <a href="/wi
ki/Space_debris" title="Space deb
ris">space debris</a> removal.<su
p id="cite_ref-308" class="refere
nce"><a href="#cite_note-308">&#9
1;299&#93;</a></sup> The booster
  was expended, and SpaceX collect
ed more data on reentry profiles.
<sup id="cite_ref-baylor-20180403
_309-0" class="reference"><a href
="#cite_note-baylor-20180403-30
9">&#91;300&#93;</a></sup> It als
o carried the first <a href="/wik
i/Costa_Rica" title="Costa Rica">
Costa Rican</a> satellite, <a hre
f="/wiki/Project_Iraz%C3%BA" clas
s="mw-redirect" title="Project Ir
azú">Project Irazú</a>,<sup id="c
ite_ref-310" class="reference"><a
href="#cite_note-310">&#91;301&#9
3;</a></sup> and the first <a hre
f="/wiki/Kenya" title="Kenya">Ken
yan</a> satellite, <a href="/wik
i/1KUNS-PF" title="1KUNS-PF">1KUN
S-PF</a>.<sup id="cite_ref-311" c
lass="reference"><a href="#cite_n
ote-311">&#91;302&#93;</a></sup>
</td></tr>

```

```
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">53
</th>
<td>18 April 2018,<br />22:51<sup
id="cite_ref-nsf20180418_312-0" c
lass="reference"><a href="#cite_n
ote-nsf20180418-312">&#91;303&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a><br />B1
045.1<sup id="cite_ref-gunter-f9_
277-3" class="reference"><a href
="#cite_note-gunter-f9-277">&#91;
268&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Transiting_Exo
planet_Survey_Satellite" title="T
ransiting Exoplanet Survey Satell
ite">Transiting Exoplanet Survey
```

```

Satellite</a> (TESS)<sup id="cite_ref-NASA_C14_313-0" class="reference"><a href="#cite_note-NASA_C14-313">&#91;304&#93;</a></sup>
</td>
<td>362&#160;kg (798&#160;lb)<sup id="cite_ref-tess-flight_314-0" class="reference"><a href="#cite_note-tess-flight-314">&#91;305&#93;</a></sup>
</td>
<td><a href="/wiki/High_Earth_orbit" title="High Earth orbit">HEO
</a> for <a href="/wiki/P/2_orbit" class="mw-redirect" title="P/2 orbit">P/2 orbit</a>
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Launch_Services_Program" title="Launch Services Program">LSP</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-TESS_NSF_315-0" class="reference"><a href="#cite_note-TESS_NSF-315">&#91;306&#93;</a></sup>
</td>

```

```

<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-TESS_NSF_315-1" class="reference"><a href="#cite_note-TESS_NSF-315">&#9
1;306&#93;</a></sup><br /><small>
(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">First NASA high-p
riority science mission launched
by SpaceX. Part of the <a href
="/wiki/Explorers_program" class
="mw-redirect" title="Explorers p
rogram">Explorers program</a>, TE
SS is <a href="/wiki/Space_tlesc
ope" title="Space telescope">spac
e telescope</a> intended for wide
-field search of <a href="/wiki/E
xoplanet" title="Exoplanet">exopl
anets</a> transiting nearby star
s. It was the first time SpaceX l
aunched a scientific satellite wh
ich wasn't designed to focus on <
a href="/wiki/Earth_observation_s
atellite" title="Earth observatio
n satellite">Earth observations</
a>. The second stage placed the s
pacecraft into a high elliptical

```

[Earth](/wiki/Earth "Earth") orbit, after which the satellite performed its own maneuvers, including a lunar fly by, such that over the course of two months it reached a stable 2:1 resonant orbit with the Moon.^{[[307]](#cite_ref-316)} In January 2018, SpaceX received NASA's [Launch Services Program](/wiki/Launch_Services_Program "Launch Services Program") Category 2 certification of its Falcon 9 "Full Thrust", certification which is required for launching "medium-risk" missions like TESS.^{[[308]](#cite_ref-317)} Last launch of a new Block 4 booster,^{[[309]](#cite_ref-318)} and the 24th successful recovery of the first stage. An experimental water landing of the launch fairing was performed in order to attempt fairing recovery, primarily as a te

```

st of parachute systems.<sup id
="cite_ref-tess-flight_314-1" cla
ss="reference"><a href="#cite_not
e-tess-flight-314">&#91;305&#93;
</a></sup><sup id="cite_ref-TESS_
NSF_315-2" class="reference"><a h
ref="#cite_note-TESS_NSF-315">&#9
1;306&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">54
</th>
<td>11 May 2018,<br />20:14<sup i
d="cite_ref-319" class="referenc
e"><a href="#cite_note-319">&#91;
310&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><sup id="cite_ref-320" class
="reference"><a href="#cite_note-
320">&#91;311&#93;</a></sup><br /
><a href="/wiki/Falcon_9_B1046" t
itle="Falcon 9 B1046">B1046.1</a>
<sup id="cite_ref-gunter-f9_277-
4" class="reference"><a href="#ci
te_note-gunter-f9-277">&#91;268&#
93;</a></sup>
</td>

```



```


<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Bangabandhu-1" title="Bangabandhu-1">Bangabandhu-1</a><sup id="cite_ref-dhakatribune_321-0" class="reference"><a href="#cite_note-dhakatribune-321">#91;312#93;</a></sup><sup id="cite_ref-gunter-bd1_322-0" class="reference"><a href="#cite_note-gunter-bd1-322">#91;313#93;</a></sup>
</td>
<td>3,600#160;kg (7,900#160;lb)
<sup id="cite_ref-323" class="reference"><a href="#cite_note-323">#91;314#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Thales_Alenia_Space" title="Thales Alenia Space">Thales-Alenia</a> / <a href="/

```

```
wiki/Bangladesh_Telecommunication
_Regulatory_Commission" title="Ba
ngladesh Telecommunication Regula
tory Commission">BTRC</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-Banga
bandhu-1_AT_324-0" class="referen
ce"><a href="#cite_note-Bangaband
hu-1_AT-324">&#91;315&#93;</a></s
up>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-Banga
bandhu-1_AT_324-1" class="referen
ce"><a href="#cite_note-Bangaband
hu-1_AT-324">&#91;315&#93;</a></s
up><br /><small>(drone ship)</sma
ll>
</td></tr>
<tr>
<td colspan="9">First <a href="/w
iki/Falcon_9_Block_5" title="Falc
on 9 Block 5">Block 5</a> launch
vehicle booster to fly. Initiall
y planned for an <a href="/wiki/A
```

riane_5" title="Ariane 5">Ariane 5 launch in December 2017,^{[316]} it became the first Bangladeshi commercial satellite,^{[317]} BRAC Onnesha is a cubesat built by Thales Alenia Space.^{[318]}^{[319]} It is intended to serve telecom services from 119.0° east with a lifetime of 15 years.^{[320]} It was the 25th successfully recovered first stage booster.<sup id="cite_ref-Bangabandhu-1_AT_324-2" class="reference"><a href="#cite_note-Bangabandhu-1_AT-

```

324">&#91;315&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">55
</th>
<td>22 May 2018,<br />19:47<sup i
d="cite_ref-330" class="referenc
e"><a href="#cite_note-330">&#91;
321&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a> <br />
B1043.2<sup id="cite_ref-331" cla
ss="reference"><a href="#cite_not
e-331">&#91;322&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Iridium_NE
XT" class="mw-redirect" title="Ir
idium NEXT">Iridium NEXT</a>-6<br

```

```

/>(5 satellites)<sup id="cite_ref-
sdc20100616_160-4" class="refere
nce"><a href="#cite_note-sdc20100
616-160">&#91;152&#93;</a></sup><
sup id="cite_ref-Iridiumrideshare
PR_163-1" class="reference"><a hr
ef="#cite_note-IridiumridesharePR
-163">&#91;155&#93;</a></sup></li
>
<li><span class="nowrap"><a href
="/wiki/GRACE-FO" class="mw-redir
ect" title="GRACE-FO">GRACE-FO</a
> × 2</span><sup id="cite_ref-iri
dium-rideshare_332-0" class="refe
rence"><a href="#cite_note-iridiu
m-rideshare-332">&#91;323&#93;</a
></sup><sup id="cite_ref-grace-fo
-launch_333-0" class="reference">
<a href="#cite_note-grace-fo-laun
ch-333">&#91;324&#93;</a></sup></
li></ul>
</div>
</td>
<td>6,460&#160;kg (14,240&#160;l
b)<sup id="cite_ref-336" class="r
eference"><a href="#cite_note-33
6">&#91;g&#93;</a></sup>
</td>
<td><a href="/wiki/Polar_orbit" t
itle="Polar orbit">Polar</a> <a h

```

```


ref="/wiki/Low_Earth_orbit" title
="Low Earth orbit">LEO</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Iridium_Co
mmunications" title="Iridium Comm
unications">Iridium Communication
s</a></li>
<li><a href="/wiki/GFZ_German_Res
earch_Centre_for_Geosciences" tit
le="GFZ German Research Centre fo
r Geosciences">GFZ</a>&#160;&#822
6;&#32;<a href="/wiki/NASA" title
="NASA">NASA</a></li></ul>
</div>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success<sup id="cite_ref-337"
class="reference"><a href="#cite
_note-337">&#91;327&#93;</a></sup
>
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<br />
<sup id="cite_ref-expendable_
173-3" class="reference"><a href

```

```

="#cite_note-expendable-173">&#9
1;165&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Sixth Iridium NEX
T mission launching 5 satellites
used the refurbished booster fro
m Zuma. GFZ arranged a rideshare
of GRACE-FO on a Falcon 9 with I
ridium following the cancellation
of their <a href="/wiki/Dnepr_(ro
cket)" title="Dnepr (rocket)">Dne
pr</a> launch contract in 2015.<s
up id="cite_ref-iridium-rideshare
_332-1" class="reference"><a href
="#cite_note-iridium-rideshare-33
2">&#91;323&#93;</a></sup> Iridiu
m CEO Matt Desch disclosed in Sep
tember 2017 that GRACE-FO would b
e launched on this mission.<sup i
d="cite_ref-338" class="referenc
e"><a href="#cite_note-338">&#91;
328&#93;</a></sup> The booster re
use turnaround was a record 4.5 m
onths between flights.<sup id="ci
te_ref-339" class="reference"><a
href="#cite_note-339">&#91;329&#
93;</a></sup>
</td></tr>
<tr>

```

```
<th scope="row" rowspan="2" style
="text-align:center;">56
</th>
<td>4 June 2018,<br />04:45<sup i
d="cite_ref-340" class="referenc
e"><a href="#cite_note-340">&#91;
330&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a> <br />
B1040.2<sup id="cite_ref-gunter-f
9_277-5" class="reference"><a hre
f="#cite_note-gunter-f9-277">&#9
1;268&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SES-12" title
="SES-12">SES-12</a><sup id="cite
_ref-SES12_341-0" class="referenc
e"><a href="#cite_note-SES12-34
1">&#91;331&#93;</a></sup>
</td>
```



```

<td>5,384&#160;kg (11,870&#160;l
b)<sup id="cite_ref-nsf-20180531_
342-0" class="reference"><a href
="#cite_note-nsf-20180531-342">&#
91;332&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-343"
class="reference"><a href="#cite
_note-343">&#91;333&#93;</a></sup>
>
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<br />
<sup id="cite_ref-expendable_
173-4" class="reference"><a href
="#cite_note-expendable-173">&#9
1;165&#93;</a></sup>
</td></tr>

```

```

<tr>
<td colspan="9">The communication
s satellite serving the Middle Ea
st and the Asia-Pacific region at
the same place as <a href="/wiki/
SES-8" title="SES-8">SES-8</a>, a
nd was the largest satellite buil
t for SES.<sup id="cite_ref-SES12
_341-1" class="reference"><a href
="#cite_note-SES12-341">&#91;331&
#93;</a></sup> The Block 4 first
stage was expended,<sup id="cite
_ref-nsf-20180531_342-1" class="r
eference"><a href="#cite_note-nsf
-20180531-342">&#91;332&#93;</a>
</sup> while the second stage was
a Block 5 version, delivering mor
e power towards a higher <a href
="/wiki/Supersynchronous_orbit" t
itle="Supersynchronous orbit">sup
ersynchronous transfer orbit</a>
with 58,000&#160;km (36,000&#16
0;mi) apogee.<sup id="cite_ref-34
4" class="reference"><a href="#ci
te_note-344">&#91;334&#93;</a></s
up>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">57

```

```

</th>
<td>29 June 2018,<br />09:42<sup
  id="cite_ref-345" class="referen
  ce"><a href="#cite_note-345">&#9
  1;335&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_4" class="mw-redirect" title="Fa
lcon 9 Block 4">F9 B4</a> <br />
B1045.2<sup id="cite_ref-346" cla
ss="reference"><a href="#cite_not
e-346">&#91;336&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-15"
title="SpaceX CRS-15">SpaceX CRS-
15</a><br />(Dragon C111.2 )
</td>
<td>2,697&#160;kg (5,946&#160;lb)
<sup id="cite_ref-347" class="ref
erence"><a href="#cite_note-347">
&#91;337&#93;</a></sup>
</td>

```

```

<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
 (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-348" class="reference"><a href="#cite_note-348">&#91;338&#93;</a></sup>
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<br /><sup id="cite_ref-expendable_173-5" class="reference"><a href="#cite_note-expendable-173">&#91;165&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Payload included

```

[MISSE-FF 2](/wiki/Materials_International_Space_Station_Experiment "Materials International Space Station Experiment"), [ECOSTRESS](/wiki/ECOSTRESS "ECOSTRESS"), a [Latching End Effector](/wiki/Mobile_Servicing_System "Mobile Servicing System"), and [Birds-2](/wiki/Birds-2 "Birds-2") payloads. The refurbished booster featured a record 2.5 months period turnaround from its original launch of TESS, a record held until February 2020 with the Starlink L4 mission. The fastest previous was 4.5 months. This was the last flight of a Block 4 booster, which was expended into the [Atlantic Ocean](/wiki/Atlantic_Ocean "Atlantic Ocean") without landing legs and grid fins.^{[\[[339]\]\(#cite_note-block4retirement-349\)](#cite_ref-block4retirement_349-0)}

```

="text-align:center;">58
</th>
<td>22 July 2018,<br />05:50<sup
  id="cite_ref-350" class="referen
  ce"><a href="#cite_note-350">&#9
  1;340&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><br /><a href="/wiki/List_of
_Falcon_9_first-stage_boosters" t
itle="List of Falcon 9 first-stag
e boosters">B1047.1</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Telstar_19V" t
itle="Telstar 19V">Telstar 19V</a
><sup id="cite_ref-sfn-20160226_3
51-0" class="reference"><a href
="#cite_note-sfn-20160226-351">&#
91;341&#93;</a></sup>
</td>
<td>7,075&#160;kg (15,598&#160;1

```

```
b)<sup id="cite_ref-352" class="reference"><a href="#cite_note-352">#91;342#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GT0</a><sup id="cite_ref-sfn-20180722_353-0" class="reference"><a href="#cite_note-sfn-20180722-353">#91;343#93;</a></sup>
</td>
<td><a href="/wiki/Telesat" title="Telesat">Telesat</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-Telstar_19V_SFI_354-0" class="reference"><a href="#cite_note-Telstar_19V_SFI-354">#91;344#93;</a></sup>
>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-Telstar_19V_SFI_354-1" class="reference"><a href="#cite_note-Telstar_19
```

```

V_SFI-354">&#91;344&#93;</a></sup>
><br /><small>(drone ship)</small>
>
</td></tr>
<tr>
<td colspan="9"><a href="/wiki/SSL_(company)" title="SSL (company)">SSL</a>-manufactured communications satellite intended to be placed at 63.0° west over the Americas,<sup id="cite_ref-355" class="reference"><a href="#cite_note-355">&#91;345&#93;</a></sup> replacing Telstar 14R.<sup id="cite_ref-sfn-20180722_353-1" class="reference"><a href="#cite_note-sfn-20180722-353">&#91;343&#93;</a></sup> At 7,075&#160;kg (15,598&#160;lb), it became the heaviest commercial communications satellite so far launched.<sup id="cite_ref-356" class="reference"><a href="#cite_note-356">&#91;346&#93;</a></sup><sup id="cite_ref-357" class="reference"><a href="#cite_note-357">&#91;347&#93;</a></sup> This necessitated that the satellite be launched into a lower-energy orbit than a usual GTO, with its initial apogee at roughly 17,90

```



```

0&#160;km (11,100&#160;mi).<sup id="cite_ref-sfn-20180722_353-2" class="reference"><a href="#cite_note-sfn-20180722-353">&#91;343&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">59
</th>
<td>25 July 2018,<br />11:39<sup id="cite_ref-358" class="reference"><a href="#cite_note-358">&#91;348&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a><sup id="cite_ref-iridiumboosters_359-0" class="reference"><a href="#cite_note-iridiumboosters-359">&#91;349&#93;</a></sup><br /><a href="/wiki/Falcon_9_booster_B1048" class="mw-redirect" title="Falcon 9 booster B1048">B1048</a>.1<sup id="cite_ref-360" class="reference"><a href="#cite_note-360">&#91;350&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect"

```

```

    title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Iridium_NEXT"
    class="mw-redirect" title="Iridi
um NEXT">Iridium NEXT</a>-7<br />
(10 satellites)<sup id="cite_ref-
sdc20100616_160-5" class="referen
ce"><a href="#cite_note-sdc201006
16-160">&#91;152&#93;</a></sup>
</td>
<td>9,600&#160;kg (21,200&#160;l
b)
</td>
<td><a href="/wiki/Polar_orbit" t
itle="Polar orbit">Polar</a> <a h
ref="/wiki/Low_Earth_orbit" title
="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/Iridium_Communi
cations" title="Iridium Communic
ations">Iridium Communications</a
>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes

```

```

s">Success<sup id="cite_ref-Iridium_NEXT-7_SN_361-0" class="reference"><a href="#cite_note-Iridium_NEXT-7_SN-361">&#91;351&#93;</a>
</sup>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-Iridium_NEXT-7_space_362-0" class="reference"><a href="#cite_note-Iridium_NEXT-7_space-362">&#91;352&#93;</a></sup><br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Seventh Iridium NEXT launch, with 10 communication satellites.<sup id="cite_ref-Iridium_NEXT-7_SN_361-1" class="reference"><a href="#cite_note-Iridium_NEXT-7_SN-361">&#91;351&#93;</a>
</sup> The booster landed safely on the drone ship in the worst weather conditions for any landing yet attempted.<sup id="cite_ref-Iridium_NEXT-7_space_362-1" class="reference"><a href="#cite_note-Iridium_NEXT-7_space-362">&#91;35

```

```

2&#93;</a></sup><sup id="cite_ref-
Iridium_NEXT-7_SN_361-2" class
="reference"><a href="#cite_note-
Iridium_NEXT-7_SN-361">&#91;351&#
93;</a></sup> <i>Mr. Steven</i> b
oat with an upgraded 4x size net
    was used to attempt fairing reco
very but failed due to harsh weat
her.<sup id="cite_ref-Iridium_NEX
T-7_space_362-2" class="referenc
e"><a href="#cite_note-Iridium_NE
XT-7_space-362">&#91;352&#93;</a>
</sup><sup id="cite_ref-Iridium_N
EXT-7_SN_361-3" class="referenc
e"><a href="#cite_note-Iridium_NE
XT-7_SN-361">&#91;351&#93;</a></s
up>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">60
</th>
<td>7 August 2018,<br />05:18<sup
id="cite_ref-363" class="referenc
e"><a href="#cite_note-363">&#91;
353&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ⚡ <br /><a href="/wiki/Falc

```

```
on_9_booster_B1046" class="mw-red
irect" title="Falcon 9 booster B1
046">B1046.2</a><sup id="cite_ref
-Ralph-20180727_364-0" class="ref
erence"><a href="#cite_note-Ralph
-20180727-364">&#91;354&#93;</a>
</sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Merah_Putih_(s
atellite)" class="mw-redirect" ti
tle="Merah Putih (satellite)">Mer
ah Putih</a> (formerly Telkom 4)<
sup id="cite_ref-365" class="refe
rence"><a href="#cite_note-365">&
#91;355&#93;</a></sup><sup id="ci
te_ref-366" class="reference"><a
href="#cite_note-366">&#91;356&#
93;</a></sup>
</td>
<td>5,800&#160;kg (12,800&#160;l
b)<sup id="cite_ref-367" class="r
```

```

reference"><a href="#cite_note-36
7">&#91;357&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Telkom_Indones
ia" title="Telkom Indonesia">Telk
om Indonesia</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-Telco
mI_S.com_368-0" class="referenc
e"><a href="#cite_note-TelcomI_S.
com-368">&#91;358&#93;</a></sup>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-Telco
mI_S.com_368-1" class="referenc
e"><a href="#cite_note-TelcomI_S.
com-368">&#91;358&#93;</a></sup><
br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Indonesian comsat

```

```

intended to replace the aging <a
  href="/wiki/Telkom_1" class="mw-
redirect" title="Telkom 1">Telkom
1</a> at 108.0°&#160;east.<sup id
="cite_ref-369" class="referenc
e"><a href="#cite_note-369">&#91;
359&#93;</a></sup> First reflight
of a Block 5-version booster.<sup
id="cite_ref-370" class="referenc
e"><a href="#cite_note-370">&#91;
360&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">61
</th>
<td>10 September 2018,<br />04:45
<sup id="cite_ref-sfn-20180910_37
1-0" class="reference"><a href="#
cite_note-sfn-20180910-371">&#91;
361&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><br /><a href="/wiki/Falcon_
9_booster_B1049" class="mw-redire
ct" title="Falcon 9 booster B104
9">B1049.1</a><sup id="cite_ref-g
unter-f9_277-6" class="referenc
e"><a href="#cite_note-gunter-f9-

```

```

277">&#91;268&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Telstar_18V" t
itle="Telstar 18V">Telstar 18V</a
> / <a href="/wiki/Apstar" class
="mw-redirect" title="Apstar">Aps
tar</a>-5C<sup id="cite_ref-sfn-2
0160226_351-1" class="reference">
<a href="#cite_note-sfn-20160226-
351">&#91;341&#93;</a></sup>
</td>
<td>7,060&#160;kg (15,560&#160;l
b)<sup id="cite_ref-sfn-20180910_
371-1" class="reference"><a href
="#cite_note-sfn-20180910-371">&#
91;361&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a><sup i
d="cite_ref-sfn-20180910_371-2" c

```



```

lass="reference"><a href="#cite_note-sfn-20180910-371">&#91;361&#93;</a></sup>
</td>
<td><a href="/wiki/Telesat" title="Telesat">Telesat</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-sfn-20180910_371-3" class="reference">
<a href="#cite_note-sfn-20180910-371">&#91;361&#93;</a></sup>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-sfn-20180910_371-4" class="reference">
<a href="#cite_note-sfn-20180910-371">&#91;361&#93;</a></sup><br />
<small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9"><a href="/wiki/CondoSat" title="CondoSat">Condosat
</a> for 138.0°&#160;east over Asia and Pacific.<sup id="cite_ref-372" class="reference"><a href="#"

```

```

cite_note-372">&#91;362&#93;</a>
</sup> Delivered to a GTO orbit w
ith apogee close to 18,000&#160;k
m (11,000&#160;mi).<sup id="cite_
ref-sfn-20180910_371-5" class="re
ference"><a href="#cite_note-sfn-
20180910-371">&#91;361&#93;</a></
sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">62
</th>
<td>8 October 2018,<br />02:22<su
p id="cite_ref-nsf-20181008_373-
0" class="reference"><a href="#ci
te_note-nsf-20181008-373">&#91;36
3&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> &#160;<br /><a href="/wiki/Falco
n_9_booster_B1048" class="mw-redi
rect" title="Falcon 9 booster B10
48">B1048.2</a><sup id="cite_ref-
374" class="reference"><a href="#
cite_note-374">&#91;364&#93;</a>
</sup>
</td>
<td><a href="/wiki/Vandenberg_Air

```

```

_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/SAOCOM_1A" cla
ss="mw-redirect" title="SAOCOM 1
A">SAOCOM 1A</a><sup id="cite_ref
-SAOCOM20090416_375-0" class="ref
erence"><a href="#cite_note-SAOCO
M20090416-375">&#91;365&#93;</a>
</sup><sup id="cite_ref-saocom_re
vision_376-0" class="reference"><
a href="#cite_note-saocom_revisio
n-376">&#91;366&#93;</a></sup>
</td>
<td>3,000&#160;kg (6,600&#160;lb)
<sup id="cite_ref-nsf-20181008_37
3-1" class="reference"><a href="#
cite_note-nsf-20181008-373">&#91;
363&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><a href="/wiki/Comisi%C3%B3n_
Nacional_de_Actividades_Espaciale

```

```

s" title="Comisión Nacional de Ac
tividades Espaciales">CONAE</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-nsf-2
0181008_373-2" class="reference">
<a href="#cite_note-nsf-20181008-
373">&#91;363&#93;</a></sup>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-nsf-2
0181008_373-3" class="reference">
<a href="#cite_note-nsf-20181008-
373">&#91;363&#93;</a></sup><br /
><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9">Argentinian Earth
-observation satellite was origin
ally intended to be launched in 2
012.<sup id="cite_ref-SAOCOM20090
416_375-1" class="reference"><a href="#cite_note-SAOCOM20090416-37
5">&#91;365&#93;</a></sup> First
landing on the <a href="/wiki/Sp
aceX_landing_zone" title="SpaceX

```

```

        landing zone">West Coast ground
        pad</a>.<sup id="cite_ref-nsf-20
181008_373-4" class="reference"><
a href="#cite_note-nsf-20181008-3
73">&#91;363&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">63
</th>
<td>15 November 2018,<br />20:46<
sup id="cite_ref-377" class="refe
rence"><a href="#cite_note-377">&
#91;367&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ↗<br /><a href="/wiki/Falco
n_9_booster_B1047" class="mw-redi
rect" title="Falcon 9 booster B10
47">B1047.2</a><sup id="cite_ref-
gunter-f9_277-7" class="referenc
e"><a href="#cite_note-gunter-f9-
277">&#91;268&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent

```

```

er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Es%27hail_2" t
itle="Es&#39;hail 2">Es'hail 2</a
><sup id="cite_ref-eshail2_378-0"
class="reference"><a href="#cite_
note-eshail2-378">&#91;368&#93;</
a></sup>
</td>
<td>5,300&#160;kg (11,700&#160;l
b)<sup id="cite_ref-379" class="r
eference"><a href="#cite_note-37
9">&#91;369&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Es%27hailSat"
title="Es&#39;hailSat">Es'hailSa
t</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-space
news20181115_380-0" class="refere
nce"><a href="#cite_note-spacenew
s20181115-380">&#91;370&#93;</a>
</sup>


```

```

</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-space
news20181115_380-1" class="reference"><a href="#cite_note-spacenews20181115-380">&#91;370&#93;</a>
</sup><br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Qatari comsat positioned at 26.0°&#160;east.<sup id="cite_ref-eshail2_378-1" class="reference"><a href="#cite_note-eshail2-378">&#91;368&#93;</a></sup> This launch used redesigned <a href="/wiki/Composite_overwrapped_pressure_vessel" title="Composite overwrapped pressure vessel">COPVs</a>. This was to meet NASA safety requirements for commercial crew missions, in response to the September 2016 pad explosion.<sup id="cite_ref-381" class="reference"><a href="#cite_note-381">&#91;371&#93;</a></sup>
</td></tr>
<tr>

```

```

<th scope="row" rowspan="2" style
="text-align:center;">64
</th>
<td>3 December 2018,<br />18:34:0
5
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>  <a href="/wiki/Falcon_9_b
ooster_B1046" class="mw-redirect"
title="Falcon 9 booster B1046">B1
046.3</a><sup id="cite_ref-gunter
-f9_277-8" class="reference"><a h
ref="#cite_note-gunter-f9-277">&#
91;268&#93;</a></sup><br /><a hre
f="/wiki/SHERPA_(space_tug)" titl
e="SHERPA (space tug)">SHERPA</a>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/SSO-A" class
="mw-redirect" title="SSO-A">SSO-
A</a> (<i>SmallSat Express</i>)
</td>

```



```

<td>~4,000&#160;kg (8,800&#160;lb)<sup id="cite_ref-382" class="reference"><a href="#cite_note-382">&#91;372&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronous_orbit" title="Sun-synchronous orbit">SSO</a>
</td>
<td><a href="/wiki/Spaceflight_Industries" title="Spaceflight Industries">Spaceflight Industries</a>
>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-space news20181203_383-0" class="reference"><a href="#cite_note-spacenews20181203-383">&#91;373&#93;</a>
</sup>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<sup id="cite_ref-space news20181203_383-1" class="reference"><a href="#cite_note-spacenews20181203-383">&#91;373&#93;</a>

```

```

</sup><br /><small>(drone ship)</small>
</td></tr>
<tr>
<td colspan="9">Rideshare mission
<sup id="cite_ref-spaceflight-rideshare_384-0" class="reference"><a href="#cite_note-spaceflight-rideshare-384">&#91;374&#93;</a></sup> where two <a href="/wiki/SHERPA_(space_tug)" title="SHERPA (space tug)">SHERPA</a> <a href="/wiki/Satellite_dispenser" title="Satellite dispenser">dispensers</a> deployed 64 small satellites,<sup id="cite_ref-:2_385-0" class="reference"><a href="#cite_note-:2-385">&#91;375&#93;</a></sup><sup id="cite_ref-:3_386-0" class="reference"><a href="#cite_note-:3-386">&#91;376&#93;</a></sup> including <a href="/wiki/EuCROPIS" title="EuCROPIS">Eu:CROPIS</a><sup id="cite_ref-eucropis_387-0" class="reference"><a href="#cite_note-eucropis-387">&#91;377&#93;</a></sup> for the German <a href="/wiki/German_Aerospace_Center" title="German Aerospace Center">DLR</a>, HIBER-2 for the Dutch Hiber GL

```

obal,⁴ ITASAT-1 for the Brazilian [Instituto Tecnológico de Aeronáutica](/wiki/Instituto_Tecnol%C3%B3gico_de_Aeron%C3%A1utica "Instituto Tecnológico de Aeronáutica"),⁵ two high-resolution [SkySat](/wiki/SkySat "SkySat") imaging satellites for [Planet Labs](/wiki/Planet_Labs "Planet Labs"),^{nsf-20180129-390} and two high school CubeSats part of NASA's [ELaNa 24](/wiki/Educational_Launch_of_Nanosatellites "Educational Launch of Nanosatellites").^{Upcoming-ELaNa_391} This was the first time a booster was used for a third fli

```

ght.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">65
</th>
<td>5 December 2018,<br />18:16
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><br /><a href="/wiki/Falcon_
9_booster_B1050" class="mw-redire
ct" title="Falcon 9 booster B105
0">B1050</a><sup id="cite_ref-gun
ter-f9_277-9" class="reference"><
a href="#cite_note-gunter-f9-27
7">&#91;268&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-16"
title="SpaceX CRS-16">SpaceX CRS-
16</a><br />(Dragon C112.2 )

```

```

</td>
<td>2,500&#160;kg (5,500&#160;lb)
<sup id="cite_ref-392" class="ref
erence"><a href="#cite_note-392">
&#91;382&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
> (<a href="/wiki/ISS" class="mw-
redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align:
center;" class="table-failur
e">Failure<sup id="cite_ref-Grush
-20181205_393-0" class="referenc
e"><a href="#cite_note-Grush-2018
1205-393">&#91;383&#93;</a></sup>
<br /><small>(ground pad)</small>

```

```

</td></tr>
<tr>
<td colspan="9">First CRS mission
with the Falcon 9 Block 5. This c
arried the <a href="/wiki/Global_
Ecosystem_Dynamics_Investigation_
lidar" class="mw-redirect" title
="Global Ecosystem Dynamics Inves
tigation lidar">Global Ecosystem
Dynamics Investigation lidar</a>
(GEDI) as an external payload.<su
p id="cite_ref-394" class="refere
nce"><a href="#cite_note-394">&#9
1;384&#93;</a></sup> The mission
was delayed by one day due to mo
ldy rodent food for one of the ex
periments on the Space Station. A
previously flown Dragon spacecraf
t was used for the mission. The b
ooster, in use for the first tim
e, experienced a grid fin hydraul
ic pump stall on reentry, which c
aused it to spin out of control a
nd touchdown at sea, heavily dama
ging the interstage section; this
was the first failed landing targ
eted for a ground pad.<sup id="ci
te_ref-Grush-20181205_393-1" clas
s="reference"><a href="#cite_note
-Grush-20181205-393">&#91;383&#9

```

```

3;</a></sup><sup id="cite_ref-39
5" class="reference"><a href="#ci
te_note-395">&#91;385&#93;</a></s
up>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">66
</th>
<td>23 December 2018,<br />13:51<
sup id="cite_ref-spacenews2018122
3_396-0" class="reference"><a hre
f="#cite_note-spacenews20181223-3
96">&#91;386&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><br />B1054<sup id="cite_ref
-nsf-20181022_397-0" class="refer
ence"><a href="#cite_note-nsf-201
81022-397">&#91;387&#93;</a></sup
>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4

```

```

0">SLC-40</a>
</td>
<td><a href="/wiki/GPS_Block_III"
title="GPS Block III">GPS III</a>
-<a href="/wiki/List_of_GPS_satel
lites#Planned_launches" title="Li
st of GPS satellites">01</a> (<i>
Vespucci</i>)
</td>
<td>4,400&#160;kg (9,700&#160;lb)
<sup id="cite_ref-sfn-20181217_39
8-0" class="reference"><a href="#
cite_note-sfn-20181217-398">&#91;
388&#93;</a></sup>
</td>
<td><a href="/wiki/Medium_Earth_or
bit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/United_States_
Air_Force" title="United States A
ir Force">USAF</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<sup id="cite_ref-space
news20181223_396-1" class="refere
nce"><a href="#cite_note-spacenew
s20181223-396">&#91;386&#93;</a>

```



```

</sup>
</td>
<td style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;" class="table-noAttempt">No attempt<br /><sup id="cite_ref-spacenews20181223_396-2" class="reference"><a href="#cite_note-spacenews20181223-396">&#91;386&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">Initially planned for a Delta IV launch,<sup id="cite_ref-399" class="reference"><a href="#cite_note-399">&#91;389&#93;</a></sup> this was SpaceX's first launch of an <a href="/wiki/Evolved_Expendable_Launch_Vehicle" class="mw-redirect" title="Evolved Expendable Launch Vehicle">EELV</a>-class payload.<sup id="cite_ref-sn-20160427_400-0" class="reference"><a href="#cite_note-sn-20160427-400">&#91;390&#93;</a></sup> There was no attempt to recover the first-stage booster for reuse<sup id="cite_ref-gunter-b5ex_401-0" class="reference"><a href="#cite_note-gunter-b5ex-401">

```

[391]</sup>^{[387]} due to the customer's requirements, including a high inclination orbit of 55.0°.^{[392]} Nicknamed <i>Vespucci</i>, the USAF marked the satellite operational on 1 January 2020 under the label SVN 74.^{[393]}

</td></tr></tbody></table>

2019</h3>

<p>Shotwell declared in May 2019 that SpaceX might conduct up to 21 launches in 2019, not counting Starlink missions.^{[394]} With a slump in worldwide commercial launch contracts for 2019, SpaceX ended up launching only 13 rockets throughout 2019 (12 without Starlink), significant

tly fewer than in 2017 and 2018, and third most launches of vehicle class behind China's [>Long March and Russia's \[>R-7 rockets.^{\\[[395]}\\]\\(#cite_ref-405\\)</sup>\]\(/wiki/R-7_\(rocket_family\) "R-7 \(rocket family\)"\)](/wiki/Long_March_(rocket_family) "Long March (rocket family)")

</p>


Flight No.	Date and time (>UTC)	>Version,
Booster^{>}
------------	---	--

```

="#cite_note-booster-11">&#91;b&#
93;</a></sup>
</th>
<th scope="col">Launch<br />site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-6" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">67
</th>
<td>11 January 2019,<br />15:31<s

```

```

up id="cite_ref-406" class="reference"><a href="#cite_note-406">&#
91;396&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>   

<a href="/wiki/Falco
n_9_booster_B1049" class="mw-redi
rect" title="Falcon 9 booster B10
49">B1049.2</a><sup id="cite_ref-
407" class="reference"><a href="#
cite_note-407">&#91;397&#93;</a>
</sup>
</td>
<td><a href="/wiki/Vandenberg_Air
_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Bas
e">VAFB</a>,<br /><a href="/wiki/
Vandenberg_Space_Launch_Complex_
4" title="Vandenberg Space Launch
Complex 4">SLC-4E</a>
</td>
<td nowrap=""><a href="/wiki/Irid
ium_NEXT" class="mw-redirect" tit
le="Iridium NEXT">Iridium NEXT</a
>-8<br />(10 satellites)<sup id
="cite_ref-sdc20100616_160-6" cla
ss="reference"><a href="#cite_not
e-sdc20100616-160">&#91;152&#93;
</a></sup>

```

```

</td>
<td>9,600#160;kg (21,200#160;l
b)
</td>
<td><span class="nowrap"><a href
="/wiki/Polar_orbit" title="Polar
orbit">Polar</a> <a href="/wiki/L
ow_Earth_Orbit" class="mw-redirec
t" title="Low Earth Orbit">LEO</a
></span>
</td>
<td><a href="/wiki/Iridium_Communi
cations" title="Iridium Communica
tions">Iridium Communications</a
>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Final launch of t

```

```

he Iridium NEXT contract, launchi
ng 10 satellites.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">68
</th>
<td>22 February 2019,<br />01:45<
sup id="cite_ref-408" class="refe
rence"><a href="#cite_note-408">&
#91;398&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> &#91;398&#93;<br /><a href="/wiki/Falco
n_9_booster_B1048" class="mw-redi
rect" title="Falcon 9 booster B10
48">B1048.3</a><sup id="cite_ref-
409" class="reference"><a href="#
cite_note-409">&#91;399&#93;</a>
</sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>

```

```

</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/Nusantara_
Satu" title="Nusantara Satu">Nusa
ntara Satu</a> (PSN-6)<sup id="ci
te_ref-jls-201801012_410-0" class
="reference"><a href="#cite_note-
jls-201801012-410">&#91;400&#93;
</a></sup></li>
<li><i><a href="/wiki/Beresheet"
title="Beresheet">Beresheet</a>
</i> Moon lander<sup id="cite_ref
-sn-20181218_411-0" class="refere
nce"><a href="#cite_note-sn-20181
218-411">&#91;401&#93;</a></sup>
</li>
<li>S5<sup id="cite_ref-sn150219_
412-0" class="reference"><a href
="#cite_note-sn150219-412">&#91;4
02&#93;</a></sup></li></ul>
</div>
</td>
<td>4,850&#160;kg (10,690&#160;l
b)<sup id="cite_ref-sn200219_413-
0" class="reference"><a href="#ci
te_note-sn200219-413">&#91;403&#9
3;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation

```



```

ary transfer orbit">GTO</a>
</td>
<td><div class="plainlist">
<ul><li><a href="/wiki/PT_Pasifik_Satelit_Nusantara" title="PT Pasifik Satelit Nusantara">PSN</a></li>
<li><a href="/wiki/SpaceIL" title="SpaceIL">SpaceIL</a> / <a href="/wiki/Israel_Aerospace_Industries" title="Israel Aerospace Industries">IAI</a></li>
<li><a href="/wiki/Air_Force_Research_Laboratory" title="Air Force Research Laboratory">Air Force Research</a></li></ul>
</div>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>

```

```

<tr>
<td colspan="9">Nusantara Satu is
a private Indonesian comsat plann
ed to be located at 146.0°&#160;e
ast,<sup id="cite_ref-jls-2018010
12_410-1" class="reference"><a hr
ef="#cite_note-jls-201801012-41
0">&#91;400&#93;</a></sup> with a
launch mass of 4,100&#160;kg (9,0
00&#160;lb),<sup id="cite_ref-sn2
00219_413-1" class="reference"><a
href="#cite_note-sn200219-413">&#
91;403&#93;</a></sup> and featuri
ng <a href="/wiki/Electrically_po
wered_spacecraft_propulsion" clas
s="mw-redirect" title="Electrical
ly powered spacecraft propulsio
n">electric propulsion</a> for or
bit-raising and station-keeping.<
sup id="cite_ref-sn-20150605_414-
0" class="reference"><a href="#ci
te_note-sn-20150605-414">&#91;404
&#93;</a></sup><sup id="cite_ref-
415" class="reference"><a href="#
cite_note-415">&#91;405&#93;</a>
</sup> S5, a 60-kg smallsat by th
e <a href="/wiki/Air_Force_Resear
ch_Laboratory" title="Air Force R
esearch Laboratory">Air Force Res
earch Laboratory</a> (AFRL), was

```

piggybacked on [Nusantara Satu](/wiki/Nusantara_Satu "Nusantara Satu"), and was deployed near its GEO position to perform a classified space situational awareness mission. This launch opportunity was brokered by [Spaceflight Industries](/wiki/Spaceflight_Industries "Spaceflight Industries") as "GT0-1".^{[1;402](#cite_ref-sn150219_412-1)}

The *Beresheet* Moon lander (initially called *Sparrow*) was one of the candidates for the [Google Lunar X-Prize](/wiki/Google_Lunar_X-Prize "Google Lunar X-Prize"), whose developers [SpaceIL](/wiki/SpaceIL "SpaceIL") had secured a launch contract with Spaceflight Industries in October 2015.^{[1;406](#cite_ref-moon-race-first-launch-deal_416-0)} Its launch mass was 58

5 kg (1,290 lb) including fuel.^{[407]} After separating into a s supersynchronous transfer orbit^{[408]} with an apogee of 69,400 km (43,100 mi),^{[409]}^{[407]} <i>Beresheet</i> raised its orbit by its own power over two months and flew to the Moon.^{[408]}<sup id="cite_ref-Shoshanna_420-0" class="reference"><a href="#cite_note-Sho

```

shanna-420">&#91;410&#93;</a></sup>
p> After successfully getting into lunar orbit, Beresheet attempted to land on the Moon on 11 April 2019 but failed.<sup id="cite_ref-421" class="reference"><a href="#cite_note-421">&#91;411&#93;</a></sup>
</p>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">69
</th>
<td>2 March 2019,<br />07:49<sup id="cite_ref-:7_422-0" class="reference"><a href="#cite_note-:7-422">&#91;412&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a><br />B1051.1<sup id="cite_ref-gunter-f9_277-10" class="reference"><a href="#cite_note-gunter-f9-277">&#91;268&#93;</a></sup><sup id="cite_ref-nac-ccp_423-0" class="reference"><a href="#cite_note-nac-ccp-423">&#91;413&#93;</a></sup>
</td>

```

```

<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Crew_Dragon_Demo-1" title="Crew Dragon Demo-1">Crew Dragon Demo-1</a><sup id="cite_ref-nsf20150305_424-0" class="reference"><a href="#cite_note-nsf20150305-424">#91;414#93;</a></sup><br />(Dragon C201)
</td>
<td>12,055#160;kg (26,577#160;lb)<sup id="cite_ref-Clark_425-0" class="reference"><a href="#cite_note-Clark-425">#91;415#93;</a></sup><sup id="cite_ref-DM1-payload-mass_426-0" class="reference"><a href="#cite_note-DM1-payload-mass-426">#91;h#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>

```

```

<td><span class="nowrap"> <a href
="/wiki/NASA" title="NASA">NASA</
a> (<a href="/wiki/Commercial_Cre
w_Development" class="mw-redirec
t" title="Commercial Crew Develop
ment">CCD</a>) </span>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">First flight of t
he SpaceX <a href="/wiki/SpaceX_D
ragon_2" title="SpaceX Dragon 2">
Crew Dragon</a>. This was the fir
st demonstration flight for the <
a href="/wiki/Commercial_Crew_Dev
elopment" class="mw-redirect" tit
le="Commercial Crew Development">
NASA Commercial Crew Program</a>
which awarded SpaceX a contract

```

in September 2014 with flights hoped as early as 2015.^{[\[416\]](#cite_note-427)} The Dragon performed an autonomous docking to the ISS 27 hours after launch with the hatch being opened roughly 2 hours later.^{[\[417\]](#cite_note-428)} The vehicle spent nearly a week docked to the ISS to test critical functions. It undocked roughly a week later on 8 March 2019 and splashed down six hours later at 13:45.^{[\[418\]](#cite_note-429)} The Dragon used on this flight was scheduled to fly on the inflight abort test in mid-2019 but was destroyed during testing.^{[\[419\]](#cite_note-:11-430)} The booster B1051.1 replaced [B1050](/wiki/Falcon_9_booster_B1050 "Falcon 9 booster B1050")^{[\[420\]](#cite_note-430)}

te_ref-nsf-20190306_431-0" class="reference">[420]</sup> and flew again on 12 June 2019.

</td></tr>

<tr>

<th scope="row" rowspan="4" style="text-align:center;">FH 2

</th>

<td rowspan="3">11 April 2019,
22:35^{[421]}

</td>

<td>Falcon Heavy
B 1055 core^{[421]}

</td>

<td rowspan="3">KSC,
<a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kenne

dy Space Center Launch Complex 39
A">LC-39A
</td>
<td rowspan="3">Arabsat-6A^{[422]}
</td>
<td rowspan="3">6,465 kg (14,253 lb)^{[423]}
</td>
<td rowspan="3">GTO
</td>
<td rowspan="3">Arabsat
</td>
<td rowspan="3" style="background-color: #9EFF9E; vertical-align: middle; text-align: center;" class="ta

```

ble-success">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<sup id="cite_ref-Falco
n_tip_over_436-0" class="referenc
e"><a href="#cite_note-Falcon_tip
_over-436">&#91;i&#93;</a></sup><
br /><small><span class="nowrap">
(drone ship)</span></small>
</td></tr>
<tr>
<td>B1052.1<br />(side)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(ground pad)</span></s
mall>
</td></tr>
<tr>
<td>B1053.1<br />(side)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(ground pad)</span></s


```

```
mall>
</td></tr>
<tr>
<td colspan="9">Second flight of
  <a href="/wiki/Falcon_Heavy" tit
le="Falcon Heavy">Falcon Heavy</a
>, the first commercial flight, a
nd the first one using <a href="/
wiki/Falcon_9_Block_5" title="Fal
con 9 Block 5">Block 5</a> booste
rs. SpaceX successfully landed th
e side boosters at <a href="/wik
i/Landing_Zones_1_and_2" title="L
anding Zones 1 and 2">Landing Zon
e 1</a> and <a href="/wiki/Landin
g_Zones_1_and_2" title="Landing Z
ones 1 and 2">LZ 2</a> and reused
the side boosters later for the <
a href="/wiki/Space_Test_Program"
title="Space Test Program">STP-2
</a> mission. The central core la
nded on <a href="/wiki/Autonomous
_spaceport_drone_ship" title="Aut
onomous spaceport drone ship">dro
ne ship</a> <i>Of Course I Still
Love You</i>, located 967&#160;k
m (601&#160;mi) downrange, the fu
rthest sea landing so far attempt
ed.<sup id="cite_ref-fanblog20190
413_437-0" class="reference"><a h
```

ref="#cite_note-fanblog20190413-437">#91;425#93;</sup> Despite the successful landing, due to rough seas the central core was unable to be secured to the deck for recovery and later tipped overboard in transit.^{#91;426#93;}^{#91;427#93;} SpaceX recovered the fairing from this launch and later reused it in the November 2019 Starlink launch.^{#91;428#93;}^{#91;429#93;}Arabsat-6A, a 6,465#160;kg (14,253#160;lb) Saudi satellite, is the most advanced commercial communications satellite so far built by <a href="/wiki/Lockheed_Martin" title="Lock

heed Martin">Lockheed Martin.
 <sup id="cite_ref-442" class="reference">
 [430]</sup> The Falco
 n Heavy delivered the Arabsat-6A
 into a <a href="/wiki/Supersynch
 ronous_orbit" title="Supersynchro
 nous orbit">supersynchronous tran
 sfer orbit with 90,000 k
 m (56,000 mi) apogee with an
 inclination of 23.0° to the <a hr
 ef="/wiki/Equator" title="Equato
 r">equator.<sup id="cite_ref-
 443" class="reference"><a href="#
 cite_note-443">[431]
 </sup>
 </td></tr>
 <tr>
 <th scope="row" rowspan="2" style
 ="text-align:center;">70
 </th>
 <td>4 May 2019,
06:48
 </td>
 <td><a href="/wiki/Falcon_9_Block
 _5" title="Falcon 9 Block 5">F9 B
 5
<a href="/wiki/Falcon_
 9_booster_B1056" class="mw-redire
 ct" title="Falcon 9 booster B105
 6">B1056.1<sup id="cite_ref-n
 sf-20190306_431-1" class="referen

```

ce"><a href="#cite_note-nsf-20190
306-431">&#91;420&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-17"
title="SpaceX CRS-17">SpaceX CRS-
17</a><sup id="cite_ref-spn-20160
224_148-6" class="reference"><a h
ref="#cite_note-spn-20160224-14
8">&#91;141&#93;</a></sup><br />
(Dragon C113.2 )
</td>
<td>2,495&#160;kg (5,501&#160;lb)
<sup id="cite_ref-:8_444-0" class
="reference"><a href="#cite_note
-:8-444">&#91;432&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)

```

```

</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">A <a href="/wiki/
Commercial_Resupply_Services" tit
le="Commercial Resupply Service
s">Commercial Resupply Service mi
ssion</a> to the <a href="/wiki/I
nternational_Space_Station" title
="International Space Station">In
ternational Space Station</a> car
rying nearly 2.5 tons of cargo in
cluding the <a href="/wiki/Orbiti

```


ng_Carbon_Observatory_3" title="Orbiting Carbon Observatory 3">Orbiting Carbon Observatory-3 as an external payload.^{#91;432#93;} Originally planned to land at Landing Zone 1, the landing was moved to the drone ship after a Dragon 2 had an anomaly during testing at LZ-1.^{#91;433#93;}

</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">71
</th>
<td>24 May 2019,
02:30
</td>
<td>F9 B5 ↗
B1049.3^{#91;434#93;}

```

</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> v0.9 <b
r />(60 satellites)
</td>
<td>13,620&#160;kg (30,030&#160;l
b)<sup id="cite_ref-SLNov19_5-1"
class="reference"><a href="#cite
_note-SLNov19-5">&#91;5&#93;</a>
</sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes

```


```

s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Following the launch of the two Tintin test satellites, this was the first full-scale test launch of the Starlink constellation, launching "production design" satellites.<sup id="cite_ref-sn20190426_447-0" class="reference"><a href="#cite_note-sn20190426-447">&#91;435&#93;</a></sup><sup id="cite_ref-448" class="reference"><a href="#cite_note-448">&#91;436&#93;</a></sup><sup id="cite_ref-449" class="reference"><a href="#cite_note-449">&#91;437&#93;</a></sup> Each Starlink satellite has a mass of 227&#160;0;kg (500&#160;lb),<sup id="cite_ref-450" class="reference"><a href="#cite_note-450">&#91;438&#93;</a></sup> and the combined launch

```

h mass was 13,620 kg (30,030
 lb) the heaviest payload la
unched by SpaceX at that time.<su
p id="cite_ref-451" class="refere
nce">	
1;439]</sup> The fairings
were recovered<sup id="cite_ref-4
52" class="reference"><a href="#c
ite_note-452">[440]</
sup> and reused for Starlink L5 i
n March 2020.<sup id="cite_ref-45
3" class="reference"><a href="#ci
te_note-453">[441]</s
up> These are the first commercia
l satellites to use <a href="/wik
i/Krypton" title="Krypton">krypto
n as fuel for their <a href
="/wiki/Ion_thruster" title="Ion
thruster">ion thrusters, whi
ch is cheaper than the usual <a h
ref="/wiki/Xenon" title="Xenon">x
enon fuel.<sup id="cite_ref-4
54" class="reference"><a href="#c
ite_note-454">[442]</
sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">72
</th>

```

<td>12 June 2019,<br />14:17
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a> <br />B1051.2<sup id="cite_ref-nsf-20190306_431-2" class="reference"><a href="#cite_note-nsf-20190306-431">&#91;420&#93;</a>
</sup>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect"
title="Vandenberg Air Force Base">VAFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/RADARSAT_Constellation" title="RADARSAT Constellation">RADARSAT Constellation</a>
<br />(3 satellites)
</td>
<td>4,200&#160;kg (9,300&#160;lb)
<sup id="cite_ref-:9_455-0" class="reference"><a href="#cite_note-:9-455">&#91;443&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronous_orbit" title="Sun-synchronous o

```

```

rbit">SSO</a>
</td>
<td><a href="/wiki/Canadian_Space_Agency" title="Canadian Space Agency">Canadian Space Agency</a>
(CSA)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(ground pad)</span></small>
</td></tr>
<tr>
<td colspan="9">A trio of satellites built for Canada's RADARSAT program were launched that plan to replace the aging <a href="/wiki/Radarsat-1" title="Radarsat-1">Radarsat-1</a> and <a href="/wiki/Radarsat-2" title="Radarsat-2">Radarsat-2</a>. The new satellites contain Automated Identification System (AIS) for locating ships an

```

d provide the world's most advanced, comprehensive method of maintaining Arctic sovereignty, conducting coastal surveillance, and ensuring maritime security.^{[\[444\]](#cite_note-456)}^{[\[443\]](#cite_note-:9_455-1)} The mission was originally scheduled to lift off in February but due to the landing failure of booster [B1050](/wiki/Falcon_9_booster_B1050 "Falcon 9 booster B1050"), this flight was switched to B1051 (used on [Crew Dragon Demo-1](/wiki/Crew_Dragon_Demo-1 "Crew Dragon Demo-1")) and delayed to allow refurbishment and transport to the West coast.^{[\[420\]](#cite_note-nsf-20190306_431-3)} The booster landed safely through fog.^{[\[445\]](#cite_note-457)}

sup> A payload cost of roughly US \$1 billion made this SpaceX's second most expensive payload launched^{^{[446]}^{[447]} and most valuable commercial payload so far put into orbit.^{[448]}}

FH 3	
	25 June 2019, 06:30^{[449]}
	Falcon Heavy B 1057 core<sup id="cite_ref-nsf-20190306_431-4" class="reference">&#91;420&#93;</sup>


```
>
</td>
<td rowspan="3"><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td rowspan="3"><a href="/wiki/Space_Test_Program" title="Space Test Program">Space Test Program</a>
> Flight 2 (STP-2)
</td>
<td rowspan="3">3,700&#160;kg (8,200&#160;lb)
</td>
<td rowspan="3"><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a>
> / <a href="/wiki/Medium_Earth_Orbit" class="mw-redirect" title="Medium Earth Orbit">MEO</a>
</td>
<td rowspan="3"><a href="/wiki/United_States_Air_Force" title="United States Air Force">USAF</a>
</td>
<td rowspan="3" style="backgroun
```

```

d: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; vertical-align: middle; text-align: center;" class="table-failure">Failure<br /><small>(drone ship)</small>
</td></tr>
<tr>
<td>B1052.2<br />(side) ⚠
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td>B1053.2<br />(side) ⚠
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small>(ground pad)</small>
</td></tr>
<tr>
<td colspan="9"><a href="/wiki/Un

```

ited_States_Air_Force" title="United States Air Force">USAF Space Test Program Flight 2 (STP-2)^{[74]} carried 24 small satellites,^{[450]} including: FormoSat>-7 A/B/C/D/E/F integrated using EELV Secondary Payload Adapter,^{[451]} DSX,
Prox-1<sup id="cite_ref-planetary-society-20170602_464-0" class="reference">&

```

#91;452&#93;</a></sup> <a href="/
wiki/Green_Propellant_Infusion_Mi
ssion" title="Green Propellant In
fusion Mission">GPIM</a>,<sup id
="cite_ref-GPIM_465-0" class="ref
erence"><a href="#cite_note-GPIM-
465">&#91;453&#93;</a></sup> <a h
ref="/wiki/Deep_Space_Atomic_Cloc
k" title="Deep Space Atomic Cloc
k">DSAC</a>,<sup id="cite_ref-DSA
C_466-0" class="reference"><a hre
f="#cite_note-DSAC-466">&#91;454&
#93;</a></sup> <a href="/wiki/Inn
ovative_Space-based_Radar_Antenna
_Technology" title="Innovative Sp
ace-based Radar Antenna Technolog
y">ISAT</a>, SET,<sup id="cite_re
f-467" class="reference"><a href
="#cite_note-467">&#91;455&#93;</
a></sup> <a href="/wiki/COSMIC-2"
title="COSMIC-2">COSMIC-2</a>, Oc
ulus-ASR, OBT, NPSat,<sup id="cit
e_ref-spacexstp2_468-0" class="re
ference"><a href="#cite_note-spac
exstp2-468">&#91;456&#93;</a></su
p> and several CubeSats including
E-TBEx,<sup id="cite_ref-469" cla
ss="reference"><a href="#cite_not
e-469">&#91;457&#93;</a></sup> <a
href="/wiki/LightSail_2" class="m

```

w-redirect" title="LightSail 2">LightSail 2,^{#91;458#93;} TEPCE, PSAT, and three ELaNa 15 CubeSats. Total payload mass was 3,700 #160;kg (8,200#160;lb).^{#91;459#93;} The mission lasted six hours during which the second stage ignited four times and went into different orbits to deploy satellites including a "propulsive passivation maneuver".^{#91;456#93;}^{#91;460#93;}</p>
<p>Third flight of Falcon Heavy. The side boosters from the Arabsat-6A mission just 2.5 months before were reused on this flight an

d successfully returned to LZ-1 and LZ-2.^{^{91;42093;}}

The center core, in use for the first time, underwent the most energetic reentry attempted by SpaceX, and attempted a landing over 1,200 km (750 mi) downrange, 30% further than any previous landing.^{^{91;46193;}}

This core suffered a thrust vector control failure in the center engine caused by a breach in the engine bay due to the extreme heat. The core thus failed its landing attempt on the drone ship *Of Course I Still Love You* due to lack of control when the outer engines shut down.^{^{91;46293;}}

For the first time one fairing half was successfully landed on the catch-net of the support ship GO *<a href="/wiki/Ms._Tree_(ship)" class="mw-redirect" title="M*

```

s. Tree (ship)">Ms. Tree</a></i>
  (formerly <i>Mr. Steven</i>).<sup
id="cite_ref-475" class="reference"><a href="#cite_note-475">&#9
1;463&#93;</a></sup>
</p>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">73
</th>
<td>25 July 2019,<br />22:01<sup
id="cite_ref-auto5_476-0" class
="reference"><a href="#cite_note-
auto5-476">&#91;464&#93;</a></sup
>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ↗<br /><a href="/wiki/Falco
n_9_booster_B1056" class="mw-redi
rect" title="Falcon 9 booster B10
56">B1056.2</a><sup id="cite_ref-
B1056use_477-0" class="referenc
e"><a href="#cite_note-B1056use-4
77">&#91;465&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air

```

```

Force Station">CCAFS</a><br /><a
href="/wiki/Cape_Canaveral_Space_
Launch_Complex_40" title="Cape Ca
naveral Space Launch Complex 40">
SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-18"
title="SpaceX CRS-18">SpaceX CRS-
18</a><sup id="cite_ref-spn-20160
224_148-7" class="reference"><a h
ref="#cite_note-spn-20160224-14
8">&#91;141&#93;</a></sup><br />
(<a href="/wiki/Dragon_C108" titl
e="Dragon C108">Dragon C108</a>.3
&#160;kg)
</td>
<td>2,268&#160;kg (5,000&#160;lb)
<sup id="cite_ref-auto5_476-1" cl
ass="reference"><a href="#cite_no
te-auto5-476">&#91;464&#93;</a></
sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com

```



```

mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(ground pad)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">This launch carri
ed nearly 9,000 individual unique
payloads including over one ton o
f science experiments, the most s
o far launched on a <a href="/wik
i/SpaceX_Dragon" title="SpaceX Dr
agon">SpaceX Dragon</a>. The thir
d <a href="/wiki/International_Do
cking_Adapter" title="Internation
al Docking Adapter">International
Docking Adapter</a> (IDA-3), a re
placement for the first IDA lost
during the <a href="/wiki/SpaceX

```

[CRS-7](#) title="SpaceX CRS-7">CRS-7 launch anomaly, was one of the external payloads on this mission.^{[cite_ref-478](#)} [cite_note-478](#)[466]</sup> Along with food and science, the Dragon also carried the [/wiki/Educational_Launch_of_Nanosatellites](#) title="Educational Launch of Nanosatellites">ELaNa 27 RFTSat CubeSat^{[cite_ref-479](#)} [cite_note-479](#)[467]</sup> and MakerSat-1 which will be used to demonstrate microgravity additive manufacturing. The satellite is expected to be launched by a [/wiki/Cygnus_\(spacecraft\)](#) title="Cygnus (spacecraft)">Cygnus dispenser later in July 2019.

<p>The booster used on this flight was the same used on [/wiki/SpaceX_CRS-17](#) title="SpaceX CRS-17">CRS-17 earlier in the year; originally, it was planned to reuse it again for the [/wiki/SpaceX_CRS-19](#) title="SpaceX CRS-19">CRS-19 mission 1

ater this year,^{[468]} but the plan was scrapped. For the first time, the twice flown Dragon spacecraft also made a third flight.^{[469]} Also used for the first time was a gray-band painted where the RP-1 kerosene tank is located, to help with thermal conductivity and thus saving fuel during long coasts.^{[470]}

</p>

</td></tr>

<tr>

<th scope="row" rowspan="2" style="text-align:center;">74

</th>

<td>6 August 2019,
23:23<sup id="cite_ref-483" class="reference">[

```

471&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a> &#x2192;<br /><a href="/wiki/Falco
n_9_booster_B1047" class="mw-redi
rect" title="Falcon 9 booster B10
47">B1047.3</a><sup id="cite_ref-
484" class="reference"><a href="#
cite_note-484">&#91;472&#93;</a>
</sup>
</td>
<td nowrap=""><a href="/wiki/Cape
_Canaveral_Air_Force_Station" cla
ss="mw-redirect" title="Cape Cana
vernal Air Force Station">CCAFS</a
>,<br /><a href="/wiki/Cape_Canav
eral_Space_Launch_Complex_40" tit
le="Cape Canaveral Space Launch C
omplex 40">SLC-40</a>
</td>
<td><a href="/wiki/Amos-17" class
="mw-redirect" title="Amos-17">AM
OS-17</a><sup id="cite_ref-485" c
lass="reference"><a href="#cite_n
ote-485">&#91;473&#93;</a></sup>
</td>
<td>6,500&#160;kg (14,300&#160;l
b)<sup id="cite_ref-1047expended_
486-0" class="reference"><a href

```


```

=>"#cite_note-1047expended-486">&#
91;474&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Spacecom" titl
e="Spacecom">Spacecom</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success
</td>
<td style="background: #EEE; vert
ical-align: middle; white-space:
nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt<s
up id="cite_ref-1047expended_486-
1" class="reference"><a href="#ci
te_note-1047expended-486">&#91;47
4&#93;</a></sup>
</td></tr>
<tr>
<td colspan="9">AMOS-17 is the mo
st advanced high-throughput satel
lite to provide satellite communi
cation services to Africa.<sup id
="cite_ref-487" class="referenc

```

e">[475]</sup> Following the loss of AMOS-6 in September 2016, Spacecom was granted a free launch in compensation for the lost satellite.^{[476]} Due to the free launch, Spacecom was able to expend the booster with no extra cost that comes with expending a booster, and thus could reach final orbit quicker. This booster became the second Block 5 booster to be expended.^{[474]}^{[477]} For the second time, <i>Ms. Tree</i> managed to catch a fairing half directly into its net.^{[478]}</td></tr>

```

<tr>
<th scope="row" rowspan="2" style
="text-align:center;">75
</th>
<td>11 November 2019,<br />14:56<
sup id="cite_ref-491" class="refe
rence"><a href="#cite_note-491">&
#91;479&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/B104
8" class="mw-redirect" title="B10
48">B1048.4</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 1 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)<sup id="cite_ref-SLNov19_5-2"

```

```

class="reference"><a href="#cite
_note-SLNov19-5">&#91;5&#93;</a>
</sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a>
</td>
<td><a href="/wiki/Spacecom" titl
e="Spacecom">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Second large batc
h of Starlink satellites and the
first operational mission of the
constellation, it launched in a r
oughly 290&#160;km (180&#160;mi)
orbit at an inclination of 53.

```


0°. At 15,600#160;kg (34,400#160;lb), it is the heaviest payload so far launched by SpaceX, breaking the record set by the Starlink v0.9 flight earlier that year.^{#91;5#93;}

This flight marked the first time that a Falcon 9 booster made a fourth flight and landing.^{#91;480#93;} This


was also the first time that a Falcon 9 re-used fairings (from ArabSat-6A in April 2019).^{#91;429#93;} It was planned to recover the fairings with both <i>Ms. Tree</i> and <i>Ms. Chief</i> but the plan was abandoned due to rough seas.^{#91;5#93;}

</td></tr>

<tr>

<th scope="row" rowspan="2" style

```

="text-align:center;">76
</th>
<td>5 December 2019,<br />17:29<sup id="cite_ref-493" class="reference"><a href="#cite_note-493">&#91;481&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a><br />B1059.1<sup id="cite_ref-:02_494-0" class="reference"><a href="#cite_note-:02-494">&#91;482&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-redirect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-19" title="SpaceX CRS-19">SpaceX CRS-
19</a><sup id="cite_ref-spn-201602242_495-0" class="reference"><a href="#cite_note-spn-201602242-495">&#91;483&#93;</a></sup><br />
(Dragon C106.3 )

```


```

</td>
<td>2,617&#160;kg (5,769&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Second re-supply flight to use a Cargo Dragon for

```

the third time.^{^{#91;484]} This flight carried Robotic Tool Stowage (RiTS), a docking station that allows equipment that looks for leaks on the Space Station be stored on the outside. Also on board were upgrades for the Cold Atom Laboratory (CAL). Onboard experiments include the testing of the spread of fire in space, mating barley in microgravity and experiments to test muscle and bone growth in microgravity.^{^{#91;485]} Secondary payloads include the Hyperspectral Imager Suite (HISUI), an experiment to image high resolution across all colours of the light spectrum, allowing for imaging of soil, rocks, vegetation, snow, ice and man-made objects. Additionally, there were three CubeSats from NASA's <a href="/wiki/Educational_Launch_of_Nan}}

```

osatellites" title="Educational L
aunch of Nanosatellites">ELaNa 28
</a> mission,<sup id="cite_ref-Up
coming-ELaNa_391-1" class="refere
nce"><a href="#cite_note-Upcoming
-ELaNa-391">&#91;381&#93;</a></su
p> including the AztechSat-1 sate
llite built by students in Mexic
o.<sup id="cite_ref-:152_497-1" c
lass="reference"><a href="#cite_n
ote-:152-497">&#91;485&#93;</a></
sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">77
</th>
<td>17 December 2019,<br />00:10<
sup id="cite_ref-sjcs_498-0" clas
s="reference"><a href="#cite_note
-sjcs-498">&#91;486&#93;</a></sup
>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/B105
6" class="mw-redirect" title="B10
56">B1056.3</a><sup id="cite_ref
-:02_494-1" class="reference"><a
href="#cite_note-:02-494">&#91;4

```

```

82&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/JSAT_(satellit
e_constellation)" title="JSAT (sa
tellite constellation)">JCSat-18
</a> / <a href="/wiki/Kacific_Bro
adband_Satellites" title="Kacific
Broadband Satellites">Kacific 1</
a><sup id="cite_ref-sn-20170905_4
99-0" class="reference"><a href
="#cite_note-sn-20170905-499">&#9
1;487&#93;</a></sup>
</td>
<td>6,956&#160;kg (15,335&#160;l
b)<sup id="cite_ref-sjcs_498-1" c
lass="reference"><a href="#cite_n
ote-sjcs-498">&#91;486&#93;</a></
sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation

```

```

ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/SKY_Perfect_JS
AT_Group" class="mw-redirect" tit
le="SKY Perfect JSAT Group">Sky P
erfect JSAT</a><br /><a href="/wi
ki/Kacific_Broadband_Satellites"
title="Kacific Broadband Satelli
tes">Kacific 1</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Singaporean-Japan
ese <a href="/wiki/CondoSat" titl
e="CondoSat">CondoSat</a> that wi
ll cover the Asia-Pacific region.
<sup id="cite_ref-500" class="ref
erence"><a href="#cite_note-500">
&#91;488&#93;</a></sup> Due to th

```

the heavy weight of the payload, it was injected into a lower energy sub-synchronous orbit of 20,000 km (12,000 mi); the satellite itself will transfer to full GTO. This was the third Falcon 9 launch for JSAT and the previous two were in 2016. SpaceX successfully landed B1056.3 but both fairing halves missed the recovery boats *Ms. Tree* and *Ms. Chief*.^{#91;489#93;}</sup>

--

2020</h3>

<p>In late 2019, Gwynne Shotwell stated that SpaceX hoped for as many as 24 launches for Starlink satellites in 2020,^{#91;490#93;} in addition to 14 o

r 15 non-Starlink launches. At 26 launches, 13 of which for Starlink satellites, Falcon 9 had its most prolific year, and Falcon rockets were second most prolific rocket family of 2020, only behind China's [>Long March rocket family.^{\[[491]}\]\(#cite_note-503\)</sup>](/wiki/Long_March_(rocket_family) "Long March (rocket family)")

</p>


Flight No.	Date and (>UTC)	>Version,
Booster<sup id="cite_ref-booste
------------	--	--

```

r_11-7" class="reference"><a href=
"#cite_note-booster-11">&#91;b&#
93;</a></sup>
</th>
<th scope="col">Launch<br />site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-7" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>
<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">78
</th>

```

```

<td>7 January 2020,<br />02:19:21
<sup id="cite_ref-504" class="ref
erence"><a href="#cite_note-504">
&#91;492&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>  <br /><a href="/wiki/List
_of_Falcon_9_first-stage_boosters
#B1049" title="List of Falcon 9 f
irst-stage boosters">B1049.4</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 2 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)<sup id="cite_ref-SLNov19_5-5"
class="reference"><a href="#cite
_note-SLNov19-5">&#91;5&#93;</a>
</sup>


```

```

</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Third large batch and second operational flight of Starlink constellation. One of the 60 satellites included a test coating to make the satellite less reflective, and thus less likely to interfere with ground-based astronomical observations.<sup id="cite_ref-505" class="referenc

```

```

e"><a href="#cite_note-505">&#91;
493&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">79
</th>
<td>19 January 2020,<br />15:30<s
up id="cite_ref-506" class="refer
ence"><a href="#cite_note-506">&#
91;494&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>  <br /><a href="/wiki/B104
6" class="mw-redirect" title="B10
46">B1046.4</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_Dragon_
2#In-flight_abort_test" title="Sp
aceX Dragon 2">Crew Dragon in-fli
ght abort test</a><sup id="cite_r
ef-sn20150702_507-0" class="refer

```

```
ence"><a href="#cite_note-sn20150702-507">&#91;495&#93;</a></sup><br />(Dragon C205.1)
</td>
<td>12,050&#160;kg (26,570&#160;l
b)
</td>
<td><a href="/wiki/Sub-orbital" c
lass="mw-redirect" title="Sub-orb
ital">Sub-orbital</a><sup id="cit
e_ref-508" class="reference"><a h
ref="#cite_note-508">&#91;496&#9
3;</a></sup>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/ISS
_Crew_Transportation_Services" cl
ass="mw-redirect" title="ISS Crew
Transportation Services">CTS</a>)
<sup id="cite_ref-CCD6_509-0" cla
ss="reference"><a href="#cite_not
e-CCD6-509">&#91;497&#93;</a></su
p>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #EEE; vert
```

```

ical-align: middle; white-space:
  nowrap; text-align: center;" cla
ss="table-noAttempt">No attempt
</td></tr>
<tr>
<td colspan="9">An atmospheric te
st of the <a href="/wiki/SpaceX_D
ragon_2" title="SpaceX Dragon 2">
Dragon 2</a> abort system after <
a href="/wiki/Max_Q" class="mw-re
direct" title="Max Q">Max Q</a>.
  The capsule fired its <a href="/
wiki/SuperDraco" title="SuperDrac
o">SuperDraco</a> engines, reache
d an apogee of 40&#160;km (25&#16
0;mi), deployed parachutes after
  reentry, and <a href="/wiki/Spla
shdown" title="Splashdown">splash
ed down</a> in the ocean 31&#160;
km (19&#160;mi) downrange from th
e launch site. The test was previ
ously slated to be accomplished w
ith the <a href="/wiki/Crew_Drago
n_Demo-1" title="Crew Dragon Demo
-1">Crew Dragon Demo-1</a> capsul
e;<sup id="cite_ref-nsf-20170811_
510-0" class="reference"><a href
="#cite_note-nsf-20170811-510">&#
91;498&#93;</a></sup> but that te
st article exploded during a grou

```

nd test of SuperDraco engines on 20 April 2019.^{^{[419]} The abort test used the capsule originally intended for the first crewed flight.^{^{[499]} As expected, the booster was destroyed by aerodynamic forces after the capsule aborted.^{^{[500]} First flight of a Falcon 9 with only one functional stage – the second stage had a ^{mass simulator} in place of its engine.}}}

</td></tr>


<tr>

<th scope="row" rowspan="2" style="text-align:center;">80

</th>

<td>29 January 2020,
14:07<sup id="cite_ref-513" class="refer


```


ence"><a href="#cite_note-513">&#
91;501&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>   
https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true
```

```

t" title="Low Earth orbit">LEO</a>
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Third operational
and fourth large batch of Starlin
k satellites, deployed in a circu
lar 290&#160;km (180&#160;mi) orb
it. One of the fairing halves was
caught, while the other was fishe
d out of the ocean.<sup id="cite_
ref-catch3_514-0" class="referenc
e"><a href="#cite_note-catch3-51
4">&#91;502&#93;</a></sup>
</td></tr>

```

```

<tr>
<th scope="row" rowspan="2" style
="text-align:center;">81
</th>
<td>17 February 2020,<br />15:05<
sup id="cite_ref-515" class="refe
rence"><a href="#cite_note-515">&
#91;503&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/Falco
n_9_booster_B1056" class="mw-redi
rect" title="Falcon 9 booster B10
56">B1056.4</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 4 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l

```

```

b)<sup id="cite_ref-SLNov19_5-7"
  class="reference"><a href="#cite
_note-SLNov19-5">&#91;5&#93;</a>
</sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a>
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align:
center;" class="table-failure">Failure<br /><small>(drone shi
p)</small>
</td></tr>
<tr>
<td colspan="9">Fourth operationa
l and fifth large batch of Starli
nk satellites. Used a new flight
  profile which deployed into a 21
2&#160;km ×&#160;386&#160;km (132
&#160;mi ×&#160;240&#160;mi) elli

```

ptical orbit instead of launching into a circular orbit and firing the second stage engine twice. The first stage booster failed to land on the drone ship^{^{[504]} due to incorrect wind data.⊃ id="cite_ref-517" class="reference">[505]} This was the first time a flight proven booster failed to land.</sup>

</td></tr>

<tr>

<th scope="row" rowspan="2" style="text-align:center;">82

</th>

<td>7 March 2020,
04:50^{[506]}

</td>

<td>F9 B5 ↗
B1059.2

</td>

```

<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-redirect" title="Cape Canaveral Air Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/SpaceX_CRS-20" title="SpaceX CRS-20">SpaceX CRS-20</a><br />(Dragon C112.3 ↻)
</td>
<td>1,977&#160;kg (4,359&#160;lb)
<sup id="cite_ref-519" class="reference"><a href="#cite_note-519">
&#91;507&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td>
<td style="background: #9EFF9E; v


```

```

vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(ground pad)</span></small>
</td></tr>
<tr>
<td colspan="9">Last launch of phase 1 of the CRS contract. Carries Bartolomeo, an <a href="/wiki/ESA" class="mw-redirect" title="ESA">ESA</a> platform for hosting external payloads onto ISS.<sup id="cite_ref-520" class="reference"><a href="#cite_note-520">¶</a></sup> Originally scheduled to launch on 2 March 2020, the launch date was pushed back due to a second stage engine failure. SpaceX decided to swap out the second stage instead of replacing the faulty part.<sup id="cite_ref-521" class="reference"><a href="#cite_note-521">¶</a></sup> It was Space

```

```

X's 50th successful landing of a
first stage booster, the third f
light of the Dragon C112 and the
last launch of the cargo <a href
="/wiki/Dragon_(spacecraft)" clas
s="mw-redirect" title="Dragon (sp
acecraft)">Dragon</a> spacecraft.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">83
</th>
<td>18 March 2020,<br />12:16<sup
id="cite_ref-522" class="referenc
e"><a href="#cite_note-522">&#91;
510&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>  <br /><a href="/wiki/Falc
on_9_booster_B1048" class="mw-red
irect" title="Falcon 9 booster B1
048">B1048.5</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>

```




```

</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a> 5 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)<sup id="cite_ref-SLNov19_5-8"
class="reference"><a href="#cite
_note-SLNov19-5">&#91;5&#93;</a>
</sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a>
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align:
center;" class="table-failure">Failure<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>

```

<tr>
<td colspan="9">Fifth operational launch of Starlink satellites. It was the first time a first stage booster flew for a fifth time and the second time the fairings were reused (Starlink flight in May 2019).^{[511]} Towards the end of the first stage burn, the booster suffered premature shut down of an engine, the first of a Merlin 1D variant and first since the CRS-1 mission in October 2012. However, the payload still reached the targeted orbit.^{[512]} This was the second Starlink launch booster landing failure in a row, later revealed to be caused by residual cleaning fluid trapped inside a sensor.^{[513]}
</td>
</tr>

```

</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">84
</th>
<td>22 April 2020,<br />19:30<sup
id="cite_ref-526" class="referenc
e"><a href="#cite_note-526">#91;
514#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1051" title="List of Falcon 9 fi
rst-stage boosters">B1051.4</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 6 v1.0
(60 satellites)
</td>
<td>15,600#160;kg (34,400#160;l
b)<sup id="cite_ref-SLNov19_5-9"

```

```

class="reference"><a href="#cite
_note-SLNov19-5">&#91;5&#93;</a>
</sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a>
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Sixth operational
launch of Starlink satellites. Th
e 84th flight of the Falcon 9 roc
ket, it surpassed <a href="/wiki/
Atlas_V" title="Atlas V">Atlas V
</a> to become the most-flown ope

```

```

rational US rocket.<sup id="cite_
ref-leader_527-0" class="referenc
e"><a href="#cite_note-leader-52
7">&#91;515&#93;</a></sup> Used f
airings launched on AMOS-17 (Augu
st 2019).<sup id="cite_ref-528" c
lass="reference"><a href="#cite_n
ote-528">&#91;516&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">85
</th>
<td>30 May 2020,<br />19:22<sup i
d="cite_ref-529" class="referenc
e"><a href="#cite_note-529">&#91;
517&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><br /><a href="/wiki/List_of
_Falcon_9_first-stage_boosters#B1
058" title="List of Falcon 9 firs
t-stage boosters">B1058.1</a><sup
id="cite_ref-nsf_2Aug19_530-0" cl
ass="reference"><a href="#cite_no
te-nsf_2Aug19-530">&#91;518&#93;
</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_

```

```
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Crew_Dragon_De
mo-2" title="Crew Dragon Demo-2">
Crew Dragon Demo-2</a><sup id="ci
te_ref-nsf20150305_424-1" class
="reference"><a href="#cite_note-
nsf20150305-424">&#91;414&#93;</a
></sup><br />(<a href="/wiki/Spac
eX_Crew_Dragon_Endavour" class
="mw-redirect" title="SpaceX Crew
Dragon Endeavour">Crew Dragon C20
6.1 <i>Endavour</i></a>)
</td>
<td>12,530&#160;kg (27,620&#160;l
b)<sup id="cite_ref-531" class="r
eference"><a href="#cite_note-53
1">&#91;519&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
```

```

ASA">NASA</a> (<a href="/wiki/Com
mercial_Crew_Development" class
="mw-redirect" title="Commercial
Crew Development">CCDev</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">First crewed orbi
tal spaceflight from American soi
l since Space Shuttle <a href="/w
iki/STS-135" title="STS-135">STS-
135</a> in July 2011, carrying <a
href="/wiki/NASA" title="NASA">NA
SA</a> astronauts <a href="/wiki/
Bob_Behnken" title="Bob Behnken">
Bob Behnken</a> and <a href="/wik
i/Doug_Hurley" title="Doug Hurle
y">Doug Hurley</a> to the <a href
="/wiki/International_Space Stati

```

on" title="International Space Station">International Space Station.^{[91;414](#cite_note-nsf20150305_424-2)} The SpaceX live stream was peaked at 4.1 million viewers, while NASA estimated roughly 10 million people watched on various online platforms, and approximately 150,000 people gathered on Florida's [space coast](/wiki/Space_coast "Space coast") despite the risks of the [COVID-19 pandemic](/wiki/COVID-19_pandemic "COVID-19 pandemic").^{[520](#cite_ref-532)}

scope="row" rowspan="2" style="text-align:center;">86
4 June 2020, 01:25 ^{521}


```

</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a> &#x2192;<br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1049" title="List of Falcon 9 first-stage boosters">B1049.5</a>
</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-redirect" title="Cape Canaveral Air Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a> 7 v1.0 (60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)<sup id="cite_ref-SLNov19_5-10" class="reference"><a href="#cite_note-SLNov19-5">&#91;5&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
>

```

```

</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Seventh operation
al launch of Starlink satellites,
occurred on the 10th anniversary
of the first Falcon 9 flight. In
cluded "VisorSat" satellite test
that uses a sunshade to limit re
flectivity.<sup id="cite_ref-NAS2
80420_534-0" class="reference"><a
href="#cite_note-NAS280420-534">&
#91;522&#93;</a></sup> First boos
ter to successfully land five tim
es, and first to land on <a href
="/wiki/Autonomous_spaceport_dron

```

```

e_ship" title="Autonomous spacepo
rt drone ship">Just Read The Inst
ructions</a> since it was moved t
o the <a href="/wiki/East_Coast_o
f_the_United_States" title="East
Coast of the United States">East
Coast</a>.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">87
</th>
<td>13 June 2020,<br />09:21<sup
id="cite_ref-:17_535-0" class="r
eference"><a href="#cite_note-:17
-535">&#91;523&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ↗<br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1059" title="List of Falcon 9 fi
rst-stage boosters">B1059.3</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape

```

Canaveral Space Launch Complex 4
Starlink 8 v1.0
(58 satellites),^{[524]}
^{[525]}
SkySats-16, -17, -18
</td>
<td>15,410 kg (33,970 l
b)^{[523]}
</td>
<td>LEO
</td>
<td>SpaceX
Planet Labs
</td>

```

<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Eighth operational launch of Starlink satellites, included the first <a href="/wiki/Secondary_payload" title="Secondary payload">rideshare</a> in SpaceX's <a href="/wiki/SpaceX_SmallSat_Rideshare_Program" class="mw-redirect" title="SpaceX SmallSat Rideshare Program">SmallSat Program</a>, of three <a href="/wiki/SkySat" title="SkySat">SkySat</a> satellites.<sup id="cite_ref-:15_538-0" class="reference"><a href="#cite_note-:15-538">&#91;526&#93;</a></sup><sup id="cite_ref-539" class="reference"><a href="#cite_note-539">&#91;527&#93;</a></s

```

up> One payload fairing half launched on JCSat-18 / Kacific 1 mission in December 2019.

The other payload fairing half flew on Starlink 2 v1.0 in January 2020.^{[528]} For the first time, SpaceX did not perform a static fire before launch.

</td></tr>

<tr>

<th scope="row" rowspan="2" style="text-align:center;">88

</th>

<td>30 June 2020,
20:10:46^{[529]}

</td>

<td>F9 B5
<a href="/wiki/List_of

```

_Falcon_9_first-stage_boosters#B1060" title="List of Falcon 9 first-stage boosters">B1060.1</a>
</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-redirect" title="Cape Canaveral Air Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/GPS_Block_III" title="GPS Block III">GPS III</a>-<a href="/wiki/List_of_GPS_satellites" title="List of GPS satellites">03</a> (<i><a href="/wiki/Matthew_Henson" title="Matthew Henson">Matthew Henson</a></i>)
</td>
<td>4,311&#160;kg (9,504&#160;lb)
<sup id="cite_ref-clark-20200630-542-0" class="reference"><a href="#cite_note-clark-20200630-542">&#91;530&#93;</a></sup>
</td>
<td><a href="/wiki/Medium_Earth_orbit" title="Medium Earth orbit">MEO</a>

```

```

</td>
<td><a href="/wiki/United_States_Space_Force" title="United States Space Force">U.S. Space Force</a>
<sup id="cite_ref-clark-20200630_542-1" class="reference"><a href="#cite_note-clark-20200630-542">
&#91;530&#93;</a></sup>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Payload manufacturing contract awarded January 2012,<sup id="cite_ref-gps_34_manufacturing_543-0" class="reference">
<a href="#cite_note-gps_34_manufacturing-543">&#91;531&#93;</a></sup> fully assembled in August 2017,<sup id="cite_ref-gpsworld_2017

```


1127_544-0" class="reference">[532]</sup>^{[533]} and completed thermal vacuum testing in June 2018.^{[534]} Launch contract was awarded initially for US\$96.5 million,^{[535]} but later, this was discounted in exchange for allowing to launch configuration enabling booster recovery.^{[536]} The vehicle nicknamed <i>Columbus</i> was transported to Florida in February 2020,^{[537]} but launch was delayed by the customer from April 2020 due to t

he [COVID-19](/wiki/COVID-19 "COVID-19") pandemic.^{[[538]](#cite_ref-sn20200407_550-0)} The launch was dedicated to the memory of the recently deceased, late commander of the [21st Space Wing](/wiki/21st_Space_Wing "21st Space Wing"), Colonel Thomas G. Falzarano,^{[[539]](#cite_ref-sn20200630_551-0)}^{[[540]](#cite_ref-s[s20200513_552-0)} and after launch, in October 2020, the nickname was changed to that of the Arctic explorer [Matthew Henson](/wiki/Matthew_Henson "Matthew Henson").^{[[541]](#cite_ref-GPS_553-0)}^{[[390]](#cite_ref-sn-20160427_400-1)}

> The second stage featured a gray band to allow more heat to be absorbed during the longer coasting period,^{[542]} while both fairings were recovered out of the water without attempting a catch in the net.</sup>

</td></tr>


<tr>

<th scope="row" rowspan="2" style="text-align:center;">89

</th>

<td>20 July 2020,
21:30^{[543]}

</td>

<td>F9 B5 
B1058.2^{[544]}

```
</td>
<td><a href="/wiki/Cape_Canaveral_Air_Force_Station" class="mw-redirect" title="Cape Canaveral Air Force Station">CCAFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/ANASIS-II" title="ANASIS-II">ANASIS-II</a>
</td>
<td>5,000–6,000&#160;kg (11,000–13,000&#160;lb)
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Republic_of_Korea_Army" title="Republic of Korea Army">Republic of Korea Army</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
```


```

<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">At 5-6 tonnes, the satellite formerly known as <i>K-Milsat-1</i> is South Korea's first dedicated military satellite. Contracted by South Korea's <a href="/wiki/Defense_Acquisition_Program_Administration" title="Defense Acquisition Program Administration">Defense Acquisition Program Administration</a> in 2014.<sup id="cite_ref-557" class="reference"><a href="#cite_note-557">&#91;545&#93;</a></sup> 57th successful recovery of a Falcon 9 first stage. For the first time both fairing halves were also successfully caught by <a href="/wiki/Ms._Tree_(ship)" class="mw-redirect" title="Ms. Tree (ship)">fairing catching ships</a>.<sup id="cite_ref-558" class="reference"><a href="#cite_note-558">&#91;546&#93;

```

This launch featured a booster reflight within 51 days, a new record turnaround time for a Falcon booster.^{[\[547\]](#cite_note-559)} It was the same booster that launched the [Crew Dragon Demo-2](/wiki/Crew_Dragon_Demo-2 "Crew Dragon Demo-2") spacecraft on 30 May 2020.^{[\[543\]](#cite_ref-SFN20200720_555-1)} The satellite was delivered to a [super-synchronous transfer orbit](/wiki/Super-synchronous_transfer_orbit "Super-synchronous transfer orbit") of 211,454 km (131,244 mi), while both fairing halves were caught in the catch nets of the support ships.^{[\[548\]](#cite_ref-560)}

```

<th scope="row" rowspan="2" style
="text-align:center;">90
</th>
<td>7 August 2020,<br />05:12<sup
id="cite_ref-561" class="referenc
e"><a href="#cite_note-561">&#91;
549&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1051" title="List of Falcon 9 fi
rst-stage boosters">B1051.5</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 9 v1.0
(57 Satellites),<sup id="cite_re
f-nsf20200612_536-1" class="refer
ence"><a href="#cite_note-nsf2020
0612-536">&#91;524&#93;</a></sup>
<br /><a href="/wiki/Spaceflight_
Industries#BlackSky" title="Space

```

```


flight Industries">SXRS-1 (BlackS
ky Global 7 and 8)</a>
</td>
<td>14,932&#160;kg (32,919&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a><br /><a href
="/wiki/Spaceflight_Industries" t
itle="Spaceflight Industries">Spa
ceflight Industries</a> (BlackSk
y)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>

```


<td colspan="9">Ninth operational launch of Starlink satellites. This mission carried 57 Starlink satellites and two BlackSky satellites as rideshare.^{[550]} This first rideshare contracted with Spaceflight Industries was dubbed internally as "SXRS-1".^{[551]} After previously testing on a single Starlink, the launch will have all 57 satellites include a "VisorSat" to reduce their brightness.^{[552]}
</td></tr>

<tr>
<th scope="row" rowspan="2" style="text-align:center;">91
</th>

```

<td>18 August 2020 <br />14:31<sup
id="cite_ref-565" class="reference"><a href="#cite_note-565">&#9
1;553&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>   



```

```

</td>
<td>~15,440#160;kg (34,040#160;
lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a><br /><a href
="/wiki/Planet_Labs" title="Plane
t Labs">Planet Labs</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Tenth operational
launch of Starlink satellites. St
arlink flight including three <a
href="/wiki/SkySat" title="SkySa

```

t">SkySat rideshare satellite
 s.^{[526]}
 p> First time a booster made a 6th
 h flight.^{[554]}
 The fairings previously flew on
 Starlink 3 v1.0. One fairing half
 f was caught by <i>Go Ms. Tree</i>,&br/>
 the other was scooped out of the
 he ocean.^{[526]}
 </td></tr>

<tr>
 <th scope="row" rowspan="2" style="text-align:center;">92
 </th>
 <td>30 August 2020
23:18^{[555]}
 </td>
 <td>F9 B
 5 
<a href="/wiki/List_

```

of_Falcon_9_first-stage_boosters#
B1059" title="List of Falcon 9 fi
rst-stage boosters">B1059.4</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/SAOCOM_1B" cla
ss="mw-redirect" title="SAOCOM 1
B">SAOCOM 1B</a><sup id="cite_ref
-skyrocket-saocom1b_568-0" class
="reference"><a href="#cite_note-
skyrocket-saocom1b-568">&#91;556&
#93;</a></sup><br /><a href="/w/i
ndex.php?title=GNOMES_1&amp;actio
n=edit&amp;redlink=1" class="new"
title="GNOMES 1 (page does not ex
ist)">GNOMES 1</a><sup id="cite_r
ef-skyrocket-saocom1b_568-1" clas
s="reference"><a href="#cite_note
-skyrocket-saocom1b-568">&#91;556
&#93;</a></sup><br /><a href="/wi
ki/Tyvak" title="Tyvak">Tyvak-017
2</a><sup id="cite_ref-SAOCOM_1B_

```

```
Mission_569-0" class="reference">
<a href="#cite_note-SAOCOM_1B_Mis
sion-569">&#91;557&#93;</a></sup>
</td>
<td>3,130&#160;kg (6,900&#160;lb)
<sup id="cite_ref-570" class="ref
erence"><a href="#cite_note-570">
&#91;558&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><a href="/wiki/CONAE" class
="mw-redirect" title="CONAE">CONA
E</a><br /><a href="/w/index.php?
title=PlanetIQ&amp;action=edit&am
p;redlink=1" class="new" title="P
lanetIQ (page does not exist)">Pl
anetIQ</a><br /><a href="/wiki/Ty
vak" title="Tyvak">Tyvak</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
```

```

s">Success<br /><small><span clas
s="nowrap">(ground pad)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">The 100th launch
  in SpaceX's history, first time
  a commercial launch on a fourth
  launch of a booster, it deployed
  Earth-observing satellites built
  by Argentina's space agency CONA
  E and two rideshares. SpaceX was
  contracted in 2009 for an initia
  l launch as early as 2013.<sup id
  ="cite_ref-571" class="referenc
  e"><a href="#cite_note-571">&#91;
  559&#93;</a></sup> Originally pla
  nned for launch from Vandenberg b
  ut launched from Cape Canaveral,
  which made it the first flight f
  rom there using the southern corr
  idor to a polar orbit since 1969.
  <sup id="cite_ref-572" class="ref
  erence"><a href="#cite_note-572">
  &#91;560&#93;</a></sup><sup id="c
  ite_ref-573" class="reference"><a
  href="#cite_note-573">&#91;561&#9
  3;</a></sup>
</td></tr>

```

```

<tr>
<th scope="row" rowspan="2" style
="text-align:center;">93
</th>
<td>3 September 2020<br />12:46:1
4<sup id="cite_ref-sfn-20200903_5
74-0" class="reference"><a href
="#cite_note-sfn-20200903-574">&#
91;562&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1060" title="List of Falcon 9 fi
rst-stage boosters">B1060.2</a><s
up id="cite_ref-nsf290820_575-0"
class="reference"><a href="#cite
_note-nsf290820-575">&#91;563&#9
3;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 11 v1.0

```



```
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)<sup id="cite_ref-SLNov19_5-11"
class="reference"><a href="#cite_
note-SLNov19-5">&#91;5&#93;</a></
sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Eleventh operatio
nal launch of Starlink satellite
```

```
s, bringing the total to 713 launched Starlink satellites.<sup id="cite_ref-sfn-20200903_574-1" class="reference"><a href="#cite_note-sfn-20200903-574">#91;562#93;</a></sup>
</td></tr>
```

```
<tr>
<th scope="row" rowspan="2" style="text-align:center;">94
</th>
<td>6 October 2020<br />11:29:34<sup id="cite_ref-576" class="reference"><a href="#cite_note-576">#91;564#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a> &#91;564#93;<br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters" title="List of Falcon 9 first-stage boosters">B1058.3</a><sup id="cite_ref-577" class="reference"><a href="#cite_note-577">#91;565#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/
```

```

Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 12 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)<sup id="cite_ref-SLNov19_5-12"
class="reference"><a href="#cite_
note-SLNov19-5">&#91;5&#93;</a></
sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas

```

```
s="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Twelfth operation
al launch of Starlink satellites,
which for the first time used a f
airing half on its third launch.<
sup id="cite_ref-578" class="refe
rence"><a href="#cite_note-578">&
#91;566&#93;</a></sup> Also, the
B1058 holds the title for the sh
ortest time a booster reached 3 f
lights which is 129 days beating
B1046 by 77 days.
</td></tr>
```

```
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">95
</th>
<td>18 October 2020<br />12:25:57
<sup id="cite_ref-579" class="ref
erence"><a href="#cite_note-579">
&#91;567&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ↗<br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters"
```

```

title="List of Falcon 9 first-stage boosters">B1051.6</a><sup id="cite_ref-580" class="reference"><a href="#cite_note-580">#91;568&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a> 13 v1.0 (60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;lb)<sup id="cite_ref-SLNov19_5-13" class="reference"><a href="#cite_note-SLNov19-5">#91;5&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td>


```

```

<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Thirteenth operational launch of Starlink satellites. Second time a booster was flown six times and first time both fairing halves were flown a third time. Both fairing halves landed on their respective ships but one fairing broke the net on Ms Tree.<sup id="cite_ref-581" class="reference"><a href="#cite_note-581">¶569¶93</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style="text-align:center;">96
</th>

```

```

<td>24 October 2020<br />15:31:34
<sup id="cite_ref-582" class="ref
erence"><a href="#cite_note-582">
&#91;570&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>  <br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters"
title="List of Falcon 9 first-sta
ge boosters">B1060.3</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 14 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a>

```

```

>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Fourteenth operat
ional launch of Starlink satellit
es and the 100th successful launc
h of a Falcon vehicle.<sup id="ci
te_ref-583" class="reference"><a
href="#cite_note-583">&#91;571&#
93;</a></sup>
</td></tr>

<tr>
<th scope="row" rowspan="2" style
="text-align:center;">97

```



```

</th>
<td>5 November 2020<br />23:24:23
<sup id="cite_ref-584" class="ref
erence"><a href="#cite_note-584">
&#91;572&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><br /><a href="/wiki/List_of
_Falcon_9_first-stage_boosters#B1
062" title="List of Falcon 9 firs
t-stage boosters">B1062.1</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/GPS_Block_III"
title="GPS Block III">GPS III</a>
-<a href="/wiki/List_of_GPS_satel
lites#Planned_launches" title="Li
st of GPS satelllites">04</a> (<i>
<a href="/wiki/Sacagawea" title
="Sacagawea">Sacagawea</a></i>)<s
up id="cite_ref-GPS_553-1" class

```

```

="reference"><a href="#cite_note-
GPS-553">&#91;541&#93;</a></sup><
sup id="cite_ref-cr-048-15_585-0"
class="reference"><a href="#cite_
note-cr-048-15-585">&#91;573&#93;
</a></sup>
</td>
<td>4,311&#160;kg (9,504&#160;lb)
</td>
<td><a href="/wiki/Medium_Earth_or
bit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>

```

<td colspan="9">Manufacturing contract awarded in January 2012,^{[531]} underwent thermal vacuum testing in December 2018,^{[574]} while the launch contract was awarded in March 2018.^{[575]} A launch attempt on 3 October 2020 was aborted two seconds before liftoff due to early start in two engines.^{[576]}^{[577]} Following the abort, two engines from B1062 were sent for further testing.^{[578]}

3;

The abort also caused delays to the Crew-1 launch to allow time for data review.

^{1;579}

^{1;580}

98

16 November 2020 00:27

^{1;581}

F9 B5

List of Falcon 9 first-stage boosters

B1061.1

^{1;582}

```

<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_Crew-1" title="SpaceX Crew-1">Crew-1</a><br />(<a href="/wiki/Crew_Dragon_Resilience" title="Crew Dragon Resilience">Crew Dragon C207.1 <i>Resilience</i></a>)
</td>
<td>~12,500&#160;kg (27,600&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Crew_Program" title="Commercial Crew Program">CCP</a>)<sup id="cite_ref-CCD6_509-1" class="reference"><a href="#cite_note-CCD6-509">&#91;497&#93;</a></sup>

```

```

</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">First crew rotation of the commercial crew program, following the return in August of the crewed test flight mission <a href="/wiki/Crew_Dragon_Demo-2" title="Crew Dragon Demo-2">Crew Demo 2</a>. Originally designated "USCV-1" by NASA. Carried astronauts <a href="/wiki/Victor_J._Glover" title="Victor J. Glover">Victor Glover</a>, <a href="/wiki/Michael_S._Hopkins" title="Michael S. Hopkins">Mike Hopkins</a>, <a href="/wiki/Shannon_Walker" title="Shannon Walker">Shannon Walker</a> and <a href="/wiki/Soichi_N

```

```

oguchi" title="Soichi Noguchi">So
ichi Noguchi</a>, for a 6-month s
tay aboard the ISS, during which
the <a href="/wiki/Boeing_Starli
ner" title="Boeing Starliner">Boe
ing Starliner</a> <a href="/wiki/
Orbital_Flight_Test_2" class="mw-
redirect" title="Orbital Flight T
est 2">OFT-2</a> flight is expect
ed to dock also.<sup id="cite_ref
-595" class="reference"><a href
="#cite_note-595">&#91;583&#93;</
a></sup> The first flight of the
crew program was initially expec
ted to launch in 2017,<sup id="ci
te_ref-596" class="reference"><a
href="#cite_note-596">&#91;584&#
93;</a></sup><sup id="cite_ref-sc
ientificamerican-2_597-0" class
="reference"><a href="#cite_note-
scientificamerican-2-597">&#91;58
5&#93;</a></sup> and finished fin
al certifications in November 202
0.<sup id="cite_ref-598" class="r
eference"><a href="#cite_note-59
8">&#91;586&#93;</a></sup>
</td></tr>

```

```

<tr>

```

```

<th scope="row" rowspan="2" style

```

```
= "text-align:center;">99
</th>
<td>21 November 2020<br />17:17:08<sup id="cite_ref-599" class="reference"><a href="#cite_note-599">&#91;587&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1063" title="List of Falcon 9 first-stage boosters">B1063.1</a>
</td>
<td><a href="/wiki/Vandenberg_Air_Force_Base" class="mw-redirect" title="Vandenberg Air Force Base">VAFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Copernicus_Sentinel-6" class="mw-redirect" title="Copernicus Sentinel-6">Sentinel-6 Michael Freilich (Jason-CS A)
</a>
</td>
<td>1,192&#160;kg (2,628&#160;lb)
</td>
```



```

<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a>
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> / <a href="/wiki/NOAA" class="mw-redirect" title="NOAA">NOAA</a> / <a href="/wiki/ESA" class="mw-redirect" title="ESA">ESA</a> / <a href="/wiki/EUMETSAT" class="mw-redirect" title="EUMETSAT">EUMETSAT</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(ground pad)</span></small>
</td></tr>
<tr>
<td colspan="9">Named after the former director of NASA's Earth science program, it is a radar altimeter satellite part of the <a href=

```

ef="/wiki/Ocean_surface_topograph
y#Satellite_missions" title="Ocea
n surface topography">Ocean Surfa
ce Topography constellation l
ocated at 1,336 km (830
0;mi) and 66° <a href="/wiki/Orbi
tal_inclination" title="Orbital i
nclination">inclination, and
a follow-up to <a href="/wiki/Ja
son_3" class="mw-redirect" title
="Jason 3">Jason 3 as a partn
ership between the United States
(<a href="/wiki/National_Oceanic
_and_Atmospheric_Administration"
title="National Oceanic and Atmo
spheric Administration">NOAA
and <a href="/wiki/NASA" title
="NASA">NASA), <a href="/wik
i/Europe" title="Europe">Europe</
a> (<a href="/wiki/European_Organ
isation_for_the_Exploitation_of_M
eteorological_Satellites" title
="European Organisation for the E
xploitation of Meteorological Sat
ellites">EUMETSAT, <a href="/
wiki/European_Space_Agency" title
="European Space Agency">ESA,
<a href="/wiki/CNES" title="CNE
S">CNES).<sup id="cite_ref-60
0" class="reference"><a href="#ci

```
te_note-600">&#91;588&#93;</a></sup>
up>
</td></tr>
```

```
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">100
</th>
<td>25 November 2020<br />02:13<sup
id="cite_ref-SFN20201122_601-
0" class="reference"><a href="#ci
te_note-SFN20201122-601">&#91;589
&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5 ⚡</a><br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1049" title="List of Falcon 9 fi
rst-stage boosters">B1049.7</a><sup
id="cite_ref-602" class="refer
ence"><a href="#cite_note-602">&#
91;590&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Air_Force_Station" class="mw-red
irect" title="Cape Canaveral Air
Force Station">CCAFS</a>,<br /><
a href="/wiki/Cape_Canaveral_Spac
e_Launch_Complex_40" title="Cape
```

```

Canaveral Space Launch Complex 4
0">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 15 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>

```

```
<td colspan="9">First time a booster was launched for a seventh time and first time SpaceX completed four launches in a single month.
</td></tr>
```

```
<tr>
<th scope="row" rowspan="2" style="text-align:center;">101
</th>
<td>6 December 2020<br />16:17:08
<sup id="cite_ref-603" class="reference"><a href="#cite_note-603">
&#91;591&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5 ↗</a><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters"
title="List of Falcon 9 first-stage boosters">B1058.4</a><sup id
="cite_ref-nextspaceflight-20201013_604-0" class="reference"><a href="#cite_note-nextspaceflight-20201013-604">
&#91;592&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Cent
```

```
er">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-21" title="SpaceX CRS-21">SpaceX CRS-21</a><br />(Dragon C208.1)
</td>
<td>2,972&#160;kg (6,552&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align:
```

```

n: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">First launch of <
a href="/wiki/Commercial_Resupply
_Services#Commercial_Resupply_Ser
vices_phase_2" title="Commercial
Resupply Services">phase 2 of th
e CRS contract</a> of six launch
s awarded in January 2016.<sup id
="cite_ref-605" class="referenc
e"><a href="#cite_note-605">&#91;
593&#93;</a></sup> It was the fir
st launch of the upgraded version
Cargo Dragon 2 spacecraft, with i
ncreased payload capacity and aut
onomous docking to the ISS. Paylo
ads included Will <a href="/wiki/
Bishop_Airlock_Module" class="mw-
redirect" title="Bishop Airlock M
odule">Nanoracks Bishop Airlock</
a><sup id="cite_ref-Bishop2020_60
6-0" class="reference"><a href="#
cite_note-Bishop2020-606">&#91;59
4&#93;</a></sup> and CFIG-1 (Cool
Flames Investigation with Gases).
<sup id="cite_ref-grc-schedule_60

```

```

7-0" class="reference"><a href="#
cite_note-grc-schedule-607">&#91;
595&#93;</a></sup> It's also the
  100th successful Falcon 9 launc
h.
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">102
</th>
<td>13 December 2020<br />17:30:0
0<sup id="cite_ref-608" class="re
ference"><a href="#cite_note-60
8">&#91;596&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5 ↗</a><br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters"
title="List of Falcon 9 first-sta
ge boosters">B1051.7</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a><sup i
d="cite_ref-609" class="referenc

```



```

e"><a href="#cite_note-609">&#91;
597&#93;</a></sup>
</td>
<td><a href="/wiki/Sirius_XM" tit
le="Sirius XM">SXM-7</a>
</td>
<td>7,000&#160;kg (15,000&#160;l
b)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Sirius_XM" tit
le="Sirius XM">Sirius XM</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-success
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Launched the larg

```

est, high-power broadcasting satellite for SiriusXM's [digital audio radio service](/wiki/Digital_audio_radio_service "Digital audio radio service") (DARS). SXM-7 was built by [Maxar Technologies](/wiki/Maxar_Technologies "Maxar Technologies"); intended to operate in the [S-band](/wiki/S_band "S band") spectrum, it will replace the SXM-3 satellite. The satellite will deliver the highest power density of any commercial satellite on-orbit,^{[598]} generate more than 20 kW of power, and have a large unfoldable antenna reflector, which enables broadcast to radios without the need for large dish-type antennas on the ground. Due to the heavy weight, the payload was injected into a sub-synchronous orbit of 224 km × 19,411 km (139 mi × 12,061 mi) and the satellite itself will transfer to full GTO.<sup id="cite_ref-611" cl

```

ass="reference"><a href="#cite_note-611">&#91;599&#93;</a></sup> I
t was the first time a commercial
primary payload flew on a booster
which had been flown more than 4
times before.<sup id="cite_ref-
auto3_612-0" class="reference"><a
href="#cite_note-auto3-612">&#9
1;600&#93;</a></sup> First dedica
ted customer launch where the fai
rings were previously used.<sup i
d="cite_ref-613" class="referenc
e"><a href="#cite_note-613">&#91;
601&#93;</a></sup>
</td></tr>
<tr>
<th scope="row" rowspan="2" style
="text-align:center;">103
</th>
<td>19 December 2020<br />14:00:0
0<sup id="cite_ref-SFN20201217_61
4-0" class="reference"><a href="#
cite_note-SFN20201217-614">&#91;6
02&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5 ↗</a><br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1059" title="List of Falcon 9 fi

```

```
rst-stage boosters">B1059.5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/List_of_NRO_launches" title="List of NRO launches">NROL-108</a>
</td>
<td data-sort-value="" style="background: #ecec; color: #2C2C2C; vertical-align: middle; text-align: center;" class="table-na">Classified
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/National_Reconnaissance_Office" title="National Reconnaissance Office">NRO</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-succes
```

```

s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-alig
n: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(ground pad)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">The planned launc
h was not known by the public unt
il FCC filings appeared in late S
eptember followed by confirmation
from the NRO on 5 October 2020, l
ikely a relatively light payload
that allows the return of the bo
oster to the launch site.<sup id
="cite_ref-615" class="referenc
e"><a href="#cite_note-615">&#91;
603&#93;</a></sup>
</td></tr>
</tbody></table>
<h3><span class="mw-headline" id
="2021">2021</span></h3>
<table class="wikitable plainrowh
eaders collapsible" style="width:
100%;">
<tbody><tr>
<th scope="col">Flight


```

```

<p>No.
</p>
</th>
<th scope="col">Date and<br />tim
e (<a href="/wiki/Coordinated_Uni
versal_Time" title="Coordinated U
niversal Time">UTC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first
-stage boosters">Version,<br />Bo
oster</a><sup id="cite_ref-booste
r_11-8" class="reference"><a href
="#cite_note-booster-11">&#91;b&#
93;</a></sup>
</th>
<th scope="col">Launch<br />site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-8" class="refer
ence"><a href="#cite_note-Dragon-
12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th>

```

```

<th scope="col">Launch<br />outco
me
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster<br />landing</a
>
</th></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">104
</th>
<td>8 January 2021<br />02:15<sup
id="cite_ref-616" class="referenc
e"><a href="#cite_note-616">&#91;
604&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>   
https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true
```

```

0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/T%C3%BCrksat_5
A" title="Türksat 5A">Türksat 5A
</a><sup id="cite_ref-turk5a_617-
0" class="reference"><a href="#ci
te_note-turk5a-617">&#91;605&#93;
</a></sup>
</td>
<td>3,500&#160;kg (7,700&#160;lb)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/T%C3%BCrksat_
(company)" title="Türksat (compan
y)">Türksat</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s

```



```

mall>
</td></tr>
<tr>
<td colspan="9">A 3,500&#160;kg
  (7,700&#160;lb) satellite intend
ed to be stationed at 31.0° east.
  <sup id="cite_ref-turk5a_617-1" c
lass="reference"><a href="#cite_n
ote-turk5a-617">&#91;605&#93;</a>
</sup> This is the most powerful
  satellite in Türksat's fleet<sup
id="cite_ref-618" class="referenc
e"><a href="#cite_note-618">&#91;
606&#93;</a></sup> and will provi
de <a href="/wiki/Ku-band" class
="mw-redirect" title="Ku-band">Ku
-band</a> television broadcast se
rvices over <a href="/wiki/Turke
y" title="Turkey">Turkey</a>, the
<a href="/wiki/Middle_East" title
="Middle East">Middle East</a>, <
a href="/wiki/Europe" title="Euro
pe">Europe</a> and <a href="/wik
i/Africa" title="Africa">Africa</
a>. The satellite was injected in
to a <a href="/wiki/Geostationary
_transfer_orbit" title="Geostatio
nary transfer orbit">Super-synchr
onous transfer orbit</a> of 280&#
160;km ×&#160;55,000&#160;km (170

```

```

&#160;mi x&#160;34,180&#160;mi) w
ith 17.6° <a href="/wiki/Orbital_
inclination" title="Orbital incli
nation">inclination</a>.<sup id
="cite_ref-619" class="referenc
e"><a href="#cite_note-619">&#91;
607&#93;</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">105
</th>
<td>20 January 2021<br />13:02<su
p id="cite_ref-620" class="refere
nce"><a href="#cite_note-620">&#9
1;608&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ∇<br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1051" title="List of Falcon 9 fi
rst-stage boosters">B1051.8</a><s
up id="cite_ref-621" class="refer
ence"><a href="#cite_note-621">&#
91;609&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/

```

```

Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 16 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>

```

```

<tr>
<td colspan="9">The first booster
to successfully launch and land e
ight times. Achieved a record tur
naround time between two launches
of the same booster of only 38 da
ys and brought the total of launc
hed Starlink satellites to over 1
000.<sup id="cite_ref-622" class
="reference"><a href="#cite_note-
622">&#91;610&#93;</a></sup> Spac
eX stated that the landing would
  occur during higher winds than u
sual; this test to expand the lan
ding envelope was successfully pa
ssed by the booster.<sup id="cite
_ref-623" class="reference"><a hr
ef="#cite_note-623">&#91;611&#93;
</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">106
</th>
<td>24 January 2021<br />15:00<su
p id="cite_ref-624" class="refere
nce"><a href="#cite_note-624">&#9
1;612&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block

```

```

_5" title="Falcon 9 Block 5">F9 B
5</a>   

<a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1058" title="List of Falcon 9 first-stage boosters">B1058.5</a><sup id="cite_ref-625" class="reference"><a href="#cite_note-625">&#91;613&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CC SFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><i><a href="/w/index.php?title=Transporter-1&action=edit&amp;redlink=1" class="new" title="Transporter-1 (page does not exist)">Transporter-1</a></i> (<a href="/wiki/List_of_spaceflight_launches_in_January%E2%80%93June_2021#SpXTransporter1" title="List of spaceflight launches in January–June 2021">143 smallsat rideshare</a>)
</td>
<td>~5,000&#160;kg (11,000&#160;1

```

```

b)
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">First dedicated s
mallsat rideshare launch, targeti
ng a 525&#160;km (326&#160;mi) <a
href="/wiki/Orbital_altitude" cla
ss="mw-redirect" title="Orbital a
ltitude">altitude</a> orbit.<sup
id="cite_ref-RsA_626-0" class="r
eference"><a href="#cite_note-RsA
-626">&#91;614&#93;</a></sup> The

```

launch deployed a record 143 satellites, consisting of 120 [CubeSats](/wiki/CubeSat "CubeSat"), 11 [microsatellites](/wiki/Microsatellite_(spaceflight) "Microsatellite (spaceflight)"), 10 [Starlinks](/wiki/Starlink "Starlink"), and 2 transfer stages. In addition, 2 hosted payloads and 1 non-separating dummy satellite^{[[615]](#cite_note-627)} were^{[<i>[\[[616]\]\(#cite_note-628\)](/wiki/Wikipedia:Verifiability "The material near this tag failed verification of its source citation(s). (May 2021)>failed verification</i>]} launched.^{<span id=")} These include [SpaceBEE](/wiki/SpaceBEE "SpaceBEE") (x 36), [https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true](/wik</p>
</div>
<div data-bbox=)

i/Spire_Global" title="Spire Global">Lemur-2 (x 8), ICEYE (x 3), UVSQ-SAT,^{[617]} ELaNa 35 (PTD-1),^{[381]} and multiple Kepler nanosats.^{[618]}^{[619]} D-Orbit flew their ION SCV LAURENTIUS, 10 Starlink satellites were placed in a polar orbit^{[620]} an

d 2 of 15 payloads remained attached to [>SHERPA-FX1. \[>Exolaunch deployed several small satellites and cubesats via their own deployment mechanisms. First flight of a Falcon 9 with a \\[>SHERPA-FX transfer stage called SHERPA-FX1.^{[621]}^{[622]}</td></tr><tr><th rowspan="2" scope="row" style="text-align:center;">107</th><td>4 February 2021
06:19^{[623]}</td><td>F9 B\\]\\(/wiki/SHERPA_\\(space_tug\\) "SHERPA \\(space tug\\)"\\)\]\(/wiki/Exolaunch "Exolaunch"\)](/wiki/SHERPA_(space_tug) "SHERPA (space tug)")

```

5 </a><br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1060" title="List of Falcon 9 fi
rst-stage boosters">B1060.5</a><s
up id="cite_ref-636" class="refer
ence"><a href="#cite_note-636">&#
91;624&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 18 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>

```

```

<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">This marked the fastest turnaround to date, at 27 days, and the first time a Falcon 9 flies twice within a month.<sup id="cite_ref-637" class="reference"><a href="#cite_note-637">91;62593</a></sup>
</td></tr>

```

```

<tr>
<th rowspan="2" scope="row" style="text-align:center;">108
</th>
<td>16 February 2021<br />03:59:37<sup id="cite_ref-638" class="reference"><a href="#cite_note-63

```

```

8">&#91;626&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5 &#160;</a><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1059" title="List of Falcon 9 fi
rst-stage boosters">B1059.6</a>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 19 v1.0
(60 satellites)<sup id="cite_ref-
nextSL19_639-0" class="referenc
e"><a href="#cite_note-nextSL19-6
39">&#91;627&#93;</a></sup>
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>

```

```

</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #FFC7C7; v
ertical-align: middle; text-align: center;" class="table-failure">Failure<br /> <small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">A hole in a heat-shielding engine cover, which likely developed through fatigue, allowed recirculating hot exhaust gases to damage one of the <a href="/wiki/SpaceX_Merlin" title="SpaceX Merlin">Merlin&#160;1D</a> first-stage engines, causing it to shut down early during ascent. <a href="/wiki/Fail-safe" title="Fail-safe">Engine-out capability</a> of the Falcon&#160;9 allowed the mission to continue and succes

```

sfully deploy the 60 Starlink satellites to orbit.^{[628]} The issue caused the booster to fail its landing attempt and miss the dronship <i>Of Course I Still Love You</i> (OCISLY) after its entry burn, breaking the longest streak of 24 landing successes.^{[629]} During this mission, <i>GO Ms. Tree</i> and <i>GO Ms. Chief</i> were used for the last time to recover the fairings.^{[630]}<sup id="cite_ref-643" class="reference">[631]</s

```

up> After this mission, both ships were retired because SpaceX no longer plans to catch the fairings.<sup id="cite_ref-644" class="reference"><a href="#cite_note-644">&#91;632&#93;</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style="text-align:center;">109
</th>
<td>4 March 2021<br />08:24<sup id="cite_ref-645" class="reference"><a href="#cite_note-645">&#91;633&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5 ↗</a><br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1049" title="List of Falcon 9 first-stage boosters">B1049.8</a><sup id="cite_ref-nextSL17_646-0" class="reference"><a href="#cite_note-nextSL17-646">&#91;634&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/

```

```

Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 17 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>

```



```

<tr>
<td colspan="9">Launch had previously been postponed multiple times, causing the payload Starlink L17 to launch after the L18 and L19 missions. Featured for the first time, a fairing which was flying on its fourth flight.<sup id="cite_ref-647" class="reference"><a href="#cite_note-647">#91;635#93;</a></sup> The second-stage deorbit burn failed, causing an uncontrolled reentry on 26 March 2021 over the west coast of the United States.<sup id="cite_ref-648" class="reference"><a href="#cite_note-648">#91;636#93;</a></sup>
</td></tr>

```

```

<tr>
<th rowspan="2" scope="row" style="text-align:center;">110
</th>
<td>11 March 2021<br />08:13:29<sup id="cite_ref-649" class="reference"><a href="#cite_note-649">#91;637#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B

```

```

5 </a><br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1058" title="List of Falcon 9 fi
rst-stage boosters">B1058.6</a><s
up id="cite_ref-NextL20_650-0" cl
ass="reference"><a href="#cite_no
te-NextL20-650">&#91;638&#93;</a>
</sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 20 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>

```

```

</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Twentieth operational launch of Starlink satellites, bringing the total to 1,265 (including prototypes) launched Starlink satellites.<sup id="cite_ref-651" class="reference"><a href="#cite_note-651">&#91;639&#93;</a></sup>
</td></tr>

<tr>
<th rowspan="2" scope="row" style="text-align:center;">111
</th>
<td>14 March 2021<br />10:01<sup id="cite_ref-652" class="referen

```

```

ce"><a href="#cite_note-652">&#9
1;640&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5 ⚡</a><br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1051" title="List of Falcon 9 fi
rst-stage boosters">B1051.9</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 21 v1.0
(60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;l
b)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>


```

```

</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">First time a first-stage booster flew and landed for the ninth time. This flight also marked the fastest turnaround time for a fairing half, at 49 days. Both fairing halves previously flew on the Transporter-1 mission.<sup id="cite_ref-653" class="reference"><a href="#cite_note-653">¶¶¶</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style="text-align:center;">112
</th>
<td>24 March 2021<br />08:28<sup>

```

```

    id="cite_ref-654" class="reference"><a href="#cite_note-654">&#9
1;642&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>   
https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true
```

```

t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Fairing "wet reco
very" achieved by contracted reco
very vessel <i>Shelia Bordelon</i>
> for the first time. Both fairin
g halves were retrieved from the
water.<sup id="cite_ref-656" cla
ss="reference"><a href="#cite_not
e-656">&#91;644&#93;</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style

```

```
= "text-align:center;">113
</th>
<td>7 April 2021<br />16:34
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5 
```




```

<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">23rd operational
  launch of Starlink satellites, b
ringing the total to 1,385 launch
ed <a href="/wiki/Starlink" title
="Starlink">Starlink satellites</
a> (including prototype). This la
unch featured the second fastest
  booster turnaround time at 27 da
ys and 8 hours (after Starlink 18
with B1060.5, which was 4 hours f
aster).<sup id="cite_ref-657" cla
ss="reference"><a href="#cite_not
e-657">&#91;645&#93;</a></sup>
</td></tr>

```

```

<tr>
<th rowspan="2" scope="row" style
="text-align:center;">114
</th>
<td>23 April 2021<br />9:49<sup i
d="cite_ref-658" class="referenc
e"><a href="#cite_note-658">&#91;
646&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>   
https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true
```

```

ect" title="SpaceX Crew Dragon En
deavour">Crew Dragon C206.2 <i>En
deavour</i></a> ↻)
</td>
<td>~13,000&#160;kg (29,000&#160;
lb)<sup id="cite_ref-660" class
="reference"><a href="#cite_note-
660">&#91;648&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/ISS
_Crew_Transportation_Services" cl
ass="mw-redirect" title="ISS Crew
Transportation Services">CTS</a>)
<sup id="cite_ref-CCD6_509-2" cla
ss="reference"><a href="#cite_not
e-CCD6-509">&#91;497&#93;</a></su
p>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>

```

```


<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Second operational flight of Crew Dragon for Commercial Crew Program. Transported NASA astronauts <a href="/wiki/Shane_Kimbrough" title="Shane Kimbrough">Shane Kimbrough</a> and <a href="/wiki/K._Megan_McArthur" title="K. Megan McArthur">Megan McArthur</a>, <a href="/wiki/JAXA" title="JAXA">JAXA</a> Astronaut <a href="/wiki/Akihiko_Hoshide" title="Akihiko Hoshide">Akihiko Hoshide</a> and <a href="/wiki/European_Space_Agency" title="European Space Agency">ESA</a> astronaut <a href="/wiki/Thomas_Pesquet" title="Thomas Pesquet">Thomas Pesquet</a> to the ISS.<sup id="cite_ref-661" class="reference"><a href="#cite_note-661">&#91;649&#93;</a></sup> The four astronauts will spend 6 months aboard the ISS.

```

Beginning with the Crew-2 mission, NASA has modified the contract to allow NASA astronauts to use flight-proven Dragon capsules and booster.^{[\[650\]](#cite_note-662)}

Thus SpaceX reflew the Dragon used on Demo-2 and used Booster B1061-2 which had been used to launch [Crew-1](/wiki/SpaceX_Crew-1) in November 2020.

29 April 2021 03:44^{[\[651\]](#cite_note-663)}

[F9 B5](/wiki/Falcon_9_Block_5)  [B1060.7](/wiki/List_of_Falcon_9_first-stage_boosters#B1060)^{[\[664\]](#cite_ref-664)}

```
ence"><a href="#cite_note-664">&#91;652&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CC SFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a> 24 v1.0 (60 satellites)
</td>
<td>15,600&#160;kg (34,400&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; vertical-align: middle; text-align: center;" class="table-success">Success
</td>
```

```

<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">24th operational
  launch of Starlink satellites, bringing the total to 1,434 Starlink satellites still in orbit. This launch also paid tribute to <a href="/wiki/Apollo_11" title="Apollo 11">Apollo 11</a> crew <a href="/wiki/Michael_Collins_(astronaut)" title="Michael Collins (astronaut)">Michael Collins</a>, who passed away hours before the launch.<sup id="cite_ref-665" class="reference"><a href="#cite_note-665">&#91;653&#93;</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style="text-align:center;">116
</th>
<td>4 May 2021<br />19:01<sup id="cite_ref-666" class="reference"><a href="#cite_note-666">&#91;

```

```

654&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>   


```




```

<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">25th operational
  launch of Starlink satellites, b
ringing the total to 1,494 Starli
nk satellites still in orbit, sec
ond time a booster flew for the n
inth time.
</td></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">117
</th>
<td>9 May 2021<br />06:42<sup id
="cite_ref-668" class="referenc
e"><a href="#cite_note-668">&#91;

```

```

656&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>   



```

```

</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Booster flew and
  landed for a record 10th time, w
ith reused fairings, bringing the
total number of operational Starl
ink satellites in the first shell
to approximately 1516 out of a pl
anned 1584.<sup id="cite_ref-NSF8
521_670-0" class="reference"><a h
ref="#cite_note-NSF8521-670">&#9
1;658&#93;</a></sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style

```

```

="text-align:center;">118
</th>
<td>15 May 2021<br />22:56<sup id
="cite_ref-671" class="referenc
e"><a href="#cite_note-671">&#91;
659&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> <br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1058" title="List of Falcon 9 fi
rst-stage boosters">B1058.8</a><s
up id="cite_ref-672" class="refer
ence"><a href="#cite_note-672">&#
91;660&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
<sup id="cite_ref-673" class="ref
erence"><a href="#cite_note-673">
&#91;661&#93;</a></sup>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a> 26 v1.0
(52 Satellites)<br /> <a href="/w

```

```
iki/Capella_Space" title="Capella
Space">Capella</a>-6 &#91;662&#93;
="/wiki/Tyvak" title="Tyvak">Tyva
k</a>-0130<sup id="cite_ref-674"
  class="reference"><a href="#cite
_note-674">&#91;662&#93;
</td>
<td>~14,000&#160;kg (31,000&#160;
lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a><br /> <a hre
f="/wiki/Capella_Space" title="Ca
pella Space">Capella Space</a> an
d <a href="/wiki/Tyvak" title="Ty
vak">Tyvak</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
```

```

s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Rideshare launch
  with a targeted orbit at 569x58
  2, significantly higher than typi
  cal Starlink launches, to allow f
  or needs of the rideshare payload
  s.<sup id="cite_ref-SL28_675-0" c
  lass="reference"><a href="#cite_n
  ote-SL28-675">&#91;663&#93;</a></
  sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">119
</th>
<td>26 May 2021<br />18:59<sup id
="cite_ref-676" class="referenc
e"><a href="#cite_note-676">&#91;
664&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> &#91;<br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1063" title="List of Falcon 9 fi
rst-stage boosters">B1063.2</a><s

```

```

up id="cite_ref-NSFS128_677-0" class="reference"><a href="#cite_note-NSFS128-677">&#91;665&#93;</a>
</sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CC SFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a><sup id="cite_ref-NSFS128_677-1" class="reference"><a href="#cite_note-NSFS128-677">&#91;665&#93;</a></sup>
</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a> 28 v1.0 (60 Satellites)<sup id="cite_ref-NSFS128_677-2" class="reference"><a href="#cite_note-NSFS128-677">&#91;665&#93;</a></sup>
</td>
<td>15,600&#160;kg (34,400&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
>

```

```

</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align: center;" class="table-succes
s">Success<br /><small><span clas
s="nowrap">(drone ship)</span></s
mall>
</td></tr>
<tr>
<td colspan="9">Will likely compl
ete the first shell of the Starli
nk network located at 550&#160;km
altitude and containing 1584 sate
llites.<sup id="cite_ref-SL28_675
-1" class="reference"><a href="#c
ite_note-SL28-675">&#91;663&#93;
</a></sup> It was 40th launch a f
airing was reused, with one half
being used for the 5th time (fir
st fairing to do so) and the othe
r for a 3rd time.<sup id="cite_re
f-sn20210526_678-0" class="refere

```


nce">[666]</sup> This launch marks SpaceX's 100th successful launch in a row without in-flight failure since December 2015.

</td></tr>

<tr>

<th rowspan="2" scope="row" style="text-align:center;">120

</th>

<td>3 June 2021
17:29^{[667]}

</td>

<td>F9 B5
B1067.1^{[668]}

</td>

<td>KSC,
<a href="/wiki/Kennedy_Space_Center_Launch_Compl

```

ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-22"
title="SpaceX CRS-22">SpaceX CRS-
22</a><br />(<a href="/wiki/Cargo
_Dragon_C209" title="Cargo Dragon
C209">Dragon C209.1</a>)
</td>
<td>3,328&#160;kg (7,337&#160;lb)
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:

```

```

n: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">Second of a minimum of six new cargo missions under the <a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS-2 contract</a>, which NASA awarded Space X in 2015. Mission was flown with an uncrewed Dragon 2 capsule,<sup id="cite_ref-nasa-20160114_681-0" class="reference"><a href="#cite_note-nasa-20160114-681">&#91;669&#93;</a></sup> which carried solar panels, catalytic reactor for the station's life support system, an emergency air supply system, Kurs remote control unit, and a Portable Water Dispense (PWD) filter. Also carried were the RamSat cubesat as payload for <a href="/wiki/ELaNa" class="mw-redirect" title="ELaNa">ELaNa 36</a>,<sup id="cite_ref-682" class="reference"><a href="#cite_note-682">&#91;670&#93;</a></sup> the SOAR cubes

```

at for the [University of Manchester](/wiki/University_of_Manchester "University of Manchester")^{[671]} and the first Mauritian satellite MIR-SAT1^{[672]} to be launched from the station later.</sup></sup>

</td></tr>


<tr>

<th rowspan="2" scope="row" style="text-align:center;">121

</th>

<td>6 June 2021
04:26^{[673]}

</td>

<td>F9 B 5 
B1061.3

</td>

<td><a href="/wiki/Cape_Canaveral

```

_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Sirius_XM#Sate
llites" title="Sirius XM">SXM-8</
a><sup id="cite_ref-spacex_manife
st_686-0" class="reference"><a hr
ef="#cite_note-spacex_manifest-68
6">&#91;674&#93;</a></sup>
</td>
<td>7,000&#160;kg (15,000&#160;l
b)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Sirius_XM" tit
le="Sirius XM">Sirius XM</a>
</td>
<td style="background: #9EFF9E; v
ertical-align: middle; text-align:
center;" class="table-succes
s">Success
</td>
<td style="background: #9EFF9E; v

```

```

vertical-align: middle; text-align: center;" class="table-success">Success<br /><small><span class="nowrap">(drone ship)</span></small>
</td></tr>
<tr>
<td colspan="9">A large, high-power broadcasting satellite for SiriusXM's digital audio radio service (DARS) contracted together with SXM-7 to replace the aging XM-4 satellite and allow broadcast to radios without the need for large dish-type antennas on the ground.<sup id="cite_ref-auto3_612-1" class="reference"><a href="#cite_note-auto3-612">&#91;600&#93;</a></sup><sup id="cite_ref-687" class="reference"><a href="#cite_note-687">&#91;675&#93;</a></sup>
</td></tr></tbody></table>
<h2><span class="mw-headline" id="Future_launches">Future launches</span></h2>
<p>Future launches are listed chronologically when firm plans are in place. The order of the later launches is much less certain, as the official SpaceX manifest does

```

not include a schedule.^{[cite_ref-spacex_manifest_686-1](#cite_note-spacex_manifest-686)} [class="reference">[674]](#cite_note-spacex_manifest-686) Tentative launch dates are cited from various sources for each launch.^{[cite_ref-sfn_ls_688-0](#cite_note-sfn_ls-688)} [class="reference">[676]](#cite_note-sfn_ls-688)^{[cite_ref-cooper_689-0](#cite_note-cooper-689)} [class="reference">[677]](#cite_note-cooper-689)^{[cite_ref-nextSFupcoming_690-0](#cite_note-nextSFupcoming-690)} [class="reference">[678]](#cite_note-nextSFupcoming-690) Launches are expected to take place "no earlier than" (NET) the listed date.

</p>

<h3>2021</h3>


<p>SpaceX has allowed for up to 54 launches for Falcon 9 and another 10 for Falcon Heavy for 2021 from Florida according to its February 2020 environmental assessment.^{[cite_ref-faa_EA_508_691-0](#)} [class="reference"><a href="#"](#)

[cite_note-faa_EA_508-691">[679]](#)

In October 2020, Musk indicated he wanted to be able to increase launches to 48 in 2021.^{[cite_ref-692" class="reference">[680]](#)}

Date and time (UTC)	Version,
Booster ^{cite_ref-booster_11-9" class="reference">&#91;b&#93;}	Launch site	Payload ^{cite_ref-Dragon_12-9" class="refer}
---	---	-------------	---


```

ence"><a href="#cite_note-Dragon-12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th></tr>
<tr>
<td rowspan="2">17 June 2021<br /
>16:09-16:24<sup id="cite_ref-sfn_ls_688-1" class="reference"><a href="#cite_note-sfn_ls-688">&#91;676&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>  <br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1062" title="List of Falcon 9 first-stage boosters">B1062.2</a><sup id="cite_ref-GPS_boosterreuse_693-0" class="reference"><a href="#cite_note-GPS_boosterreuse-693">&#91;681&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape Canaveral Space Force Station">CC SFS</a>,<br /><a href="/wiki/Cape_Canaveral_Space_Launch_Complex_4


```

```

0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/GPS_Block_III"
title="GPS Block III">GPS III</a>
-<a href="/wiki/List_of_GPS_satel
lites" title="List of GPS satell
ites">05</a> (<i>Neil Armstrong</i
>)<sup id="cite_ref-GPS_553-2" cl
ass="reference"><a href="#cite_no
te-GPS-553">&#91;541&#93;</a></su
p><sup id="cite_ref-sfn-20181217_
398-1" class="reference"><a href
="#cite_note-sfn-20181217-398">&#
91;388&#93;</a></sup>
</td>
<td><a href="/wiki/Medium_Earth_or
bit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF</a><sup id="cit
e_ref-clark-20200630_542-2" class
="reference"><a href="#cite_note-
clark-20200630-542">&#91;530&#93;
</a></sup>
</td></tr>
<tr>
<td colspan="5">Manufacturing con

```

tract awarded February 2013.^{[682]} In March 2018, the Air Force announced it had awarded the launch contract for three GPS satellites to SpaceX.^{[683]}</td></tr>

<tr>
<td rowspan="2">24 June 2021^{[678]}
</td>
<td>F9 B 5 
B1060.8
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape

```

Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><i>Transporter-2</i> SmallSat
Rideshare
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Expected to launc
h are Polar Vigilance (4 sats), E
xolaunch YAM-3 (~30 Sats), - Mars
Demo-1, <a href="/wiki/Satellogi
c" title="Satellogic">Satellogic
</a>,<sup id="cite_ref-696" class
="reference"><a href="#cite_note-
696">&#91;684&#93;</a></sup> Cape
lla-5<sup id="cite_ref-697" class
="reference"><a href="#cite_note-
697">&#91;685&#93;</a></sup> Hawk
Eye Cluster 3 (multiple sats), <a
href="/wiki/Spaceflight_Industrie
s" title="Spaceflight Industrie

```

```
s">Spaceflight Industries</a> (multiple sats on <a href="/wiki/SHERPA_(space_tug)" title="SHERPA (space tug)">Sherpa-FX2 Sherpa-LTE1</a> and one on a separate port).<sup id="cite_ref-698" class="reference"><a href="#cite_note-698">&#91;686&#93;</a></sup></td></tr>
```

```
<tr>
<td rowspan="2">July 2021<sup id="cite_ref-nextSFupcoming_690-2" class="reference"><a href="#cite_note-nextSFupcoming-690">&#91;678&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a> ↗ <br /><a href="/wiki/List_of_Falcon_9_first-stage_boosters#B1049" title="List of Falcon 9 first-stage boosters">B1049.10</a>
<sup id="cite_ref-699" class="reference"><a href="#cite_note-699">&#91;687&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br />
```

```

><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a>
</td>
<td><span class="nowrap"><a href="/wiki/Polar_orbit" title="Polar orbit">Polar</a> <a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a>
</span>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td></tr>
<tr>
<td colspan="5">Polar Starlink launches to start from July 2021.<sup id="cite_ref-SL28_675-2" class="reference"><a href="#cite_note-SL28-675">&#91;663&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">July 2021<sup id="cite_ref-sfn28521_700-0" class="reference"><a href="#cite_note-

```

```
sfn28521-700">&#91;688&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Ken
nedy Space Center Launch Complex
39A">LC-39A</a> or <a href="/wik
i/Cape_Canaveral_Space_Launch_Com
plex_40" title="Cape Canaveral Sp
ace Launch Complex 40">SLC-40</a>
or <a href="/wiki/Vandenberg_Spac
e_Force_Base" title="Vandenberg S
pace Force Base">VSFB</a>, <a hre
f="/wiki/Vandenberg_Space_Launch_
Complex_4" title="Vandenberg Spac
e Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a>
</td>
<td><span class="nowrap"><a href
="/wiki/Polar_orbit" title="Polar
orbit">Polar</a> <a href="/wiki/L
ow_Earth_Orbit" class="mw-redirec
```

```

t" title="Low Earth Orbit">LEO</a>
or <a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a></span>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td></tr>
<tr>
<td colspan="5">
</td></tr>

<tr>
<td rowspan="2">18 August 2021<sup id="cite_ref-sfn_ls_688-2" class="reference"><a href="#cite_note-sfn_ls-688">&#91;676&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>

```



```

<td><a href="/wiki/SpaceX_CRS-23"
title="SpaceX CRS-23">SpaceX CRS-
23</a>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td></tr>
<tr>
<td colspan="5">Third of six new
cargo missions NASA awarded in 2
015 to SpaceX under the <a href
="/wiki/Commercial_Resupply_Servi
ces" title="Commercial Resupply S
ervices">CRS-2 contract</a> to be
flown after the initial 20 missio
ns of phase 1 were completed in 2
020.<sup id="cite_ref-nasa-201601
14_681-1" class="reference"><a hr
ef="#cite_note-nasa-20160114-68
1">&#91;669&#93;</a></sup> Includ
es FBCE, SoFIE.

```

```
</td></tr>
```

```
<tr>
```

```
<td rowspan="2">August 2021<sup id="cite_ref-RsA_626-1" class="reference"><a href="#cite_note-RsA-626">#91;614#93;</a></sup>
```

```
</td>
```

```
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
```

```
</td>
```

```
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
```

```
</td>
```

```
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a>
```

```
</td>
```


```
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
```

```
>
```

```
</td>
```

```

<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>
</td></tr>
<tr>
<td colspan="5">
</td></tr>

<tr>
<td rowspan="2">15 September 2021
<sup id="cite_ref-701" class="ref
erence"><a href="#cite_note-701">
&#91;689&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>  <sup id="cite_ref-Isaacma
n_Youtube_702-0" class="referenc
e"><a href="#cite_note-Isaacman_Y
outube-702">&#91;690&#93;</a></su
p>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Inspiration4"
title="Inspiration4">Inspiration

```

```
4</a>
</td>
<td>LEO
</td>
<td><a href="/wiki/Jared_Isaacman" title="Jared Isaacman">Jared Isaacman</a>
</td></tr>
<tr>
<td colspan="5">SpaceX signed in February 2021, its first all-civilian flight for a crewed spacecraft with <a href="/wiki/Jared_Isaacman" title="Jared Isaacman">Jared Isaacman</a> (Leadership), founder and CEO of Shift4 Payments, who will command and pilot the mission, and who donated the three other seats in the Crew Dragon vehicle's launch to LEO. The first of these three seats (Generosity) was won by <a href="/wiki/Christopher_Sembroski" title="Christopher Sembroski">Christopher Sembroski</a> in a lottery, who donated to <a href="/wiki/St._Jude_Children%27s_Research_Hospital" title="St. Jude Children's Research Hospital">St. Jude Children's Research Hospital</a>, the second
```

seat (Hope) was awarded to [Hayley Arceneaux](/wiki/Hayley_Arceneaux "Hayley Arceneaux"), an ambassador associated with that hospital, and the third seat (Prosperity) was awarded to [Sian Proctor](/wiki/Sian_Proctor "Sian Proctor"), the winner of a contest between entrepreneurs who use Shift4Shop. The seats was awarded on 30 March 2021.^{[\[691\]](#cite_note-703)}^{[\[692\]](#cite_note-BW20210201_704-0)} The mission will go to an orbit with an apogee of about 540,000 km and last about three days. The docking adapter of Crew Dragon *Resilience* will be replaced by an extra dome window.^{[\[690\]](#cite_ref-Isaacman_Youtube_702-1)}^{[\[693\]](#cite_ref-705)}

```
</td></tr>
```

```
<tr>
```

```
<td rowspan="2">September 2021<sup id="cite_ref-gunter-sarah1_706-0" class="reference"><a href="#cite_note-gunter-sarah1-706">&#91;694&#93;</a></sup>
```

```
</td>
```

```
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a>
```

```
</td>
```

```
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
```

```
</td>
```

```
<td><a href="/wiki/SARah" class="mw-redirect" title="SARah">SARah</a>-1<sup id="cite_ref-gunter-sarah1_706-1" class="reference"><a href="#cite_note-gunter-sarah1-706">&#91;694&#93;</a></sup><br />Additional payload to be announced.<sup id="cite_ref-gunter-sarah1_706-2" class="reference"><a href
```

```

=>#cite_note-gunter-sarah1-706">&
#91;694&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><a href="/wiki/German_Intelli
gence_Service" class="mw-redirec
t" title="German Intelligence Ser
vice">German Intelligence Service
</a>
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Ph
ased_array" title="Phased array">
Phased-array-antenna</a> satellit
e intended to upgrade the German
  <a href="/wiki/SAR-Lupe" title
="SAR-Lupe">SAR-Lupe</a> surveill
ance satellites.<sup id="cite_ref
-spx-20130808_707-0" class="refer
ence"><a href="#cite_note-spx-201
30808-707">&#91;695&#93;</a></sup
> In January 2019, the satellites
were expected to be launched betw
een November 2020 and September 2
021.<sup id="cite_ref-Deutscher_B
undestag_708-0" class="referenc
e"><a href="#cite_note-Deutscher_

```

```

Bundestag-708">&#91;696&#93;</a>
</sup>
</td></tr>

```

```

<tr>
<td rowspan="2">September 2021<sup id="cite_ref-gunter-sarah2_709-0" class="reference"><a href="#cite_note-gunter-sarah2-709">&#91;697&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/SARah" class="mw-redirect" title="SARah">SARah</a> 2 & 3<sup id="cite_ref-gunter-sarah2_709-1" class="reference"><a href="#cite_note-gunter-sarah2-709">&#91;697&#93;</a></sup>
p>

```



```

</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><a href="/wiki/Federal_Intell
igence_Service" title="Federal In
telligence Service">German Intell
igence Service</a>
</td></tr>
<tr>
<td colspan="5">In January 2019,
the satellites were expected to
be launched between November 202
0 and September 2021.<sup id="cit
e_ref-Deutscher_Bundestag_708-1"
class="reference"><a href="#cite
_note-Deutscher_Bundestag-708">&#
91;696&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">September 2021<su
p id="cite_ref-Ridesharefl_710-0"
class="reference"><a href="#cite_
note-Ridesharefl-710">&#91;698&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B

```

```

5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Starlink" title="Starlink">Starlink</a>
</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td></tr>
<tr>
<td colspan="5">
</td></tr>

<tr>
<td rowspan="2">Q3 2021<sup id="cite_ref-711" class="reference"><a

```

```

href="#cite_note-711">&#91;699&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a hre
f="/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
>
</td>
<td><a href="/wiki/O3b_mPOWER" ti
tle="O3b mPOWER">O3b mPOWER</a>
  1, 2 and 3
</td>
<td><a href="/wiki/Medium_Earth_or
bit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td></tr>

```

```

<tr>
<td colspan="5">In September 201
9, SES signed a contract to launc
h the first part of their seven M
EO satellites for its proven O3b
  low-latency, high-performance co
nnectivity services.<sup id="cite
_ref-auto7_712-0" class="referenc
e"><a href="#cite_note-auto7-71
2">&#91;700&#93;</a></sup><sup id
="cite_ref-auto6_713-0" class="re
ference"><a href="#cite_note-auto
6-713">&#91;701&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">23 October 2021<s
up id="cite_ref-sfn_ls_688-3" cla
ss="reference"><a href="#cite_not
e-sfn_ls-688">&#91;676&#93;</a></
sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ↗<br /><a href="/wiki/List_
of_Falcon_9_first-stage_boosters#
B1067" title="List of Falcon 9 fi
rst-stage boosters">B1067.2</a><s
up id="cite_ref-714" class="refer
ence"><a href="#cite_note-714">&#

```

```

91;702&#93;</a></sup>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_Crew-3" title="SpaceX Crew-3">Crew-3</a>
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/ISS_Crew_Transportation_Services" class="mw-redirect" title="ISS Crew Transportation Services">CTS</a>)
<sup id="cite_ref-CCD6_509-3" class="reference"><a href="#cite_note-CCD6-509">&#91;497&#93;</a></sup>
</td></tr>
<tr>
<td colspan="5">SpaceX's third op

```

erational Crew Dragon flight is scheduled to carry NASA astronauts [Thomas Marshburn](/wiki/Thomas_Marshburn "Thomas Marshburn"), [Kayla Barron](/wiki/Kayla_Barron "Kayla Barron") and [Raja Chari](/wiki/Raja_Chari "Raja Chari") as well as German ESA astronaut [Matthias Maurer](/wiki/Matthias_Maurer "Matthias Maurer").^{[\[7\]](#cite_ref-SFN20201229_715-0)} It will also carry up to 1000kg (220lb) of cargo to the ISS as well as feature a lifeboat function to evacuate astronauts from ISS in case of an emergency.^{[\[4\]](#cite_ref-CCD6_509-4)}

October 2021^{[\[5\]](#cite_ref-sfn-20210523_716-0)}

```
note-sfn-20210523-716">&#91;704&#
93;</a></sup>
</td>
<td><a href="/wiki/Falcon_Heavy"
  title="Falcon Heavy">Falcon Heav
y</a><br /><a href="/wiki/List_of
_Falcon_9_first-stage_boosters#B1
064" title="List of Falcon 9 firs
t-stage boosters">B1064.1</a>, <a
href="/wiki/List_of_Falcon_9_firs
t-stage_boosters#B1065" title="Li
st of Falcon 9 first-stage booste
rs">B1065.1</a>, <a href="/wiki/L
ist_of_Falcon_9_first-stage_boost
ers#B1066" title="List of Falcon
  9 first-stage boosters">B1066</a
>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF-44</a><sup id
="cite_ref-USDD190219_717-0" clas
s="reference"><a href="#cite_note
```

```
-USDD190219-717">&#91;705&#93;</a>
</sup><br />Tetra-1<sup id="cite
_ref-718" class="reference"><a href="#cite_note-718">&#91;706&#93;
</a></sup>
</td>
<td><a href="/wiki/Geostationary_
Earth_orbit" class="mw-redirect"
title="Geostationary Earth orbi
t">GEO</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF</a>
</td></tr>
<tr>
<td colspan="5">Classified payloa
d totaling 3,750&#160;kg (8,270&#
160;lb). Will use three new boost
ers, and first Heavy launch to de
liberately expend the center core
which may lack grid fins and land
ing gear needed for a landing, wh
ile the two side-boosters will be
targeting a simultaneous landing
on dronships, JRTI and <a href
="/wiki/Autonomous_spaceport_dron
e_ship#A_Shortfall_Of_Gravitas" t
itle="Autonomous spaceport drone
ship">A Shortfall Of Gravitas</a>
```



```
> (ASOG).<sup id="cite_ref-719" class="reference"><a href="#cite_note-719">&#91;707&#93;</a></sup><sup id="cite_ref-720" class="reference"><a href="#cite_note-720">&#91;708&#93;</a></sup><sup id="cite_ref-721" class="reference"><a href="#cite_note-721">&#91;709&#93;</a></sup> First SpaceX mission directly to geostationary orbit. Secondary payload <i>Tetra-1</i>.</td></tr>
```

```
<tr>
<td rowspan="2">October 2021<sup id="cite_ref-722" class="reference"><a href="#cite_note-722">&#91;710&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href
```

```

="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td><a href="/wiki/List_of_NRO_la
unches" title="List of NRO launch
es">NROL-85</a> (Intruder 13A and
13B)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/National_Recon
naissance_Office" title="National
Reconnaissance Office">NRO</a>
</td></tr>
<tr>
<td colspan="5">Classified missio
n awarded to SpaceX in February 2
019.<sup id="cite_ref-723" class
="reference"><a href="#cite_note-
723">&#91;711&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">17 November 2021<
sup id="cite_ref-sfn_ls_688-4" cl
ass="reference"><a href="#cite_no

```

```

te-sfn_ls-688">&#91;676&#93;</a>
</sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a> ↻
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Imaging_X-ray_Polarimetry_Explorer" class="mw-r
edirect" title="Imaging X-ray Pol
arimetry Explorer">Imaging X-ray
Polarimetry Explorer</a> (IXPE)<
sup id="cite_ref-NASA_ixpe_724-0"
class="reference"><a href="#cite_
note-NASA_ixpe-724">&#91;712&#93;
</a></sup>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO</a
>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (LSP)

```

```

</td></tr>
<tr>
<td colspan="5">SMEX 14 mission w
ith three identical NASA telescop
es on a single spacecraft, design
ed to measure X-Rays. The launch
  contract was awarded to SpaceX f
or US$50.3 million.<sup id="cite_
ref-NASA_ixpe_724-1" class="refer
ence"><a href="#cite_note-NASA_ix
pe-724">&#91;712&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">24 November 2021<
sup id="cite_ref-725" class="refe
rence"><a href="#cite_note-725">&
#91;713&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
  Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>

```

```

</td>
<td><a href="/wiki/Double_Asteroid_Redirection_Test" title="Double Asteroid Redirection Test">Double Asteroid Redirection Test (DART)
</a><sup id="cite_ref-NASA_DART_726-0" class="reference"><a href="#cite_note-NASA_DART-726">#91;714#93;</a></sup><sup id="cite_ref-727" class="reference"><a href="#cite_note-727">#91;715#93;</a></sup>
</td>
<td><a href="/wiki/Heliocentric_orbit" title="Heliocentric orbit">Heliocentric</a>
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (LSP)
</td></tr>
<tr>
<td colspan="5">The 500#160;kg DART spacecraft will be used to measure the kinetic effects of crashing an impactor into the surface of the moon of <a href="/wiki/65803_Didymos" title="65803 Didymos">65803 Didymos</a> asteroid. It will be the first mission to demonstrate asteroid redirect capabil

```

```
ity.<sup id="cite_ref-NASA_DART_7
26-1" class="reference"><a href
="#cite_note-NASA_DART-726">#91;
714#93;</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">November 2021<sup
id="cite_ref-Ridesharefl_710-1" c
lass="reference"><a href="#cite_n
ote-Ridesharefl-710">#91;698#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Spac
e_Center_Launch_Complex_39A" titl
e="Kennedy Space Center Launch Co
mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td><a href="/wiki/Starlink" titl
e="Starlink">Starlink</a>
```

```

</td>
<td><a href="/wiki/Low_Earth_orbit" title="Low Earth orbit">LEO</a>
</td>
<td><a href="/wiki/SpaceX" title="SpaceX">SpaceX</a>
</td></tr>
<tr>
<td colspan="5">
</td></tr>

<tr>
<td rowspan="2">4 December 2021<sup id="cite_ref-sfn_ls_688-5" class="reference"><a href="#cite_note-sfn_ls-688">&#91;676&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>

```

```

<td><a href="/wiki/SpaceX_CRS-24"
title="SpaceX CRS-24">SpaceX CRS-
24</a>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td></tr>
<tr>
<td colspan="5">Fourth of six new
cargo missions NASA awarded in 20
15 to SpaceX under the <a href="/
wiki/Commercial_Resupply_Service
s" title="Commercial Resupply Ser
vices">CRS-2 contract</a> to be f
low n after the initial 20 mission
s of phase 1 were completed in 20
20.<sup id="cite_ref-nasa-2016011
4_681-2" class="reference"><a hre
f="#cite_note-nasa-20160114-681">
&#91;669&#93;</a></sup>
</td></tr>

```



```

<tr>
<td rowspan="2">December 2021<sup
id="cite_ref-Ridesharefl_710-2" c
lass="reference"><a href="#cite_n
ote-Ridesharefl-710">&#91;698&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><i>Transporter-3</i>, SmallSa
t Rideshare<sup id="cite_ref-728"
class="reference"><a href="#cite_
note-728">&#91;716&#93;</a></sup>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various


```

```
</td></tr>
<tr>
<td colspan="5">
</td></tr>

<tr>
<td rowspan="2">Q4 2021<sup id="cite_ref-sfn_ls_688-6" class="reference"><a href="#cite_note-sfn_ls-688">&#91;676&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Turksat_(satellite)" class="mw-redirect" title="Turksat (satellite)">Türksat 5B
</a>
```

```

</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/T%C3%BCrksat_(company)" title="Türksat (company)">Türksat</a>
</td></tr>
<tr>
<td colspan="5">The first GTO satellite partially built in Turkey, the 4,500&#160;kg (9,900&#160;lb) satellite is intended to be placed at 42.0°&#160;east.<sup id="cite_ref-729" class="reference"><a href="#cite_note-729">&#91;717&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">Q4 2021<sup id="cite_ref-via-20210504_730-0" class="reference"><a href="#cite_note-via-20210504-730">&#91;718&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a> <sup id="cite_ref-worldvie

```

```
wlegion_731-0" class="reference">
<a href="#cite_note-worldviewlegi
on-731">&#91;719&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><a href="/wiki/DigitalGlobe#W
orldView_satellite_system" title
="DigitalGlobe">WorldView Legion
Mission 1</a><sup id="cite_ref-w
orldviewlegion_731-1" class="refe
rence"><a href="#cite_note-worldv
iewlegion-731">&#91;719&#93;</a>
</sup>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><a href="/wiki/Maxar_Technolo
gies" title="Maxar Technologies">
Maxar</a>
</td></tr>
<tr>
```

```

<td colspan="5">Two <a href="/wiki/Maxar_Technologies" title="Maxar Technologies">Maxar Technologies</a> satellites built by subsidiary <a href="/wiki/SSL_(company)" title="SSL (company)">SSL</a> for subsidiary <a href="/wiki/DigitalGlobe" title="DigitalGlobe">DigitalGlobe</a>.<sup id="cite_ref-worldviewlegion_731-2" class="reference"><a href="#cite_note-worldviewlegion-731">&#91;719&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">Q4 2021 to mid 2022<sup id="cite_ref-spaceflightnow_2020-02-18_732-0" class="reference"><a href="#cite_note-spaceflightnow_2020-02-18-732">&#91;720&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/

```

```
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Space_Adventur
es_Dragon_Mission" class="mw-redi
rect" title="Space Adventures Dra
gon Mission">Space Adventures Dra
gon Mission</a>
</td>
<td>LEO
</td>
<td><a href="/wiki/Space_Adventur
es" title="Space Adventures">Spac
e Adventures</a>
</td></tr>
<tr>
<td colspan="5">SpaceX signed in
February 2020, its first commerc
ial flight for a crewed spacecraf
t with the Virginia-based company
that had flown seven space touris
ts between 2001 and 2009. The fli
ght will be around 3 days, up to
5 days, on an elliptical orbit w
ith the apogee three times that o
f the ISS, and up to four space t
ourists with a price per seat of
around US$50 million.<sup id="ci
te_ref-spaceflightnow_2020-02-18_
```

```

732-1" class="reference"><a href
="#cite_note-spaceflightnow_2020-
02-18-732">&#91;720&#93;</a></sup
><sup id="cite_ref-733" class="re
ference"><a href="#cite_note-73
3">&#91;721&#93;</a></sup>
</td></tr></tbody></table>
<h3><span class="mw-headline" id
="2022">2022</span></h3>
<p>SpaceX has allowed for up to 6
0 launches every year from Florid
a alone according to its February
2020 environmental assessment.<su
p id="cite_ref-faa_EA_508_691-1"
class="reference"><a href="#cite
_note-faa_EA_508-691">&#91;679&#9
3;</a></sup>
</p>
<table class="wikitable" style="w
idth: 100%;">
<tbody><tr>
<th scope="col" style="width: 1
0%;">Date and time (<a href="/wik
i/Coordinated_Universal_Time" tit
le="Coordinated Universal Time">U
TC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first

```

```

-stage boosters">Version,<br />Bo
oster</a><sup id="cite_ref-booste
r_11-10" class="reference"><a href
="#cite_note-booster-11">&#91;b&
#93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-10" class="refe
rence"><a href="#cite_note-Dragon
-12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th></tr>

<tr>
<td rowspan="2">January 2022<sup
id="cite_ref-734" class="referen
ce"><a href="#cite_note-734">&#9
1;722&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent

```



```

er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Axiom_Space_Dr
agon_mission_1" class="mw-redirec
t" title="Axiom Space Dragon miss
ion 1">AX-1</a><br />(<a href="/w
iki/Crew_Dragon_Resilience" title
="Crew Dragon Resilience">Crew Dr
agon C207.3 <i>Resilience</i></a>
🔄)
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/Axiom_Space" t
itle="Axiom Space">Axiom Space</a
>
</td></tr>
<tr>
<td colspan="5">Announced in Marc
h 2020, the flight will be the fi
rst fully private flight to the I
SS.<sup id="cite_ref-735" class
="reference"><a href="#cite_note-

```

```

735">&#91;723&#93;</a></sup> Crew
Dragon will be commanded by Axiom
professional astronaut <a href="/
wiki/Michael_L%C3%B3pez-Alegr%C3%
ADa" title="Michael López-Alegrí
a">Michael López-Alegría</a>.
</td></tr>

```

```

<tr>
<td rowspan="2">4 February 2022
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> ↻
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_Crew-4"
title="SpaceX Crew-4">Crew-4</a>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)

```

```

</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/ISS
_Crew_Transportation_Services" cl
ass="mw-redirect" title="ISS Crew
Transportation Services">CTS</a>)
<sup id="cite_ref-CCD6_509-5" cla
ss="reference"><a href="#cite_not
e-CCD6-509">&#91;497&#93;</a></su
p>
</td></tr>
<tr>
<td colspan="5">NASA has awarded
  six missions with <a href="/wik
i/Crew_Dragon" class="mw-redirec
t" title="Crew Dragon">Crew Drago
n</a> to carry up to four astronau
ts and 100&#160;kg (220&#160;lb)
of cargo to the ISS as well as fe
ature a lifeboat function to evac
uate astronauts from ISS in case
  of an emergency.<sup id="cite_re
f-CCD6_509-6" class="reference"><
a href="#cite_note-CCD6-509">&#9
1;497&#93;</a></sup> First two as
tronauts are NASA's <a href="/wik
i/Kjell_Lindgren" class="mw-redir
ect" title="Kjell Lindgren">Kjell
Lindgren</a> and <a href="/wiki/R
obert_Hines_(astronaut)" title="R

```

```

    obert Hines (astronaut)">Bob Hine
s</a>.<sup id="cite_ref-736" clas
s="reference"><a href="#cite_note
-736">&#91;724&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">March 2022<sup id
="cite_ref-sn-20200820_737-0" cla
ss="reference"><a href="#cite_not
e-sn-20200820-737">&#91;725&#93;
</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a hre
f="/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
>
</td>
<td><a href="/wiki/O3b_mPOWER" ti

```

```

t1e="03b mPOWER">03b mPOWER</a> -
4, -5, -6
</td>
<td><a href="/wiki/Medium_Earth_orbit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td></tr>
<tr>
<td colspan="5">Second part of SE
S' MEO satellites for its proven
03b low-latency, high-performanc
e connectivity services.<sup id
="cite_ref-auto7_712-1" class="re
ference"><a href="#cite_note-auto
7-712">&#91;700&#93;</a></sup><su
p id="cite_ref-auto6_713-1" class
="reference"><a href="#cite_note-
auto6-713">&#91;701&#93;</a></sup
>
</td></tr>

<tr>
<td rowspan="2">March 2022<sup id
="cite_ref-spacex-smallsat_738-0"
class="reference"><a href="#cite_
note-spacex-smallsat-738">&#91;72
6&#93;</a></sup>

```

```

</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><i>Transporter-4</i>, SmallSa
t Rideshare
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Dedicated SmallSa
t Rideshare mission to sun-synchr
onous orbit.
</td></tr>

<tr>
<td rowspan="2">Q1 2022<sup id="c

```

```

ite_ref-739" class="reference"><a
href="#cite_note-739">&#91;727&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Intuitive_Mach
ines" title="Intuitive Machines">
Intuitive Machines</a> <i><a href
="/wiki/Nova-C" title="Nova-C">No
va-C</a></i> lunar lander
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
tion">TLI</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Lunar_Payload_Services" t
itle="Commercial Lunar Payload Se
rvices">CLPS</a>)

```

```

</td></tr>
<tr>
<td colspan="5">First mission of
  NASA's <a href="/wiki/Commercial
_Lunar_Payload_Services" title="C
ommercial Lunar Payload Service
s">Commercial Lunar Payload Servi
ces</a> program, and would be the
first private American company to
land a spacecraft on the Moon. Th
e lander is expected to carry fiv
e payloads of up to 100&#160;kg
(220&#160;lb) total (LRA, NDL, L
N-1, SCALPSS, and ROLSES) and tra
nsmit data from the lunar surface
in a mission lasting 2 weeks.<sup
id="cite_ref-740" class="referenc
e"><a href="#cite_note-740">&#91;
728&#93;</a></sup><sup id="cite_r
ef-741" class="reference"><a href
="#cite_note-741">&#91;729&#93;</
a></sup><sup id="cite_ref-arst-20
190601_742-0" class="reference"><
a href="#cite_note-arst-20190601-
742">&#91;730&#93;</a></sup> DOGE
-1 will be a secondary rideshare
payload massing 40&#160;kg.<sup
id="cite_ref-743" class="referen
ce"><a href="#cite_note-743">&#9
1;731&#93;</a></sup><sup id="cite

```



```
_ref-744" class="reference"><a href="#cite_note-744">&#91;732&#93;
</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">Q1 2022<sup id="cite_ref-via-20210504_730-1" class="reference"><a href="#cite_note-via-20210504-730">&#91;718&#93;</a></sup><sup id="cite_ref-745" class="reference"><a href="#cite_note-745">&#91;733&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a> ∆<sup id="cite_ref-worldviewlegion_731-3" class="reference"><a href="#cite_note-worldviewlegion-731">&#91;719&#93;</a></sup>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><a href="/wiki/DigitalGlobe#W
```

```

orldView_satellite_system" title
="DigitalGlobe">WorldView Legion
Mission 2</a><sup id="cite_ref-w
orldviewlegion_731-4" class="refe
rence"><a href="#cite_note-worldv
iewlegion-731">&#91;719&#93;</a>
</sup>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Ma
xar_Technologies" title="Maxar Te
chnologies">Maxar Technologies</a
> built satellites.
</td></tr>

<tr>
<td rowspan="2">April 2022<sup id
="cite_ref-NASA-SMSR_746-0" class
="reference"><a href="#cite_note-
NASA-SMSR-746">&#91;734&#93;</a>
</sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B

```

```

5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-25" title="SpaceX CRS-25">SpaceX CRS-25</a><sup id="cite_ref-nasa-20160114_681-3" class="reference"><a href="#cite_note-nasa-20160114-681">¶669¶93</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td></tr>
<tr>
<td colspan="5">Fifth of six new

```

cargo missions NASA awarded in 2015 to SpaceX under the [CRS-2 contract](/wiki/Commercial_Resupply_Services "Commercial Resupply Services") to be flown after the initial 20 missions of phase 1 were completed in 2020.^{[cited note-nasa-20160114-681](#cite_ref-nasa-20160114_681-4)}

Early 2022^{[cited note-sfn-20210523-716](#cite_ref-sfn-20210523_716-1)}^{[cited note-sfn_ls-688](#cite_ref-sfn_ls_688-7)}

[Falcon Heavy](/wiki/Falcon_Heavy "Falcon Heavy")

[KSC](/wiki/Kennedy_Space_Center "Kennedy Space Center"),
[https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true](/wiki/</p>
</div>
<div data-bbox=)

```
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF-52</a>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF</a>
</td></tr>
<tr>
<td colspan="5">Classified payloa
d contract awarded in June 2018 f
or US$130 million.<sup id="cite_r
ef-747" class="reference"><a href
="#cite_note-747">&#91;735&#93;</
a></sup> Draft solicitation said
the launch was 6,350&#160;kg (1
4,000&#160;lb) to GT0.<sup id="ci
te_ref-748" class="reference"><a
href="#cite_note-748">&#91;736&#
93;</a></sup>
</td></tr>
```

```

<tr>
<td rowspan="2">Early 2022 <sup id="cite_ref-749" class="reference"><a href="#cite_note-749">#91;737&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/ViaSat" class="mw-redirect" title="ViaSat">ViaSat-3</a> class <sup id="cite_ref-750" class="reference"><a href="#cite_note-750">#91;738&#93;</a></sup><sup id="cite_ref-SN20181025_751-0" class="reference"><a href="#cite_note-SN20181025-751">#91;739&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_orbit" title="Geostationary orbit">GEO</a>

```

```

</td>
<td><a href="/wiki/ViaSat" class
="mw-redirect" title="ViaSat">Via
Sat</a>
</td></tr>
<tr>
<td colspan="5">This mission will
inject the satellite in close pro
ximity to <a href="/wiki/Geostati
onary_orbit" title="Geostationary
orbit">geostationary orbit</a>, t
hus allowing it to be operational
faster. Satellites of the ViaSat-
3 class use <a href="/wiki/Electr
ic_propulsion" class="mw-redirec
t" title="Electric propulsion">el
ectric propulsion</a>, which requ
ires less fuel for stationkeeping
operations over their lifetime, b
ut would need several months to r
aise its orbit from GTO to GEO.<s
up id="cite_ref-SN20181025_751-1"
class="reference"><a href="#cite_
note-SN20181025-751">&#91;739&#9
3;</a></sup>
</td></tr>

<tr>
<td rowspan="2">June 2022<sup id
="cite_ref-spacex-smallsat_738-1"

```

```

class="reference"><a href="#cite_
note-spacex-smallsat-738">&#91;72
6&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><i>Transporter-5</i>, SmallSa
t Rideshare
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Dedicated SmallSa
t Rideshare mission to sun-synchr
onous orbit.
</td></tr>

```



```

<tr>
<td rowspan="2">1 August 2022<sup
id="cite_ref-752" class="referenc
e"><a href="#cite_note-752">&#91;
740&#93;</a></sup><sup id="cite_r
ef-753" class="reference"><a href
="#cite_note-753">&#91;741&#93;</
a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Korea_Pathfind
er_Lunar_Orbiter" title="Korea Pa
thfinder Lunar Orbiter">Korea Pat
hfinder Lunar Orbiter</a> (KPLO)<
sup id="cite_ref-kplo_754-0" clas
s="reference"><a href="#cite_note
-kplo-754">&#91;742&#93;</a></sup
>

```

```

</td>
<td><a href="/wiki/Trans-lunar_injection" title="Trans-lunar injection">TLI</a>
</td>
<td><a href="/wiki/Korea_Aerospace_Research_Institute" title="Korea Aerospace Research Institute">KARI</a>
</td></tr>
<tr>
<td colspan="5">South Korea's first lunar mission.<sup id="cite_ref-kplo_754-1" class="reference"><a href="#cite_note-kplo-754">#91;742#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">August 2022<sup id="cite_ref-NASA-SMSR_746-1" class="reference"><a href="#cite_note-NASA-SMSR-746">#91;734#93;</a>
</sup>
</td>
<td><a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a>
</td>
<td><a href="/wiki/Kennedy_Space_

```

```

Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Psyche_(spacec
raft)" title="Psyche (spacecraf
t)"><i>Psyche</i></a> and possibl
y <a href="/wiki/Janus_(spacecraf
t)" title="Janus (spacecraft)"><i
>Janus</i></a><sup id="cite_ref-7
55" class="reference"><a href="#c
ite_note-755">&#91;743&#93;</a></
sup>
</td>
<td><a href="/wiki/Heliocentric_o
rbit" title="Heliocentric orbit">
Heliocentric</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Dis
covery_Program" title="Discovery
Program">Discovery</a>)
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Di
scovery_Program" title="Discovery
Program">Discovery Program</a> mi
ssion designed to explore asteroi

```

d 16 Psyche that has a limited 6-week launch window. The asteroid is hoped to show what the early solar system looked like and how planets formed.^{[744]} Janus, planned dual space probe to visit two binary asteroids, (35107) 1991 VH and (175706) 1996 FG3 is also expected to be launched as a secondary payload together with the Psyche space probe.

</td></tr>

<tr>

<td rowspan="2">September 2022<sup id="cite_ref-NASA-SMSR_746-2" class="reference"><a href="#cite_n

```

ote-NASA-SMSR-746">&#91;734&#93;
</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-26"
title="SpaceX CRS-26">SpaceX CRS-
26</a><sup id="cite_ref-nasa-2016
0114_681-5" class="reference"><a
href="#cite_note-nasa-20160114-6
81">&#91;669&#93;</a></sup>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title

```

```

="Commercial Resupply Services">C
RS</a>)
</td></tr>
<tr>
<td colspan="5">Last of six new c
argo missions NASA awarded in 201
5 to SpaceX under the <a href="/w
iki/Commercial_Resupply_Services"
title="Commercial Resupply Servic
es">CRS-2 contract</a> to be flow
n after the initial 20 missions o
f phase 1 were completed in 2020.
<sup id="cite_ref-nasa-20160114_6
81-6" class="reference"><a href
="#cite_note-nasa-20160114-681">&
#91;669&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">Q3 2022
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Spac
e_Center_Launch_Complex_39A" titl
e="Kennedy Space Center Launch Co

```

```

mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td>Galaxy 31 and Galaxy 32 (2 sa
tellites)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Intelsat" titl
e="Intelsat">Intelsat</a>
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Ma
xar_Technologies" title="Maxar Te
chnologies">Maxar Technologies</a
> or <a href="/wiki/Northrop_Grum
man" title="Northrop Grumman">Nor
throp Grumman</a> built satellite
s<sup id="cite_ref-cnbc.com_757-
0" class="reference"><a href="#ci
te_note-cnbc.com-757">&#91;745&#9
3;</a></sup>
</td></tr>

<tr>

```

```

<td rowspan="2">Q3 2022<sup id="cite_ref-arstechnica.com_758-0" class="reference"><a href="#cite_note-arstechnica.com-758">#91;746&#93;</a></sup>
</td>
<td>Likely <a href="/wiki/Falcon_Heavy" title="Falcon Heavy">Falcon Heavy</a>
</td>
<td>TBD
</td>
<td>USSF-67
</td>
<td>TBD
</td>
<td><a href="/wiki/United_States_Space_Force" title="United States Space Force">USSF</a>
</td></tr>
<tr>
<td colspan="5">First launch of Phase 2 US Air Force contract. US $316 million cost for the fiscal year of 2022 for the first flight,<sup id="cite_ref-arstechnica.com_758-1" class="reference"><a href="#cite_note-arstechnica.com-758">#91;746&#93;</a></sup> mostly includes the cost of an extended

```



1	October 2022
	F9 B5
	CC , LC-39A or

```

ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td><a href="/wiki/MethaneSAT" ti
tle="MethaneSAT">MethaneSAT</a>
</td>
<td>SSO
</td>
<td>Environmental Defense Fund<br
/>New Zealand Space Agency
</td></tr>
<tr>
<td colspan="5">MethaneSAT is a 3
50&#160;kg (770&#160;lb) among sa
tellite aimed at locating, quanti
fying, and tracking <a href="/wik
i/Methane_emissions" title="Metha
ne emissions">methane emissions</
a> from oil and gas operations wo
rldwide. The project received $10
0 million grant for the mission's
completion and launching from the
Bezos Earth Fund, established by
  <a href="/wiki/Jeff_Bezos" title
="Jeff Bezos">Jeff Bezos</a>.<sup
id="cite_ref-760" class="referenc
e"><a href="#cite_note-760">&#91;
748&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">25 October 2022<sup id="cite_ref-NASA-SMSR_746-3"
class="reference"><a href="#cite_note-NASA-SMSR-746">91;734&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a> 
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td>Crew-5
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl
e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/ISS
_Crew_Transportation_Services" cl

```

```

ass="mw-redirect" title="ISS Crew
Transportation Services">CTS</a>)
<sup id="cite_ref-CCD6_509-7" cla
ss="reference"><a href="#cite_not
e-CCD6-509">&#91;497&#93;</a></su
p>
</td></tr>
<tr>
<td colspan="5">Fifth <a href="/wiki/Commercial_Crew_Development"
class="mw-redirect" title="Comme
rcial Crew Development">USCV</a>
launches out of NASA award of si
x <a href="/wiki/Crew_Dragon" cla
ss="mw-redirect" title="Crew Drag
on">Crew Dragon</a> mission, to c
arry up to four astronauts and 10
0&#160;kg (220&#160;lb) of cargo
to the ISS as well as feature a
lifeboat function to evacuate as
tronauts from ISS in case of an e
mergency.<sup id="cite_ref-CCD6_5
09-8" class="reference"><a href
="#cite_note-CCD6-509">&#91;497&#
93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">October 2022<sup
id="cite_ref-spacex-smallsat_738

```

```

-2" class="reference"><a href="#cite_note-spacex-smallsat-738">#91;726#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br /><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E</a>
</td>
<td><i>Transporter-6</i>, SmallSat Rideshare
</td>
<td><a href="/wiki/Sun-synchronous_orbit" title="Sun-synchronous orbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Dedicated SmallSat Rideshare mission to sun-synchronous orbit.
</td></tr>

```

```
<tr>
<td rowspan="2">November 2022<sup
id="cite_ref-NASA-SMSR_746-4" cla
ss="reference"><a href="#cite_not
e-NASA-SMSR-746">&#91;734&#93;</a
></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a><sup id="cite_ref-swot-contra
ct_761-0" class="reference"><a hr
ef="#cite_note-swot-contract-76
1">&#91;749&#93;</a></sup>
</td>
<td><a href="/wiki/Surface_Water_
Ocean_Topography" class="mw-redir
ect" title="Surface Water Ocean T
opography">Surface Water Ocean To
pography</a> (SWOT)
</td>
<td><a href="/wiki/Low_Earth_Orbi
```

```

t" class="mw-redirect" title="Low
Earth Orbit">LEO</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a>
</td></tr>
<tr>
<td colspan="5">American-European
satellite intended to measure the
surface altitude of water bodies
with centimeter-level precision.
<sup id="cite_ref-762" class="ref
erence"><a href="#cite_note-762">
&#91;750&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">December 2022
</td>
<td>TBD
</td>
<td>TBD
</td>
<td><a href="/wiki/Masten_Space_S
ystems#Masten_Mission_One" title
="Masten Space Systems">Masten Mi
ssion One (MM1)</a><br /><a href
="/wiki/Masten_Space_Systems#XL-
1" title="Masten Space Systems">X
L-1</a> lunar lander

```

```

</td>
<td><a href="/wiki/Trans-lunar_injection" title="Trans-lunar injection">TLI</a>
</td>
<td><a href="/wiki/Masten_Space_Systems" title="Masten Space Systems">Masten Space Systems</a><br />
<a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Lunar_Payload_Services" title="Commercial Lunar Payload Services">CLPS</a>)
</td></tr>
<tr>
<td colspan="5">In April 2020, NASA announced Masten as one of the CLPS contract winners to send a lander to the lunar South pole in 2022 with several payloads.<sup id="cite_ref-763" class="reference"><a href="#cite_note-763">#91;751&#93;</a></sup> In August 2020, Masten announced they signed a launch contract with SpaceX.<sup id="cite_ref-764" class="reference"><a href="#cite_note-764">#91;752&#93;</a></sup><sup id="cite_ref-765" class="reference"><a href="#cite_note-765">#91;753&#9

```



```
3;</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">Late 2022<sup id
="cite_ref-HenrySpaceNorway_766-
0" class="reference"><a href="#ci
te_note-HenrySpaceNorway-766">&#9
1;754&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td>ASBM 1 and ASBM 2
</td>
<td><a href="/wiki/Highly_ellipti
cal_orbit" title="Highly elliptic
al orbit">HEO</a>
</td>
<td><a href="/wiki/Norwegian_Spac
e_Agency" title="Norwegian Space
```

```

Agency">Space Norway</a>
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Norwegian_Space_Agency" title="Norwegian Space Agency">Space Norway
</a> will launch 2 satellites of
the <a href="/wiki/Arctic_Satellite_Broadband_Mission" class="mw-redirect" title="Arctic Satellite Broadband Mission">Arctic Satellite Broadband Mission</a> (ASBM) system into highly elliptical orbits (apogee 43,509&#160;km (27,035&#160;mi), perigee 8,089&#160;km (5,026&#160;mi), 63.4°)<sup id="cite_ref-767" class="reference"><a href="#cite_note-767">&#91;755&#93;</a></sup>) to provide communication coverage to high latitudes not served by geosynchronous satellites.<sup id="cite_ref-HenrySpaceNorway_766-1" class="reference"><a href="#cite_note-HenrySpaceNorway-766">&#91;754&#93;</a></sup>
</td></tr>
<tr>
<td rowspan="2">Q4 2022

```

```
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" titl
e="Kennedy Space Center Launch Co
mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td>Galaxy 33 and Galaxy 34 (2 sa
tellites)
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Intelsat" titl
e="Intelsat">Intelsat</a>
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Ma
xar_Technologies" title="Maxar Te
chnologies">Maxar Technologies</a>
```

```
> or <a href="/wiki/Northrop_Grumman" title="Northrop Grumman">Northrop Grumman</a> built satellites.<sup id="cite_ref-cnbc.com_757-1" class="reference"><a href="#cite_note-cnbc.com-757">&#91;745&#93;</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">Q4 2022<sup id="cite_ref-768" class="reference"><a href="#cite_note-768">&#91;756&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
</td>
<td>TBD
</td>
<td><a href="/wiki/Intuitive_Machines" title="Intuitive Machines">Intuitive Machines</a> <i><a href="/wiki/Nova-C" title="Nova-C">Nova-C</a></i> 2 lunar lander
</td>
<td><a href="/wiki/Trans-lunar_injection" title="Trans-lunar injection">TLI</a>
```

```

</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Lunar_Payload_Services" t
itle="Commercial Lunar Payload Se
rvices">CLPS</a>)<br /><a href="/
wiki/Ispace_(Japanese_company)" t
itle="Ispace (Japanese company)">
ispace</a>
</td></tr>
<tr>
<td colspan="5">Intuitive Machine
s is sending its second lander ab
oard a SpaceX Falcon 9, with a pr
ojected launch time frame happeni
ng sometime around late 2022. Int
uitive Machines has already booke
d a first lander mission via Spac
eX, which is also hosting payload
s for other private companies see
king to make lunar landfall under
NASA's Commercial Lunar Payload S
ervices program.
</td></tr>

<tr>
<td rowspan="2">2022<sup id="cite
_ref-769" class="reference"><a hr
ef="#cite_note-769">&#91;757&#93;
</a></sup>

```

```

</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canaveral_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
</a>,<br /><a href="/wiki/SLC-40"
class="mw-redirect" title="SLC-4
0">SLC-40</a>
</td>
<td><a href="/wiki/Hakuto" title
="Hakuto">Hakuto</a>-R Mission 1
Moon lander and<br /><a href="/w
iki/Emirates_Lunar_Mission" title
="Emirates Lunar Mission">Emirate
s Lunar Mission</a> (<a href="/wi
ki/Emirates_Lunar_Mission" title
="Emirates Lunar Mission">Rashid
</a>) rover (secondary payload)
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
tion">TLI</a>
</td>
<td><a href="/wiki/Ispace_(Japane
se_company)" title="Ispace (Japan
ese company)">ispace</a> and <br
/><a href="/wiki/Mohammed_bin_Ra

```

```

shid_Space_Centre" title="Mohamme
d bin Rashid Space Centre">MBRSC
</a>
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Is
pace_(Japanese_company)" title="I
space (Japanese company)">ispace
</a>'s Hakuto-R (for Reboot) is d
erived from the <a href="/wiki/Ha
kuto" title="Hakuto">Hakuto</a> p
roject that was one of the defunc
t <a href="/wiki/Google_Lunar_X_P
rize" title="Google Lunar X Priz
e">Google Lunar X Prize</a> conte
stants. The rebooted project aims
to launch a lander-rover mission
    carrying a <a href="/wiki/Hakut
o" title="Hakuto">Hakuto</a>-R la
nder and <a href="/wiki/Emirates_
Lunar_Mission" title="Emirates Lu
nar Mission">Emirates Lunar Missi
on</a>(<a href="/wiki/Emirates_Lu
nar_Mission" title="Emirates Luna
r Mission">Rashid</a>) rover (in
    collaboration with <a href="/wik
i/Mohammed_bin_Rashid_Space_Centr
e" title="Mohammed bin Rashid Spa
ce Centre">MBRSC</a>) in 2022 wit
h a separate Japanese rover missi

```

on in 2023, both as secondary pay
loads on other unspecified Falcon
9 missions.<sup id="cite_ref-spac
enews-20180926_770-0" class="refe
rence"><a href="#cite_note-spacen
ews-20180926-770">[758]</
a></sup><sup id="cite_ref-inspace2
0190822_771-0" class="reference">
<a href="#cite_note-inspace2019082
2-771">[759]</sup>
</td></tr>

<tr>
<td rowspan="2">2022<sup id="cite
_ref-772" class="reference"><a hr
ef="#cite_note-772">[760]
</sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5 [<sup id="cite_ref-GPS_boos
terreuse_693-1" class="referenc
e"><a href="#cite_note-GPS_booste
rreuse-693">[681]</su
p>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC,

<a href="/wiki/Kennedy_Spac
e_Center_Launch_Complex_39A" titl


```

e="Kennedy Space Center Launch Co
mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td><a href="/wiki/GPS_Block_III"
title="GPS Block III">GPS III</a>
-<a href="/wiki/List_of_GPS_satel
lites" title="List of GPS satelli
tes">06</a> (<i>Amelia Earhart</i>
)<sup id="cite_ref-GPS_553-3" cl
ass="reference"><a href="#cite_no
te-GPS-553">&#91;541&#93;</a></su
p><sup id="cite_ref-sfn-20181217_
398-2" class="reference"><a href
="#cite_note-sfn-20181217-398">&#
91;388&#93;</a></sup>
</td>
<td><a href="/wiki/Medium_Earth_or
bit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/United_States_
Space_Force" title="United States
Space Force">USSF</a><sup id="cit
e_ref-clark-20200630_542-3" class
="reference"><a href="#cite_note-
clark-20200630-542">&#91;530&#93;

```

```

</a></sup>
</td></tr>
<tr>
<td colspan="5">Space vehicle man
ufacturing contract awarded Febru
ary 2013.<sup id="cite_ref-GPS_II
I_5678_694-1" class="reference"><
a href="#cite_note-GPS_III_5678-6
94">&#91;682&#93;</a></sup> In Se
ptember 2018, the space vehicle w
as integrating harnesses.<sup id
="cite_ref-gps_status_20180926_54
6-1" class="reference"><a href="#
cite_note-gps_status_20180926-54
6">&#91;534&#93;</a></sup> In Mar
ch 2018, the Air Force announced
it had awarded the launch contra
ct for three GPS satellites to Sp
aceX.
</td></tr>

```

```

<tr>
<td rowspan="2">2022<sup id="cite
_ref-773" class="reference"><a hr
ef="#cite_note-773">&#91;761&#93;
</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> or <a href="/wiki/Falcon_He

```

```
avy" title="Falcon Heavy">Falcon
Heavy</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td>Inmarsat-6B
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Inmarsat" titl
e="Inmarsat">Inmarsat</a>
</td></tr>
<tr>
<td colspan="5">Inmarsat maintain
ed its launch option after a sche
duled 2016 Falcon Heavy launch (a
<a href="/wiki/European_Aviation_
Network" title="European Aviation
Network">European Aviation Networ
k</a> satellite) was switched for
an <a href="/wiki/Ariane_5" title
="Ariane 5">Ariane 5</a> launch i
n 2017.<sup id="cite_ref-spacenew
```

s-20180601_774-0" class="reference">[762]</sup> This option may be used for launching Inmarsat-6B,^{[763]} and, as of April 2020^{[update]}, SpaceX's launch manifest listed Inmarsat for a Falcon 9 launch.^{[764]}
</td></tr>

<tr>
<td rowspan="2">2022
</td>
<td>F9 B

```

5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td>SES-18 and SES-19<sup id="cite_ref-777" class="reference"><a href="#cite_note-777">&#91;765&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/SES_S.A." title="SES S.A.">SES</a>
</td></tr>
<tr>
<td colspan="5">SpaceX will launch two C-band satellites for SES, with the option to launch a third satellite on a second flight.<s

```

```

up id="cite_ref-778" class="reference"><a href="#cite_note-778">&#
91;766&#93;</a></sup><sup id="cit
e_ref-779" class="reference"><a h
ref="#cite_note-779">&#91;767&#9
3;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">2022<sup id="cite
_ref-sn-20200820_737-1" class="re
ference"><a href="#cite_note-sn-2
0200820-737">&#91;725&#93;</a></s
up>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a hre
f="/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
>

```

```

</td>
<td><a href="/wiki/O3b_mPOWER" ti
tle="O3b mPOWER">O3b mPOWER</a>
  7, 8 and 9
</td>
<td><a href="/wiki/Medium_Earth_o
rbit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td></tr>
<tr>
<td colspan="5">In August 2020, S
ES expanded the O3m contract with
two additional launches, raising
the number of satellites from 7
to 11 satellites at nearly 2 ton
s each.<sup id="cite_ref-780" cla
ss="reference"><a href="#cite_not
e-780">&#91;768&#93;</a></sup><su
p id="cite_ref-businesswire.com_7
81-0" class="reference"><a href
="#cite_note-businesswire.com-78
1">&#91;769&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">2022<sup id="cite
_ref-broadcastpro20200122_782-0"

```

```

class="reference"><a href="#cite_note-broadcastpro20200122-782">&#91;770&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" titl
e="Kennedy Space Center Launch Co
mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td>Nilesat-301<sup id="cite_ref-
broadcastpro20200122_782-1" class
="reference"><a href="#cite_note-
broadcastpro20200122-782">&#91;77
0&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Nilesat" title

```



```

="Nilesat">Nilesat</a>
</td></tr>
<tr>
<td colspan="5">Built by <a href
="/wiki/Thales_Alenia_Space" titl
e="Thales Alenia Space">Thales Al
enia Space</a>, the Egyptian sate
llite will be stationed at 7.0°&#
160;west.<sup id="cite_ref-broadc
astpro20200122_782-2" class="refe
rence"><a href="#cite_note-broadc
astpro20200122-782">&#91;770&#93;
</a></sup>
</td></tr>

<tr>
<td rowspan="2">2022
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Spac
e_Center_Launch_Complex_39A" titl
e="Kennedy Space Center Launch Co
mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave

```

```

    ral Space Launch Complex 40">SLC-
    40</a>
  </td>
  <td>Intelsat 40e<br /><a href="/wiki/Tropospheric_Emissions:_Monitoring_of_Pollution" title="Tropospheric Emissions: Monitoring of Pollution">TEMPO</a>
  </td>
  <td><a href="/wiki/Geostationary_transfer_orbit" title="Geostationary transfer orbit">GTO</a>
  </td>
  <td><a href="/wiki/Intelsat" title="Intelsat">Intelsat</a><br /><a href="/wiki/NASA" title="NASA">NASA</a>
  </td></tr>
<tr>
  <td colspan="5"><a href="/wiki/Maxar_Technologies" title="Maxar Technologies">Maxar Technologies</a> built satellite that will service North and Central America.<sup id="cite_ref-783" class="reference"><a href="#cite_note-783">&#91;771&#93;</a></sup>
  </td></tr>

<tr>

```

```
<td rowspan="2">2022<sup id="cite_ref-784" class="reference"><a href="#cite_note-784">&#91;772&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><a href="/wiki/List_of_NRO_launches" title="List of NRO launch
es">NROL-87</a>
</td>
<td><a href="/wiki/Sun-synchronous_orbit" title="Sun-synchronous o
rbit">SSO</a><sup id="cite_ref-gunter-NRO_785-0" class="referenc
e"><a href="#cite_note-gunter-NRO-785">&#91;773&#93;</a></sup>
</td>
<td><a href="/wiki/National_Reconnaissance_Office" title="National
```

```
Reconnaissance Office">NRO</a>
</td></tr>
<tr>
<td colspan="5">Classified payload. It was expected to be completed by December 2021.<sup id="cite_ref-USDD190219_717-1" class="reference"><a href="#cite_note-USDD190219-717">#91;705#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">2022<sup id="cite_ref-786" class="reference"><a href="#cite_note-786">#91;774#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-
```

```

40</a>
</td>
<td>Aurora 4A (secondary payload)
<sup id="cite_ref-787" class="ref
erence"><a href="#cite_note-787">
&#91;775&#93;</a></sup>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GT0</a>
</td>
<td><a href="/wiki/Astranis" titl
e="Astranis">Astranis</a>
</td></tr>
<tr>
<td colspan="5">This small (300&#
160;kg (660&#160;lb)) geostationa
ry satellite intends to provide
7.5 Gbit/s of bandwidth to Alask
a, in partnership with <a href="/
w/index.php?title=Pacific_Datapor
t&amp;action=edit&amp;redlink=1"
class="new" title="Pacific Datapor
t (page does not exist)">Pacifi
c Dataport</a>. Originally was ai
ming for launch in quarter four 2
020.<sup id="cite_ref-788" class
="reference"><a href="#cite_note-
788">&#91;776&#93;</a></sup>
</td></tr>

```

```

</tbody></table>
<h3><span class="mw-headline" id
="2023">2023</span></h3>
<table class="wikitable" style="w
idth: 100%;">
<tbody><tr>
<th scope="col" style="width: 1
0%;">Date and time (<a href="/wik
i/Coordinated_Universal_Time" tit
le="Coordinated Universal Time">U
TC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first
-stage boosters">Version,<br />Bo
oster</a><sup id="cite_ref-booste
r_11-11" class="reference"><a hre
f="#cite_note-booster-11">&#91;b&
#93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-11" class="refe
rence"><a href="#cite_note-Dragon
-12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Orbit

```

```

</th>
<th scope="col">Customer
</th></tr>

<tr>
<td rowspan="2">10 January 2023<sup id="cite_ref-NASA-SMSR_746-5"
class="reference"><a href="#cite_note-NASA-SMSR-746">91;7349
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-27"
class="mw-redirect" title="SpaceX
CRS-27">SpaceX CRS-27</a>
</td>
<td><a href="/wiki/Low_Earth_Orbi
t" class="mw-redirect" title="Low
Earth Orbit">LEO</a> (<a href="/w
iki/ISS" class="mw-redirect" titl

```

```


e="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS</a>)
</td></tr>
<tr>
<td colspan="5">Three more <a hre
f="/wiki/Commercial_Resupply_Serv
ices" title="Commercial Resupply
Services">CRS-2</a> missions for
Dragon 2 covering up to CRS-29 we
re announced in December 2020.<su
p id="cite_ref-gunter-v2c_789-0"
class="reference"><a href="#cite
_note-gunter-v2c-789">&#91;777&#9
3;</a></sup>
</td></tr>

<tr>
<td rowspan="2">1 February 2023<s
up id="cite_ref-NASA-SMSR_746-6"
class="reference"><a href="#cite
_note-NASA-SMSR-746">&#91;734&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B

```



```

5</a> 
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td>Crew-6
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/ISS_Crew_Transportation_Services" class="mw-redirect" title="ISS Crew Transportation Services">CTS</a>)
<sup id="cite_ref-CCD6_509-9" class="reference"><a href="#cite_note-CCD6-509">&#91;497&#93;</a></sup>
</td></tr>
<tr>
<td colspan="5">Last <a href="/wiki/Commercial_Crew_Development" c

```

```

lass="mw-redirect" title="Commercial Crew Development">USCV</a> launches out of NASA award of six <a href="/wiki/Crew_Dragon" class="mw-redirect" title="Crew Dragon">Crew Dragon</a> mission, to carry up to four astronauts and 100&#160;kg (220&#160;lb) of cargo to the ISS as well as feature a lifeboat function to evacuate astronauts from ISS in case of an emergency.<sup id="cite_ref-CCD6_509-10" class="reference"><a href="#cite_note-CCD6-509">&#91;497&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">March 2023<sup id="cite_ref-ispac20190822_771-1" class="reference"><a href="#cite_note-ispac20190822-771">&#91;759&#93;</a></sup><sup id="cite_ref-790" class="reference"><a href="#cite_note-790">&#91;778&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>

```

```

</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space Launch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Hakuto" title="Hakuto">Hakuto</a>-R Moon lander (secondary payload)<sup id="cite_ref-spacenews-20180926_770-1" class="reference"><a href="#cite_note-spacenews-20180926-770">&#91;758&#93;</a></sup><sup id="cite_ref-791" class="reference"><a href="#cite_note-791">&#91;779&#93;</a></sup>
</td>
<td><a href="/wiki/Trans-lunar_injection" title="Trans-lunar injection">TLI</a>
</td>
<td><a href="/wiki/Ispace_(Japanese_company)" title="Ispace (Japanese company)">ispace</a>

```

```

</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Isp
ace_(Japanese_company)" title="I
space (Japanese company)">Ispace
</a>'s Hakuto-R (for Reboot) is d
erived from the <a href="/wiki/Ha
kuto" title="Hakuto">Hakuto</a> p
roject that was one of the defunc
t <a href="/wiki/Google_Lunar_X_P
rize" title="Google Lunar X Priz
e">Google Lunar X Prize</a> conte
stants. The rebooted project aims
to launch a lander-rover mission
    carrying a <a href="/wiki/Hakut
o" title="Hakuto">Hakuto</a>-R la
nder and <a href="/wiki/Emirates
_Lunar_Mission" title="Emirates L
unar Mission">Rashid</a> rover (i
n collaboration with <a href="/wi
ki/Mohammed_bin_Rashid_Space_Cent
re" title="Mohammed bin Rashid Sp
ace Centre">MBRSC</a>) in 2021 wi
th a separate Japanese rover miss
ion in 2023, both as secondary pa
yloads on other unspecified Falco
n 9 missions.<sup id="cite_ref-sp
acenews-20180926_770-2" class="re
ference"><a href="#cite_note-spac
enews-20180926-770">&#91;758&#93;

```

```
</a></sup><sup id="cite_ref-ispac
e20190822_771-2" class="referenc
e"><a href="#cite_note-ispac2019
0822-771">&#91;759&#93;</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">April 2023<sup id
="cite_ref-spacex-smallsat_738-3"
class="reference"><a href="#cite_
note-spacex-smallsat-738">&#91;72
6&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB</a>,<br /
><a href="/wiki/Vandenberg_Space_
Launch_Complex_4" title="Vandenbe
rg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><i>Transporter-7</i>, SmallSa
t Rideshare
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
```

```

rbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Dedicated SmallSat Rideshare mission to sun-synchronous orbit. The On-Orbit Servicing, Assembly and Manufacturing Mission 2 (OSAM-2), formerly known as <a href="/wiki/Archinaut" title="Archinaut">Archinaut</a> One, may launch on this rideshare mission in early 2023.<sup id="cite_ref-792" class="reference"><a href="#cite_note-792">¶780¶</a></sup><sup id="cite_ref-793" class="reference"><a href="#cite_note-793">¶781¶</a></sup>
</td></tr>

<tr>
<td rowspan="2">5 June 2023<sup id="cite_ref-NASA-SMSR_746-7" class="reference"><a href="#cite_note-NASA-SMSR-746">¶734¶</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B

```

```
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Center">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy Space Center Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/SpaceX_CRS-28" class="mw-redirect" title="SpaceX CRS-28">SpaceX CRS-28</a>
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td></tr>
<tr>
<td colspan="5">Three more <a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS-2</a> missions for
```

Dragon 2 covering up to CRS-29 we re announced in December 2020.^{#91;777#93;}</td></tr>

<tr>
<td rowspan="2">Q2 2023^{#91;726#93;}
</td>
<td>F9 B 5
</td>
<td>VSFB,
SLC-4E
</td>
<td><i>Transporter-8</i>, SmallSat Rideshare
</td>


```

<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Dedicated SmallSa
t Rideshare mission to sun-synchr
onous orbit.
</td></tr>

```

```

<tr>
<td rowspan="2">Mid 2023<sup id
="cite_ref-794" class="referenc
e"><a href="#cite_note-794">#91;
782&#93;</a></sup><sup id="cite_r
ef-795" class="reference"><a href
="#cite_note-795">#91;783&#93;</
a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent

```

```

er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Firefly_Aerosp
ace#Blue_Ghost_lunar_lander" titl
e="Firefly Aerospace">Blue Ghost
</a> lunar lander
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
tion">TLI</a>
</td>
<td><a href="/wiki/Firefly_Aerosp
ace" title="Firefly Aerospace">Fi
refly Aerospace</a><br />NASA (<a
href="/wiki/Commercial_Lunar_Payl
oad_Services" title="Commercial L
unar Payload Services">CLPS</a>)
</td></tr>
<tr>
<td colspan="5"><a href="/wiki/Fi
refly_Aerospace" title="Firefly A
erospace">Firefly Aerospace</a> c
hose <a href="/wiki/SpaceX" title
="SpaceX">SpaceX</a>'s Falcon 9 r
ocket to deliver the Blue Ghost l
unar lander to the lunar surface.
Blue Ghost will carry 10 payloads
for NASA's <a href="/wiki/Commerc
ial_Lunar_Payload_Services" title
="Commercial Lunar Payload Servic

```

```
es">Commercial Lunar Payload Serv
ices</a> task order 19D mission a
long with other separately contra
cted payloads.<sup id="cite_ref-7
96" class="reference"><a href="#c
ite_note-796">&#91;784&#93;</a></
sup>
</td></tr>
```


```
<tr>
<td rowspan="2">20 October 2023<s
up id="cite_ref-NASA-SMSR_746-8"
class="reference"><a href="#cite
_note-NASA-SMSR-746">&#91;734&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/w/index.php?title=S
paceX_CRS-29&action=edit&
redlink=1" class="new" title="Spa
```

```

ceX CRS-29 (page does not exist)">SpaceX CRS-29</a>
</td>
<td><a href="/wiki/Low_Earth_Orbit" class="mw-redirect" title="Low Earth Orbit">LEO</a> (<a href="/wiki/ISS" class="mw-redirect" title="ISS">ISS</a>)
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a> (<a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS</a>)
</td></tr>
<tr>
<td colspan="5">Three more <a href="/wiki/Commercial_Resupply_Services" title="Commercial Resupply Services">CRS-2</a> missions for Dragon 2 covering up to CRS-29 were announced in December 2020.<sup id="cite_ref-gunter-v2c_789-2" class="reference"><a href="#cite_note-gunter-v2c-789">91;777&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">30 November 2023<

```

```
sup id="cite_ref-NASA-SMSR_746-9"
class="reference"><a href="#cite_
note-NASA-SMSR-746">&#91;734&#93;
</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a> 
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
SFS</a>,<br /><a href="/wiki/Cape
_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a>
</td>
<td><a href="/wiki/Plankton,_Aero
sol,_Cloud,_ocean_Ecosystem" titl
e="Plankton, Aerosol, Cloud, ocea
n Ecosystem">PACE</a>
</td>
<td><a href="/wiki/Sun-synchronou
s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Lau
nch_Services_Program" title="Laun
ch Services Program">LSP</a>)
```

```

</td></tr>
<tr>
<td colspan="5"><i>Plankton, Aero
sol, Cloud, ocean Ecosystem</i> i
s a 1.7 tonne, US$800 million cra
ft that will orbit at 676&#160;km
(420&#160;mi) altitude. It will i
nclude the <i>Ocean Color Imager
</i> intended to study phytoplank
ton in the ocean, and two polarim
eters for studying properties of
clouds, aerosols and the ocean.
The launch price was US$80.4 mil
lion.<sup id="cite_ref-797" class
="reference"><a href="#cite_note-
797">&#91;785&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">November 2023<sup
id="cite_ref-798" class="referenc
e"><a href="#cite_note-798">&#91;
786&#93;</a></sup>
</td>
<td><a href="/wiki/Falcon_Heavy"
title="Falcon Heavy">Falcon Heav
y</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent

```

```

er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/w/index.php?title=G
riffin_Mission_1&action=edit&
amp;redlink=1" class="new" title
="Griffin Mission 1 (page does no
t exist)">Griffin Mission 1</a>
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
tion">TLI</a>
</td>
<td><a href="/wiki/Astrobotic" cl
ass="mw-redirect" title="Astrobot
ic">Astrobotic</a><br />NASA (<a
href="/wiki/Artemis_program" tit
le="Artemis program">Artemis</a>)
</td></tr>
<tr>
<td colspan="5">Astrobotic's <a h
ref="/wiki/Griffin_(spacecraft)"
class="mw-redirect" title="Griff
in (spacecraft)">Griffin lunar la
nder</a> will deliver NASA's <i><
a href="/wiki/VIPER_(rover)" titl
e="VIPER (rover)">VIPER</a></i> s
pacecraft to the <a href="/wiki/L

```

```
unar_south_pole" title="Lunar south pole">lunar south pole</a>.<sup id="cite_ref-799" class="reference"><a href="#cite_note-799">&#91;787&#93;</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">Q4 2023<sup id="cite_ref-spacex-smallsat_738-5" class="reference"><a href="#cite_note-spacex-smallsat-738">&#91;726&#93;</a></sup>
</td>
```

```
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B 5</a>
</td>
```

```
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br />
<a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E
</a>
</td>
```

```
<td><i>Transporter-9</i>, SmallSat Rideshare
</td>
```

```
<td><a href="/wiki/Sun-synchronou
```



```

s_orbit" title="Sun-synchronous o
rbit">SSO</a>
</td>
<td>Various
</td></tr>
<tr>
<td colspan="5">Dedicated SmallSa
t Rideshare mission to sun-synchr
onous orbit.
</td></tr>

<tr>
<td rowspan="2">Q4 2023<sup id="c
ite_ref-800" class="reference"><a
href="#cite_note-800">#91;788#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a hre
f="/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La

```

```

unch Complex 40">SLC-40</a></span>
>
</td>
<td><a href="/w/index.php?title=S
ATRIA&action=edit&redlink
=1" class="new" title="SATRIA (pa
ge does not exist)">SATRIA</a>
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/PT_Pasifik_Sat
elit_Nusantara" title="PT Pasifik
Satelit Nusantara">PT Pasifik Sat
elit Nusantara</a>
</td></tr>
<tr>
<td colspan="5">PSN chose Falcon
  9 in September 2020 to launch it
s satellite instead of a Chinese
  rocket or <a href="/wiki/Ariane_
5" title="Ariane 5">Ariane 5</a>.
</td></tr>

<tr>
<td rowspan="2">Q4 2023
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B

```

```

5</a><sup id="cite_ref-ussf36config_801-0" class="reference"><a href="#cite_note-ussf36config-801">
&#91;789&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
><sup id="cite_ref-ussf36location_802-0" class="reference"><a href="#cite_note-ussf36location-802">
&#91;790&#93;</a></sup>
</td>
<td>USSF-36
</td>
<td>TBD
</td>
<td><a href="/wiki/United_States_Space_Force" title="United States
Space Force">USSF</a>
</td></tr>
<tr>
<td colspan="5">Launch part of Ph

```

```

ase 2 US Air Force contract award
ed in 2021.<sup id="cite_ref-defe
nse.gov_803-0" class="reference">
<a href="#cite_note-defense.gov-8
03">&#91;791&#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">Q4 2023
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><sup id="cite_ref-ussf36conf
ig_801-1" class="reference"><a hr
ef="#cite_note-ussf36config-801">
&#91;789&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a href=
"/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
><sup id="cite_ref-ussf36location
_802-1" class="reference"><a href
="#cite_note-ussf36location-802">

```

```

&#91;790&#93;</a></sup>
</td>
<td>NROL-69
</td>
<td>TBD
</td>
<td><a href="/wiki/United_States_Space_Force" title="United States Space Force">USSF</a>
</td></tr>
<tr>
<td colspan="5">Launch part of Phase 2 US Air Force contract awarded in 2021.<sup id="cite_ref-defense.gov_803-1" class="reference">
<a href="#cite_note-defense.gov-803">&#91;791&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">2023
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" titl

```

```

e="Kennedy Space Center Launch Co
mplex 39A">LC-39A</a> or <a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40</a>
</td>
<td>Intelsat satellite
</td>
<td><a href="/wiki/Geostationary_
transfer_orbit" title="Geostation
ary transfer orbit">GTO</a>
</td>
<td><a href="/wiki/Intelsat" titl
e="Intelsat">Intelsat</a>
</td></tr>
<tr>
<td colspan="5">Intelsat contract
ed both SpaceX and Arianespace to
launch its fifth <a href="/wiki/M
axar_Technologies" title="Maxar T
echnologies">Maxar Technologies</
a> built satellite, and award whi
chever doesn't launch it with a s
eparate contract at a later date.
<sup id="cite_ref-cnbc.com_757-2"
class="reference"><a href="#cite_
note-cnbc.com-757">&#91;745&#93;
</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">2023
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a><sup id="cite_ref-ussf36config_801-2" class="reference"><a href="#cite_note-ussf36config-801">
&#91;789&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canaveral" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a href="/wiki/Kennedy_Space_Center_Launch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_Canaveral_Space_Launch_Complex_40" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span>
>
</td>
<td>Ax-2
</td>
<td>TBD
</td>
<td>Axiom Space
</td></tr>
<tr>

```

<td colspan="5">Contract for 3 additional missions was signed in June 2021.^{[792]} Peggy Whitson and John Shoffner were signed on as commander and pilot.^{[793]}^{[794]} The third seat is expected to be awarded to a Discovery reality TV show winner of Who Wants To Be An Astronaut?.^{[795]}

</td></tr>

<tr>

<td rowspan="2">2023

</td>

<td>F9 B 5^{[789]}

</td>

<td>CC,
LC-39A or SLC-40

</td>

<td>Ax-3

</td>

<td>TBD

</td>

<td>Axiom Space

</td></tr>

```

<tr>
<td colspan="5">Contract for 3 ad
ditional missions was signed in J
une 2021.<sup id="cite_ref-axiom_
804-1" class="reference"><a href
="#cite_note-axiom-804">&#91;792&
#93;</a></sup>
</td></tr>

```

```

<tr>
<td rowspan="2">2023
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a><sup id="cite_ref-ussf36conf
ig_801-4" class="reference"><a hr
ef="#cite_note-ussf36config-801">
&#91;789&#93;</a></sup>
</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a href
="/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
>

```

```

</td>
<td>Ax-4
</td>
<td>TBD
</td>
<td>Axiom Space
</td></tr>
<tr>
<td colspan="5">Contract for 3 ad
ditional missions was signed in J
une 2021.<sup id="cite_ref-axiom_
804-2" class="reference"><a href
="#cite_note-axiom-804">&#91;792&
#93;</a></sup>
</td></tr>
</tbody></table>
<h3><span class="mw-headline" id
="2024_and_beyond">2024 and beyon
d</span></h3>
<table class="wikitable" style="w
idth: 100%;">
<tbody><tr>
<th scope="col" style="width: 1
0%;">Date and time (<a href="/wik
i/Coordinated_Universal_Time" tit
le="Coordinated Universal Time">U
TC</a>)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste

```

```

rs" title="List of Falcon 9 first
-stage boosters">Version,<br />Bo
oster</a><sup id="cite_ref-booste
r_11-12" class="reference"><a href
="#cite_note-booster-11">&#91;b&
#93;</a></sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup id="c
ite_ref-Dragon_12-12" class="refe
rence"><a href="#cite_note-Dragon
-12">&#91;c&#93;</a></sup>
</th>
<th scope="col">Orbit
</th>
<th scope="col">Customer
</th></tr>

<tr>
<td rowspan="2">2024–2027<sup id
="cite_ref-arstechnica.com_758-2"
class="reference"><a href="#cite_
note-arstechnica.com-758">&#91;74
6&#93;</a></sup>
</td>
<td>TBD
</td>
<td>TBD
</td>

```

```

<td>about 12 more launches
</td>
<td>TBD
</td>
<td><a href="/wiki/United_States_Space_Force" title="United States Space Force">USSF</a>
</td></tr>
<tr>
<td colspan="5">Launches part of
  Phase 2 US Air Force contract awarding SpaceX 40% of the about 34 launches expected to occur between 2022 and 2027.<sup id="cite_ref-arstechnica.com_758-3" class="reference"><a href="#cite_note-arstechnica.com-758">#91;746#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">June 2024
</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B5</a>
</td>
<td><a href="/wiki/Vandenberg_Space_Force_Base" title="Vandenberg Space Force Base">VSFB</a>,<br /

```

```

><a href="/wiki/Vandenberg_Space_Launch_Complex_4" title="Vandenberg Space Launch Complex 4">SLC-4E
</a>
</td>
<td><a href="/wiki/SPHEREx" title="SPHEREx">SPHEREx</a>
</td>
<td><a href="/wiki/Sun-synchronous_orbit" title="Sun-synchronous orbit">SSO</a><sup id="cite_ref-808" class="reference"><a href="#cite_note-808">&#91;796&#93;</a></sup>
</td>
<td><a href="/wiki/NASA" title="NASA">NASA</a>
</td></tr>
<tr>
<td colspan="5">In February 2021, NASA announced a $99m contract for its Astrophysics Division.<sup id="cite_ref-809" class="reference"><a href="#cite_note-809">&#91;797&#93;</a></sup>
</td></tr>

<tr>
<td rowspan="2">Q4 2024<sup id="cite_ref-810" class="reference"><a

```

```

href="#cite_note-810">&#91;798&#9
3;</a></sup>
</td>
<td><a href="/wiki/Falcon_Heavy"
  title="Falcon Heavy">Falcon Heav
y</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Power_and_Prop
ulsion_Element" title="Power and
Propulsion Element">Power and Pr
opulsion Element</a> (PPE)<br /><
a href="/wiki/Lunar_Gateway#Plann
ed_modules" title="Lunar Gatewa
y">Habitation and Logistics Outpo
st</a> (HALO)<sup id="cite_ref-81
1" class="reference"><a href="#ci
te_note-811">&#91;799&#93;</a></s
up>
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
tion">TLI</a>
</td>

```

```

<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Art
emis_program" title="Artemis prog
ram">Artemis</a>)
</td></tr>
<tr>
<td colspan="5">First elements fo
r the <a href="/wiki/Lunar_Gatewa
y" title="Lunar Gateway">Gateway
</a> station as part of the <a hr
ef="/wiki/Artemis_program" title
="Artemis program">Artemis progra
m</a>, awarded in February 2021.
  The launch will cost NASA $331.8
million.<sup id="cite_ref-ppe_812
-0" class="reference"><a href="#c
ite_note-ppe-812">&#91;800&#93;</
a></sup>
</td></tr>

<tr>
<td rowspan="2">2024<sup id="cite
_ref-sn-20200820_737-2" class="re
ference"><a href="#cite_note-sn-2
0200820-737">&#91;725&#93;</a></s
up>
</td>
<td><a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">F9 B
5</a>

```



```

</td>
<td><a href="/wiki/Cape_Canavera
l" title="Cape Canaveral">CC</a>,
<br /><span class="nowrap"><a href=
"/wiki/Kennedy_Space_Center_Lau
nch_Complex_39A" title="Kennedy S
pace Center Launch Complex 39A">L
C-39A</a> or <a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40</a></span
>
</td>
<td><a href="/wiki/O3b_mPOWER" ti
tle="O3b mPOWER">O3b mPOWER</a> 1
0 and 11
</td>
<td><a href="/wiki/Medium_Earth_or
bit" title="Medium Earth orbit">
MEO</a>
</td>
<td><a href="/wiki/SES_S.A." titl
e="SES S.A.">SES</a>
</td></tr>
<tr>
<td colspan="5">In August 2020, S
ES expanded the O3m contract with
a fourth launch.<sup id="cite_ref
-businesswire.com_781-1" class="r
eference"><a href="#cite_note-bus

```

```
inesswire.com-781">&#91;769&#93;
</a></sup>
</td></tr>
```

```
<tr>
<td rowspan="2">2024<sup id="cite
_ref-813" class="reference"><a hr
ef="#cite_note-813">&#91;801&#93;
</a></sup><sup id="cite_ref-814"
class="reference"><a href="#cite
_note-814">&#91;802&#93;</a></sup
>
</td>
<td><a href="/wiki/Falcon_Heavy"
title="Falcon Heavy">Falcon Heav
y</a>
</td>
<td><a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Dragon_XL" cla
ss="mw-redirect" title="Dragon X
L">Dragon XL</a>
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
```

```

tion">TLI</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Gat
eway_Logistics_Services" title="G
ateway Logistics Services">Gatewa
y Logistics Services</a>)
</td></tr>
<tr>
<td colspan="5">In March 2020, NA
SA announced its first contract f
or the <a href="/wiki/Gateway_Log
istics_Services" title="Gateway L
ogistics Services">Gateway Logist
ics Services</a> that guarantees
    at least two launches on a modif
ied Crew Dragon spacecraft that w
ill carry over 5 tonnes of cargo
    to the Lunar orbit on 6-12 month
s long missions.<sup id="cite_ref
-815" class="reference"><a href
="#cite_note-815">&#91;803&#93;</
a></sup>
</td></tr>

<tr>
<td rowspan="2">1 February 2025<s
up id="cite_ref-816" class="refer
ence"><a href="#cite_note-816">&#
91;804&#93;</a></sup>

```

```

</td>
<td><a href="/wiki/Falcon_9_Block_5" title="Falcon 9 Block 5">F9 B
5</a>
</td>
<td><a href="/wiki/Kennedy_Space_Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Interstellar_M
apping_and_Acceleration_Probe" ti
tle="Interstellar Mapping and Acc
eleration Probe">Interstellar Map
ping and Acceleration Probe</a>
  (IMAP)
</td>
<td><a href="/wiki/Lagrangian_poi
nt" class="mw-redirect" title="La
grangian point">Sun-Earth L<sub>1
</sub></a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a>
</td></tr>
<tr>
<td colspan="5">In September 202
0, NASA selected SpaceX to launch

```

IMAP mission, which will help researchers better understand the boundary of the heliosphere, a magnetic barrier surrounding our solar system. The total launch cost is approximately US\$109.4 million. The secondary payloads are NASA's Lunar Trailblazer mission, two NASA heliophysics missions of opportunity, and the National Oceanic and Atmospheric Administration's Space Weather Follow On-Lagrange 1 (SWFO-L1) mission.^{[817](#cite_note-817)}

^{[818](#cite_note-oig.nasa.gov_818-0)}

[Falcon Heavy](/wiki/Falcon_Heavy "Falcon Heavy")

[https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true](/wiki/Kennedy_Space_</p>
</div>
<div data-bbox=)

```
Center" title="Kennedy Space Cent
er">KSC</a>,<br /><a href="/wiki/
Kennedy_Space_Center_Launch_Compl
ex_39A" title="Kennedy Space Cent
er Launch Complex 39A">LC-39A</a>
</td>
<td><a href="/wiki/Dragon_XL" cla
ss="mw-redirect" title="Dragon X
L">Dragon XL</a>
</td>
<td><a href="/wiki/Trans-lunar_in
jection" title="Trans-lunar injec
tion">TLI</a>
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA</a> (<a href="/wiki/Gat
eway_Logistics_Services" title="G
ateway Logistics Services">Gatewa
y Logistics Services</a>)
</td></tr>
<tr>
<td colspan="5">Second Dragon XL
logistics module.<sup id="cite_r
ef-oig.nasa.gov_818-1" class="ref
erence"><a href="#cite_note-oig.n
asa.gov-818">&#91;806&#93;</a></s
up>
</td></tr>

</tbody></table>
```

```

<h2><span class="mw-headline" id
="Notable_launches">Notable launc
hes</span></h2>
<h3><span class="mw-headline" id
="First_flight_of_Falcon_9">First
flight of Falcon 9</span></h3>
<style data-mw-deduplicate="Templ
ateStyles:r1033289096">.mw-parser
-output .hatnote{font-style:itali
c}.mw-parser-output div.hatnote{p
adding-left:1.6em;margin-bottom:
0.5em}.mw-parser-output .hatnote
i{font-style:normal}.mw-parser-o
utput .hatnote+link+.hatnote{marg
in-top:-0.5em}</style><div role
="note" class="hatnote navigation
-not-searchable">Main article: <a
href="/wiki/Dragon_Spacecraft_Qua
lification_Unit" title="Dragon Sp
acecraft Qualification Unit">Drag
on Spacecraft Qualification Unit
</a></div>
<div class="thumb tright"><div cl
ass="thumbinner" style="width:292
px;"><video id="mwe_player_0" pos
ter="//upload.wikimedia.org/wikip
edia/commons/thumb/a/af/SpaceX_Fa
lcon_9_Flight_1_launch.ogv/290px-
SpaceX_Falcon_9_Flight_1_launch.
ogv.jpg" controls="" preload="non

```

```
e" class="thumbimage" width="290"
height="218" data-durationhint="1
13" data-mwtitle="SpaceX_Falcon_9
_Flight_1_launch.ogv" data-mwprov
ider="wikimediacommons"><source s
rc="//upload.wikimedia.org/wikipe
dia/commons/a/af/SpaceX_Falcon_9
_Flight_1_launch.ogv" type="video/
ogg; codecs=&quot;theora, vorbis&
quot;" data-title="Original Ogg f
ile, 512 × 384 (451 kbps)" data-s
horttitle="Ogg source" data-width
="512" data-height="384" data-ban
dwidth="450916" data-framerate="2
9.970029829795" /><source src="//
upload.wikimedia.org/wikipedia/co
mmons/transcoded/a/af/SpaceX_Falc
on_9_Flight_1_launch.ogv/SpaceX_F
alcon_9_Flight_1_launch.ogv.120p.
vp9.webm" type="video/webm; codec
s=&quot;vp9, opus&quot;" data-tit
le="Lowest bandwidth VP9 (120P)"
data-shorttitle="VP9 120P" data-
transcodekey="120p.vp9.webm" data
-width="160" data-height="120" da
ta-bandwidth="95248" data-framera
te="29.970029829795" /><source sr
c="//upload.wikimedia.org/wikiped
ia/commons/transcoded/a/af/SpaceX
_Falcon_9_Flight_1_launch.ogv/Spa
```



```
ceX_Falcon_9_Flight_1_launch.ogv.  
160p.webm" type="video/webm; code  
cs="vp8, vorbis" data-  
title="Low bandwidth WebM (160P)"  
data-shorttitle="WebM 160P" data-  
transcodekey="160p.webm" data-wid  
th="214" data-height="160" data-b  
andwidth="191272" data-framerate  
="29.970029829795" /><source src  
="//upload.wikimedia.org/wikipedi  
a/commons/transcoded/a/af/SpaceX_  
Falcon_9_Flight_1_launch.ogv/Spac  
eX_Falcon_9_Flight_1_launch.ogv.1  
80p.vp9.webm" type="video/webm; c  
odecs="vp9, opus" data-  
title="Low bandwidth VP9 (180P)"  
data-shorttitle="VP9 180P" data-t  
ranscodekey="180p.vp9.webm" data-  
width="240" data-height="180" dat  
a-bandwidth="105864" data-framera  
te="29.970029829795" /><source sr  
c="//upload.wikimedia.org/wikiped  
ia/commons/transcoded/a/af/SpaceX_  
Falcon_9_Flight_1_launch.ogv/Spa  
ceX_Falcon_9_Flight_1_launch.ogv.  
240p.vp9.webm" type="video/webm;  
codecs="vp9, opus" da  
ta-title="Small VP9 (240P)" data-  
shorttitle="VP9 240P" data-transc  
odekey="240p.vp9.webm" data-width
```

```
= "320" data-height="240" data-bandwidth="113560" data-framerate="29.970029829795" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/a/af/SpaceX_Falcon_9_Flight_1_launch.ogv/SpaceX_Falcon_9_Flight_1_launch.ogv.240p.webm" type="video/webm; codecs="vp8, vorbis"" data-title="Small WebM (240P)" data-shorttitle="WebM 240P" data-transcodekey="240p.webm" data-width="320" data-height="240" data-bandwidth="311320" data-framerate="29.970029829795" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/a/af/SpaceX_Falcon_9_Flight_1_launch.ogv/SpaceX_Falcon_9_Flight_1_launch.ogv.360p.vp9.webm" type="video/webm; codecs="vp9, opus"" data-title="VP9 (360P)" data-shorttitle="VP9 360P" data-transcodekey="360p.vp9.webm" data-width="480" data-height="360" data-bandwidth="140688" data-framerate="29.970029829795" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/a/af/SpaceX_Falcon_9_Flight_1_launch.ogv/SpaceX_Falcon_9_Flight_1_
```

```

launch.ogv.360p.webm" type="video/webm; codecs="vp8, vorbis"" data-title="WebM (360P)" data-shorttitle="WebM 360P" data-transcodekey="360p.webm" data-width="480" data-height="360" data-bandwidth="564216" data-framerate="29.970029829795" /></video> <div class="thumbcaption"><div class="magnify"><a href="/wiki/File:SpaceX_Falcon_9_Flight_1_launch.ogv" class="internal" title="Enlarge"></a></div>Launch of Falcon 9 Flight 1 with a <a href="/wiki/Boilerplate_(spaceflight)" title="Boilerplate (spaceflight)">boilerplate</a> Dragon</div></div></div>
<p>On 4 June 2010, the first Falcon 9 launch successfully placed a test payload into the intended orbit.<sup id="cite_ref-sfn20100604_17-1" class="reference"><a href="#cite_note-sfn20100604-17">&#91;11&#93;</a></sup> Starting at the moment of liftoff, the booster experienced <a href="/wiki/Flight_dynamics_(fixed-wing_aircraft)" title="Flight dynamics (fixed-wing aircraft)">roll</a>.<sup id="cite_ref-Bowersox_interview_819-0"

```

```

class="reference"><a href="#cite_
note-Bowersox_interview-819">&#9
1;807&#93;</a></sup> The roll sto
pped before the craft reached the
top of the tower, but the second
stage began to roll near the end
of its burn,<sup id="cite_ref-sfn
20100604_17-2" class="reference">
<a href="#cite_note-sfn20100604-1
7">&#91;11&#93;</a></sup> tumblin
g out of control during the passi
vation process and creating a gas
eous halo of vented propellant th
at could be seen from all of <a h
ref="/wiki/Eastern_Australia" cla
ss="mw-redirect" title="Eastern A
ustralia">Eastern Australia</a>,
raising <a href="/wiki/UFO" clas
s="mw-redirect" title="UFO">UFO</
a> concerns.<sup id="cite_ref-ab
c.net.au_June_5,_820-0" class="re
ference"><a href="#cite_note-abc.
net.au_June_5,-820">&#91;808&#93;
</a></sup><sup id="cite_ref-spac
e.com_June_7,_821-0" class="refer
ence"><a href="#cite_note-space.c
om_June_7,-821">&#91;809&#93;</a>
</sup>
</p>
<h3><span class="mw-headline" id

```

```
=>"COTS_demonstration_flights">COTS demonstration flights</span></h3>  
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main articles: <a href="/wiki/COTS_Demo_Flight_1" class="mw-redirect" title="COTS Demo Flight 1">COTS Demo Flight 1</a> and <a href="/wiki/Dragon_C2%2B" class="mw-redirect" title="Dragon C2+">Dragon C2+</a></div>  
<div class="thumb tright"><div class="thumbinner" style="width:292px;"><a href="/wiki/File:COTS-1_Dragon_After_Return_from_Orbit_(crop).jpg" class="image"></a> <div class="thumbcaption"><div class="magnify"><a href="/wiki/File:COTS-1\_Dragon\_After\_Return\_from\_Orbit\_(crop).jpg" class="internal" title="Enlarge"></a></div>COTS-1 Dragon after return from orbit</div></div></div>

<p>Second launch of Falcon 9 was <a href="/wiki/COTS\_Demo\_Flight\_1" class="mw-redirect" title="COTS Demo Flight 1">COTS Demo Flight 1</a>, which placed an operational <a href="/wiki/SpaceX\_Dragon" title="SpaceX Dragon">Dragon</a> capsule in a roughly 300&#160;km (190&#160;mi) orbit on 8 December 2010,<sup id="cite\_ref-BBCLaunchDec2010\_822-0" class="reference"><a href="#cite\_note-BBCLaunchDec2010-822">&#91;810&#93;</a></sup> The capsule re-entered the atmosphere after two orbits, allowin

g testing for the pressure vessel integrity, attitude control using the [Draco thrusters](/wiki/Draco_thruster "Draco thruster"), telemetry, guidance, navigation, control systems, and the [PICA-X](/wiki/PICA-X "PICA-X") heat shield, and intended to test the parachutes at speed. The capsule was recovered off the coast of Mexico<sup><sup id="cite\_ref-SFN\_Status\_823-0" class="reference"><a href="#cite\_note-SFN\_Status-823">&#91;811&#93;</a></sup></sup> and then placed on display at SpaceX headquarters.<sup><sup id="cite\_ref-824" class="reference"><a href="#cite\_note-824">&#91;812&#93;</a></sup></sup>

The remaining objectives of the [NASA COTS](/wiki/Commercial_Orbital_Transportation_Services "Commercial Orbital Transportation Services") qualification program were combined into a single [Dragon C2+](/wiki/Dragon_C2%2B "Dragon C2+") mission,<sup><sup id="cite\_ref-Space\_New</sup>

s\_2011-07-22\_825-0" class="reference"><a href="#cite\_note-Space\_News\_2011-07-22-825">91;81393;  
</a></sup> on the condition that all milestones would be validated in space before <a href="/wiki/Spacecraft\_docking\_and\_berthing\_mechanisms" class="mw-redirect" title="Spacecraft docking and berthing mechanisms">berthing</a> Drag on to the ISS. The Dragon capsule was propelled to orbit on 22 May, and for the next days tested its positioning system, solar panels, <a href="/wiki/Grapple\_fixture" title="Grapple fixture">grapple fixture</a>, proximity navigation sensors, and its rendezvous capabilities at safe distances. After a final hold position a 9#160;m (30#160;ft) away from the <a href="/wiki/Harmony\_(ISS\_module)" title="Harmony (ISS module)">Harmony</a> docking port on 25 May, it was grabbed with <a href="/wiki/Mobile\_Servicing\_System" title="Mobile Servicing System">the station's robotic arm</a> (Canadarm 2), and eventually, the hatch was opened on 26 May. It was released



on 31 May and successfully completed all the return procedures,<sup>814</sup> and the recovered Dragon C2+ capsule is now on display at [Kennedy Space Center](/wiki/Kennedy_Space_Center).<sup>815</sup> Falcon 9 and Dragon thus became the first fully commercially developed launcher to deliver a payload to the International Space Station, paving the way for SpaceX and NASA to sign the first [Commercial Resupply Services](/wiki/Commercial_Resupply_Services) agreement for 12 cargo deliveries.<sup>816</sup>

### CRS-1

[mw-deduplicated-inline](#)

```
-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main article: SpaceX CRS-1</div>
<div class="thumb tright"><div class="thumbinner" style="width:292px;"> <div class="thumbcaption"><div class="magnify"></
```

[Dragon CRS-1](/wiki/Dragon_CRS-1 "Dragon CRS-1") berthed to the [International Space Station](/wiki/International_Space_Station "International Space Station") (ISS) on 14 October 2012, photographed from the [Cupola](/wiki/Cupola_(ISS_module) "Cupola (ISS module)").

First operational cargo resupply mission to ISS, the fourth flight of Falcon 9, was launched on 7 October 2012. At 76 seconds after liftoff, engine 1 of the first stage suffered a loss of pressure which caused an automatic shutdown of that engine, but the remaining eight first-stage engines continued to burn and the Dragon capsule reached orbit successfully and thus demonstrated the rocket's "engine out" capability in flight.<sup>&#91;817&#93;</sup><sup>&#91;817&#93;</sup>

f="#cite\_note-flight4engineanomaly-830">&#91;818&#93;</a></sup> Due to ISS visiting vehicle safety rules, at NASA's request, the secondary payload Orbcomm-2 was released into a lower-than-intended orbit.<sup id="cite\_ref-OrbcommTotalLoss\_32-1" class="reference"><a href="#cite\_note-OrbcommTotalLoss-32">&#91;26&#93;</a></sup> The mission continued to rendezvous and berth the Dragon capsule with the ISS where the ISS crew unloaded its payload and reloaded the spacecraft with cargo for return to Earth.<sup id="cite\_ref-Dragon\_mission\_report\_CRS-1\_831-0" class="reference"><a href="#cite\_note-Dragon\_mission\_report\_CRS-1-831">&#91;819&#93;</a></sup> Despite the incident, Orbcomm said they gathered useful test data from the mission and planned to send more satellites via SpaceX,<sup id="cite\_ref-nyt-20121030\_31-1" class="reference"><a href="#cite\_note-nyt-20121030-31">&#91;25&#93;</a></sup> which happened in <a href="/wiki/Falcon\_9\_flight\_10" title="Falcon 9 flight 10">July 2014</

```
a> and December 2015.
</p>
<h3>Maiden flight of v1.1</h3>
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main article: CASSIOPE</div>
<div class="thumb tright"><div class="thumbinner" style="width:292px;"><video id="mwe_player_1" poster="//upload.wikimedia.org/wikipedia/commons/thumb/9/9d/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm/290px--SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm.jpg" controls="" preload="none" class="thumbimage" width="290" height="163" data-durationhint="101" data-mwtitle="SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm" data-mwprovider="wikimediacommons"><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/9/
```

```
9d/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm.360p.vp9.webm" type="video/webm; codecs="vp9, opus"" data-title="VP9 (360P)" data-shorttitle="VP9 360P" data-transcodekey="360p.vp9.webm" data-width="640" data-height="360" data-bandwidth="151608" data-framerate="1000" /><source src="//upload.wikimedia.org/wikipedia/commons/9/9d/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm" type="video/webm; codecs="vp8, vorbis"" data-title="Original WebM file, 640 × 360 (235 kbps)" data-shorttitle="WebM source" data-width="640" data-height="360" data-bandwidth="234999" data-framerate="1000" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/9/9d/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm.360p.webm" type="video/webm; codecs="vp8, vorbis"" data-title="WebM (360P)" data-shorttitle="WebM 360P" data-transcodekey="360p.webm" data-width
```

```
= "640" data-height="360" data-bandwidth="469976" data-framerate="1000" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/9/9d/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm.120p.vp9.webm" type="video/webm; codecs="vp9, opus"" data-title="Lowest bandwidth VP9 (120P)" data-shorttitle="VP9 120P" data-transcodekey="120p.vp9.webm" data-width="214" data-height="120" data-bandwidth="97440" data-framerate="1000" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/9/9d/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm/SpaceX_Falcon_9_Cassiope_Launch_29_Sep_2013.webm.160p.webm" type="video/webm; codecs="vp8, vorbis"" data-title="Low bandwidth WebM (160P)" data-shorttitle="WebM 160P" data-transcodekey="160p.webm" data-width="284" data-height="160" data-bandwidth="194408" data-framerate="1000" /><source src="//upload.wikimedia.org/wikipedia/commons/transcoded/9/9d/SpaceX_Falcon_9_Cassio
```

```

pe_Launch_29_Sep_2013.webm/SpaceX
_Falcon_9_Cassiope_Launch_29_Sep_
2013.webm.180p.vp9.webm" type="vi
deo/webm; codecs="vp9, opus"
" data-title="Low bandwidth
 VP9 (180P)" data-shorttitle="VP9
180P" data-transcodekey="180p.vp
9.webm" data-width="320" data-hei
ght="180" data-bandwidth="108816"
data-framerate="1000" /><source s
rc="//upload.wikimedia.org/wikipe
dia/commons/transcoded/9/9d/Space
X_Falcon_9_Cassiope_Launch_29_Sep
_2013.webm/SpaceX_Falcon_9_Cassio
pe_Launch_29_Sep_2013.webm.240p.v
p9.webm" type="video/webm; codecs
="vp9, opus" data-titl
e="Small VP9 (240P)" data-shortti
tle="VP9 240P" data-transcodekey
="240p.vp9.webm" data-width="426"
data-height="240" data-bandwidth
="118808" data-framerate="1000" /
><source src="//upload.wikimedia.
org/wikipedia/commons/transcoded/
9/9d/SpaceX_Falcon_9_Cassiope_Lau
nch_29_Sep_2013.webm/SpaceX_Falco
n_9_Cassiope_Launch_29_Sep_2013.w
ebm.240p.webm" type="video/webm;
 codecs="vp8, vorbis"
 data-title="Small WebM (240P)" d

```



```

ata-shorttitle="WebM 240P" data-t
ranscodekey="240p.webm" data-widt
h="426" data-height="240" data-ba
ndwidth="314720" data-framerate
="1000" /></video> <div class="t
humbcaption"><div class="magnif
y"><a href="/wiki/File:SpaceX_Fal
con_9_Cassiope_Launch_29_Sep_201
3.webm" class="internal" title="E
nlarge"></div>SpaceX <a href
="/wiki/Falcon_9_v1.1" title="Fal
con 9 v1.1">Falcon 9 v1.1 lau
nch from <a href="/wiki/Vandenber
g_AFB_Space_Launch_Complex_4" cla
ss="mw-redirect" title="Vandenber
g AFB Space Launch Complex 4">Van
denberg with <a href="/wiki/C
ASSIOPE" title="CASSIOPE">CASSIOP
E</div></div></div>
<p>Following unsuccessful attempt
s at recovering the first stage w
ith parachutes, SpaceX upgraded t
o much larger first stage booster
and with greater thrust, termed <
a href="/wiki/Falcon_9_v1.1" titl
e="Falcon 9 v1.1">Falcon 9 v1.1</
a> (also termed Block 2<sup id="c
ite_ref-block123_832-0" class="re
ference"><a href="#cite_note-bloc
k123-832">[820]</sup

```

>). SpaceX performed its first, demonstration flight of this version on 29 September 2013,<sup><a href="#cite\_note-sfn20130928-833">#91;821#93;</a></sup> with <a href="/wiki/CASSIOPE" title="CASSIOPE">CASSIOPE</a> as a primary payload. This had a payload mass that is very small relative to the rocket's capability, and was launched at a discounted rate, approximately 20% of the normal published price.<sup><a href="#cite\_note-sn20130906-834">#91;822#93;</a></sup><sup id="cite\_ref-sn20130929\_835-0" class="reference"><a href="#cite\_note-sn20130929-835">#91;823#93;</a></sup><sup id="cite\_ref-pa20130930\_36-3" class="reference"><a href="#cite\_note-pa20130930-36">#91;30#93;</a></sup> After the <a href="/wiki/Second\_stage" class="mw-redirect" title="Second stage">second stage</a> separation, SpaceX conducted a novel <a href="/wiki/Falcon\_9\_first-stage\_landing\_tests" title="Falc</sup></sup>

on 9 first-stage landing tests">high-altitude, high-velocity flight test</a>, wherein the <a href="/wiki/Falcon\_9#First\_stage" title="Falcon 9">booster</a> attempted to reenter the lower atmosphere in a controlled manner and decelerate to a simulated over-water landing.<sup id="cite\_ref-pa20130930\_36-4" class="reference"><a href="#cite\_note-pa20130930-36">&#91;30&#93;</a></sup></p><h3><span class="mw-headline" id="Loss\_of\_CRS-7\_mission">Loss of CRS-7 mission</span></h3><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main article: <a href="/wiki/SpaceX\_CRS-7" title="SpaceX CRS-7">SpaceX CRS-7</a></div><div class="thumb tright"><div class="thumbinner" style="width:292px;"><a href="/wiki/File:SpaceX\_CRS-7\_launch\_failure.jpg" class="image"></a> <div class="thumbcaption"><div class="magnify"><a href="/wiki/File:SpaceX\_CRS-7\_launch\_failure.jpg" class="internal" title="Enlarge"></a></div>SpaceX CRS-7 disintegrating two minutes after liftoff, as seen from a NASA tracking camera.</div></div></div>

<p>On 28 June 2015, <a href="/wiki/Falcon\_9\_Flight\_19" class="mw-redirect" title="Falcon 9 Flight 19">Falcon 9 Flight 19</a> carried a <a href="/wiki/Dragon\_capsule" class="mw-redirect" title="Dragon capsule">Dragon capsule</a> on the seventh <a href="/wiki/Commercial\_Resupply\_Services" title="C

Commercial Resupply Services">Commercial Resupply Services</a> mission to the <a href="/wiki/International\_Space\_Station" title="International Space Station">ISS</a>. The second stage disintegrated due to an internal helium tank failure while the first stage was still burning normally. This was the first (and only as of May 2021) primary mission loss for any Falcon 9 rocket.<sup id="cite\_ref-nyt-20150628\_100-1" class="reference"><a href="#cite\_note-nyt-20150628-100">&#91;93&#93;</a></sup> In addition to ISS consumables and experiments, this mission carried the first <a href="/wiki/International\_Docking\_Adapter" title="International Docking Adapter">International Docking Adapter</a> (IDA-1), whose loss delayed preparedness of the station's <a href="/wiki/US\_Orbital\_Segment" title="US Orbital Segment">US Orbital Segment</a> (USOS) for <a href="/wiki/Commercial\_Crew\_Development" class="mw-redirect" title="Commercial Crew Development">future crewed missions</a>.<sup id="cite\_ref-83

6" class="reference"><a href="#cite\_note-836">&#91;824&#93;</a></sup>  
</p><p>Performance was nominal until T+140 seconds into launch when a cloud of white vapor appeared, followed by rapid loss of second-stage <a href="/wiki/LOX" class="mw-redirect" title="LOX">LOX</a> tank pressure. The booster continued on its trajectory until complete vehicle breakup at T+150 seconds. The Dragon capsule was ejected from the disintegrating rocket and continued transmitting data until impact with the ocean. SpaceX officials stated that the capsule could have been recovered if the parachutes had deployed; however, the Dragon software did not include any provisions for parachute deployment in this situation.<sup id="cite\_ref-nsf-20150727\_102-1" class="reference"><a href="#cite\_note-nsf-20150727-102">&#91;95&#93;</a></sup> Subsequent investigations traced the cause of the accident to the failure of a strut that secured a helium bottle inside the second-stage LOX

tank. With the helium pressurization system integrity breached, excess helium quickly flooded the tank, eventually causing it to burst from overpressure.<sup id="cite\_ref-SpaceXJuly2015\_837-0" class="reference"><a href="#cite\_note-SpaceXJuly2015-837">#91;825#93;</a></sup><sup id="cite\_ref-838" class="reference"><a href="#cite\_note-838">#91;826#93;</a></sup> NASA's independent accident investigation into the loss of Space X CRS-7 found that the failure of the strut which led to the breakup of the Falcon-9 represented a design error. Specifically, that industrial grade stainless steel had been used in a critical load path under cryogenic conditions and flight conditions, without additional part screening, and without regard to manufacturer recommendations.<sup id="cite\_ref-839" class="reference"><a href="#cite\_note-839">#91;827#93;</a></sup></p>
</p>
<h3><span class="mw-headline" id="Full-thrust\_version\_and\_first\_booster\_landings">Full-thrust vers

```
ion and first booster landings</h3>
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main articles: Falcon 9 flight 20 and SpaceX CRS-8</div>
<div class="thumb tright"><div class="thumbinner" style="width:292px;"><img alt="" src="//upload.wikimedia.org/wikipedia/commons/thumb/6/64/ORBCOMM-2_First-Stage_Landing_%2823271687254%29.jpg/290px-ORBCOMM-2_First-Stage_Landing_%2823271687254%29.jpg" decoding="async" width="290" height="193" class="thumbimage" srcset="//upload.wikimedia.org/wikipedia/commons/thumb/6/64/ORBCOMM-2_First-Stage_Landing_%2823271687254%29.jpg/435px-ORBCOMM-2_First-Stage_Landing_%2823271687254%29.jpg 1.5x, //upload.wikimedia.org/w
```



ikipedia/commons/thumb/6/64/ORBCOMM-2\_First-Stage\_Landing\_%2823271687254%29.jpg/580px-ORBCOMM-2\_First-Stage\_Landing\_%2823271687254%29.jpg 2x" data-file-width="3000" data-file-height="2000" /></a>  
 <div class="thumbcaption"><div class="magnify"><a href="/wiki/File:ORBCOMM-2\_First-Stage\_Landing\_(23271687254).jpg" class="internal" title="Enlarge"></a></div><a href="/wiki/Falcon\_9\_Flight\_20" class="mw-redirect" title="Falcon 9 Flight 20">Falcon 9 Flight 20</a> historic <a href="/wiki/SpaceX\_reusable\_launch\_system\_development\_program" title="SpaceX reusable launch system development program">first-stage landing</a> at <a href="/wiki/Cape\_Canaveral\_Air\_Force\_Station" class="mw-redirect" title="Cape Canaveral Air Force Station">CCAFS</a> <a href="/wiki/Landing\_Zones\_1\_and\_2" title="Landing Zones 1 and 2">Landing Zone 1</a>, 22 December 2015</div></div>  
 <p>After pausing launches for months, SpaceX launched on 22 December 2015, the highly anticipated r

eturn-to-flight mission after the loss of [CRS-7](/wiki/CRS-7 "CRS-7"). This launch inaugurated a new [Falcon 9 Full Thrust](/wiki/Falcon_9_Full_Thrust "Falcon 9 Full Thrust") version (also initially termed Block 3<sup>[\) of its flagship rocket featuring increased performance, notably thanks to \[subcooling\]\(/wiki/Subcooling "Subcooling"\) of the propellants. After launching a constellation of 11 \[Orbcomm-OG2\]\(/wiki/Orbcomm-OG2 "Orbcomm-OG2"\) second-generation satellites,<sup>\[controlled-descent and landing test\]\(/wiki/Falcon\_9\_first-stage\_landing\_tests "Falcon 9 first-stage landing tests"\) for the eighth time, SpaceX attempted to land the</sup>](#cite_ref-block123_832-1)</sup>

booster on land for the first time. It managed to return the first stage successfully to the [Landing Zone 1](/wiki/Landing_Zones_1_and_2 "Landing Zones 1 and 2") at [Cape Canaveral](/wiki/Cape_Canaveral_Air_Force_Station "Cape Canaveral Air Force Station"), marking the first successful recovery of a rocket first stage that launched a payload to orbit.<sup>&#91;829&#93;</sup> After recovery, [the first stage booster](/wiki/Falcon_9_booster_B1019 "Falcon 9 booster B1019") performed further ground tests and then was put on permanent display outside SpaceX's headquarters in [Hawthorne, California](/wiki/Hawthorne,_California "Hawthorne, California").<sup>&#91;98&#93;</sup>

On 8 April 2016, SpaceX delivered its [commercial resupply](/wiki/Commercial_Resupply_Services "Commercial Resupply Services") mission to the International Space Station marking the return-to-flight of the Dragon capsule, after the loss of CRS-7. After separation, the [first-stage booster](/wiki/Falcon_9_booster_B1021 "Falcon 9 booster B1021") slowed itself with a boostback maneuver, re-entered the atmosphere, executed an automated controlled descent and landed vertically onto the drone ship *[Of Course I Still Love You](/wiki/Of_Course_I_Still_Love_You "Of Course I Still Love You")*, marking the first successful landing of a rocket on a ship at sea. <sup>[&#91;830&#93;](#cite_note-natgeo-842)</sup> This was the fourth attempt to land on a drone ship, as part of the company's experimental [\[https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module\\\_1\\\_L2/jupyter-labs-webscraping.ipynb?lti=true\]\(https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module\_1\_L2/jupyter-labs-webscraping.ipynb?lti=true\)](/wiki/Falcon_9_first-stag</a></p></div><div data-bbox=)

e\_landing\_tests" title="Falcon 9 first-stage landing tests">controlled-descent and landing tests</a>.<sup id="cite\_ref-843" class="reference"><a href="#cite\_note-843">&#91;831&#93;</a></sup></p><h3><span class="mw-headline" id="Loss\_of\_Amos-6\_on\_the\_launch\_pad">Loss of Amos-6 on the launch pad</span></h3><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main article: <a href="/wiki/Amos-6" class="mw-redirect" title="Amos-6">Amos-6</a></div><p>On 1 September 2016, the 29th Falcon 9 rocket exploded on the launchpad while propellant was being loaded for a routine pre-launch static fire test. The payload, Israeli satellite <a href="/wiki/Amos-6" class="mw-redirect" title="Amos-6">Amos-6</a>, partly commissioned by <a href="/wiki/Facebook" title="Facebook">Facebook</a>, was destroyed with the laun

cher.<sup id="cite\_ref-Malik\_844-0" class="reference"><a href="#cite\_note-Malik-844">&#91;832&#93;</a></sup> On 2 January 2017, SpaceX released an official statement indicating that the cause of the failure was a buckled liner in several of the <a href="/wiki/COPV" class="mw-redirect" title="COPV">COPV</a> tanks, causing perforations that allowed liquid and/or solid oxygen to accumulate underneath the COPVs carbon strands, which were subsequently ignited possibly due to friction of breaking strands.<sup id="cite\_ref-auto1\_157-1" class="reference"><a href="#cite\_note-auto1-157">&#91;149&#93;</a></sup></p></div><h3><span class="mw-headline" id="Inaugural\_reuse\_of\_the\_first\_stage">Inaugural reuse of the first stage</span></h3><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main article: <a href="/wiki/SES-10" title="SES-10">SE

SES-10</a></div>  
 <p>On March 30, 2017, Flight 32 l  
 aunched the <a href="/wiki/SES-1  
 0" title="SES-10">SES-10</a> sate  
 llite with the first-stage booste  
 r <a href="/wiki/B1021" class="mw  
 -redirect" title="B1021">B1021</a  
 >, which had been previously used  
 for the <a href="/wiki/SpaceX\_CRS  
 -8" title="SpaceX CRS-8">CRS-8</a  
 > mission a year earlier. The sta  
 ge was successfully recovered a s  
 econd time and was retired and pu  
 t on display at <a href="/wiki/Ca  
 pe\_Canaveral\_Air\_Force\_Station" c  
 lass="mw-redirect" title="Cape Ca  
 naveral Air Force Station">Cape C  
 anaveral Air Force Station</a>.<s  
 up id="cite\_ref-SpaceflightInside  
 r-2017-04-04\_845-0" class="refere  
 nce"><a href="#cite\_note-Spacefli  
 ghtInsider-2017-04-04-845">&#91;8  
 33&#93;</a></sup>  
 </p>  
 <h3><span class="mw-headline" id  
 ="Zuma\_launch\_controversy">Zuma l  
 aunch controversy</span></h3>  
 <link rel="mw-deduplicated-inline  
 -style" href="mw-data:TemplateSty  
 les:r1033289096"/><div role="not

```
e" class="hatnote navigation-not-searchable">Main article: Zuma (satellite)</div>
<p>Zuma was a classified United States government satellite and was developed and built by Northrop Grumman at an estimated cost of US$3.5 billion.^{[834]} Its launch, originally planned for mid-November 2017, was postponed to 8 January 2018 as fairing tests for another SpaceX customer were assessed. Following a successful Falcon 9 launch, the first-stage booster landed at LZ-1.^{[242]} Unconfirmed reports su
```



ggested that the Zuma spacecraft was lost,<sup><sup id="cite\_ref-ZumaVerge2\_252-2" class="reference"><a href="#cite\_note-ZumaVerge2-252">#91;243#93;</a></sup> with claims that either the payload failed following orbital release, or that the customer-provided adapter failed to release the satellite from the upper stage, while other claims argued that Zuma was in orbit and operating covertly.<sup><sup id="cite\_ref-ZumaVerge2\_252-3" class="reference"><a href="#cite\_note-ZumaVerge2-252">#91;243#93;</a></sup> SpaceX's COO [<sup id="cite\\_ref-ZumaVerge2\\_252-4" class="reference"><a href="#cite\\_note-ZumaVerge2-252">#91;243#93;</a></sup> A preliminary report indicated that the payload adapter, modified by Northrop Grumman after purchasing it from a subcontractor, failed to](/wiki/Gwynne_Shotwell "Gwynne Shotwell")</sup></sup>

separate the satellite from the second stage under the zero gravity conditions.<sup>[\[835\]](#cite_note-847)</sup><sup>[\[834\]](#cite_note-markwatch_846-1)</sup> Due to the classified nature of the mission, no further official information is expected.<sup>[\[243\]](#cite_note-ZumaVerge2-252)</sup>

</p>
 <h3><span class="mw-headline" id="Falcon\_Heavy\_test\_flight">Falcon Heavy test flight</span></h3>
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main article: <a href="/wiki/Falcon\_Heavy\_test\_flight" title="Falcon Heavy test flight">Falcon Heavy test flight</a></div>
 <style data-mw-deduplicate="TemplateStyles:r978413945/mw-parser-ou

```
tput/.tmulti">.mw-parser-output .
tmulti .thumbinner{display:flex;f
lex-direction:column}.mw-parser-o
utput .tmulti .trow{display:flex;
flex-direction:row;clear:left;fle
x-wrap:wrap;width:100%;box-sizin
g:border-box}.mw-parser-output .t
multi .tsingle{margin:1px;float:l
eft}.mw-parser-output .tmulti .th
eader{clear:both;font-weight:bol
d;text-align:center;align-self:ce
nter;background-color:transparen
t;width:100%}.mw-parser-output .t
multi .thumbcaption{background-co
lor:transparent}.mw-parser-output
.tmulti .text-align-left{text-ali
gn:left}.mw-parser-output .tmulti
.text-align-right{text-align:righ
t}.mw-parser-output .tmulti .text
-align-center{text-align:center}@
media all and (max-width:720px){.
mw-parser-output .tmulti .thumbin
ner{width:100%!important;box-sizi
ng:border-box;max-width:none!impo
rtant;align-items:center}.mw-pars
er-output .tmulti .trow{justify-c
ontent:center}.mw-parser-output .
tmulti .tsingle{float:none!import
ant;max-width:100%!important;box-
sizing:border-box;text-align:cent
```

```

er}.mw-parser-output .tmulti .tsi
ngle .thumbcaption{text-align:lef
t}.mw-parser-output .tmulti .trow
>.thumbcaption{text-align:cente
r}}</style><div class="thumb tmul
ti tright"><div class="thumbinne
r" style="width:572px;max-width:5
72px"><div class="trow"><div clas
s="tsingle" style="width:284px;ma
x-width:284px"><div class="thumbi
mage" style="height:188px;overflo
w:hidden"><a href="/wiki/File:Fal
con_Heavy_Demo_Mission_(401264618
51).jpg" class="image"></div></div><div class="tsingle" style="width:284px;max-width:284px"><div class="thumbimage" style="height:188px;overflow:hidden"></div></div>
</div><div class="trow" style="di
splay:flex"><div class="thumbcapt
ion">Liftoff of Falcon Heavy on i
ts maiden flight (left) and its t
wo side-boosters landing at <a hr
ef="/wiki/Landing_Zones_1_and_2"
title="Landing Zones 1 and 2">LZ
-1 and LZ-2 a few minutes lat
er (right)</div></div></div></div
>
<p>The maiden launch of the <a hr
ef="/wiki/Falcon_Heavy" title="Fa
lcon Heavy">Falcon Heavy occu
rred on February 6, 2018, marking
the launch of the most powerful r
ocket since the <a href="/wiki/Sp
ace_Shuttle" title="Space Shuttl
e">Space Shuttle, with a theo
retical payload capacity to <a hr
ef="/wiki/Low_Earth_orbit" title
="Low Earth orbit">low Earth orbi
t more than double the <a hre
f="/wiki/Delta_IV_Heavy" title="D
elta IV Heavy">Delta IV Heavy.<sup id="cite_ref-848" class="r
eference"><a href="#cite_note-84
8">[836]</sup><sup id

```

= "cite\_ref-NatGeo-2018-02-06\_849-0" class="reference"><a href="#cite\_note-NatGeo-2018-02-06-849">&#91;837&#93;</a></sup> Both side boosters landed nearly simultaneously after a ten-minute flight. The central core failed to land on a <a href="/wiki/Autonomous\_spaceport\_drone\_ship" title="Autonomous spaceport drone ship">floating platform</a> at sea.<sup id="cite\_ref-middle-booster\_270-1" class="reference"><a href="#cite\_note-middle-booster-270">&#91;261&#93;</a></sup> The rocket carried <a href="/wiki/Elon\_Musk%27s\_Tesla\_Roadster" title="Elon Musk&#39;s Tesla Roadster">a car and a mannequin</a> to an <a href="/wiki/Orbital\_eccentricity" title="Orbital eccentricity">eccentric</a> <a href="/wiki/Heliocentric\_orbit" title="Heliocentric orbit">heliocentric orbit</a> that reaches further than <a href="/wiki/Perihelion\_and\_aphelion" class="mw-redirect" title="Perihelion and aphelion">aphelion</a> of <a href="/wiki/Mars" title="Mars">Mars</a>.<sup id="cite\_ref-PopMech-2018-02-05

```

_850-0" class="reference"><a href
="#cite_note-PopMech-2018-02-05-8
50">[838]</sup>
</p>
<h3><span class="mw-headline" id
="Maiden_flight_Crew_Dragon_and_f
irst_crewed_flight">Maiden flight
Crew Dragon and first crewed flig
ht</h3>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1033289096"/><div role="not
e" class="hatnote navigation-not-
searchable">Main articles: <a hre
f="/wiki/Crew_Dragon_Demo-1" titl
e="Crew Dragon Demo-1">Crew Drago
n Demo-1 and <a href="/wiki/C
rew_Dragon_Demo-2" title="Crew Dr
agon Demo-2">Crew Dragon Demo-2</
a></div>
<p>On March 2, 2019, SpaceX launc
hed its first orbital flight of <
a href="/wiki/SpaceX_Dragon_2" ti
tle="SpaceX Dragon 2">Dragon 2 (Crew Dragon). It was an uncrew
ed mission to the <a href="/wiki/
International_Space_Station" titl
e="International Space Station">I
nternational Space Station. T
he Dragon contained a mannequin n

```



amed Ripley which was equipped with multiple sensors to gather data about how a human would feel during the flight. Along with the mannequin was 300 pounds of cargo of food and other supplies.<sup>[\[851\]](#cite_note-851)</sup> Also on board was Earth plush toy referred to as a 'Super high tech zero-g indicator'.<sup>[\[852\]](#cite_note-852)</sup> The toy became a hit with astronaut [Anne McClain](/wiki/Anne_McClain) who showed the plushy on the ISS each day<sup>[\[853\]](#cite_note-853)</sup> and also deciding to keep it on board to experience the crewed [SpX-DM2](/wiki/SpX-DM2).

The Dragon spent six days in space including five docked to the International Space Station. During the time, various syste

ms were tested to make sure the vehicle was ready for US astronauts [Doug Hurley](/wiki/Doug_Hurley "Doug Hurley") and [Bob Behnken](/wiki/Bob_Behnken "Bob Behnken") to fly in it in 2020. The Dragon undocked and performed a re-entry burn before splashing down on March 8, 2019 at 08:45 EST, 320&#160;km (200&#160;mi) off the coast of Florida.<sup id="cite\_ref-854" class="reference"><a href="#cite\_note-854">&#91;842&#93;</a></sup>

</p><p>SpaceX held a successful launch of the first commercial orbital human space flight on May 30, 2020, crewed with NASA astronauts [Doug Hurley](/wiki/Doug_Hurley "Doug Hurley") and [Bob Behnken](/wiki/Bob_Behnken "Bob Behnken")</a>. Both astronauts focused on conducting tests on the Crew Dragon capsule. Crew Dragon successfully returned to Earth, splashing down in the Gulf of Mexico on August 2, 2020.<sup id="cite\_ref-855" class="reference"><a href="#cite\_n

ote-855">&#91;843&#93;</a></sup>  
</p>  
<h3><span class="mw-headline" id="Booster\_reflightright\_records">Booster reflightright records</span></h3>  
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1033289096"/><div role="note" class="hatnote navigation-not-searchable">Main articles: <a href="/wiki/Falcon\_9\_B1046" title="Falcon 9 B1046">Falcon 9 B1046</a> and <a href="/wiki/Falcon\_9\_B1048" title="Falcon 9 B1048">Falcon 9 B1048</a></div>  
<p>Most records were set during launches of Starlink satellites.  
</p><p>On 3 December 2018, <a href="/wiki/SSO-A" class="mw-redirect" title="SSO-A">Spaceflight SSO-A</a> launched on B1046. It was the first commercial mission to use a booster flying for the third time.  
</p><p>B1048 made the first fourth flight of a booster in November 2019, and the fifth flight in March 2020, but the booster was lost during re-entry.  
</p><p>B1049 was the first booste

r to be recovered five times on 4 June 2020, six times on 18 August 2020, and seven times on 25 November 2020.

B1051 was the first booster to be recovered eight times on 20 January 2021. It was recovered for the ninth time on 14 March 2021.<sup>[\[91;844\]](#cite_note-856)</sup><sup>[\[91;845\]](#cite_note-857)</sup>

On 9 May 2021, B1051 launched and landed for the tenth time, achieving one of SpaceX's milestone goals for reuse.<sup>[\[91;846\]](#cite_note-858)</sup>

Booster B1060 holds the record for fastest turnaround at 27 days. It launched on 7 January and again on 4 February 2021.<sup>[\[91;847\]](#cite_note-859)</sup><sup>[\[91;848\]](#cite_note-860)</sup>

```

3;</sup>
</p>
<h2><span class="mw-headline" id
="See_also">See also</h2>
<style data-mw-deduplicate="Templ
ateStyles:r1072126029">.mw-parser
-output .portalbox{float:right;pa
dding:0}.mw-parser-output .portal
border{border:solid #aaa 1px}.mw-
parser-output .portalbox.tleft{ma
rgin:0.5em 1em 0.5em 0}.mw-parser
-output .portalbox.tright{margin:
0.5em 0 0.5em 1em}.mw-parser-outp
ut .portalbox>ul{display:table;bo
x-sizing:border-box;max-width:175
px;font-size:85%;line-height:11
0%;font-style:italic;font-weight:
bold}.mw-parser-output .portalbor
der>ul{padding:0.1em;background:#
f9f9f9}.mw-parser-output .portalb
ox>ul>li{display:table-row}.mw-pa
rser-output .portalbox>ul>li>spa
n:first-child{display:table-cell;
padding:0.2em;vertical-align:midd
le;text-align:center}.mw-parser-o
utput .portalbox>ul>li>span:last-
child{display:table-cell;padding:
0.2em 0.2em 0.2em 0.3em;vertical-
align:middle}</style><div role="n
avigation" aria-label="Portals" c

```

```
lass="noprint plainlist portalbox
portalborder tright">

Spaceflight portal</div>
List of Falcon 1 launches
List of Falcon 9 first-stage
```

```
boosters
<a href="/wiki/SpaceX_Dragon#
List_of_missions" title="SpaceX D
ragon">List of SpaceX Dragon 1 mi
ssions
<a href="/wiki/SpaceX_Dragon_
2#List_of_flights" title="SpaceX
Dragon 2">List of SpaceX Dragon
2 missions
<a href="/wiki/Starlink#Launc
hes" title="Starlink">List of Sta
rlink flights
<a href="/wiki/List_of_Starsh
ip_flights" class="mw-redirect" t
itle="List of Starship flights">L
ist of Starship flights

<h2><span class="mw-headline" id
="Notes">Notes</h2>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1011085734"/><div class="ref
list reflist-lower-alpha">
<div class="mw-references-wrap"><
ol class="references">
<li id="cite_note-6"><span class
="mw-cite-backlink"><a href="#"
cite_ref-6">^ <spa
n class="reference-text">The <a h
ref="/wiki/Telstar_18V" title="Te
```

```

lstar 18V">Telstar 18V and <a
href="/wiki/Telstar_19V" title="T
elstar 19V">Telstar 19V satel
lites were heavier, but were laun
ched into a lower-energy transfer
orbit achieving an apogee well be
low the geostationary altitude.</
span>

<li id="cite_note-booster-11"><sp
an class="mw-cite-backlink">^ <s
up><i>a</i></sup> <a h
ref="#cite_ref-booster_11-1"><sup
><i>b</i></sup> <a hre
f="#cite_ref-booster_11-2"><sup><
i>c</i></sup> <sup><i
>d</i></sup> <sup><i
>e</i></sup> <sup><i
>f</i></sup> <sup><i
>g</i></sup> <sup><i
>h</i></sup> <sup><i
>i</i></sup> <sup><i

```



```

>j</i></sup> <sup><
i>k</i></sup> <sup><
i>l</i></sup> <sup><
i>m</i></sup> <
span class="reference-text">Falco
n 9 first-stage boosters are desi
gnated with a construction serial
number and an optional flight num
ber when reused, e.g. B1021.1 and
B1021.2 represent the two flights
of booster <a href="/wiki/B1021"
class="mw-redirect" title="B102
1">B1021. Launches using reus
ed boosters are denoted with a re
cycled symbol ♻️.

<li id="cite_note-Dragon-12"><spa
n class="mw-cite-backlink">^ <a h
ref="#cite_ref-Dragon_12-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <a href="#
cite_ref-Dragon_12-2"><sup><i>
c</i></sup> <a href="#cit
e_ref-Dragon_12-3"><sup><i>d</
b></i></sup> <a href="#cite_r
ef-Dragon_12-4"><sup><i>e

```

[<sup><i><b>f</b></i></sup></a> \[<sup><i><b>g</b></i></sup></a> \\[<sup><i><b>h</b></i></sup></a> \\\[<sup><i><b>i</b></i></sup></a> \\\\[<sup><i><b>j</b></i></sup></a> \\\\\[<sup><i><b>k</b></i></sup></a> \\\\\\[<sup><i><b>l</b></i></sup></a> \\\\\\\[<sup><i><b>m</b></i></sup></a></span>  
Dragon 1 or 2 are designated with a construction serial number or name and an optional flight number when reused, e.g. Dragon C106.1 and Dragon C106.2 represent the two flights of \\\\\\\\[Dragon C106\\\\\\\\]\\\\\\\\(/wiki/Dragon\\\\\\\\_C106 "Dragon C106"\\\\\\\\). Dragon Spacecrafts that are reused are denoted with a recycled symbol ♻️.</span>  
</li>  
- https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module\\\\\\\\\_1\\\\\\\\\_L2/jupyter-labs-webscraping.ipynb?lti=true</sup>\\\\\\\]\\\\\\\(#cite\\\\\\\_ref-Dragon\\\\\\\_12-12\\\\\\\)</sup>\\\\\\]\\\\\\(#cite\\\\\\_ref-Dragon\\\\\\_12-11\\\\\\)</sup>\\\\\]\\\\\(#cite\\\\\_ref-Dragon\\\\\_12-10\\\\\)</sup>\\\\]\\\\(#cite\\\\_ref-Dragon\\\\_12-9\\\\)</sup>\\\]\\\(#cite\\\_ref-Dragon\\\_12-8\\\)</sup>\\]\\(#cite\\_ref-Dragon\\_12-7\\)</sup>\]\(#cite\_ref-Dragon\_12-6\)</sup>](#cite_ref-Dragon_12-5)

<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup>

A controlled "ocean landing" denotes a controlled [atmospheric entry](/wiki/Atmospheric_entry "Atmospheric entry"), descent and vertical splash down on the ocean's surface at near zero velocity, for the sole purpose of gathering test data; such boosters were destroyed at sea.

<sup>^</sup>

**[^](#cite_ref-152)**

<span class="reference-text">Since it was a pre-flight test, SpaceX does not count this scheduled attempt in their launch totals. Some sources do consider this planned flight into the counting schemes, and as a result, some sources might list launch totals after 2016 with one additional launch.</span>

</li>

<li id="cite\_note-249"><span class="mw-cite-backlink"><b><a href="#cite\_ref-249">^</a></b></span><span class="reference-text">Unspecified U.S. government agency</span>

</li>

<li id="cite\_note-336"><span class="mw-cite-backlink"><b><a href="#cite\_ref-336">^</a></b></span><span class="reference-text">Payload comprises five Iridium satellites weighing 860 kg each,<sup id="cite\_ref-gunter-iridium\_334-0" class="reference"><a href="#cite\_note-gunter-iridium-334">&#91;325&#93;</a></sup> two GRACE-FO satellites weighing 580 kg each,<sup id="cite\_ref-gunter-grace\_335-0"

```

class="reference">[326]</sup> plus a 1000 kg dispenser.^{[159]}

<li id="cite_note-DM1-payload-mass-426">^ Total payload mass includes the Crew Dragon capsule, fuel, suited mannequin, instrumentation and 204 kg of cargo.

<li id="cite_note-Falcon_tip_over-436">^ Despite making a successful landing, de-tanking and heading back home, the stage tipped over at sea. This is still considered a successful landing as the stage damage occurred while in transport.<sup id="cite_ref-435" class="referenc

```

702/1892

```
er-output .id-lock-limited a,.mw-
parser-output .id-lock-registrati
on a,.mw-parser-output .citation
 .cs1-lock-limited a,.mw-parser-o
utput .citation .cs1-lock-registr
ation a{background:linear-gradien
t(transparent,transparent),url
("//upload.wikimedia.org/wikipedi
a/commons/d/d6/Lock-gray-alt-2.sv
g")right 0.1em center/9px no-repe
at}.mw-parser-output .id-lock-sub
scription a,.mw-parser-output .ci
tation .cs1-lock-subscription a{b
ackground:linear-gradient(transpa
rent,transparent),url("//upload.w
ikimedia.org/wikipedia/commons/a/
aa/Lock-red-alt-2.svg")right 0.1e
m center/9px no-repeat}.mw-parser
-output .cs1-ws-icon a{backgroun
d:linear-gradient(transparent,tra
nsparent),url("//upload.wikimedi
a.org/wikipedia/commons/4/4c/Wiki
source-logo.svg")right 0.1em cent
er/12px no-repeat}.mw-parser-outp
ut .cs1-code{color:inherit;backgr
ound:inherit;border:none;padding:
inherit}.mw-parser-output .cs1-hi
dden-error{display:none;color:#d3
33}.mw-parser-output .cs1-visible-
error{color:#d333}.mw-parser-outpu
```

```

t .cs1-maint{display:none;color:#
3a3;margin-left:0.3em}.mw-parser-
output .cs1-format{font-size:9
5%}.mw-parser-output .cs1-kern-le
ft{padding-left:0.2em}.mw-parser-
output .cs1-kern-right{padding-ri
ght:0.2em}.mw-parser-output .cita
tion .mw-selflink{font-weight:inh
erit}</style><cite class="citatio
n news cs1"><a rel="nofollow" cla
ss="external text" href="https://
web.archive.org/web/2014080517572
4/http://www.spacex.com/falcon
9">"Falcon 9 Overview". Space
X. 8 May 2010. Archived from <a r
el="nofollow" class="external tex
t" href="http://www.spacex.com/fa
lcon9">the original on 5 Augu
st 2014.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.atitle=Falcon+9+Overview&rft
.date=2010-05-08&rft_id=htt
p%3A%2F%2Fwww.spacex.com%2Ffalcon
9&rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">


```



```
<li id="cite_note-pm20120207-2"><
span class="mw-cite-backlink">
<a href="#cite_ref-pm20120207_2-
0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFSimberg2012"
class="citation news cs1">Simber
g, Rand (8 February 2012). <a rel
="nofollow" class="external text"
href="http://www.popularmechanic
s.com/space/rockets/a7446/elon-mu
sk-on-spacexs-reusable-rocket-pla
ns-6653023/">"Elon Musk on Space
X's Reusable Rocket Plans". P
opular Mechanics<span class="refe
rence-accessdate">. Retrieved <sp
an class="nowrap">2 November</spa
n> 2017.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=Elon+Musk+on+Spac
eX%27s+Reusable+Rocket+Plans&
rft.date=2012-02-08&rft.aulas
t=Simberg&rft.aufirst=Rand&am
p;rft_id=http%3A%2F%2Fwww.popular
mechanics.com%2Fspace%2Frockets%2
Fa7446%2Felon-musk-on-spacexs-reu
```

```
sable-rocket-plans-6653023%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-3"><span class
="mw-cite-backlink"><a href="#
cite_ref-3">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFWall2
015" class="citation news cs1">Wa
ll, Mike (21 December 2015). <a r
el="nofollow" class="external tex
t" href="https://www.space.com/31
420-spacex-rocket-landing-succes
s.html">"Wow! SpaceX Lands Orbita
l Rocket Successfully in Historic
First". Space.com<span class
="reference-accessdate">. Retriev
ed 17 August
 2017.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=a
rticle&rft.atitle=Wow%21+Spac
eX+Lands+Orbital+Rocket+Successfu
lly+in+Historic+First&rft.dat
```

```

e=2015-12-21&rft.au=Wall&
&rft.au=first=Mike&rft_id=h
ttps%3A%2F%2Fwww.space.com%2F3142
0-spacex-rocket-landing-success.h
tml&rft_id=info%3Aid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">

<li id="cite_note-4"><span class
="mw-cite-backlink"><a href="#
cite_ref-4">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFGrush
2015" class="citation news cs1">G
rush, Laren (21 December 2015). <
a rel="nofollow" class="external
text" href="https://www.theverg
e.com/2015/12/21/10640306/spacex-
elon-musk-rocket-landing-succes
s">"SpaceX successfully landed it
s Falcon 9 rocket after launching
it to space". The Verge. R
etrieved 16
August 2017.</cite
><span title="ctx_ver=Z39.88-2004
&rft_val_fmt=info%3Aofi%2Ffm

```

t%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Space X+successfully+landed+its+Falcon+9+rocket+after+launching+it+to+space&rft.date=2015-12-21&rft.aulast=Grush&rft.aufirst=Laren&rft\_id=https%3A%2F%2Fwww.theverge.com%2F2015%2F12%2F21%2F10640306%2Fspacex-elon-musk-rocket-landing-success&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-SLNov19-5"><span class="mw-cite-backlink">^ <a href="#cite\_ref-SLNov19\_5-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-3"><sup><i><b>d</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-4"><sup><i><b>e</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-5"><sup><i><b>f</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-6"><sup><i><b>g</b></i></sup></a>

<sup></a> <a href="#cite\_ref-SLNov19\_5-7"><sup><i><b>h</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-8"><sup><i><b>i</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-9"><sup><i><b>j</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-10"><sup><i><b>k</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-11"><sup><i><b>l</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-12"><sup><i><b>m</b></i></sup></a> <a href="#cite\_ref-SLNov19\_5-13"><sup><i><b>n</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2019/11/spacex-cape-return-first-operational-starlink-mission/">"SpaceX and Cape Canaveral Return to Action with First Operational Starlink Mission"</a>. NASASpaceFlight.com. 11 November 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">11 November </span> 2019</span>.</cite><span</sup>

```

title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX+and+Cap
e+Canaveral+Return+to+Action+with
+First+Operational+Starlink+Missi
on&rft.pub=NASASpaceFlight.co
m&rft.date=2019-11-11&rft
_id=https%3A%2F%2Fwww.nasaspacefl
ight.com%2F2019%2F11%2Fspacex-cap
e-return-first-operational-starli
nk-mission%2F&rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-nsf20180517-7">
<a href="#cite_ref-nsf20180517_7
-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFBaylor2018"
class="citation news cs1">Baylo
r, Michael (17 May 2018). <a rel
="nofollow" class="external text"
href="https://www.nasaspacefligh
t.com/2018/05/block-5-spacex-incr
ease-launch-cadence-lower-price

```

s/">"With Block 5, SpaceX to increase launch cadence and lower prices"</a>. NASASpaceFlight.com<span class="reference-accessdate">.

Retrieved <span class="nowrap">5 July</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=With+Block+5%2C+SpaceX+to+increase+launch+cadence+and+lower+prices&amp;rft.date=2018-05-17&amp;rft.aulast=Baylor&amp;rft.aufirst=Michael&amp;rft\_id=https%3A%2F%2Fwww.nasaspacelight.com%2F2018%2F05%2Fblock-5-spacex-increase-launch-cadence-lower-prices%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-MuskMay2012-13"><span class="mw-cite-backlink">^ <a href="#cite\_ref-MuskMay2012\_13-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-MuskMay2012\_13-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-MuskMay2012\_13-2"><sup><i><b>c</b></i>

[</sup></a> \[<sup><i><b>d</b></i></sup></a> \\[<sup><i><b>e</b></i></sup></a> \\\[<sup><i><b>f</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2012" class="citation web cs1">Clark, Stephen \\\\(18 May 2012\\\\). <a rel="nofollow" class="external text" href="http://spaceflightnow.com/falcon9/003/120518musk/">"Q&A with SpaceX founder and chief designer Elon Musk"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">29 June</span> 2012</span>. <q>The next version of Falcon 9 will be used for everything. The last flight of version 1.0 will be Flight 5. All future missions after Flight 5 will be v1.1.</q></cite><span title="ctx\\\\\_ver=Z39.88-2004&rft\\\\\_val\\\\\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Q%26A+wi\\\]\\\(#cite\\\_ref-MuskMay2012\\\_13-5\\\)\\]\\(#cite\\_ref-MuskMay2012\\_13-4\\)\]\(#cite\_ref-MuskMay2012\_13-3\)](#cite_ref-MuskMay2012_13-3)



```

th+SpaceX+founder+and+chief+desig
ner+Elon+Musk&rft.pub=Spacefl
ight+Now&rft.date=2012-05-18&
amp;rft.aulast=Clark&rft.aufi
rst=Stephen&rft_id=http%3A%2
F%2Fspaceflightnow.com%2Ffalcon9%
2F003%2F120518musk%2F&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></
span>

<li id="cite_note-block_numbers-1
4"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-block_num
bers_14-0"><sup><i>a</i></
sup> <a href="#cite_ref-block
_numbers_14-1"><sup><i>b</
i></sup> <a href="#cite_ref-b
lock_numbers_14-2"><sup><i>c</
b></i></sup> <a href="#cite_r
ef-block_numbers_14-3"><sup><i>d</i></sup> <a href="#ci
te_ref-block_numbers_14-4"><sup><
i>e</i></sup> <
sup><i>f</i></sup> <a
href="#cite_ref-block_numbers_14
-6">^{<i>g</i>} <a href="#cite_ref-block_number

```

s\_14-7"><sup><i><b>h</b></i></sup>  
 ></a> <a href="#cite\_ref-block\_numbers\_14-8"><sup><i><b>i</b></i>  
 </sup></a> <a href="#cite\_ref-block\_numbers\_14-9"><sup><i><b>j</b>  
 </i></sup></a> <a href="#cite\_ref-block\_numbers\_14-10"><sup><i><b>k</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-11"><sup><i><b>l</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-12"><sup><i><b>m</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-13"><sup><i><b>n</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-14"><sup><i><b>o</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-15"><sup><i><b>p</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-16"><sup><i><b>q</b></i></sup></a> <a href="#cite\_ref-block\_numbers\_14-17"><sup><i><b>r</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://www.spacelaunchreport.com/falcon9f

```

t.html">"Space Launch Report: SpaceX Falcon 9 v1.2 Data Sheet"
>. Space Launch Report. 14 August 2017<span class="reference-access
date">. Retrieved <span class="no
wrap">13 August 2017
>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Space+Launch+Report%3A+SpaceX+Fal
con+9+v1.2+Data+Sheet&rft.pub
=Space+Launch+Report&rft.date
=2017-08-14&rft_id=http%3A%2
F%2Fwww.spacelaunchreport.com%2Ff
alcon9ft.html&rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-ns20110930-15">
^
 <a href="#cite_ref-ns20110930_15
-0">^{<i>a</i>}
> <a href="#cite_ref-ns20110930_1
5-1">^{<i>b</i>}
<a href="#cite_ref-ns20110930_
15-2">^{<i>c</i>}
 <span class="referenc
e-text"><link rel="mw-deduplicate

```

```

d-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSpencer2011" class="citation web cs1">Spencer, Henry (30 September 2011). "Falcon rockets to land on their toes". New Scientist. Archived from the original on 16 December 2017. Retrieved 13 July 2016.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Falcon+rockets+to+land+on+their+toes&rft.pub=New+Scientist&rft.date=2011-09-30&rft.aulast=Spencer&rft.aufirst=Henry&rft_id=https%3A%2F%2Fwww.newscienti

```

```

st.com%2Fblogs%2Fshortsharpscienc
e%2F2011%2F09%2Ffalcon-rockets-to
-land-on-thei.html&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-16"><span class
="mw-cite-backlink"><a href="#
cite_ref-16">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFClark2
010" class="citation web cs1">Cla
rk, Stephen (3 June 2010). <a rel
="nofollow" class="external text"
href="http://www.spaceflightnow.c
om/falcon9/001/100603prelaunc
h/">"Falcon 9 demo launch will te
st more than a new rocket". S
paceFlight Now<span class="refere
nce-accessdate">. Retrieved 13 July 201
6.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&rft.genre=unknown&rft.b
title=Falcon+9+demo+launch+will+t

```

```

est+more+than+a+new+rocket&rf
t.pub=SpaceFlight+Now&rft.dat
e=2010-06-03&rft.aulast=Clark
&rft.aufirst=Stephen&rft_
id=http%3A%2F%2Fwww.spaceflightno
w.com%2Ffalcon9%2F001%2F100603pre
launch%2F&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-sfn20100604-1
7"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sfn201006
04_17-0"><sup><i>a</i></su
p> <a href="#cite_ref-sfn2010
0604_17-1"><sup><i>b</i></
sup> <a href="#cite_ref-sfn20
100604_17-2"><sup><i>c</i>
</sup> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite id="CITEREFClark2010" class
="citation news cs1">Clark, Steph
en (4 June 2010). <a rel="nofollow"
class="external text" href="ht
tp://spaceflightnow.com/falcon9/0
01/100604launch/index.html">"Falc
on 9 booster rockets into orbit o

```

```

n dramatic first launch". Spa
ceflight Now<span class="referenc
e-accessdate">. Retrieved <span c
lass="nowrap">4 June 2010
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.atitle=Falcon+9+booster+rockets
+into+orbit+on+dramatic+first+lau
nch&rft.date=2010-06-04&r
ft.aulast=Clark&rft.aufirst=S
tephen&rft_id=http%3A%2F%2Fsp
aceflightnow.com%2Ffalcon9%2F001%
2F100604launch%2Findex.html&r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-parachute-18"><
span class="mw-cite-backlink">^ <
a href="#cite_ref-parachute_18-
0">^{<i>a</i>}
<a href="#cite_ref-parachute_18-
1">^{<i>b</i>}
 <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C

```

```

ITEREFGraham2017" class="citation
web cs1">Graham, William (30 Marc
h 2017). <a rel="nofollow" class
="external text" href="https://ww
w.nasaspaceflight.com/2017/03/spa
cex-historic-falcon-9-re-flight-s
es-10/">"SpaceX conducts historic
Falcon 9 re-flight with SES-10 -
Lands booster again". <i>nas
aspaceflight.com</i>.</cite>

<li id="cite_note-spaceflightnow_Clark_Launch_Report-19"><a href

```



```

="#cite_ref-spaceflightnow_Clark_
Launch_Report_19-0">^</sp
an>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1067248974"/><cite id="CITER
EFClark2010" class="citation web
cs1">Clark, Stephen (9 December
2010). <a rel="nofollow" class
="external text" href="http://spa
ceflightnow.com/falcon9/002/statu
s.html">"Mission Status Center"</
a>. Spaceflight Now<span class="r
eference-accessdate">. Retrieved
10 November
 2017.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=Mission+Status
+Center&rft.pub=Spaceflight+N
ow&rft.date=2010-12-09&rft
.aulast=Clark&rft.aufirst=St
ephen&rft_id=http%3A%2F%2Fspa
ceflightnow.com%2Ffalcon9%2F002%2
Fstatus.html&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">


```

```
<li id="cite_note-20">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFMatt2010" class="citation web cs1">Matt (7 May 2010). "Preparations for first Falcon 9 launch". Space Fellowship. Retrieved 13 July 2016.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Preparations+for+first+Falcon+9+launch&rft.pub=Space+Fellowship&rft.date=2010-05-07&rft.au=Matt&rft_id=http%3A%2F%2Fspacefellowship.com%2Fnews%2Fart19992%2Fpreparations-for-first-falcon-9-launch.html&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+H
```

```
eavy+launches" class="Z3988">

<li id="cite_note-spaceflightnow_Clark_unleashing_Dragon-21">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2010" class="citation news cs1">Clark, Stephen (7 December 2010). "SpaceX on the verge of unleashing Dragon in the sky". Spaceflight Now. Retrieved 10 November 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+on+the+verge+of+unleashing+Dragon+in+the+sky&rft.date=2010-12-07&rft.aulast=Clark
```

```

&rft.aufirst=Stephen&rft_
id=http%3A%2F%2Fwww.spaceflightno
w.com%2Ffalcon9%2F002%2F101207pre
view%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-NRO_Taps_Boeing
_for_Next_Batch_of_CubeSats-22"><
span class="mw-cite-backlink">
<a href="#cite_ref-NRO_Taps_Boein
g_for_Next_Batch_of_CubeSats_22-
0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFBrinton2010"
class="citation news cs1">Brinto
n, Turner (8 April 2010). <a rel
="nofollow" class="external text"
href="http://spacenews.com/nro-ta
ps-boeing-next-batch-cubesat
s/">"NRO Taps Boeing for Next Bat
ch of Cubesats". SpaceNews<sp
an class="reference-accessdate">.
Retrieved 2
November 2017.</ci
te><span title="ctx_ver=Z39.88-20
04&rft_val_fmt=info%3Aofi%2Ff

```

```

mt%3Akev%3Amtx%3Ajournal&rft.
genre=article&rft.atitle=NRO+
Taps+Boeing+for+Next+Batch+of+Cub
esats&rft.date=2010-04-08&am
p;rft.aulast=Brinton&rft.aufi
rst=Turner&rft_id=http%3A%2F%
2Fspacenews.com%2Fnro-taps-boeing
-next-batch-cubesats%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-BBC_new_era-2
3"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-BBC_new_e
ra_23-0"><sup><i>a</i></su
p> <a href="#cite_ref-BBC_new
_era_23-1"><sup><i>b</i></
sup> <span class="refe
rence-text"><link rel="mw-dedupli
cated-inline-style" href="mw-dat
a:TemplateStyles:r1067248974"/><c
ite id="CITEREFAmos2012" class="c
itation news cs1">Amos, Jonathan
(22 May 2012). <a rel="nofollow"
class="external text" href="http
s://www.bbc.co.uk/news/science-en
vironment-18154937">"Nasa chief h
ails new era in space". <i>BB

```

C News</i><span class="reference-accessdate">. Retrieved <span class="nowrap">25 May</span> 2012</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.jt itle=BBC+News&amp;rft.atitle=Nasa+chief+hails+new+era+in+space&amp;rft.date=2012-05-22&amp;rft.a ulast=Amos&amp;rft.aufirst=Jonathan&amp;rft\_id=https%3A%2F%2Fwww.bb c.co.uk%2Fnews%2Fscience-environm ent-18154937&amp;rfr\_id=info%3Asi d%2Fen.wikipedia.org%3AList+of+Fa lcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-C2-24"><span class="mw-cite-backlink"><b><a href="#cite\_ref-C2\_24-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:Template Styles:r1067248974"/><cite id="CITEREFCarreau2011" class="citation news cs1">Carreau, Mark (20 July 2011). <a rel="nofollow" class="external text" href="http://aviationweek.com/awin/spacex-station

-cargo-mission-eyes-november-launch">"SpaceX Station Cargo Mission Eyes November Launch"</a>. Aviation Week & Space Technology<span class="reference-accessdate">. Retrieved <span class="nowrap">6 March</span> 2016</span>.</cite>  
<span title="ctx\_ver=Z39.88-2004& rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+Station+Cargo+Mission+Eyes+November+Launch&rft.date=2011-07-20&rft.aulast=Carreau&rft.aufirst=Mark&rft\_id=http%3A%2F%2Faviationweek.com%2Fawin%2Fspacex-station-cargo-mission-eyes-november-launch&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-25"><span class="mw-cite-backlink"><b><a href="#cite\_ref-25">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFHartman2012" class="citation web cs1">H

artman, Dan (23 July 2012). <a rel="nofollow" class="external text" href="http://www.nasa.gov/pdf/672214main\_1-Hartman\_July12\_NAC\_Final\_508.pdf">"International Space Station Program Status"</a> <span class="cs1-format">(PDF)</span>. NASA<span class="reference-accessdate">. Retrieved <span class="nowrap">25 September</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=International+Space+Station+Program+Status&amp;rft.pub=NASA&amp;rft.date=2012-07-23&amp;rft.aulast=Hartman&amp;rft.aufirst=Dan&amp;rft\_id=http%3A%2F%2Fwww.nasa.gov%2Fpdf%2F672214main\_1-Hartman\_July12\_NAC\_Final\_508.pdf&amp;rft\_r\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span> <img alt="Public Domain" src="//upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/12px-PD-icon.svg.png" decoding="async" width="12" height="12" class="noviewer" srcset="//upload.wikimedi



a.org/wikipedia/en/thumb/6/62/PD-icon.svg/18px-PD-icon.svg.png 1.5x, //upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/24px-PD-icon.svg.png 2x" data-file-width="196" data-file-height="196" /> <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span></li>

<li id="cite\_note-26"><span class="mw-cite-backlink"><b><a href="#cite\_ref-26">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2012" class="citation news cs1">Clark, Stephen (22 May 2012). <a rel="nofollow" class="external text" href="http://spaceflightnow.com/falcon9/003/120522launch/">"Dragon circling Earth after flawless predawn blastoff"</a>. Spaceflight Now. <a rel="nofollow" class="external text" href="https://web.archive.org/web/20120525074758/http://spaceflightnow.com/falcon9/00

3/120522launch/">Archived</a> from the original on 25 May 2012<span class="reference-accessdate">.

Retrieved <span class="nowrap">22 May</span> 2012</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Dragon+circling+Earth+after+flawless+predawn+blastoff&amp;rft.date=2012-05-22&amp;rft.aulast=Clark&amp;rft.aufirst=Stephen&amp;rft\_id=http%3A%2F%2Fspaceflightnow.com%2Ffalcon9%2F003%2F120522launch%2F&amp;rft\_r\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-SFN\_LLog-27"><span class="mw-cite-backlink">^ <a href="#cite\_ref-SFN\_LLog\_27-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-SFN\_LLog\_27-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-SFN\_LLog\_27-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-SFN\_LLog\_27-3"><sup><i><b>d</b></i></sup></a> <a href

```
= "#cite_ref-SFN_LLog_27-4"><sup><
i>e</i></sup> <sup><
i>f</i></sup> <sup><
i>g</i></sup> <sup><
i>h</i></sup> <sup><
i>i</i></sup> <sup><
i>j</i></sup> <sup>
<i>k</i></sup> <sup>
<i>l</i></sup>
<li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite class="cita
tion web cs1"><a rel="nofollow" c
lass="external text" href="http
s://web.archive.org/web/201604221
01717/http://spaceflightnow.com/t
racking/launchlog.html">"Launch L
og". Spaceflight Now. 1 Febru
ary 2016. Archived from <a rel="n
ofollow" class="external text" hr
ef="http://spaceflightnow.com/tra
cking/launchlog.html">the origina
```

l</a> on 22 April 2016<span class="reference-accessdate">. Retrieved <span class="nowrap">9 February</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Launch+Log&amp;rft.pub=Spaceflight+Now&amp;rft.date=2016-02-01&amp;rft\_id=http%3A%2F%2Fspaceflightnow.com%2Ftracking%2Flaunchlog.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-sxManifest20120925-28"><span class="mw-cite-backlink">^ <a href="#cite\_ref-sxManifest20120925\_28-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-sxManifest20120925\_28-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-sxManifest20120925\_28-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-sxManifest20120925\_28-3"><sup><i><b>d</b></i></sup></a> <a href="#cite\_ref-sxManifest20120925\_28-4"><sup><i><b>

[<sup>f</sup>](#cite_ref-sxManifest20120925_28-5)
[<sup>g</sup>](#cite_ref-sxManifest20120925_28-6)
[<sup>h</sup>](#cite_ref-sxManifest20120925_28-7)
[<sup>i</sup>](#cite_ref-sxManifest20120925_28-8)
[<sup>j</sup>](#cite_ref-sxManifest20120925_28-9)
[<sup>k</sup>](#cite_ref-sxManifest20120925_28-10)

<link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/>
<a rel="nofollow" class="external text" href="https://web.archive.org/web/20121004103731/http://www.spacex.com/launch\_manifest.php">"SpaceX Launch Manifest"</a>. SpaceX. Archived from <a rel="nofollow" class="external text" href="http://www.spacex.com/launch\_manifest.php">the original</a> on 4 October 2012<span class="reference-accessdate">. Retrieved <span clas

```

s="nowrap">25 September 20
12.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Abo
ok&rft.genre=unknown&rft.
btitle=SpaceX+Launch+Manifest&am
p;rft.pub=SpaceX&rft_id=http%
3A%2F%2Fwww.spacex.com%2Flaunch_m
anifest.php&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-Orbcomm-29"><sp
an class="mw-cite-backlink">^</
a> <span class="refere
nce-text">
(secondary payloa
d) <link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1067248974"/><cite id="CI
TEREFde_Selding2012" class="citat
ion news cs1">de Selding, Peter
B. (25 May 2012). <a rel="nofoll
ow" class="external text" href="h
ttp://spacenews.com/orbcomm-eager
ly-awaits-launch-new-satellite-ne
xt-falcon-9/">"Orbcomm Eagerly Aw
aits Launch of New Satellite on N
ext Falcon 9". SpaceNews<span

```

```

class="reference-accessdate">. Retrieved 28 M
ay 2012.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.atitle=Orbcomm+Eag
erly+Awaits+Launch+of+New+Satelli
te+on+Next+Falcon+9&rft.date=
2012-05-25&rft.aulast=de+Seld
ing&rft.aufirst=Peter+B.&
rft_id=http%3A%2F%2Fspacenews.co
m%2Forbcomm-eagerly-awaits-launch
-new-satellite-next-falcon-9%2F&
rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-gunter-og2-30">
^
 <a href="#cite_ref-gunter-og2_30
-0">^{<i>a</i>}
 <a href="#cite_ref-gunter-og2_3
0-1">^{<i>b</i>}
 <a href="#cite_ref-gunter-og2_
30-2">^{<i>c</i>}
 <span class="referenc
e-text"><link rel="mw-deduplicate
d-inline-style" href="mw-data:Tem

```

```

plateStyles:r1067248974"/><cite id=
"CITEREFKrebs" class="citation
web cs1">Krebs, Gunter. <a rel
="nofollow" class="external text"
href="http://space.skyrocket.de/d
oc_sdat/orbcomm-2.htm">"Orbcomm F
M101, ..., FM119 (OG2)". Gunt
er's Space Page<span class="refer
ence-accessdate">. Retrieved <spa
n class="nowrap">16 April
2017.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Orbcomm+FM101%2C
+...%2C+FM119+%28OG2%29&rft.p
ub=Gunter%27s+Space+Page&rft.
aulast=Krebs&rft.aufirst=Gunt
er&rft_id=http%3A%2F%2Fspace.
skyrocket.de%2Fdoc_sdat%2Forbcomm
-2.htm&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-nyt-20121030-3
1"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nyt-20121
030_31-0"><sup><i>a</i></s
up> <a href="#cite_ref-nyt-20

```



121030\_31-1"><sup><i><b>b</b></i>  
</sup></a></span> <span class="reference-text"><link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFEditorial2012" class="citation news cs1">Editorial (30 October 2012). <a rel="nofollow" class="external text" href="https://www.nytimes.com/2012/10/30/opinion/first-outing-for-spacex-pleases-nasa.html">"First Outing for SpaceX"</a>. <i>The New York Times</i><span class="reference-accessdate">. Retrieved <span class="nowrap">17 January</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.jtitle=The+New+York+Times&amp;rft.atitle=First+Outing+for+SpaceX&amp;rft.date=2012-10-30&amp;rft.au=Editorial&amp;rft\_id=https%3A%2F%2Fwww.nytimes.com%2F2012%2F10%2F30%2Fopinion%2Ffirst-outing-for-spacex-pleases-nasa.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></sp

```

an>

<li id="cite_note-OrbcommTotalLoss-32">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2012" class="citation news cs1">Clark, Stephen (11 October 2012). "Orbcomm craft falls to Earth, company claims total loss". Spaceflight Now. Retrieved 11 October 2012.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Orbcomm+craft+falls+to+Earth%2C+company+claims+to+total+loss&rft.date=2012-10-11&

```

```

&rft.aulast=Clark&rft.aufi
rst=Stephen&rft_id=http%3A%2
F%2Fwww.spaceflightnow.com%2Ffalc
on9%2F004%2F121011orbcomm%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-sn20121011-33">
<a href="#cite_ref-sn20121011_33
-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFde_Selding20
12" class="citation news cs1">de
Selding, Peter B. (11 October 20
12). <a rel="nofollow" class="ext
ernal text" href="http://spacenew
s.com/orbcomm-craft-launched-by-f
alcon-9-falls-out-of-orbit/">"Orb
comm Craft Launched by Falcon 9 F
alls out of Orbit". SpaceNews
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">12 October 2012.
<q>Orbcomm requested that SpaceX
carry one of their small satellit

```

tes (weighing a few hundred pounds, versus Dragon at over 12,000 pounds)... The higher the orbit, the more test data [Orbcomm] can gather, so they requested that we attempt to restart and raise altitude. NASA agreed to allow that, but only on condition that there be substantial propellant reserves, since the orbit would be close to the space station. It is important to appreciate that Orbcomm understood from the beginning that the orbit-raising maneuver was tentative. They accepted that there was a high risk of their satellite remaining at the Dragon insertion orbit. SpaceX would not have agreed to fly their satellite otherwise, since this was not part of the core mission and there was a known, material risk of no altitude raise.

[https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module\\_1\\_L2/jupyter-labs-webscraping.ipynb?lti=true](https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true)

```

ufirst=Peter+B.&rft_id=http%3A%2F%2Fspacenews.com%2Forbcomm-craft-launched-by-falcon-9-falls-out-of-orbit%2F&rfr_id=info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-34">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2012" class="citation web cs1">Clark, Stephen (14 November 2012). "Dragon Mission Report". Spaceflight Now. Retrieved 10 November 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Dragon+Mission+Report&rft.pub=Spaceflight+Now&a

```

```

mp;rft.date=2012-11-14&rft.au
last=Clark&rft.aufirst=Stephe
n&rft_id=http%3A%2F%2Fwww.spa
ceflightnow.com%2Ffalcon9%2F004%2
F121114anomalies%2F&rfr_id=in
fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></sp
an>

<li id="cite_note-sxf9_20110321-3
5"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sxf9_2011
0321_35-0"><sup><i>a</i></
sup> <a href="#cite_ref-sxf9_
20110321_35-1"><sup><i>b</
i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://web.archi
ve.org/web/20120118103620/http://
www.spacex.com/falcon9.php">"Falc
on 9 Overview". SpaceX. 27 Ma
y 2012. Archived from <a rel="nof
ollow" class="external text" href
="http://www.spacex.com/falcon9.p
hp">the original on 18 Januar

```

y 2012

<li id="cite\_note-pa20130930-36">  
 <span class="mw-cite-backlink">^  
   <a href="#cite\_ref-pa20130930\_36-0"><sup><i><b>a</b></i></sup></a>  
   <a href="#cite\_ref-pa20130930\_36-1"><sup><i><b>b</b></i></sup></a>  
   <a href="#cite\_ref-pa20130930\_36-2"><sup><i><b>c</b></i></sup></a>  
   <a href="#cite\_ref-pa20130930\_36-3"><sup><i><b>d</b></i></sup></a>  
   <a href="#cite\_ref-pa20130930\_36-4"><sup><i><b>e</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:T

```

emplateStyles:r1067248974"/><cite
id="CITEREFMessier2013" class="ci
tation news cs1">Messier, Doug (2
9 September 2013). <a rel="nofoll
ow" class="external text" href="h
ttp://www.parabolicarc.com/2013/0
9/29/falcon-9-launch-payloads-orb
it-vandenberg/">"Falcon 9 Launch
s Payloads into Orbit From Vanden
berg". Parabolic Arc<span cla
ss="reference-accessdate">. Retri
eved 30 Sept
ember 2013.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Ajournal&rft.genr
e=article&rft.atitle=Falcon+9
+Launches+Payloads+into+Orbit+Fro
m+Vandenberg&rft.date=2013-09
-29&rft.aulast=Messier&rft
.aufirst=Doug&rft_id=http%3
A%2F%2Fwww.parabolicarc.com%2F201
3%2F09%2F29%2Ffalcon-9-launch-pay
loads-orbit-vandenberg%2F&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-CASSIOPE_MDA-3

```



```

7"><span class="mw-cite-backlin
k"><a href="#cite_ref-CASSIOPE
_MDA_37-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFClark20
12" class="citation web cs1">Clar
k, Stephen (18 May 2012). <a rel
="nofollow" class="external text"
href="http://www.spaceflightnow.c
om/falcon9/003/120518musk/">"Drag
on Mission Report | Q&A
with SpaceX founder and chief de
signer Elon Musk". Spacefligh
t Now<span class="reference-acces
sdate">. Retrieved <span class="n
owrap">25 May 2012.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft
.genre=unknown&rft.btitle=Dr
agon+Mission+Report+%26%23124%3B+
Q%26A+with+SpaceX+founder+and+chi
ef+designer+Elon+Musk&rft.pub
=Spaceflight+Now&rft.date=201
2-05-18&rft.aulast=Clark&
rft.aufirst=Stephen&rft_id=ht
tp%3A%2F%2Fwww.spaceflightnow.co
m%2Ffalcon9%2F003%2F120518musk%2F

```

```

&rfr_id=info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-39">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SES-8 Mission Press Kit" (PDF). <i>spaceflightnow.com</i>. SpaceX. November 2013 . Retrieved 1 September 2019 >.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=spaceflightnow.com&rft.attitle=SES-8+Mission+Press+Kit&rft.date=2013-11&rft_id=https%3A%2F%2Fspaceflightnow.com%2Ffalco

```

```

on9%2F007%2Fses8_presskit.pdf&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-40"><span class
="mw-cite-backlink"><a href="#
cite_ref-40">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFBraunS
forzoCampbell2017" class="citatio
n book cs1">Braun, Robert D.; Sfo
rzo, Brandon; Campbell, Charles
(2017). "Advancing Supersonic Re
tropropulsion Using Mars-Relevant
Flight Data: An Overview". <i>AIA
A SPACE and Astronautics Forum an
d Exposition</i>. <a href="/wiki/
Doi_(identifier)" class="mw-redir
ect" title="Doi (identifier)">doi
:<a rel="nofollow" class="ext
ernal text" href="https://doi.or
g/10.2514%2F6.2017-5292">10.2514/
6.2017-5292. <a href="/wiki/H
dl_(identifier)" class="mw-redirect"
title="Hdl (identifier)">hdl
:<a rel="nofollow" class="ext

```

```
ernal text" href="//hdl.handle.net/2060%2F20170008535">2060/20170008535. ISBN
 <bdi>978-1-62410-483-1</bdi>.</cite>

```

```
<li id="cite_note-sfn_wwls20130624-41">^
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX Successfully Completes First Mission to Geostationary Transfer Orbit". SpaceX. 3 December 2013. Archived from the original on 29 December 2019. Retrieved 25 November 2013.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abo
```

ok&rft.genre=unknown&rft.btitle=SpaceX+Successfully+Completes+First+Mission+to+Geostationary+Transfer+Orbit&rft.pub=SpaceX&rft.date=2013-12-03&rft\_id=https%3A%2F%2Fwww.spacex.com%2Fpress%2F2013%2F12%2F03%2Fspacex-successfully-completes-first-mission-geostationary-transfer-orbit&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-spx-pr-42"><span class="mw-cite-backlink">^ <a href="#cite\_ref-spx-pr\_42-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-spx-pr\_42-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBrostFeldes2011" class="citation pressrelease cs1">Brost, Kirstin; Feltz, Yves (14 March 2011). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20190910061940/https://www.spac

ex.com/press/2012/12/19/spacex-and-ses-announce-satellite-launch-agreement">"SpaceX and SES Announce Satellite Launch Agreement"</a> (Press release). SpaceX. Archived from <a rel="nofollow" class="external text" href="http://www.spacex.com/press/2012/12/19/spacex-and-ses-announce-satellite-launch-agreement">the original</a> on 10 September 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">6 March</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+and+SES+Announce+Satellite+Launch+Agreement&amp;rft.pub=SpaceX&amp;rft.date=2011-03-14&amp;rft.aulast=Brost&amp;rft.aufirst=Kirstin&amp;rft.au=Felts%2C+Yves&amp;rft\_id=http%3A%2F%2Fwww.spacex.com%2Fpress%2F2012%2F12%2F19%2Fspacex-and-ses-announce-satellite-launch-agreement&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

```

<li id="cite_note-aw20110323-43">
<a href="#cite_ref-aw20110323_43
-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFMorrington2011"
class="citation news cs1">Morrin
g, Frank, Jr. (21 March 2011). <a
rel="nofollow" class="external te
xt" href="http://aviationweek.co
m/awin/satellite-operators-boost-
launcher-competition">"Satellite
Operators Boost Launcher Competi
tion". <i>Aviation Week &
Space Technology</i><span class
="reference-accessdate">. Retriev
ed 6 March</
span> 2016.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Ajournal&rft.genre=artic
le&rft.jtitle=Aviation+Week+%
26+Space+Technology&rft.atitl
e=Satellite+Operators+Boost+Launc
her+Competition&rft.date=2011
-03-21&rft.aulast=Morrington&
rft.aufirst=Frank%2C+Jr.&rft
```



```

t_id=http%3A%2F%2Faviationweek.co
m%2Fawin%2Fsatellite-operators-bo
ost-launcher-competition&rfr_
id=info%3Aid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988">

<li id="cite_note-SNMissionStatus
7-44"><span class="mw-cite-backli
nk"><a href="#cite_ref-SNMissi
onStatus7_44-0">^
 <li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite class="cita
tion web cs1"><a rel="nofollow" c
lass="external text" href="http
s://web.archive.org/web/201403280
62838/https://spaceflightnow.com/
falcon9/007/status.html">"Spacefl
ightNow Mission Status Center". Spaceflight Now. 3 December 20
13. Archived from <a rel="nofollo
w" class="external text" href="ht
tp://spaceflightnow.com/falcon9/0
07/status.html">the original
 on 28 March 2014.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A

```

```

mtx%3Abook&rft.genre=unknown&
&rft.btitle=SpaceflightNow+Mis
sion+Status+Center&rft.pub=Sp
aceflight+Now&rft.date=2013-1
2-03&rft_id=http%3A%2F%2Fspac
eflightnow.com%2Ffalcon9%2F007%2F
status.html&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-sf10120131203-4
5"><span class="mw-cite-backlin
k"><a href="#cite_ref-sf101201
31203_45-0">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite class="citation
web cs1"><a rel="nofollow" class
="external text" href="https://we
b.archive.org/web/20160304034110/
http://www.spaceflight101.net/spa
cex-falcon-9-v11-ses-8-launch-upd
ates.html">"SpaceX Falcon 9 v1.1
- SES-8 Launch Updates". Spa
ceflight 101. 3 December 2013. Ar
chived from <a rel="nofollow" cla
ss="external text" href="http://w
ww.spaceflight101.net/spacex-falc

```

on-9-v11-ses-8-launch-updates.html">the original</a> on 4 March 2016<span class="reference-accessdate">. Retrieved <span class="nowrap">13 July</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+Falcon+9+v1.1+-+SES-8+Launch+Updates&amp;rft.pub=Spaceflight+101&amp;rft.date=2013-12-03&amp;rft\_id=http%3A%2F%2Fwww.spaceflight101.net%2Fspacex-falcon-9-v11-ses-8-launch-updates.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-46"><span class="mw-cite-backlink"><b><a href="#cite\_ref-46">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGraham 2013" class="citation web cs1">Graham, William (3 December 2013). <a rel="nofollow" class="externa

```

l text" href="https://www.nasaspaceflight.com/2013/12/spacex-falcon-9-v1-1-milestone-ses-8-launch/">"Falcon 9 v1.1 successfully lifts SES-8 in milestone launch". <i>nasaspaceflight.com</i>.</cite>

<li id="cite_note-47">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation w

```

```

eb cs1"><a rel="nofollow" class
="external text" href="https://sp
ace.skyrocket.de/doc_chr/flau2014.
htm">"Orbital Launches of 2014"</
a>. Gunter space page<span class
="reference-accessdate">. Retriev
ed 11 Januar
y 2020.</cite>

<li id="cite_note-NASA_Spaceflight-48">^
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGraham2014" class="citation news cs1">Graham, William (5 January

```

```

2014). <a rel="nofollow" class
="external text" href="http://ww
w.nasaspaceflight.com/2014/01/spa
cex-falcon-9-v1-1-launch-thaicom-
6/">"SpaceX Falcon 9 v1.1 launch
s Thaicom-6 at first attempt". NASASpaceFlight.com<span class
="reference-accessdate">. Retriev
ed 10 Novemb
er 2017.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.atitle=SpaceX+Falc
on+9+v1.1+launches+Thaicom-6+at+f
irst+attempt&rft.date=2014-01
-05&rft.aulast=Graham&rft
.aufirst=William&rft_id=htt
p%3A%2F%2Fwww.nasaspaceflight.co
m%2F2014%2F01%2Fspacex-falcon-9-v
1-1-launch-thaicom-6%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-sn20140106-49">
<a href="#cite_ref-sn20140106_49
-0">^ <span class

```

```

="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFde_Selding20
14" class="citation news cs1">de
 Selding, Peter B. (6 January 201
4). <a rel="nofollow" class="exte
rnal text" href="http://spacenew
s.com/38959spacex-delivers-thaico
m-6-satellite-to-orbit/">"SpaceX
 Delivers Thaicom-6 Satellite to
 Orbit". SpaceNews<span class
="reference-accessdate">. Retriev
ed 2 Novembe
r 2017.</cite>


```

```

<li id="cite_note-50"><span class
="mw-cite-backlink"><a href="#
cite_ref-50">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n
ews cs1"><a rel="nofollow" class
="external text" href="http://ww
w.spaceflightnow.com/falcon9/009/
140430firststage/">"SpaceX plans
to recover stages when customers
allow". SpaceFlight Now. 30 A
pril 2014<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">17 August 2017
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.atitle=SpaceX+plans+to+recover+
stages+when+customers+allow&r
ft.date=2014-04-30&rft_id=htt
p%3A%2F%2Fwww.spaceflightnow.com%
2Ffalcon9%2F009%2F140430firststag
e%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">


```



```
<li id="cite_note-bloomberg20140722-51"><a href="#cite_ref-bloomb
erg20140722_51-0">^</span
> <link rel="mw-deduplicated-inline-s
tyle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
Capaccio2014" class="citation new
s cs1">Capaccio, Tony (20 July 20
14). <a rel="nofollow" class="ext
ernal text" href="https://www.blo
omberg.com/news/articles/2014-07-
21/air-force-examines-anomalies-a
s-musk-s-spacex-seeks-work">"Air
Force Examines Anomalies as Mus
k's SpaceX Seeks Work". Bloom
berg<span class="reference-access
date">. Retrieved <span class="no
wrap">10 November 2017</sp
an>. <q>A second anomaly was a st
age-one fire on the "Octaweb" eng
ine structure during a flight in
December.</q></cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=Air+Force+Examine
s+Anomalies+as+Musk%27s+SpaceX+Se
eks+Work&rft.date=2014-07-20&
```

```

&rft.aulast=Capaccio&rft.a
ufirst=Tony&rft_id=https%3A%2
F%2Fwww.bloomberg.com%2Fnews%2Far
ticles%2F2014-07-21%2Fair-force-e
xamines-anomalies-as-musk-s-space
x-seeks-work&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-52"><span class
="mw-cite-backlink"><a href="#
cite_ref-52">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n
ews cs1"><a rel="nofollow" class
="external text" href="https://ww
w.nasa.gov/sites/default/files/fi
les/Orbital_CRS3_mission_overvie
w.pdf">"Orbital CRS-3 Mission Ove
rview" <span class="cs1-forma
t">(PDF). NASA<span class
="reference-accessdate">. Retriev
ed 17 August
 2017.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=a

```

```

rticle&#amp;rft.atitle=Orbital+CRS
-3+Mission+Overview&#amp;rft_id=ht
tps%3A%2F%2Fwww.nasa.gov%2Fsites%
2Fdefault%2Ffiles%2Ffiles%2FOrbit
al_CRS3_mission_overview.pdf&#amp;
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span> <img alt="Public Domain" sr
c="//upload.wikimedia.org/wikiped
ia/en/thumb/6/62/PD-icon.svg/12px
-PD-icon.svg.png" decoding="asyn
c" width="12" height="12" class
="noviewer" srcset="//upload.wiki
media.org/wikipedia/en/thumb/6/6
2/PD-icon.svg/18px-PD-icon.svg.pn
g 1.5x, //upload.wikimedia.org/wi
kipedia/en/thumb/6/62/PD-icon.sv
g/24px-PD-icon.svg.png 2x" data-f
ile-width="196" data-file-height
="196" /> <i>This article incorpo
rates text from this source, whic
h is in the <a href="/wiki/Public
_domain" title="Public domain">pu
blic domain</i><i>.</i>

<li id="cite_note-auto-53">^ <a hr
ef="#cite_ref-auto_53-0"><sup><i>

```

```

a</i></sup> <a href="#
cite_ref-auto_53-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation ne
ws cs1"><a rel="nofollow" class
="external text" href="https://ww
w.youtube.com/watch?v=CQnR5fhCXk
Q">"Falcon 9 First Stage Return:
ORBCOMM Mission". SpaceX. 22
July 2014 – via YouTube.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&rft
.genre=article&rft.atitle=Fa
lcon+9+First+Stage+Return%3A+ORBC
OMM+Mission&rft.date=2014-07-
22&rft_id=https%3A%2F%2Fwww.y
outube.com%2Fwatch%3Fv%3DCQnR5fhC
XkQ&rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">

<li id="cite_note-mit20140422-5
4"><span class="mw-cite-backlin
k"><a href="#cite_ref-mit20140
422_54-0">^ <span

```

```

class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFBelfior
e2014" class="citation news cs1">
Belfiore, Michael (22 April 201
4). <a rel="nofollow" class="exte
rnal text" href="https://www.tech
nologyreview.com/s/526806/spacex-
brings-a-booster-safely-back-to-e
arth/">"SpaceX Brings a Booster S
afely Back to Earth". <i><a h
ref="/wiki/MIT_Technology_Review"
title="MIT Technology Review">MIT
Technology Review</i>. <a hre
f="/wiki/MIT" class="mw-redirect"
title="MIT">MIT<span class="r
eference-accessdate">. Retrieved
10 November
 2017.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=a
rticle&rft.jtitle=MIT+Technol
ogy+Review&rft.atitle=SpaceX+
Brings+a+Booster+Safely+Back+to+E
arth&rft.date=2014-04-22&
rft.aulast=Belfiore&rft.aufir
st=Michael&rft_id=https%3A%2
F%2Fwww.technologyreview.com%2Fs%

```

2F526806%2Fspacex-brings-a-booster-safely-back-to-earth%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-aw20140428-55">

<span class="mw-cite-backlink"><b><a href="#cite\_ref-aw20140428\_55-0">^</a></b></span> <span class="reference-text"><link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFNorris2014" class="citation news cs1">Norris, Guy (28 April 2014). <a rel="nofollow" class="external text" href="http://aviationweek.com/space/spacex-plans-multiple-reusable-booster-tests">"SpaceX Plans For Multiple Reusable Booster Tests"</a>. <i><a href="/wiki/Aviation\_Week\_%26\_Space\_Technology" title="Aviation Week & Space Technology">Aviation Week & Space Technology</a></i><span class="reference-accessdate">. Retrieved <span class="nowrap">28 April</span> 2014</span>. <q>The April 17

F9R Dev 1 flight, which lasted under 1 min, was the first vertical landing test of a production-representative recoverable Falcon 9 v 1.1 first stage, while the April 18 cargo flight to the ISS was the first opportunity for SpaceX to evaluate the design of foldable landing legs and upgraded thrusters that control the stage during its initial descent.

</span></span>

</li>

<li id="cite\_note-auto2-56"><span class="mw-cite-backlink">^ <a href

f="#cite\_ref-auto2\_56-0"><sup><i>  
<b>a</b></i></sup></a> <a href="#  
cite\_ref-auto2\_56-1"><sup><i><b>b  
</b></i></sup></a></span> <span c  
lass="reference-text"><link rel  
="mw-deduplicated-inline-style" h  
ref="mw-data:TemplateStyles:r1067  
248974"/><cite id="CITEREFMahoney  
2016" class="citation web cs1">Ma  
honey, Erin (3 July 2016). <a rel  
="nofollow" class="external text"  
href="http://www.nasa.gov/conten  
t/past-elana-cubesat-launches">"P  
ast Elana CubeSat Launches"</a>.

NASA<span class="reference-acces  
sdate">. Retrieved <span class="n  
owrap">18 February</span> 2019</s  
pan>.</cite><span title="ctx\_ver=  
Z39.88-2004&amp;rft\_val\_fmt=info%  
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am  
p;rft.genre=unknown&amp;rft.btitl  
e=Past+Elana+CubeSat+Launches&am  
p;rft.pub=NASA&amp;rft.date=2016-  
07-03&amp;rft.aulast=Mahoney&amp;  
rft.aufirst=Erin&amp;rft\_id=http%  
3A%2F%2Fwww.nasa.gov%2Fcontent%2F  
past-elana-cubesat-launches&amp;r  
fr\_id=info%3Asid%2Fen.wikipedia.o  
rg%3AList+of+Falcon+9+and+Falcon+  
Heavy+launches" class="Z3988"></s



```

pan> <img alt="Public Domain" src
="//upload.wikimedia.org/wikipedi
a/en/thumb/6/62/PD-icon.svg/12px-
PD-icon.svg.png" decoding="async"
width="12" height="12" class="nov
iewer" srcset="//upload.wikimedi
a.org/wikipedia/en/thumb/6/62/PD-
icon.svg/18px-PD-icon.svg.png 1.5
x, //upload.wikimedia.org/wikiped
ia/en/thumb/6/62/PD-icon.svg/24px
-PD-icon.svg.png 2x" data-file-wi
dth="196" data-file-height="196"
/> <i>This article incorporates
text from this source, which is
in the <a href="/wiki/Public_dom
ain" title="Public domain">public
domain</i><i>.</i>

<li id="cite_note-57"><span class
="mw-cite-backlink"><a href="#
cite_ref-57">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w
eb cs1"><a rel="nofollow" class
="external text" href="https://ww
w.nasa.gov/sites/default/files/fi
les/ELaNa_V_Spx3_CubeSat_Factshee
t_508.pdf">"ELaNa V CubeSat Launc

```

h on SpaceX-3 Mission"</a> <span class="cs1-format">(PDF)</span>. NASA. March 2014<span class="reference-accessdate">. Retrieved <span class="nowrap">17 February</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=ELaNa+V+CubeSat+Launch+on+SpaceX-3+Mission&amp;rft.pub=NASA&amp;rft.date=2014-03&amp;rft\_id=https%3A%2F%2Fwww.nasa.gov%2Fsites%2Fdefault%2Ffiles%2Ffiles%2FELaNa\_V\_Spx3\_CubeSat\_Factsheet\_508.pdf&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This artic
le incorporates text from this so
urce, which is in the <a href="/w
iki/Public_domain" title="Public
domain">public domain</a></i><i
>.</i></span>
</li>
<li id="cite_note-og2-01_20140714
-58"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-og2-01_2
0140714_58-0">^</a></b></span> <s
pan class="reference-text"><link
rel="mw-deduplicated-inline-styl
e" href="mw-data:TemplateStyles:r
1067248974"/><cite class="citatio
n web cs1"><a rel="nofollow" clas
s="external text" href="https://w
eb.archive.org/web/2019052514114
9/https://www.spacex.com/news/201
4/07/14/falcon-9-launches-orbcomm
-og2-satellites-orbit">"Falcon 9
Launches Orbcomm OG2 Satellites
to Orbit"</a>. SpaceX. 14 July 2
014. Archived from <a rel="nofoll
ow" class="external text" href="h
ttp://www.spacex.com/news/2014/0
7/14/falcon-9-launches-orbcomm-og
2-satellites-orbit">the original
</a> on 25 May 2019<span class="r
eference-accessdate">. Retrieved

```

```

<span class="nowrap">6 August</span> 2014</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Falcon+9+Launches+Orbcomm+OG2+Satellites+to+Orbit&amp;rft.pub=SpaceX&amp;rft.date=2014-07-14&amp;rft_id=http%3A%2F%2Fwww.spacex.com%2Fnews%2F2014%2F07%2F14%2Ffalcon-9-launches-orbcomm-og2-satellites-orbit&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-gunter-og2-sim-59"><span class="mw-cite-backlink">^ <a href="#cite_ref-gunter-og2-sim_59-0"><sup><i><b>a</b></i></sup></a> <a href="#cite_ref-gunter-og2-sim_59-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. <a rel="nofollow" class="exte

```

```

rnal text" href="http://space.sky
rocket.de/doc_sdat/orbcomm-2-mass
-simulator.htm">"Orbcomm-OG2 Mass
Simulator 1, 2"</a>. Gunter's Spa
ce Page<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">16 April</span> 2017</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&amp;rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&amp;rft.btitl
e=Orbcomm-OG2+Mass+Simulator+1%2C
+2&amp;rft.pub=Gunter%27s+Space+P
age&amp;rft.aulast=Krebs&amp;rft.
aufirst=Gunter&amp;rft_id=http%3
A%2F%2Fspace.skyrocket.de%2Fdoc_s
dat%2Forbcomm-2-mass-simulator.ht
m&amp;rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88"></span></span>
</li>
<li id="cite_note-SpaceX22072014-
60"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-SpaceX22
072014_60-0">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w

```

```

eb cs1"><a rel="nofollow" class
="external text" href="https://we
b.archive.org/web/20200223152402/
http://www.spacex.com/news/2014/0
7/22/spacex-soft-lands-falcon-9-r
ocket-first-stage">"SpaceX Soft L
ands Falcon 9 Rocket First Stage"
</a>. SpaceX. 22 July 2014. Archi
ved from <a rel="nofollow" class
="external text" href="http://ww
w.spacex.com/news/2014/07/22/spac
ex-soft-lands-falcon-9-rocket-fir
st-stage">the original</a> on 23
February 2020<span class="refere
nce-accessdate">. Retrieved <span
class="nowrap">22 July</span> 201
4</span>.</cite><span title="ctx_
ver=Z39.88-2004&amp;rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&amp;rft.genre=unknown&amp;rft.b
title=SpaceX+Soft+Lands+Falcon+9+
Rocket+First+Stage&amp;rft.pub=Sp
aceX&amp;rft.date=2014-07-22&amp;
rft_id=http%3A%2F%2Fwww.spacex.co
m%2Fnews%2F2014%2F07%2F22%2Fspace
x-soft-lands-falcon-9-rocket-firs
t-stage&amp;rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>

```

```
</li>
<li id="cite_note-AsiaSat_SpaceX-61"><span class="mw-cite-backlink">^ <a href="#cite_ref-AsiaSat_SpaceX_61-0"><sup><i><b>a</b></i></sup></a> <a href="#cite_ref-AsiaSat_SpaceX_61-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2012" class="citation news cs1">Clark, Stephen (8 February 2012). <a rel="nofollow" class="external text" href="http://www.spaceflightnow.com/news/n1202/08spacexasiasat/">"SpaceX to launch AsiaSat craft from Cape Canaveral"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">9 February</span> 2012</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+to+launch+AsiaSat+craft+from+Cape+Canaveral&amp;rft.date=2012-02-08&amp;rft.aulast=Clark&amp;rft.aufirst=Stephen&am
```

p;rft_id=http%3A%2F%2Fwww.spaceflightnow.com%2Fnews%2Fn1202%2F08spacexasiadat%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-62">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFShanklinCubbonPang2014" class="citation web cs1">Shanklin, Emily; Cubbon, Sabrina; Pang, Winnie (4 August 2014). "SpaceX AsiaSat 8 Press Kit" (PDF). Spaceflight Now. Retrieved 6 March 2016.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+Asia

Sat+8+Press+Kit&rft.pub=Space
 flight+Now&rft.date=2014-08-0
 4&rft.aulast=Shanklin&rft.
 aufirst=Emily&rft.au=Cubbo
 n%2C+Sabrina&rft.au=Pang%2C+W
 innie&rft_id=https%3A%2F%2Fsp
 aceflightnow.com%2Ffalcon9%2F011%
 2Fpresskit.pdf&rfr_id=info%3A
 sid%2Fen.wikipedia.org%3AList+of+
 Falcon+9+and+Falcon+Heavy+launche
 s" class="Z3988">

 <li id="cite_note-as8_20140805-6
 3"><span class="mw-cite-backlin
 k"><a href="#cite_ref-as8_2014
 0805_63-0">^ <span
 class="reference-text"><link rel
 ="mw-deduplicated-inline-style" h
 ref="mw-data:TemplateStyles:r1067
 248974"/><cite class="citation pr
 essrelease cs1"><a rel="nofollow"
 class="external text" href="http
 s://web.archive.org/web/201501191
 33755/http://www.asiasat.com/asiasat/
 EN/upload/doc/pressrelease/ne
 ws_e20140805.pdf">"AsiaSat 8 Succ
 essfully Lifts Off" <span cla
 ss="cs1-format">(PDF) (Pre
 ss release). AsiaSat. Archived fr
 om <a rel="nofollow" class="exter

nal text" href="http://www.asiasat.com/asiasat/EN/upload/doc/pressrelease/news_e20140805.pdf">the original (PDF) on 19 January 2015. Retrieved 6 August 2014.

</cite>

<li id="cite_note-ampspace-20140803-64">^ ^{<i>a</i>} ^{<i>b</i>} <link rel

```
= "mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFEvans20
14" class="citation web cs1">Evan
s, Ben (3 August 2014). <a rel="n
ofollow" class="external text" hr
ef="http://www.americaspace.com/2
014/08/03/spacex-prepares-to-scor
e-two-personal-bests-with-asiasat
-8-launch/">"SpaceX Prepares to S
core Two "Personal Bests" With As
iaSat-8 Launch"</a>. AmericaSpace
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">13 July</span> 2016</span>.</c
ite><span title="ctx_ver=Z39.88-2
004&amp;rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Abook&amp;rft.ge
nre=unknown&amp;rft.btitle=SpaceX
+Prepares+to+Score+Two+%22Persona
l+Bests%22+With+AsiaSat-8+Launch&
amp;rft.pub=AmericaSpace&amp;rft.
date=2014-08-03&amp;rft.aulast=Ev
ans&amp;rft.aufirst=Ben&amp;rft_i
d=http%3A%2F%2Fwww.americaspace.c
om%2F2014%2F08%2F03%2Fspacex-prep
ares-to-score-two-personal-bests-
with-asiasat-8-launch%2F&amp;rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
```

```

vy+launches" class="Z3988"></span
></span>
</li>
<li id="cite_note-65"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-65">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n
ews cs1"><a rel="nofollow" class
="external text" href="http://ww
w.satnews.com/story.php?number=11
79629582">"Space Systems/Loral (S
SL), AsiaSat + SpaceX—AsiaSat 6 A
rrives @ Canaveral AFS (Launch Pr
eparations)"</a>. SatNews. 30 Jul
y 2014<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">31 July</span> 2014</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&amp;rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&amp;rft.ati
tle=Space+Systems%2FLoral+%28SSL%
29%2C+AsiaSat+%2B+SpaceX%E2%80%94
AsiaSat+6+Arrives+%40+Canaveral+A
FS+%28Launch+Preparations%29&amp;
rft.date=2014-07-30&amp;rft_id=ht
tp%3A%2F%2Fwww.satnews.com%2Fstor

```

```

y.php%3Fnumber%3D1179629582&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-sdc20140907-66"><span class="mw-cite-backlink"><b><a href="#cite_ref-sdc20140907_66-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWall2014" class="citation news cs1">Wall, Mike (7 September 2014). <a rel="nofollow" class="external text" href="http://www.space.com/27052-spacex-launches-asiasat6-satellite.html">"Dazzling SpaceX Nighttime Launch Sends AsiaSat 6 Satellite Into Orbit"</a>. Space.com<span class="reference-accessdate">. Retrieved <span class="nowrap">7 September</span> 2014</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Dazzling+SpaceX+Nighttime+Laun

```

```

ch+Sends+AsiaSat+6+Satellite+Into
+Orbit&#amp;rft.date=2014-09-07&#amp;
p;rft.aulast=Wall&#amp;rft.aufirst
=Mike&#amp;rft_id=http%3A%2F%2Fww
w.space.com%2F27052-spacex-launch
es-asiasat6-satellite.html&#amp;rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-67"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-67">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w
eb cs1"><a rel="nofollow" class
="external text" href="https://ww
w.nbcnews.com/science/space/space
x-falcon-launches-asiasat-6-satel
lite-after-weeks-delay-n19756
1">"SpaceX Falcon Launches AsiaSa
t 6 Satellite After Weeks of Dela
y"</a>. <i>NBC News</i>. 7 Septem
ber 2014.</cite><span title="ctx_
ver=Z39.88-2004&#amp;rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&#amp;rft.genre=unknown&#amp;rft

```

```

t.jtitle=NBC+News&rft.atitle=
SpaceX+Falcon+Launches+AsiaSat+6+
Satellite+After+Weeks+of+Delay&
p;rft.date=2014-09-07&rft_id=
https%3A%2F%2Fwww.nbcnews.com%2Fs
cience%2Fspace%2Fspacex-falcon-la
unches-asiasat-6-satellite-after-
weeks-delay-n197561&rfr_id=in
fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></span></sp
an>
</li>
<li id="cite_note-68"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-68">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFEvans2
014" class="citation web cs1">Eva
ns, Ben (7 September 2014). <a re
l="nofollow" class="external tex
t" href="http://www.americaspace.
com/2014/09/07/spacex-successfull
y-delivers-asiasat-6-to-orbit-in-
spectacular-sunday-morning-launc
h/">"SpaceX Successfully Delivers
AsiaSat-6 to Orbit in Spectacular
Sunday Morning Launch"</a>. <i>Am

```

```

ericaSpace</i>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&amp;rft.genre=unknown
&amp;rft.jtitle=AmericaSpace&amp;
rft.atitle=SpaceX+Successfully+De
livers+AsiaSat-6+to+Orbit+in+Spec
tacular+Sunday+Morning+Launch&am
p;rft.date=2014-09-07&amp;rft.aul
ast=Evans&amp;rft.aufirst=Ben&am
p;rft_id=http%3A%2F%2Fwww.america
space.com%2F2014%2F09%2F07%2Fspac
ex-successfully-delivers-asiasat-
6-to-orbit-in-spectacular-sunday-
morning-launch%2F&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-69"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-69">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n
ews cs1"><a rel="nofollow" class
="external text" href="http://ww
w.nasa.gov/sites/default/files/fi

```


les/SpaceX_CRS-4_Mission_Overview-1.pdf">"SpaceX CRS-4 Mission Overview" (PDF). NASA. Retrieved 17 August 2017.</cite> <i>This article incorpo
rates text from this source, whic
h is in the <a href="/wiki/Public
_domain" title="Public domain">pu
blic domain</i><i>.</i>

<li id="cite_note-nasacrs42014092
1-70"><span class="mw-cite-backli
nk"><a href="#cite_ref-nasacrs
420140921_70-0">^
 <li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
SchierholzHuot2014" class="citati
on pressrelease cs1">Schierholz,
 Stephanie; Huot, Dan (21 Septemb
er 2014). <a rel="nofollow" class
="external text" href="http://ww
w.nasa.gov/press/2014/september/n
asa-cargo-launches-to-space-stati
on-aboard-spacex-resupply-mission
-0/">"NASA Cargo Launches to Spac
e Station aboard SpaceX Resupply
 Mission" (Press release). NA
SA<span class="reference-accessda
te">. Retrieved <span class="nowr
ap">21 September 2014</spa
n>.</cite><span title="ctx_ver=Z3

```

9.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+Cargo+Launches+to+Space+Station+aboard+SpaceX+Resupply+Mission&rft.pub=NASA&rft.date=2014-09-21&rft.aulast=Schierholz&rft.aufirst=Stephanie&rft.au=Huot%2C+Dan&rft\_id=http%3A%2F%2Fwww.nasa.gov%2Fpress%2F2014%2Fseptember%2Fnasa-cargo-launches-to-space-station-aboard-spacex-resupply-mission-0%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is

788/1892

```
+Land+an+Orbital+Rocket+Booster&
mp;rft.pub=SpaceX&rft.date=20
17-09-14&rft_id=https%3A%2F%2
Fwww.youtube.com%2Fwatch%3Fv%3Dbv
im4rsNHkQ%26t%3D32s&rfr_id=in
fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></sp
an>

<li id="cite_note-aw20141016-72">
^
 <a href="#cite_ref-aw20141016_72
-0">^{<i>a</i>} <a href="#cite_ref-aw20141016_7
2-1">^{<i>b</i>}</
a> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFMorrison2014" class="cita
tion news cs1">Morrison, Frank, J
r. (20 October 2014). <span class
="cs1-lock-subscription" title="P
aid subscription required"><a rel
="nofollow" class="external text"
href="http://aviationweek.com/spa
ce/nasa-spacex-share-data-superso
nic-retropropulsion">"NASA, Space
X Share Data On Supersonic Retrop
```

propulsion" data-bbox="296 36 882 954">: Data-sharing deal will help SpaceX land Falcon 9 on Earth and NASA put humans on Mars". Aviation Week & Space Technology. [A](https://web.archive.org/web/20141027133828/http://aviationweek.com/space/nasa-spacex-share-data-supersonic-retropropulsion)rchived from the original on 27 October 2014 class="reference-accessdate">. Retrieved . <q>[The] partnership between NASA and SpaceX is giving the American space agency an early look at what it would take to land multi-ton habitats and supply caches on Mars for human explorers, while providing sophisticated infrared (IR) imagery to help the spacecraft company develop a reusable launch vehicle. After multiple attempts, airborne  [and  \[IR tracking cameras ... captured a Space\]\(/wiki/United\_States\_Navy "United States Navy"\)](/wiki/NASA "NASA")

X Falcon 9 in flight as its first stage [fell] back toward Earth shortly after second-stage ignition and then reignited to lower the stage toward a propulsive "zero-velocity, zero-altitude" touchdown

on the sea surface.</q></cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=NASA%2C+SpaceX+Share+Data+On+Supersonic+Retropropulsion+%3A+Data-sharing+deal+will+help+SpaceX+land+Falcon+9+on+Earth+and+NASA+put+humans+on+Mars&amp;rft.date=2014-10-20&amp;rft.aulast=Morring&amp;rft.aufirst=Frank%2C+Jr.&amp;rft\_id=http%3A%2F%2Faviationweek.com%2Fspace%2FNASA-spacex-share-data-supersonic-retropropulsion&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-73"><span class="mw-cite-backlink"><b><a href="#cite\_ref-73">^</a></b></span> <span class="reference-text"><link r

```
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w
eb cs1"><a rel="nofollow" class
="external text" href="https://sp
ace.skyrocket.de/doc_chr/lau2015.
htm">"Orbital Launches of 2015"</
a>. Gunters space page<span class
="reference-accessdate">. Retriev
ed 11 Januar
y 2020.</cite>

<li id="cite_note-nasa20150107-74">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067
```



248974"/><cite id="CITEREFHeiney2015" class="citation news cs1">Heiney, Anna (7 January 2015). <a rel="nofollow" class="external text" href="https://blogs.nasa.gov/spacex/2015/01/07/next-spacex-launch-attempt-saturday-jan-10/">"Next SpaceX Launch Attempt Saturday, January 10"</a>. NASA<span class="reference-accessdate">. Retrieved <span class="nowrap">8 January </span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Next+SpaceX+Launch+Attempt+Saturday%2C+January+10&amp;rft.date=2015-01-07&amp;rft.aulast=Heiney&amp;rft.aufirst=Anna&amp;rft\_id=https%3A%2F%2Fblogs.nasa.gov%2Fspacex%2F2015%2F01%2F07%2Fnext-spacex-launch-attempt-saturday-jan-10%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span> <i>This article incorporates te
xt from this source, which is in
the <a href="/wiki/Public_domai
n" title="Public domain">public d
omain</a></i><i>.</i></span>
</li>
<li id="cite_note-sxManifest20130
731-75"><span class="mw-cite-back
link">^ <a href="#cite_ref-sxMani
fest20130731_75-0"><sup><i><b>a</
b></i></sup></a> <a href="#cite_r
ef-sxManifest20130731_75-1"><sup>
<i><b>b</b></i></sup></a> <a href
="#cite_ref-sxManifest20130731_75
-2"><sup><i><b>c</b></i></sup></a
> <a href="#cite_ref-sxManifest20
130731_75-3"><sup><i><b>d</b></i>
</sup></a> <a href="#cite_ref-sxM
anifest20130731_75-4"><sup><i><b>
e</b></i></sup></a> <a href="#cit
e_ref-sxManifest20130731_75-5"><s
up><i><b>f</b></i></sup></a> <a h

```

ref="#cite_ref-sxManifest20130731_75-6">^{<i>g</i>} ^{<i>h</i>} ^{<i>i</i>} ^{<i>j</i>} ^{<i>k</i>} <link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Launch Manifest". SpaceX. Archived from the original on 2 August 2013. Retrieved 31 July 2013.</cite><span title="ctx_ver=Z39.88-2004&rft_va

```

l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&
p;rft.btitle=Launch+Manifest&
rft.pub=SpaceX&rft_id=http%3
A%2F%2Fwww.spacex.com%2Fmissions&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-76"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-76">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n
ews cs1"><a rel="nofollow" class
="external text" href="https://ww
w.nasa.gov/sites/default/files/fi
les/SpaceX_CRS-5_factsheet.pd
f">"SpaceX CRS-5 factsheet"</a> <
span class="cs1-format">(PDF)</sp
an>. NASA. December 2014<span cla
ss="reference-accessdate">. Retri
eved <span class="nowrap">17 Augu
st</span> 2017</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=a

```

```

rticle&rft.atitle=SpaceX+CRS-
5+factsheet&rft.date=2014-12&
amp;rft_id=https%3A%2F%2Fwww.nas
a.gov%2Fsites%2Fdefault%2Ffiles%2
Ffiles%2FSpaceX_CRS-5_factsheet.p
df&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988"></span>  <i>This article inco
rporates text from this source, w
hich is in the <a href="/wiki/Pub
lic_domain" title="Public domai
n">public domain</a></i><i>.</i>
</span>
</li>
<li id="cite_note-nasacrs52015011
0-77"><span class="mw-cite-backli
nk"><b><a href="#cite_ref-nasacrs

```

520150110_77-0">^
<li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
Siceloff2015" class="citation web
cs1">Siceloff, Steven (10 January
2015). <a rel="nofollow" class="e
xternal text" href="http://www.na
sa.gov/content/dragon-begins-carg
o-laden-chase-of-station">"Dragon
Begins Cargo-laden Chase of Stati
on". NASA<span class="referen
ce-accessdate">. Retrieved <span
class="nowrap">10 January
2015.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
.btitle=Dragon+Begins+Cargo-lade
n+Chase+of+Station&rft.pub=NA
SA&rft.date=2015-01-10&rft
.au1ast=Siceloff&rft.au1irst
=Steven&rft_id=http%3A%2F%2Fw
ww.nasa.gov%2Fcontent%2Fdragon-be
gins-cargo-laden-chase-of-station
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8"> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-sfn20150110-78">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2015" class="citation news cs1">Clark, Stephen (10 January 2015). <a rel="nofollow" class="external text" href="http://spaceflightnow.c

```

```

om/2015/01/10/dragon-successfully
-launched-rocket-recovery-demo-cr
ash-lands/">"Dragon successfully
 launched, rocket recovery demo c
rash lands". Spaceflight Now<
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">10 January 2015.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Ajournal&am
p;rft.genre=article&rft.atitl
e=Dragon+successfully+launched%2C
+rocket+recovery+demo+crash+lands
&rft.date=2015-01-10&rft.
aulast=Clark&rft.aufirst=Step
hen&rft_id=http%3A%2F%2Fspace
flightnow.com%2F2015%2F01%2F10%2F
dragon-successfully-launched-rock
et-recovery-demo-crash-lands%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-79"><span class
="mw-cite-backlink"><a href="#
cite_ref-79">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"

```



href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://web.archive.org/web/20150206081040/http://www.nesdis.noaa.gov/DSCOVER/index.html">"DSCOVER:Deep Space Climate Observatory"</a>. NOAA. 19 January 2015. Archived from <a rel="nofollow" class="external text" href="http://www.nesdis.noaa.gov/DSCOVER/index.html">the original</a> on 6 February 2015<span class="reference-accessdate">. Retrieved <span class="nowrap">20 January</span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=DSCOVER%3ADeep+Space+Climate+Observatory&amp;rft.pub=NOAA&amp;rft.date=2015-01-19&amp;rft\_id=http%3A%2F%2Fwww.nesdis.noaa.gov%2FDSCOVER%2Findex.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span> 
 <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span>

</li>
 <li id="cite\_note-80"><span class="mw-cite-backlink"><b><a href="#cite\_ref-80">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2012" class="citation news cs1">Clark, Stephen (6 December 2012). <a rel="nofollow" class="external text" href="http://www.spaceflighnow.com/news/n1212/06spacexdo d/">"SpaceX books first two launches with U.S. military"</a>. Spac

```
eflight Now<span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">18 November 2
013.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Aj
ournal&rft.genre=article&
rft.atitle=SpaceX+books+first+two
+launches+with+U.S.+military&
rft.date=2012-12-06&rft.aulas
t=Clark&rft.aufirst=Stephen&a
mp;rft_id=http%3A%2F%2Fwww.spacef
lightnow.com%2Fnews%2Fn1212%2F06s
pacexdod%2F&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-spx20121205-8
1"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-spx201212
05_81-0"><sup><i>a</i></su
p> <a href="#cite_ref-spx2012
1205_81-1"><sup><i>b</i></
sup> <span class="refe
rence-text"><link rel="mw-dedupli
cated-inline-style" href="mw-dat
a:TemplateStyles:r1067248974"/><c
ite class="citation pressrelease
cs1"><a rel="nofollow" class="ex
```

ternal text" href="https://web.archive.org/web/20190803111257/http://www.spacex.com/press/2012/12/19/spacex-awarded-two-eelv-class-missions-united-states-air-force">"SpaceX Awarded Two EELV-Class Missions from the United States Air Force"</a> (Press release). SpaceX. 5 December 2012. Archived from <a rel="nofollow" class="external text" href="http://www.spacex.com/press/2012/12/19/spacex-awarded-two-eelv-class-missions-united-states-air-force">the original</a> on 3 August 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">3 March</span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+Awarded+Two+EELV-Class+Missions+from+the+United+States+Air+Force&rft.pub=SpaceX&rft.date=2012-12-05&rft\_id=http%3A%2F%2Fwww.spacex.com%2Fpress%2F2012%2F12%2F19%2Fspacex-awarded-two-eelv-class-missions-united-states-air-force&rfr\_id=info%3Asid%2Fen.wikipedia.o

```

rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-MuskTweet-20150
211-82"><span class="mw-cite-back
link"><a href="#cite_ref-MuskT
weet-20150211_82-0">^</sp
an>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1067248974"/><cite id="CITER
EF@elonmusk2015" class="citation
web cs1">@elonmusk (11 February
2015). <a rel="nofollow" class
="external text" href="https://tw
itter.com/elonmusk/status/5656595
78915115011">"Rocket soft landed
in the ocean within 10 m of targ
et and nicely vertical! High prob
ability of good dronship landing
in non-stormy weather" (Twee
t)<span class="reference-accessda
te">. Retrieved <span class="nowr
ap">14 February 2015 – via <a href="/wiki/Twit
ter" title="Twitter">Twitter.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft

```

```
t.genre=unknown&rft.btitle=Rocket+soft+landed+in+the+ocean+with+10+m+of+target+and+nicely+vertical%21+High+probability+of+good+droneship+landing+in+non-stormy+weather&rft.date=2015-02-11&rft.au=%40elonmusk&rft_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F565659578915115011&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-patrickafmil02142015-83">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Patrick Air Force Base – Home – Next Launch". Patrick Air Force Base. 14 February 2015. Retrieved 14 Febru
```

ary</span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Patrick+Air+Force+Base+%E2%80%94+Home+%E2%80%94+Next+Launch&amp;rft.pub=Patrick+Air+Force+Base&amp;rft.date=2015-02-14&amp;rft\_id=http%3A%2F%2Fwww.patrick.af.mil%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span>

```


<li id="cite_note-84"><span class
="mw-cite-backlink"><a href="#
cite_ref-84">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFBergin
2015" class="citation web cs1">Be
rgin, Chris (25 February 2015). <
a rel="nofollow" class="external
text" href="https://www.nasaspac
eflight.com/2015/02/legless-falco
n-9-static-fire-ahead-launch/">"L
egless Falcon 9 conducts Static F
ire test ahead of Sunday launch"
. NASASpaceFlight.com<span cl
ass="reference-accessdate">. Retr
ieved 13 Jul
y 2016.</cite><span
title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Legless+Falcon+9+conducts+Static+Fire+test+ahead+of+Sunday+launch&rft.pub=NASA+SpaceFlight.com&rft.date=2015-02-25&rft.aulast=Bergin&rft.aufirst=Chris&rft_id=http%3A%2F%2Fwww.nasaspaceflight.co

```



```

m%2F2015%2F02%2Flegless-falcon-9-
static-fire-ahead-launch%2F&r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-aw20140310-85">
<a href="#cite_ref-aw20140310_85
-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFSvitak2014"
class="citation news cs1">Svita
k, Amy (10 March 2014). <a rel="n
ofollow" class="external text" hr
ef="http://aviationweek.com/awin/
spacex-says-falcon-9-compete-eelv
-year">"SpaceX Says Falcon 9 To C
ompete For EELV This Year". <
i>Aviation Week & Space Techn
ology</i><span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">6 February 2015
. <q>But the Falcon 9 is n
ot just changing the way launch-v
ehicle providers do business; its
reach has gone further, prompting

```

satellite makers and commercial fleet operators to retool business plans in response to the low-cost rocket. In March 2012, Boeing announced the start of a new line of all-electric telecommunications spacecraft, the [Boeing 702](/wiki/Boeing_702 "Boeing 702")[SP](/wiki/Boeing_702SP "Boeing 702SP"), which are designed to launch in pairs on a Falcon 9 v1.1. Anchor customers [Asia Broadcast Satellite](/wiki/ABS_(satellite_operator) "ABS (satellite operator)") (ABS) of Hong Kong and [Mexico](/wiki/Mexico "Mexico")'s [Satmex](/wiki/Satmex "Satmex")'s plan to loft the first two of four such spacecraft on a Falcon 9. [...] Using electric rather than chemical propulsion will mean the satellites take months, rather than weeks, to reach their final orbital destination. But because all-electric spacecraft are about 40% lighter than their conventional counterparts, the cost to launch them is considerably less than that for a chemically propelled satellite.

```

</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Ajournal&
p;rft.genre=article&rft.jtitl
e=Aviation+Week+%26+Space+Technol
ogy&rft.atitle=SpaceX+Says+Fa
lcon+9+To+Compete+For+EELV+This+Y
ear&rft.date=2014-03-10&r
ft.aulast=Svitak&rft.aufirst=
Amy&rft_id=http%3A%2F%2Faviat
ionweek.com%2Fawin%2Fspacex-says-
falcon-9-compete-eelv-year&r
f_r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-boeing20141112-
86"><span class="mw-cite-backlin
k"><a href="#cite_ref-boeing20
141112_86-0">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFClimer
2014" class="citation pressreleas
e cs1">Climer, Joanna (12 Novembe
r 2014). <a rel="nofollow" class
="external text" href="http://boe
ing.mediaroom.com/2014-11-12-Boei

```

ng-Stacks-Two-Satellites-to-Launch-as-a-Pair">"Boeing Stacks Two Satellites to Launch as a Pair"</a> (Press release). Boeing<span class="reference-accessdate">. Retrieved <span class="nowrap">6 February</span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Boeing+Stacks+Two+Satellites+to+Launch+as+a+Pair&amp;rft.pub=Boeing&amp;rft.date=2014-11-12&amp;rft.aulast=Climer&amp;rft.aufirst=Joanna&amp;rft\_id=http%3A%2F%2Fboeing.mediaroom.com%2F2014-11-12-Boeing-Stacks-Two-Satellites-to-Launch-as-a-Pair&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z39.88"></span></span>

</li>

<li id="cite\_note-sfn20150302-87"><span class="mw-cite-backlink"><b><a href="#cite\_ref-sfn20150302\_87-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067

```

248974"/><cite id="CITEREFClark20
15" class="citation news cs1">Cla
rk, Stephen (2 March 2015). <a re
l="nofollow" class="external tex
t" href="http://spaceflightnow.co
m/2015/03/02/plasma-driven-satell
ites-launched-from-cape-canavera
l/">"Plasma-driven satellites lau
nched from Cape Canaveral". S
paceflight Now<span class="refere
nce-accessdate">. Retrieved 2 March 201
5.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&rft.genre=article&rft
.atitle=Plasma-driven+satellites
+launched+from+Cape+Canaveral&am
p;rft.date=2015-03-02&rft.aul
ast=Clark&rft.aufirst=Stephen
&rft_id=http%3A%2F%2Fspacefli
ghtnow.com%2F2015%2F03%2F02%2Fpla
sma-driven-satellites-launched-fr
om-cape-canaveral%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s
pan>

<li id="cite_note-boeing-88"><spa

```

```

n class="mw-cite-backlink">^ <a h
ref="#cite_ref-boeing_88-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFClimer
2015" class="citation pressreleas
e cs1">Climer, Joanna (10 Septemb
er 2015). <a rel="nofollow" class
="external text" href="http://boei
ng.mediaroom.com/2015-09-10-Boei
ng-World-s-First-All-Electric-Pro
pulsion-Satellite-Begins-Operatio
ns">"Boeing: World's First All-El
ectric Propulsion Satellite Begin
s Operations" (Press releas
e). Boeing<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">6 January 2016
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Boeing%3A+World%27s+First+Al
l-Electric+Propulsion+Satellite+B
egins+Operations&rft.pub=Boei
ng&rft.date=2015-09-10&rf

```

```

t.aulast=Climer&rft.aufirst=J
oanna&rft_id=http%3A%2F%2Fboe
ing.mediaroom.com%2F2015-09-10-Bo
eing-World-s-First-All-Electric-P
ropulsion-Satellite-Begins-Operat
ions&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-89"><span class
="mw-cite-backlink"><a href="#
cite_ref-89">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n
ews cs1"><a rel="nofollow" class
="external text" href="https://ww
w.nasa.gov/sites/default/files/fi
les/SpaceX_CRS-6_Mission_Overvie
w%281%29.pdf">"SpaceX CRS-6 Missi
on Overview" <span class="cs1
-format">(PDF). NASA. Apri
l 2015<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">17 August 2017</
span>.</cite><span title="ctx_ver
=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajourn

```

```

al&rft.genre=article&rft.
atitle=SpaceX+CRS-6+Mission+Overv
iew&rft.date=2015-04&rft_
id=https%3A%2F%2Fwww.nasa.gov%2Fs
ites%2Fdefault%2Ffiles%2Ffiles%2F
SpaceX_CRS-6_Mission_Overview%252
81%2529.pdf&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"> <i>This art
icle incorporates text from this
source, which is in the <a href
="/wiki/Public_domain" title="Pub
lic domain">public domain</i>
<i>.</i>

<li id="cite_note-90"><span class
="mw-cite-backlink"><a href="#"

```



cite\_ref-90">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.youtube.com/watch?v=NcT0TeoaafU">"CRS-6 First Stage Tracking Cam"</a>. SpaceX. 14 April 2015<span class="reference-accessdate">. Retrieved <span class="nowrap">17 August</span> 2017</span> &#8211; via YouTube.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=CRS-6+First+Stage+Tracking+Cam&amp;rft.pub=SpaceX&amp;rft.date=2015-04-14&amp;rft\_id=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DNcT0TeoaafU&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-91"><span class="mw-cite-backlink"><b><a href="#cite\_ref-91">^</a></b></span> <span

```
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREF@elonm
usk2015" class="citation web cs
1">@elonmusk (14 April 2015). <a
rel="nofollow" class="external t
ext" href="https://twitter.com/el
onmusk/status/58808257418390323
2">"Looks like Falcon landed fin
e, but excess lateral velocity ca
used it to tip over post landing"
 (Tweet) – via
Twitter.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
.btitle=Looks+like+Falcon+landed
+fine%2C+but+excess+lateral+veloc
ity+caused+it+to+tip+over+post+la
nding&rft.date=2015-04-14&am
p;rft.au=%40elonmusk&rft_id=h
ttps%3A%2F%2Ftwitter.com%2Felonmu
sk%2Fstatus%2F588082574183903232&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

```

```
<li id="cite_note-92">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation audio-visual cs1"><i>CRS-6 First Stage Landing</i>. SpaceX. 15 April 2015. Retrieved 6 March 2016.</cite><li id="cite_note-patrickafb20150414-93"><span class="mw-cite-back
```

```
link"><a href="#cite_ref-patri
ckafb20150414_93-0">^</sp
an>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1067248974"/><cite class="ci
tation web cs1"><a rel="nofollow"
class="external text" href="htt
p://www.patrick.af.mil">"Patrick
Air Force Base". Patrick Air
Force Base<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">15 April 2015
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Patrick+Air+Force+Base&r
ft.pub=Patrick+Air+Force+Base&am
p;rft_id=http%3A%2F%2Fwww.patric
k.af.mil&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988"> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-turkmen-monaco-94">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFEvans2015" class="citation web cs1">Evans, Ben (25 April 2015). "Second SpaceX Mission in Two Weeks Gears Up for Monday Launch". AmericaSpace. Ret

```

rieved <span class="nowrap">2 Nov
ember</span> 2017</span>.</cite><
span title="ctx_ver=Z39.88-2004&
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&rft.genre=u
nknown&rft.btitle=Second+Spac
eX+Mission+in+Two+Weeks+Gears+Up+
for+Monday+Launch&rft.pub=Ame
ricaSpace&rft.date=2015-04-25
&rft.aulast=Evans&rft.auf
irst=Ben&rft_id=http%3A%2F%2F
www.americaspace.com%2F2015%2F04%
2F25%2Fsecond-spacex-mission-in-t
wo-weeks-gears-up-for-monday-laun
ch%2F&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-95"><span class
="mw-cite-backlink"><b><a href="#
cite_ref-95">^</a></b></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFClark2
015" class="citation news cs1">Cl
ark, Stephen (27 April 2015). <a
rel="nofollow" class="external t
ext" href="http://spaceflightnow.

```

com/2015/04/27/turkmenistans-first-satellite-braced-for-liftoff/f/">"Turkmenistan's first satellite braced for liftoff". Space flight Now. Retrieved 27 April 2015.</cite>

<li id="cite_note-96">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWall20

```

15" class="citation news cs1">Wal
l, Mike (27 April 2015). <a rel
="nofollow" class="external text"
href="http://www.space.com/29229-
spacex-launches-turkmenistan-sate
llite.html">"SpaceX Falcon 9 Rock
et Launches Turkmenistan's First-
Ever Satellite"</a>. Space.com<sp
an class="reference-accessdate">.
Retrieved <span class="nowrap">13
July</span> 2016</span>.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&rft.genre
=article&rft.atitle=SpaceX+Fa
lcon+9+Rocket+Launches+Turkmenist
an%27s+First-Ever+Satellite&r
ft.date=2015-04-27&rft.aulast
=Wall&rft.aufirst=Mike&rft
_id=http%3A%2F%2Fwww.space.com%2
F29229-spacex-launches-turkmenist
an-satellite.html&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-zgn20150323-9
7"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-zgn20150

```



```

323_97-0">^</a></b></span> <span
  class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation ne
ws cs1"><a rel="nofollow" class
="external text" href="http://ww
w.zerognews.com/2015/03/23/spacex
-clarifies-reason-for-turkmenalem
52e-launch-delay/">"SpaceX Clarif
ies Reason For TurkmenAlem52E Lau
nch Delay"</a>. ZeroG News. 23 Ma
rch 2015<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">25 March</span> 2015</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&amp;rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&amp;rft.genre=article&amp;rft.at
itle=SpaceX+Clarifies+Reason+For+
TurkmenAlem52E+Launch+Delay&amp;r
ft.date=2015-03-23&amp;rft_id=htt
p%3A%2F%2Fwww.zerognews.com%2F201
5%2F03%2F23%2Fspacex-clarifies-re
ason-for-turkmenalem52e-launch-de
lay%2F&amp;rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>

```

```

<li id="cite_note-nasama20150520-98"><span class="mw-cite-backlink"><b><a href="#cite_ref-nasama20150520_98-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation pressrelease cs1"><a rel="nofollow" class="external text" href="http://www.nasa.gov/press-release/nasa-opens-media-accreditation-for-next-spacex-station-resupply-launch-0">"NASA Opens Media Accreditation for Next SpaceX Station Resupply Launch"</a> (Press release). NASA. 20 May 2015<span class="reference-accessdate">. Retrieved <span class="nowrap">20 May</span> 2015</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=NASA+Opens+Media+Accreditation+for+Next+SpaceX+Station+Resupply+Launch&amp;rft.pub=NASA&amp;rft.date=2015-05-20&amp;rft_id=http%3A%2F%2Fwww.nasa.gov%2Fpress-release%2Fnasa-opens-media-accreditation-for-next-spacex-sta

```

tion-resupply-launch-0&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

 <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

 <li id="cite_note-99">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class

```

="external text" href="https://www.nasa.gov/sites/default/files/atoms/files/spacex_crs7_mission_overview.pdf">"SpaceX CRS-7 Mission Overview"</a> <span class="cs1-format">(PDF)</span>. NASA. June 2015<span class="reference-accessdate">. Retrieved <span class="nowrap">17 August</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+CRS-7+Mission+Overview&amp;rft.date=2015-06&amp;rft_id=https%3A%2F%2Fwww.nasa.gov%2Fsites%2Fdefault%2Ffiles%2Fatoms%2Ffiles%2Fspacex_crs7_mission_overview.pdf&amp;rft_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article in
corporates text from this source,
which is in the <a href="/wiki/Pu
blic_domain" title="Public domai
n">public domain</a></i><i>.</i>
</span>
</li>
<li id="cite_note-nyt-20150628-10
0"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nyt-20150
628_100-0"><sup><i><b>a</b></i></
sup></a> <a href="#cite_ref-nyt-2
0150628_100-1"><sup><i><b>b</b></
i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFChang2015" c
lass="citation news cs1">Chang, K
enneth (28 June 2015). <a rel="no
follow" class="external text" hre
f="https://www.nytimes.com/2015/0
6/29/science/space/spacex-rocket-
explodes-during-launch.html">"Spa
ceX Rocket Explodes After Launch
to Space Station"</a>. <i>The Ne
w York Times</i><span class="refe

```

```
rence-accessdate">. Retrieved <span class="nowrap">29 June</span>
  2015</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&amp;rft.genre=article
&amp;rft.jtitle=The+New+York+Time
s&amp;rft.atitle=SpaceX+Rocket+Ex
plodes+After+Launch+to+Space+Stat
ion&amp;rft.date=2015-06-28&amp;r
ft.aulast=Chang&amp;rft.aufirst=K
enneth&amp;rft_id=https%3A%2F%2Fw
ww.nytimes.com%2F2015%2F06%2F29%2
Fscience%2Fspace%2Fspacex-rocket-
explodes-during-launch.html&amp;r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan></span>
</li>
<li id="cite_note-101"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-101">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBe
rginChris_Gebhardt2015" class="ci
tation web cs1">Bergin, Chris; Ch
ris Gebhardt (24 June 2015). <a r
```

```

el="nofollow" class="external text" href="http://www.nasaspaceflight.com/2015/06/world-launch-markets-rocket-reusability/">"World launch markets look toward rocket reusability"</a>. NASASpaceFlight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">13 July</span> 2016</span>.
</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=World+launch+markets+look+toward+rocket+reusability&amp;rft.pub=NASA+SpaceFlight.com&amp;rft.date=2015-06-24&amp;rft.aulast=Bergin&amp;rft.aufirst=Chris&amp;rft.au=Chris+Gebhardt&amp;rft_id=http%3A%2F%2Fwww.nasaspaceflight.com%2F2015%2F06%2Fworld-launch-markets-rocket-reusability%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-nsf-20150727-102"><span class="mw-cite-backlink">^ <a href="#cite_ref-nsf-20150727_102-0"><sup><i><b>a</b></i></sup>

```

```

sup></a> <a href="#cite_ref-nsf-2
0150727_102-1"><sup><i><b>b</b></
i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFBergin2015"
class="citation news cs1">Bergi
n, Chris (27 July 2015). <a rel
="nofollow" class="external text"
href="https://www.nasaspacefligh
t.com/2015/07/saving-spaceship-dr
agon-contingency-chute/">"Saving
Spaceship Dragon – Software to p
rovide contingency chute deploy"
</a>. <i>nasaspaceflight.com</i><
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">6 April</span> 2018</span>.</c
ite><span title="ctx_ver=Z39.88-2
004&amp;rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&amp;rft
.genre=article&amp;rft.jtitle=na
saspaceflight.com&amp;rft.atitle=
Saving+Spaceship+Dragon+%E2%80%93
+Software+to+provide+contingency+
chute+deploy&amp;rft.date=2015-07
-27&amp;rft.aulast=Bergin&amp;rft
.aufirst=Chris&amp;rft_id=https%
3A%2F%2Fwww.nasaspaceflight.com%2

```


F2015%2F07%2Fsaving-spaceship-dragon-contingency-chute%2F&rft_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

 <li id="cite_note-nsf20150618-103">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSmedley2015" class="citation news cs1">Smedley, Jesse (18 June 2015). "SpaceX Augments and Upgrades Drone Ship Armada". NASASpaceFlight.com. Retrieved 18 June 2015. </cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitl

```

e=SpaceX+Augments+and+Upgrades+Dr
one+Ship+Armada&rft.date=2015
-06-18&rft.aulast=Smedley&am
p;rft.aufirst=Jesse&rft_id=ht
tp%3A%2F%2Fwww.nasaspaceflight.co
m%2F2015%2F06%2Fspacex-augments-u
pgrades-drone-ship-armada%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span></span>
</li>
<li id="cite_note-orbcomm-og2-10
4"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-orbcomm-o
g2_104-0"><sup><i><b>a</b></i></s
up></a> <a href="#cite_ref-orbcom
m-og2_104-1"><sup><i><b>b</b></i>
</sup></a></span> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite class="citation web cs1"><a
rel="nofollow" class="external t
ext" href="http://www.orbcomm.co
m/en/networks/satellite/orbcomm-o
g2">"ORBCOMM OG2 Next-Generation
Satellite Constellation - OG2 Mi
ssion 2"</a>. Orbcomm<span class
="reference-accessdate">. Retrie

```

```

ed <span class="nowrap">4 January
</span> 2016</span>.</cite><span
  title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&amp;rft.genre=unkn
own&amp;rft.btitle=ORBCOMM+OG2+Ne
xt-Generation+Satellite+Constella
tion+-+OG2+Mission+2&amp;rft.pub=
Orbcomm&amp;rft_id=http%3A%2F%2Fw
ww.orbcomm.com%2Fen%2Fnetworks%2F
satellite%2Forbcomm-og2&amp;rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988"></span>
</span>
</li>
<li id="cite_note-flight20-booste
r-105"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-flight2
0-booster_105-0"><sup><i><b>a</b>
</i></sup></a> <a href="#cite_ref
-flight20-booster_105-1"><sup><i>
<b>b</b></i></sup></a> <a href="#
cite_ref-flight20-booster_105-2">
<sup><i><b>c</b></i></sup></a></s
pan> <span class="reference-tex
t"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1067248974"/><cite id="CI
TEREFClark2016" class="citation n

```

```

ews cs1">Clark, Stephen (20 August 2016). <a rel="nofollow" class="external text" href="http://spaceflightnow.com/2016/08/20/spacex-puts-historic-flown-rocket-on-permanent-display/">"SpaceX puts historic flown rocket on permanent display"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">19 January</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+puts+historic+flown+rocket+on+permanent+display&amp;rft.date=2016-08-20&amp;rft.aulast=Clark&amp;rft.aufirst=Stephen&amp;rft_id=http%3A%2F%2Fspaceflightnow.com%2F2016%2F08%2F20%2Fspacex-puts-historic-flown-rocket-on-permanent-display%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-flight20-landing-106"><span class="mw-cite-backlink">^ <a href="#cite_ref-flight2

```

0-landing_106-0">^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFChang2015" class="citation news cs1">Chang, Kenneth (21 December 2015). "Spacex Successfully Lands Rocket after Launch of Satellites into Orbit". <i>The New York Times</i>. Retrieved 22 December 2015.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=The+New+York+Times&rft.atitle=Spacex+Successfully+Lands+Rocket+after+Launch+of+Satellites+into+Orbit&rft.date=2015-12-21&rft.auiast=Chang&rft.aufirst=Kenneth&rft_id=https%3A%2F%2Fwww.nyt

```

imes.com%2F2015%2F12%2F22%2Fscien
ce%2Fspacex-rocket-landing.html&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-sn20151016-10
7"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sn2015101
6_107-0"><sup><i><b>a</b></i></su
p></a> <a href="#cite_ref-sn20151
016_107-1"><sup><i><b>b</b></i></
sup></a> <a href="#cite_ref-sn201
51016_107-2"><sup><i><b>c</b></i>
</sup></a></span> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite id="CITEREFde_Selding2015" c
lass="citation news cs1">de Seldi
ng, Peter B. (16 October 2015). <
a rel="nofollow" class="external
text" href="http://spacenews.co
m/spacex-changes-its-falcon-9-ret
urn-to-flight-plans/">"SpaceX Cha
nges its Falcon 9 Return-to-fligh
t Plans"</a>. SpaceNews<span clas
s="reference-accessdate">. Retrie
ved <span class="nowrap">16 Octob

```

```

er</span> 2015</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.atitle=SpaceX+Chan
ges+its+Falcon+9+Return-to-flight
+Plans&rft.date=2015-10-16&
p;rft.aulast=de+Selding&rft.a
ufirst=Peter+B.&rft_id=http%3
A%2F%2Fspacenews.com%2Fspacex-cha
nges-its-falcon-9-return-to-fligh
t-plans%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988"></span></span>
</li>
<li id="cite_note-sn20150508-10
8"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-sn201505
08_108-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFde_Seld
ing2015" class="citation news cs
1">de Selding, Peter B. (8 May 20
15). <a rel="nofollow" class="ext
ernal text" href="http://spacene
ws.com/orbcomm-to-spacex-launch-ou
r-satellites-before-october/">"Or

```

bcomm to SpaceX: Launch our Satellites Before October". SpaceNews. Retrieved 8 May 2015.

<li id="cite_note-109">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFDillow2015" class="citation news cs1">Dillow, Clay (2 December 201


```

5). <a rel="nofollow" class="external text" href="http://fortune.com/2015/12/02/spacex-will-try-rocket-landing-on-solid-ground/">"SpaceX Will Try Its Next Rocket Landing on Solid Ground"</a>. <i>Fortune</i><span class="reference-accessdate">. Retrieved <span class="nowrap">4 December</span> 2015</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.jtitle=Fortune&amp;rft.atitle=SpaceX+Will+Try+Its+Next+Rocket+Landing+on+Solid+Ground&amp;rft.date=2015-12-02&amp;rft.aulast=Dilloy&amp;rft.aufirst=Clay&amp;rft_id=http%3A%2F%2Ffortune.com%2F2015%2F12%2F02%2Fspacex-will-try-rocket-landing-on-solid-ground%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-110"><span class="mw-cite-backlink"><b><a href="#cite_ref-110">^</a></b></span>
<span class="reference-text"><lin

```

```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://
space.skyrocket.de/doc_chr/la2016.htm">"Orbital Launches of 2016"
</a>. Gunters space page<span class="reference-accessdate">. Retrieved <span class="nowrap">11 Janu
ary</span> 2020</span>.</cite><span title="ctx_ver=Z39.88-2004&
p;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Orbital+Launches+of+2016&rft.pub=Gunters+
space+page&rft_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc_chr%
2F%2Flau2016.htm&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-111"><span class="mw-cite-backlink"><b><a href
="#cite_ref-111">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati

```

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="http://w
ww.nesdis.noaa.gov/jason-3/">"Jas
on-3 satellite"</a>. <i>National
Environmental Satellite Data and
Information Service</i>. NOAA<spa
n class="reference-accessdate">.
Retrieved <span class="nowrap">1
1 December</span> 2015</span>.</c
ite><span title="ctx_ver=Z39.88-2
004&amp;rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&amp;rft
t.genre=unknown&amp;rft.jtitle=Na
tional+Environmental+Satellite+Da
ta+and+Information+Service&amp;rft
t.atitle=Jason-3+satellite&amp;rft
t_id=http%3A%2F%2Fwww.nesdis.noa
a.gov%2Fjason-3%2F&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span>  <i>This
article incorporates text from th
is source, which is in the <a href=
"/wiki/Public_domain" title="Pu
blic domain">public domain</a></i
><i>.</i></span>
</li>
<li id="cite_note-gw20160117-11
2"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-gw201601
17_112-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFBoyle20
16" class="citation news cs1">Boy
le, Alan (17 January 2016). <a re
l="nofollow" class="external tex
t" href="http://www.geekwire.com/
2016/spacex-launches-jason-3-sate
llite-then-tries-landing-falcon-9
-rocket-at-sea/">"SpaceX rocket l
aunches satellite, but tips over
during sea landing attempt"</a>.
GeekWire<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">18 January</span> 2016
</span>.</cite><span title="ctx_v

```

```

er=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+rocket+launches+satellite%2C+but+tips+over+during+sea+landing+attempt&rft.date=2016-01-17&rft.aulast=Boyle&rft.aufirst=Alan&rft_id=http%3A%2F%2Fwww.geekwire.com%2F2016%2Fspacex-launches-jason-3-satellite-then-tries-landing-falcon-9-rocket-at-sea%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-113"><span class="mw-cite-backlink"><b><a href="#cite_ref-113">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://web.archive.org/web/20160118044922/https://www.instagram.com/p/BAqirNbwEc0/">"Falcon lands then tips over"</a>. Elon Musk on Instagram. 17 January 2016. Archived fro

```

```

m <a rel="nofollow" class="external
al text" href="https://www.instag
ram.com/p/BAqirNbwEc0/">the origi
nal</a> on 18 January 2016<span c
lass="reference-accessdate">. Ret
rieved <span class="nowrap">17 Au
gust</span> 2017</span>.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&amp;rft.genre=un
known&amp;rft.btitle=Falcon+lands
+then+tips+over&amp;rft.pub=Elon+
Musk+on+Instagram&amp;rft.date=20
16-01-17&amp;rft_id=https%3A%2F%2
Fwww.instagram.com%2Fp%2FBAqirNbw
Ec0%2F&amp;rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>
<li id="cite_note-wp20160118-11
4"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-wp201601
18_114-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation ne
ws cs1"><a rel="nofollow" class
="external text" href="https://ww

```

w.seattletimes.com/nation-world/the-latest-us-european-ocean-monitoring-satellite-launches/">"Latest: SpaceX: ice buildup may have led rocket to tip over". <i>The Seattle Times</i>. 18 January 2016. Retrieved 3 November 2017.</cite>

<li id="cite_note-skyrocket_1.2-115">^ <sup><i>a</i>

```

</sup></a> <a href="#cite_ref-skyrocket_1.2_115-1"><sup><i><b>b</b></i></sup></a> <a href="#cite_ref-skyrocket_1.2_115-2"><sup><i><b>c</b></i></sup></a> <a href="#cite_ref-skyrocket_1.2_115-3"><sup><i><b>d</b></i></sup></a> <a href="#cite_ref-skyrocket_1.2_115-4"><sup><i><b>e</b></i></sup></a> <a href="#cite_ref-skyrocket_1.2_115-5"><sup><i><b>f</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. <a rel="nofollow" class="external text" href="http://space.skyrocket.de/doc_lau_det/falcon-9_v1-2.htm">"Falcon-9 v1.2 (Falcon-9FT)"</a>. <i>space.skyrocket.de</i>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=space.skyrocket.de&amp;rft.atitle=Falcon-9+v1.2+%28Falcon-9FT%29&amp;rft.aulast=Krebs&amp;rft.aufirst=Gunter&amp;rft_id=http%3A%2F%2Fspace.skyro

```



```

cket.de%2Fdoc_lau_det%2Ffalcon-9_
v1-2.htm&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988"></span></span>
</li>
<li id="cite_note-spacenews201404
10-116"><span class="mw-cite-back
link">^ <a href="#cite_ref-spacen
ews20140410_116-0"><sup><i><b>a</
b></i></sup></a> <a href="#cite_r
ef-spacenews20140410_116-1"><sup>
<i><b>b</b></i></sup></a></span>
  <span class="reference-text"><li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
de_Selding2014" class="citation w
eb cs1">de Selding, Peter B. (10
  April 2014). <a rel="nofollow" c
lass="external text" href="htt
p://spacenews.com/40165ses-books-
spacex-falcon-9-for-hybrid-satell
ites-debut/">"SES Books SpaceX Fa
lcon 9 for Hybrid Satellite's Deb
ut"</a>. SpaceNews<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">6 January</sp
an> 2016</span>.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va

```

```

l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&
;rft.btitle=SES+Books+SpaceX+Fal
con+9+for+Hybrid+Satellite%27s+De
but&rft.pub=SpaceNews&rft
t.date=2014-04-10&rft.aulast=
de+Selding&rft.aufirst=Peter+
B.&rft_id=http%3A%2F%2Fspacen
ews.com%2F40165ses-books-spacex-f
alcon-9-for-hybrid-satellites-deb
ut%2F&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-nsf20160208-11
7"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf201602
08_117-0"><sup><i><b>a</b></i></s
up></a> <a href="#cite_ref-nsf201
60208_117-1"><sup><i><b>b</b></i>
</sup></a></span> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite id="CITEREFBergin2016" class
="citation news cs1">Bergin, Chri
s (8 February 2016). <a rel="nofo
llow" class="external text" href
="http://www.nasaspaceflight.com/

```

2016/02/spacex-prepares-ses-9-mission-dragons-return/">"SpaceX prepares for SES-9 mission and Dragon's return". NASASpaceFlight.com. Retrieved 27 February 2016.</cite>

<li id="cite_note-bi20160223-118">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067

```

248974"/><cite id="CITEREFOrwig20
16" class="citation news cs1">Orwig, Jessica (23 February 2016). <
a rel="nofollow" class="external
text" href="http://www.businessinsider.com/how-to-watch-wednesday-
spacex-launch-2016-2">"SpaceX will attempt a potentially historic
rocket landing this week – here's how to watch live"</a>. Business
Insider<span class="reference-accessdate">. Retrieved <span class
="nowrap">23 February</span> 2016
</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+will+attempt+a+potentially+historic+rocket+landing+this+week+%E2%80%94+here%27s+how+to+watch+live&amp;rft.date=2016-02-23&amp;rft.aulast=Orwig&amp;rft.aufirst=Jessica&amp;rft_id=http%3A%2F%2Fwww.businessinsider.com%2Fhow-to-watch-wednesday-spacex-launch-2016-2&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>

```

```

<li id="cite_note-sxPressKit20160223-119"><span class="mw-cite-backlink"><b><a href="#cite_ref-sxPressKit20160223_119-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://web.archive.org/web/20190727151524/https://www.spacex.com/sites/spacex/files/spacex_ses9_press_kit_final.pdf">"SES-9 Mission Press Kit"</a> <span class="cs1-format">(PDF)</span>. SpaceX. 23 February 2016. Archived from <a rel="nofollow" class="external text" href="http://www.spacex.com/sites/spacex/files/spacex_ses9_press_kit_final.pdf">the original</a> <span class="cs1-format">(PDF)</span> on 27 July 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">24 February</span> 2016</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SES-9+Missio

```

```

n+Press+Kit&#x26;rft.pub=SpaceX&#x26;rft.date=2016-02-23&#x26;rft_id=
http%3A%2F%2Fwww.spacex.com%2Fsit
es%2Fspacex%2Ffiles%2Fspacex_ses9
_press_kit_final.pdf&#x26;rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3ALi
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></span></s
pan>
</li>
<li id="cite_note-musk-tweet-2016
0305-120"><span class="mw-cite-ba
cklink"><b><a href="#cite_ref-mus
k-tweet-20160305_120-0">^</a></b>
</span> <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREF@elonmusk2016" class="citat
ion web cs1">@elonmusk (5 March 2
016). <a rel="nofollow" class="ex
ternal text" href="https://twitte
r.com/elonmusk/status/70591792497
2736512">"Rocket landed hard on t
he droneship. Didn't expect this
one to work (versus hot reentr
y), but next flight has a good ch
ance"</a> (Tweet) &#8211; via <a
href="/wiki/Twitter" title="Twit
ter">Twitter</a>.</cite><span tit

```

```

le="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Rocket+landed+hard+on+the+droneship.+Didn%27t+expect+this+one+to+work+%28versus+hot+reentry%29%2C+but+next+flight+has+a+good+chance.&rft.date=2016-03-05&rft.au=%40elonmusk&rft_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F705917924972736512&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-sn20160304-121"><span class="mw-cite-backlink"><b><a href="#cite_ref-sn20160304_121-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFFoust2016" class="citation news cs1">Foust, Jeff (4 March 2016). <a rel="nofollow" class="external text" href="http://spacenews.com/spacex-launches-ses-9-satellite/">"SpaceX launches SES-9 satellite"</a>.

```

SpaceNews

<li id="cite_note-nsf-20170330-122">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGraham201


```

7" class="citation news cs1">Grah
am, William (30 March 2017). <a r
el="nofollow" class="external tex
t" href="https://www.nasaspacefli
ght.com/2017/03/spacex-historic-f
alcon-9-re-flight-ses-10/">"Space
X conducts historic Falcon 9 re-f
light with SES-10 – Lands booster
again"</a>. NASASpaceFlight.com<s
pan class="reference-accessdat
e">. Retrieved <span class="nowra
p">3 May</span> 2017</span>.</cit
e><span title="ctx_ver=Z39.88-200
4&amp;rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Ajournal&amp;rft.g
enre=article&amp;rft.atitle=Space
X+conducts+historic+Falcon+9+re-f
light+with+SES-10+%E2%80%93+Lands
+booster+again&amp;rft.date=2017-
03-30&amp;rft.aulast=Graham&amp;r
ft.aufirst=William&amp;rft_id=htt
ps%3A%2F%2Fwww.nasaspaceflight.co
m%2F2017%2F03%2Fspacex-historic-f
alcon-9-re-flight-ses-10%2F&amp;r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan></span>
</li>
<li id="cite_note-123"><span clas

```

```
s="mw-cite-backlink"><b><a href
="#cite_ref-123">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://www.nasa.gov/sites/default/fi
les/atoms/files/spacex_crs-8_miss
ion_overview.pdf">"CRS-8 Mission
Overview"</a> <span class="cs1-f
ormat">(PDF)</span>. NASA<span cl
ass="reference-accessdate">. Retr
ieved <span class="nowrap">17 Aug
ust</span> 2017</span>.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&amp;rft.genre
=article&amp;rft.atitle=CRS-8+Mis
sion+Overview&amp;rft_id=https%3
A%2F%2Fwww.nasa.gov%2Fsites%2Fdef
ault%2Ffiles%2Fatoms%2Ffiles%2Fsp
acex_crs-8_mission_overview.pdf&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span></li>

<li id="cite\_note-crs-8-webcast-124"><span class="mw-cite-backlink"><b><a href="#cite\_ref-crs-8-webcast\_124-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.youtube.com/watch?v=7pUAYdjne5M">"CRS-8 Official Webcast"</a>. SpaceX. 8 April 2016<span class="reference-accessdate">. Retrie

ed <span class="nowrap">17 August  
</span> 2017</span> &#8211; via YouTube.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=CRS-8+Official+Webcast&amp;rft.pub=SpaceX&amp;rft.date=2016-04-08&amp;rft\_id=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D7pUAYdjne5M&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-125"><span class="mw-cite-backlink"><b><a href="#cite\_ref-125">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF@SpaceX2016" class="citation web cs1">@SpaceX (8 April 2016). <a rel="nofollow" class="external text" href="https://twitter.com/SpaceX/status/718542763545899008">"1st stage landed on droneship Of Course I Still Love You"</a> (Tweet) &#8211; via <a href="/wiki/Twitte

```

r" title="Twitter">Twitter.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=1st+s
tage+landed+on+droneship+Of+Cours
e+I+Still+Love+You&rft.date=2
016-04-08&rft.au=%40SpaceX&am
p;rft_id=https%3A%2F%2Ftwitter.co
m%2FSpaceX%2Fstatus%2F71854276354
5899008&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-126"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFTh
omson2015" class="citation news c
s1">Thomson, Iain (14 March 201
5). <a rel="nofollow" class="exte
rnal text" href="https://www.ther
egister.co.uk/2015/03/14/spacex_i
nflatable_bigelow_iss/">"SpaceX t
o deliver Bigelow blow-up job to
ISS astronauts". The Registe

```

```

r<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">27 April 2015.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Ajournal&rft
t.genre=article&rft.atitle=Sp
aceX+to+deliver+Bigelow+blow-up+j
ob+to+ISS+astronauts&rft.date
=2015-03-14&rft.aulast=Thomso
n&rft.aufirst=Iain&rft_id
=https%3A%2F%2Fwww.theregister.c
o.uk%2F2015%2F03%2F14%2Fspacex_in
flatable_bigelow_iss%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-flight23-127"><
span class="mw-cite-backlink">
<a href="#cite_ref-flight23_127-
0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFDrake2016" c
lass="citation news cs1">Drake, N
adia (8 April 2016). <a rel="nofo
llow" class="external text" href

```

```

="http://phenomena.nationalgeographic.com/2016/04/08/spacex-rocket-makes-spectacular-landing-on-drone-ship/">"SpaceX Rocket Makes Spectacular Landing on Drone Ship"
. <i>National Geographic</i>. Retrieved 8 April 2016. <q>To space and back, in less than nine minutes? Hello, future.</q>
</cite>

<li id="cite_note-128"><span clas

```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2016" class="citation web cs
1">Clark, Stephen (11 May 2016).
 <a rel="nofollow" class="externa
l text" href="https://spaceflight
now.com/2016/05/11/cargo-carrying
-dragon-spaceship-returns-to-eart
h/">"Cargo-carrying Dragon spaces
hip returns to Earth". Spacef
light Now.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Abo
ok&rft.genre=unknown&rft.
btitle=Cargo-carrying+Dragon+spac
eship+returns+to+Earth&rft.pu
b=Spaceflight+Now&rft.date=20
16-05-11&rft.aulast=Clark&am
p;rft.aufirst=Stephen&rft_id=
https%3A%2F%2Fspaceflightnow.com%
2F2016%2F05%2F11%2Fcargo-carrying
-dragon-spaceship-returns-to-eart
h%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">
```



```


<li id="cite_note-nsf20170325-12
9"><span class="mw-cite-backlin
k"><a href="#cite_ref-nsf20170
325_129-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFGebhard
t2017" class="citation news cs1">
Gebhardt, Chris (12 April 2017).
 <a rel="nofollow" class="externa
l text" href="https://www.nasaspa
ceflight.com/2017/03/ses-10-stati
c-fire-spacex-first-core-re-fligh
t/">"SES-10 F9 static fire - Spac
eX for history books and first co
re stage re-flight". NASASpac
eFlight.com<span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">13 April 2017
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.atitle=SES-10+F9+static+fire+%E
2%80%93+SpaceX+for+history+books+
and+first+core+stage+re-flight&am
p;rft.date=2017-04-12&rft.aul
ast=Gebhardt&rft.aufirst=Chri

```

s&#x26;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2017%2F03%2Fspaces-10-static-fire-spacex-first-core-re-flight%2F&#x26;rfr\_id=info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-130"><span class="mw-cite-backlink"><b><a href="#cite\_ref-130">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREBergin2014" class="citation web cs1">Bergin, Chris (10 January 2014). <a rel="nofollow" class="external text" href="http://www.nasaspaceflight.com/2014/01/spacex-win-contract-jcsat-14-falcon-9/">"SpaceX win contract to loft JCSAT-14 via Falcon 9"</a>. NASASpaceFlight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">17 January</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&#x26;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&#x26;rft.genre=unknown&#x26;rft.bt

```

itle=SpaceX+win+contract+to+loft+
JCSAT-14+via+Falcon+9&rft.pub
=NASASpaceFlight.com&rft.date
=2014-01-10&rft.aulast=Bergin
&rft.aufirst=Chris&rft_id
=http%3A%2F%2Fwww.nasaspacefligh
t.com%2F2014%2F01%2Fspacex-win-co
ntract-jcsat-14-falcon-9%2F&r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-131"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGr
aham2016" class="citation web cs
1">Graham, William (5 May 2016).
 <a rel="nofollow" class="externa
l text" href="https://www.nasaspa
ceflight.com/2016/05/falcon-9-jcs
at-14-launch/">"Falcon 9 launches
with JCSAT-14 – lands another sta
ge". NASASpaceFlight.com. Re
trieved 17 A

```

ugust</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Falcon+9+launches+with+JCSAT-14+%E2%80%93+lands+another+stage&amp;rft.pub=NASA+SpaceFlight.com&amp;rft.date=2016-05-05&amp;rft.aulast=Graham&amp;rft.aufirst=William&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2016%2F05%2Ffalcon-9-jcsat-14-launch%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-132"><span class="mw-cite-backlink"><b><a href="#cite\_ref-132">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFAmos2016" class="citation web cs1">Amos, Jonathan (6 May 2016). <a rel="nofollow" class="external text" href="https://www.bbc.co.uk/news/science-environment-36223745">"SpaceX records another rocket

landing"</a>. <i>BBC News</i><span class="reference-accessdate">.  
 Retrieved <span class="nowrap">1  
 1 November</span> 2017</span>.</c  
 ite><span title="ctx\_ver=Z39.88-2  
 004&amp;rft\_val\_fmt=info%3Aofi%2F  
 fmt%3Akev%3Amtx%3Ajournal&amp;rft  
 t.genre=unknown&amp;rft.jtitle=BB  
 C+News&amp;rft.atitle=SpaceX+reco  
 rds+another+rocket+landing&amp;rft  
 t.date=2016-05-06&amp;rft.aulast=  
 Amos&amp;rft.aufirst=Jonathan&am  
 p;rft\_id=https%3A%2F%2Fwww.bbc.c  
 o.uk%2Fnews%2Fscience-environment  
 -36223745&amp;rfr\_id=info%3Asid%2  
 Fen.wikipedia.org%3AList+of+Falco  
 n+9+and+Falcon+Heavy+launches" cl  
 ass="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-133"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-133">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:  
 r1067248974"/><cite id="CITEREFDe  
 an2016" class="citation news cs  
 1">Dean, James (16 May 2016). <a  
 rel="nofollow" class="external t  
 ext" href="http://www.floridatoda

y.com/story/tech/science/space/spacex/2016/05/16/landed-spacex-rocket-suffered-max-damage/84454230/">"SpaceX Falcon 9 first stage booster suffered "max" damage on landing"</a>. <i>Florida Today</i><span class="reference-accessdate">. Retrieved <span class="nowrap">31 March</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=Florida+Today&rft.atitle=SpaceX+Falcon+9+first+stage+booster+suffered+%22max%22+damage+on+landing&rft.date=2016-05-16&rft.aulast=Dean&rft.aufirst=James&rft\_id=http%3A%2F%2Fwww.floridatoday.com%2Fstory%2Ftech%2Fscience%2Fspace%2Fspacex%2F2016%2F05%2F16%2Flanded-spacex-rocket-suffered-max-damage%2F84454230%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-134"><span class="mw-cite-backlink"><b><a href

```

="#cite_ref-134">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.youtube.com/watch?v=L0bMeDj76
ig">"JCSAT-14 Hosted Webcast". SpaceX. 5 May 2016<span class
="reference-accessdate">. Retriev
ed 10 Novemb
er 2017 – via
YouTube.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=JCSAT-14+Hosted+Webcast&
rft.pub=SpaceX&rft.date=2016-
05-05&rft_id=https%3A%2F%2Fww
w.youtube.com%2Fwatch%3Fv%3DL0bMe
Dj76ig&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-135"><span clas
s="mw-cite-backlink">^
<lin

```

```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWall2016" class="citation news cs1">Wall, Mike (27 May 2016). "Three in a Row! SpaceX Lands Rocket on Ship at Sea Yet Again". Space.com. Retrieved 27 May 2016.</cite><li id="cite_note-nsf-20170425-13
```



6"><span class="mw-cite-backlin  
k">^ <a href="#cite\_ref-nsf-20170  
425\_136-0"><sup><i><b>a</b></i></  
sup></a> <a href="#cite\_ref-nsf-2  
0170425\_136-1"><sup><i><b>b</b></i></  
sup></a> <a href="#cite\_ref-n  
sf-20170425\_136-2"><sup><i><b>c</  
b></i></sup></a> <a href="#cite\_r  
ef-nsf-20170425\_136-3"><sup><i><b  
>d</b></i></sup></a> <a href="#ci  
te\_ref-nsf-20170425\_136-4"><sup><  
i><b>e</b></i></sup></a></span> <  
span class="reference-text"><link  
rel="mw-deduplicated-inline-styl  
e" href="mw-data:TemplateStyles:r  
1067248974"/><cite id="CITEREFBer  
gin2017" class="citation news cs  
1">Bergin, Chris (25 April 2017).  
<a rel="nofollow" class="external  
text" href="https://www.nasaspace  
flight.com/2017/04/spacex-static-  
fire-tests-spy-sat-rocket-falcon-  
heavy-core/">"SpaceX Static Fire  
spy sat rocket and prepare to te  
st Falcon Heavy core"</a>. NASASp  
aceFlight.com<span class="referen  
ce-accessdate">. Retrieved <span  
class="nowrap">3 May</span> 2017  
</span>.</cite><span title="ctx\_v  
er=Z39.88-2004&amp;rft\_val\_fmt=in

```
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.title=SpaceX+Static+Fire+spy+sat+rocket+and+prepare+to+test+Fal
con+Heavy+core&rft.date=2017-
04-25&rft.aulast=Bergin&rft
.aufirst=Chris&rft_id=http
s%3A%2F%2Fwww.nasaspaceflight.co
m%2F2017%2F04%2Fspacex-static-fir
e-tests-spy-sat-rocket-falcon-hea
vy-core%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988">

<li id="cite_note-sn20140430-13
7"><span class="mw-cite-backlin
k"><a href="#cite_ref-sn201404
30_137-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFde_Seld
ing2014" class="citation news cs
1">de Selding, Peter B. (30 April
2014). <a rel="nofollow" class="e
xternal text" href="http://spacen
ews.com/40420orbital-to-build-spa
cex-to-launch-thaicom-8/">"Orbita
l To Build, SpaceX To Launch, Tha
```

```
icom 8". SpaceNews<span class
="reference-accessdate">. Retrie
ed 1 May</sp
an> 2014.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=Orbital+To+Build%
2C+SpaceX+To+Launch%2C+Thaicom+8&
amp;rft.date=2014-04-30&rft.a
ulast=de+Selding&rft.aufirst=
Peter+B.&rft_id=http%3A%2F%2F
spacenews.com%2F40420orbital-to-b
uild-spacex-to-launch-thaicom-8%2
F&rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">

<li id="cite_note-138"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFTo
rtermvasana2016" class="citation
news cs1">Tortermvasana, Komsan
(27 February 2016). <a rel="nofo
llow" class="external text" href
```

```
= "https://www.bangkokpost.com/archive/thaicom-determined-to-launch-eighth-satellite-despite-probe/878436">"Thaicom determined to launch eighth satellite despite probe". <i>Bangkok Post</i>. Retrieved 2 November 2017.</cite>

<li id="cite_note-139">^
```

```

<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SatBeams - Satellite Details - Thaicom 8". Satbeams. Retrieved 17 August 2017.</cite>

<li id="cite_note-140">^
<a rel="nofollow" class="external tex

```

t" href="https://www.youtube.com/watch?v=4jEz03Z8azc">First-stage landing|Onboard camera</a>, Published on May 27, 2016 by SpaceX on YouTube</span>

</li>

<li id="cite\_note-141"><span class="mw-cite-backlink"><b><a href="#cite\_ref-141">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGraham2016" class="citation web cs1">Graham, William (26 May 2016). <a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2016/05/falcon-9-thaicom-8-launch/">"SpaceX Falcon 9 launches Thaicom 8 and nails another ASDS landing"</a>. <i>nasaspaceflight.com</i>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=nasaspaceflight.com&amp;rft.atitle=SpaceX+Falcon+9+launches+Thaicom+8+and+nails+another+ASDS+landing&amp;rft.date=2016-05-26&amp;rft.aulast=Graham&am

```

p;rft.aufirst=William&rft_id=
https%3A%2F%2Fwww.nasaspacefligh
t.com%2F2016%2F05%2Ffalcon-9-thai
com-8-launch%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-142"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.satbeams.com/satellites?id=26
67">"Thaicom 8". Satbeams<spa
n class="reference-accessdate">.
Retrieved 2
2 May 2016.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&rft.genre=u
nknown&rft.btitle=Thaicom+8&a
mp;rft.pub=Satbeams&rft_id=ht
tps%3A%2F%2Fwww.satbeams.com%2Fsa
tellites%3Fid%3D2667&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3ALi

```

```
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s
pan>

<li id="cite_note-143"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
web.archive.org/web/2020032320021
6/https://www.spacex.com/news/201
6/05/27/thaicom-8-mission-photo
s">"THAICOM 8 Mission in Photos"
. SpaceX. Archived from <a re
l="nofollow" class="external tex
t" href="https://www.spacex.com/n
ews/2016/05/27/thaicom-8-mission-
photos">the original on 23 Ma
rch 2020<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">23 March 2020</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=THAICOM+8+Mission+in+Photos&am
```



```

p;rft.pub=SpaceX&rft_id=http
s%3A%2F%2Fwww.spacex.com%2Fnews%
2F2016%2F05%2F27%2Fthaicom-8-missi
on-photos&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-144"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.satbeams.com/satellites?id=26
21">"Satbeams:ABS2A". Satbeam
s<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">17 August 2017.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft
t.genre=unknown&rft.btitle=Sa
tbeams%3AABS2A&rft.pub=Satbea
ms&rft_id=https%3A%2F%2Fwww.s
atbeams.com%2Fsatellites%3Fid%3D2
621&rfr_id=info%3Asid%2Fen.wi

```

```

kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">

<li id="cite_note-145"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.satbeams.com/satellites?id=26
48">"Satbeams:Eutelsat 117 West
B". Satbeams<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">17 August</spa
n> 2017.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Satbeams%3AEutelsat+
117+West+B&rft.pub=Satbeams&a
mp;rft_id=https%3A%2F%2Fwww.satbe
ams.com%2Fsatellites%3Fid%3D2648&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

```

```


<li id="cite_note-146"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@e
lonmusk2016" class="citation web
cs1">@elonmusk (15 June 2016). <
a rel="nofollow" class="external
text" href="https://twitter.com/
elonmusk/status/74309733778276352
1">"Looks like thrust was low on
 1 of 3 landing engines. High g l
andings v sensitive to all engine
s operating at max" (Tweet) &
#8211; via <a href="/wiki/Twitte
r" title="Twitter">Twitter.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=Looks
+like+thrust+was+low+on+1+of+3+la
nding+engines.+High+g+landings+v+
sensitive+to+all+engines+operatin
g+at+max.&rft.date=2016-06-15
&rft.au=%40elonmusk&rft_i
d=https%3A%2F%2Ftwitter.com%2Felo
nmusk%2Fstatus%2F7430973377827635

```

```

21&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-147"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@e
lonmusk2016" class="citation web
cs1">@elonmusk (16 June 2016). <
a rel="nofollow" class="external
text" href="https://twitter.com/
elonmusk/status/74360289422665318
4">"Looks like early liquid oxyge
n depletion caused engine shutdow
n just above the deck" (Twee
t) ȑ via <a href="/wiki/Twi
tter" title="Twitter">Twitter.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Looks+like+early+liquid+oxygen+de
pletion+caused+engine+shutdown+ju
st+above+the+deck&rft.date=20
16-06-16&rft.au=%40elonmusk&a

```

mp;rft\_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F743602894226653184&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-spn-20160224-148"><span class="mw-cite-backlink">^ <a href="#cite\_ref-spn-20160224\_148-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-3"><sup><i><b>d</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-4"><sup><i><b>e</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-5"><sup><i><b>f</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-6"><sup><i><b>g</b></i></sup></a> <a href="#cite\_ref-spn-20160224\_148-7"><sup><i><b>h</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite

```

id="CITEREFde_Selding2016" class
="citation news cs1">de Selding,
Peter B. (24 February 2016). <a
rel="nofollow" class="external t
ext" href="http://spacenews.com/s
pacex-wins-5-new-space-station-ca
rgo-missions-in-nasa-contract-est
imated-at-700-million/">"SpaceX w
ins 5 new space station cargo mis
sions in NASA contract estimated
at US$700 million". SpaceNew
s. Slide shows yearly breakdown o
f NASA missions from 2016 to 2021
<span class="reference-accessdat
e">. Retrieved <span class="nowrap
">25 February 2016.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=article&rft.atit
le=SpaceX+wins+5+new+space+statio
n+cargo+missions+in+NASA+contract
+estimated+at+US%24700+million&am
p;rft.pages=Slide+shows+yearly+br
eakdown+of+NASA+missions+from+201
6+to+2021.&rft.date=2016-02-2
4&rft.aulast=de+Selding&r
ft.aufirst=Peter+B.&rft_id=ht
tp%3A%2F%2Fspacenews.com%2Fspacex
-wins-5-new-space-station-cargo-m

```

issions-in-nasa-contract-estimate  
d-at-700-million%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-149"><span class="mw-cite-backlink"><b><a href="#cite\_ref-149">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://www.nasa.gov/sites/default/files/atoms/files/spacex\_crs-9\_mission\_overview2.pdf">"SpaceX CRS-9 Mission Overview"</a> <span class="cs1-format">(PDF)</span>. NASA<span class="reference-accessdate">. Retrieved <span class="nowrap">17 August</span> 2017</span>.</cite>  
<span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+CRS-9+Mission+Overview&rft.pub=NASA&rft\_id=http%3A%2F%2Fww

w.nasa.gov%2Fsites%2Fdefault%2Ffiles%2Fatoms%2Ffiles%2Fspacex\_crs-9\_mission\_overview2.pdf&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  
   
 <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span>  
 </li>  
 <li id="cite\_note-150"><span class="mw-cite-backlink"><b><a href="#cite\_ref-150">^</a></b></span>  
 <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:



```

r1067248974"/><cite id="CITEREFClark2016" class="citation news cs
1">Clark, Stephen (18 July 2016).
<a rel="nofollow" class="external
text" href="http://spaceflightno
w.com/2016/07/18/spacex-sends-sup
plies-to-space-station-lands-anot
her-falcon-rocket/">"SpaceX sends
supplies to space station lands a
nother falcon rocket". Spacef
light Now<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">20 July 2016</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=article&rft.at
itle=SpaceX+sends+supplies+to+spa
ce+station+lands+another+falcon+r
ocket&rft.date=2016-07-18&am
p;rft.aulast=Clark&rft.aufirs
t=Stephen&rft_id=http%3A%2F%2
Fspaceflightnow.com%2F2016%2F07%2
F18%2Fspacex-sends-supplies-to-sp
ace-station-lands-another-falcon-
rocket%2F&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">


```

```
<li id="cite_note-151"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http://
spaceflight101.com/falcon-9-jcsat
-16/falcon-9-rocket-lifts-japanes
e-communications-satellite-aces-h
igh-energy-ocean-landing/">"Falco
n 9 Rocket lifts Japanese Communi
cations Satellite, aces high-ener
gy Ocean Landing". Spacefligh
t101. 15 August 2016<span class
="reference-accessdate">. Retriev
ed 11 Novemb
er 2017.</cite><spa
n title="ctx_ver=Z39.88-2004&
;rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.atitle=Falcon+9+Ro
cket+lifts+Japanese+Communication
s+Satellite%2C+aces+high-energy+O
cean+Landing&rft.date=2016-08
-15&rft_id=http%3A%2F%2Fspace
flight101.com%2Ffalcon-9-jcsat-1
6%2Ffalcon-9-rocket-lifts-japanes
```

e-communications-satellite-aces-high-energy-ocean-landing%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-153"><span class="mw-cite-backlink"><b><a href="#cite\_ref-153">^</a></b></span>

<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREGodwin2016" class="citation web cs1">Godwin, Curt (1 September 2016). <a rel="nofollow" class="external text" href="http://www.spaceflightinsider.com/organizations/space-exploration-technologies/spacex-set-launch-amos-6-tropical-storm-hermine-looms/">"SpaceX set to launch heaviest payload to date as Tropical Storm Hermine looms"</a>. SpaceFlight Insider<span class="reference-accessdate">. Retrieved <span class="nowrap">31 March</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Ake

```

v%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+set+to+launch+heaviest+payload+to+date+as+Tropical+Storm+Hermine+looms&rft.pub=SpaceFlight+Insider&rft.date=2016-09-01&rft.aulast=Godwin&rft.aufirst=Curt&rft_id=http%3A%2F%2Fwww.spaceflightinsider.com%2Forganizations%2Fspace-exploration-technologies%2Fspacex-set-launch-amos-6-tropical-storm-hermine-looms%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">
<li id="cite_note-154">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFde_Selding,_Peter_B._[@pbdes]2016" class="citation web cs1">
de Selding, Peter B. [@pbdes] (26 January 2016). <a rel="nofollow" class="external text" href="https://twitter.com/pbdes/status/6918

```

60110751240192">"Spacecom of Israel: SpaceX confirms our Amos-6 satellite, included our Ku- and Facebook/Eutelsat Ka-band for 4.0° west, to launch in May on Falcon 9" </a> (Tweet) &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Spacecom+of+Israel%3A+SpaceX+confirms+our+Amos-6+satellite%2C+included+our+Ku-+and+Facebook%2FEutelsat+Ka-band+for+4.0%C2%B0+west%2C+to+launch+in+May+on+Falcon+9.&amp;rft.date=2016-01-26&amp;rft.au=de+Selding%2C+Peter+B.+%5B%40pbdes%5D&amp;rft\_id=https%3A%2F%2Ftwitter.com%2Fpbdes%2Fstatus%2F691860110751240192&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-155"><span class="mw-cite-backlink"><b><a href="#cite\_ref-155">^</a></b></span><span class="reference-text"><lin

```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFMa
lik2016" class="citation news cs
1">Malik, Tariq (1 September 201
6). <a rel="nofollow" class="exte
rnal text" href="http://www.spac
e.com/33929-spacex-falcon-9-rocke
t-explodes-on-launch-pad.html">"S
paceX Falcon 9 Rocket Explodes on
Launch Pad in Florida". Spac
e.com<span class="reference-acces
sdate">. Retrieved <span class="n
owrap">1 September 2016</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=article&rft.at
itle=SpaceX+Falcon+9+Rocket+Explo
des+on+Launch+Pad+in+Florida&
rft.date=2016-09-01&rft.aulas
t=Malik&rft.aufirst=Tariq&am
p;rft_id=http%3A%2F%2Fwww.space.c
om%2F33929-spacex-falcon-9-rocket
-explodes-on-launch-pad.html&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>


```

```
<li id="cite_note-156"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@S
paceX2016" class="citation web cs
1">@SpaceX (1 September 2016). <a
rel="nofollow" class="external te
xt" href="https://twitter.com/Spa
ceX/status/771395212304277504">"U
pdate on this morning's anomaly"
 (Tweet) – via
Twitter.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
.btitle=Update+on+this+morning%2
7s+anomaly&rft.date=2016-09-0
1&rft.au=%40SpaceX&rft_id
=https%3A%2F%2Ftwitter.com%2FSpac
eX%2Fstatus%2F771395212304277504&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-auto1-157"><spa
```

```

n class="mw-cite-backlink">^ <a h
ref="#cite_ref-auto1_157-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w
eb cs1"><a rel="nofollow" class
="external text" href="https://we
b.archive.org/web/20200519183949/
https://www.spacex.com/news/2016/
09/01/anomaly-updates">"January 2
Anomaly Updates". SpaceX. 2 J
anuary 2017. Archived from <a rel
="nofollow" class="external text"
href="http://www.spacex.com/news/
2016/09/01/anomaly-updates">the o
riginal on 19 May 2020.</cite
><span title="ctx_ver=Z39.88-2004
&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=January+
2+Anomaly+Updates&rft.pub=Spa
ceX&rft.date=2017-01-02&r
ft_id=http%3A%2F%2Fwww.spacex.co
m%2Fnews%2F2016%2F09%2F01%2Fanoma
ly-updates&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc

```



```
on+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-158">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Orbital Launches of 2017". Gunters space page. Retrieved 11 January 2020.</cite>

```

```
<li id="cite_note-NSF-2017-01-17-159">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFChris_Bergin2017" class="citation news cs1">Chris Bergin (17 January 2017). "Landed Falcon 9 booster sails into Los Angeles". NASASpaceFlight.com. Retrieved 11 November 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Landed+Falcon+9+booster+sails+into+Los+Angeles&rft.date=2017-01-17&rft.au=Chris+Bergin&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2017%2F01%2Flanded-falcon-9-booster-los-angeles%2F&rfr_id=info%3Asid%2
```

```
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-sdc20100616-16
0"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sdc201006
16_160-0"><sup><i>a</i></s
up> <a href="#cite_ref-sdc201
00616_160-1"><sup><i>b</i>
</sup> <a href="#cite_ref-sdc
20100616_160-2"><sup><i>c
</i></sup> <a href="#cite_ref
-sdc20100616_160-3"><sup><i>d
</i></sup> <a href="#cite
_ref-sdc20100616_160-4"><sup><i><
b>e</i></sup> <a href="#c
ite_ref-sdc20100616_160-5"><sup><
i>f</i></sup> <s
up><i>g</i></sup></spa
n> <
link rel="mw-deduplicated-inline-
style" href="mw-data:TemplateStyl
es:r1067248974"/><cite id="CITERE
FMoskowitz2010" class="citation n
ews cs1">Moskowitz, Clara (16 Jun
e 2010). <a rel="nofollow" class
="external text" href="http://ww
w.space.com/8611-largest-commerci
```

```

al-rocket-launch-deal-signed-spac
ex.html">"Largest Commercial Rock
et Launch Deal Ever Signed by Spa
ceX". Space.com<span class="r
eference-accessdate">. Retrieved
 6 March</sp
an> 2016.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=Largest+Commercia
l+Rocket+Launch+Deal+Ever+Signed+
by+SpaceX&rft.date=2010-06-16
&rft.aulast=Moskowitz&rft
t.aufirst=Clara&rft_id=http%3
A%2F%2Fwww.space.com%2F8611-large
st-commercial-rocket-launch-deal-
signed-spacex.html&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-161"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGr

```

aham2017" class="citation web cs 1">Graham, William (13 January 2017). <a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2017/01/spacex-return-to-flight-iridium-next-launch/">"SpaceX Returns To Flight with Iridium NEXT launch – and landing"</a>. NASASpaceFlight.com<span class="reference-accessdate">.

Retrieved <span class="nowrap">4 February</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+Returns+To+Flight+with+Iridium+NEXT+launch+%E2%80%93+and+landing&amp;rft.pub=NASASpaceFlight.com&amp;rft.date=2017-01-13&amp;rft.aulast=Graham&amp;rft.aufirst=William&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2017%2F01%2Fspacex-return-to-flight-iridium-next-launch%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-162"><span clas

```

s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@S
paceX2017" class="citation web cs
1">@SpaceX (14 January 2017). <a
rel="nofollow" class="external t
ext" href="https://twitter.com/Sp
aceX/status/82033054952904704
0">"First stage has landed on Jus
t Read the Instructions" (Twe
et) – via <a href="/wiki/Tw
itter" title="Twitter">Twitter.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
First+stage+has+landed+on+Just+Re
ad+the+Instructions&rft.date=
2017-01-14&rft.au=%40SpaceX&a
mp;rft_id=https%3A%2F%2Ftwitter.c
om%2FSpaceX%2Fstatus%2F8203305495
29047040&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-Iridiumrideschar

```

ePR-163"><span class="mw-cite-backlink">^ <a href="#cite\_ref-IridiumridesharePR\_163-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-IridiumridesharePR\_163-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation pressrelease cs1"><a rel="nofollow" class="external text" href="https://web.archive.org/web/20170204151829/http://investor.iridium.com/releasedetail.cfm?ReleaseID=1009711">"Iridium Adds Eighth Launch with SpaceX for Satellite Rideshare with NASA/GFZ (NASDAQ: IRDM)"</a> (Press release). Iridium. 31 January 2017. Archived from <a rel="nofollow" class="external text" href="http://investor.iridium.com/releasedetail.cfm?ReleaseID=1009711">the original</a> on 4 February 2017<span class="reference-accessdate">. Retrieved <span class="nowrap">4 February</span> > 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amt

```

x%3Abook&rft.genre=unknown&
p;rft.btitle=Iridium+Adds+Eighth+
Launch+with+SpaceX+for+Satellite+
Rideshare+with+NASA%2FGFZ+%28NASD
AQ%3AIRDM%29&rft.pub=Iridium&
amp;rft.date=2017-01-31&rft_i
d=http%3A%2F%2Finvestor.iridium.c
om%2Freleasedetail.cfm%3FReleaseI
D%3D1009711&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-sfn-164"><a h
ref="#cite_ref-sfn_164-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFClark2015" class="citati
on news cs1">Clark, Stephen (10 N
ovember 2015). <a rel="nofollow"
 class="external text" href="http
s://web.archive.org/web/201601141
23725/http://spaceflightnow.com/2
015/11/10/radio-bug-to-keep-new-i
ridium-satellites-grounded-until-
april/">"Radio bug to keep new Ir
idium satellites grounded until A

```



pril"</a>. Spaceflight Now. Archived from <a rel="nofollow" class="external text" href="http://spaceflightnow.com/2015/11/10/radio-bug-to-keep-new-iridium-satellite-s-grounded-until-april/">the original</a> on 14 January 2016<span class="reference-accessdate">. Retrieved <span class="nowrap">6 January</span> 2016</span>.</cite>  
<span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Radio+bug+to+keep+new+Iridium+satellites+grounded+until+April&amp;rft.date=2015-11-10&amp;rft.aulast=Clark&amp;rft.aufirst=Stephen&amp;rft\_id=http%3A%2F%2Fspaceflightnow.com%2F2015%2F11%2F10%2Fradio-bug-to-keep-new-iridium-satellites-grounded-until-april%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-165"><span class="mw-cite-backlink"><b><a href="#cite\_ref-165">^</a></b></span>

```

<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFde
_Selding2017" class="citation web
cs1">de Selding, Peter B. (2 Febr
uary 2017). <span class="cs1-lock
-subscription" title="Paid subscri
ption required"><a rel="nofollo
w" class="external text" href="ht
tps://www.spaceintelreport.com/ir
idium">"Iridium". Spac
e Intel Report<span class="refere
nce-accessdate">. Retrieved 17 August 2
017.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ab
ook&rft.genre=unknown&rft
.btitle=Iridium&rft.pub=Spac
e+Intel+Report&rft.date=2017-
02-02&rft.aulast=de+Selding&a
mp;rft.aufirst=Peter+B.&rft_i
d=https%3A%2F%2Fwww.spaceintelrep
ort.com%2Firidium&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>


```

```

<li id="cite_note-spn-20160225-16
6"><span class="mw-cite-backlin
k"><a href="#cite_ref-spn-2016
0225_166-0">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFde_Se
lding2016" class="citation news c
s1">de Selding, Peter B. (25 Febr
uary 2016). <a rel="nofollow" cla
ss="external text" href="http://s
pacenews.com/iridium-frustrated-b
y-russian-red-tape-to-launch-firs
t-10-iridium-next-satellites-with
-spacex-in-july/">"Iridium, frust
rated by Russian red tape, to lau
nch first 10 Iridium Next satellit
es with SpaceX in July". Spa
ceNews<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">25 February 2016
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.atitle=Iridium%2C+frustrated+by
+Russian+red+tape%2C+to+launch+fi
rst+10+Iridium+Next+satellites+wi
th+SpaceX+in+July&rft.date=20

```

```

16-02-25&rft.au=last=de+Selding
&rft.au=first=Peter+B.&rft
_id=http%3A%2F%2Fspacenews.com%2
Firidium-frustrated-by-russian-re
d-tape-to-launch-first-10-iridium
-next-satellites-with-spacex-in-j
uly%2F&rft_id=info%3Aid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-spn-167">^ <a href=
"#cite_ref-spn_167-0"><sup><i>
a</i></sup> <a href="#
cite_ref-spn_167-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFde_Seld
ing2016" class="citation news cs
1">de Selding, Peter B. (15 June
2016). <a rel="nofollow" class
="external text" href="http://spa
cenews.com/iridiiums-spacex-launch
-slowed-by-vandenberg-bottlenec
k/">"Iridium's SpaceX launch slow
ed by Vandenberg bottleneck".
SpaceNews<span class="reference-a

```

ccessdate">. Retrieved <span class="nowrap">21 June</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Iridium%27s+SpaceX+launch+slowed+by+Vandenberg+bottleneck&amp;rft.date=2016-06-15&amp;rft.auiast=de+Selding&amp;rft.aufirst=Peter+B.&amp;rft\_id=http%3A%2F%2Fspacenews.com%2Firidiums-spacex-launch-slowed-by-vandenberg-bottleneck%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-168"><span class="mw-cite-backlink"><b><a href="#cite\_ref-168">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.nasa.gov/sites/default/files/atoms/files/spacex\_crs-10\_mission\_overview.pdf">"SpaceX CRS-10 mis

sion overview"</a> <span class="c  
s1-format">(PDF)</span>. <a href  
="/wiki/NASA" title="NASA">NASA</  
a><span class="reference-accessda  
te">. Retrieved <span class="nowr  
ap">17 August</span> 2017</span>.  
</cite><span title="ctx\_ver=Z39.8  
8-2004&amp;rft\_val\_fmt=info%3Aof  
i%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.  
genre=unknown&amp;rft.btitle=Sp  
aceX+CRS-10+mission+overview&amp;  
rft.pub=NASA&amp;rft\_id=https%3A%  
2F%2Fwww.nasa.gov%2Fsites%2Fdefau  
lt%2Ffiles%2Fatoms%2Ffiles%2Fspac  
ex\_crs-10\_mission\_overview.pdf&am  
p;rfr\_id=info%3Asid%2Fen.wikipedi  
a.org%3AList+of+Falcon+9+and+Falc  
on+Heavy+launches" class="Z3988">  
</span>  <i>This article incorpo
rates text from this source, whic
h is in the <a href="/wiki/Public
_domain" title="Public domain">pu
blic domain</a></i><i>.</i></span
>
</li>
<li id="cite_note-:10-169"><span
  class="mw-cite-backlink">^ <a hr
ef="#cite_ref-:10_169-0"><sup><i>
<b>a</b></i></sup></a> <a href="#
cite_ref-:10_169-1"><sup><i><b>b
</b></i></sup></a></span> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFPearlma
n2017" class="citation web cs1">P
earlman, Robert Z. (17 February 2
017). <a rel="nofollow" class="ex
ternal text" href="https://www.sp
ace.com/35736-nasa-greatest-space
-launches-from-pad-39a.html">"The
Milestone Space Missions Launched
from NASA's Historic Pad 39A"</a
>. <i>Space</i>. Space.com<span c
lass="reference-accessdate">. Ret
rieved <span class="nowrap">17 Ma
y</span> 2019</span>.</cite><span
title="ctx_ver=Z39.88-2004&amp;r

```

```
t_val_fmt=info%3Aofi%2Ffmt%3Akev%
3Amtx%3Ajournal&rft.genre=unk
nown&rft.jtitle=Space&rft
t.atitle=The+Milestone+Space+Miss
ions+Launched+from+NASA%27s+Histo
ric+Pad+39A&rft.date=2017-02-
17&rft.aulast=Pearlman&rft
t.aufirst=Robert+Z.&rft_id=ht
tps%3A%2F%2Fwww.space.com%2F35736
-nasa-greatest-space-launches-fro
m-pad-39a.html&rft_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988"></span></span>
</li>
<li id="cite_note-170"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-170">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSi
celoff2017" class="citation web c
s1">Siceloff, Steven (19 February
2017). <a rel="nofollow" class="e
xternal text" href="https://blog
s.nasa.gov/spacex/2017/02/19/nasa
-cargo-headed-to-space-station-in
cludes-important-experiments-equi
pment/">"NASA Cargo Headed to Spa
```


ce Station Includes Important Experiments, Equipment". NASA 2017.</cite> ![Public Domain](//upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/12px-PD-icon.svg.png)https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true

edia.org/wikipedia/en/thumb/6/62/PD-icon.svg/24px-PD-icon.svg.png 2x" data-file-width="196" data-file-height="196" /> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-171">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation audio-visual cs1"><i>EchoStar XXIII Launch</i> (the number 30 is visible just above the engines). 16 March 2017. Retrieved 1 May 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.ge

```

nre=unknown&rft.btitle=EchoStar+XXIII+Launch&rft.date=2017-03-16&rft_id=https%3A%2F%2Fwww.flickr.com%2Fphotos%2Fspacex%2F33094073720%2Fin%2Fphotostream%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-172"><span class="mw-cite-backlink"><b><a href="#cite_ref-172">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2017" class="citation web cs1">Clark, Stephen (16 March 2017). <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2017/03/16/tv-broadcast-satellite-launched-aboard-falcon-9-rocket/">"TV broadcast satellite launched aboard Falcon 9 rocket"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">17 March</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&rft

```

```

t_val_fmt=info%3Aofi%2Ffmt%3Akev%
3Amtx%3Abook&rft.genre=unknow
n&rft.btitle=TV+broadcast+sat
ellite+launched+aboard+Falcon+9+r
ocket&rft.pub=Spaceflight+Now
&rft.date=2017-03-16&rft.
aulast=Clark&rft.aufirst=Step
hen&rft_id=https%3A%2F%2Fspac
eflightnow.com%2F2017%2F03%2F16%2
Ftv-broadcast-satellite-launched-
aboard-falcon-9-rocket%2F&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-expendable-17
3"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-expendabl
e_173-0"><sup><i><b>a</b></i></su
p></a> <a href="#cite_ref-expenda
ble_173-1"><sup><i><b>b</b></i></
sup></a> <a href="#cite_ref-expen
dable_173-2"><sup><i><b>c</b></i>
</sup></a> <a href="#cite_ref-exp
endable_173-3"><sup><i><b>d</b></
i></sup></a> <a href="#cite_ref-e
xpendable_173-4"><sup><i><b>e</b>
</i></sup></a> <a href="#cite_ref-
expendable_173-5"><sup><i><b>f</

```

```

b></i></sup></a></span> <span cla
ss="reference-text"><link rel="mw
-deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREFKrebs" cla
ss="citation web cs1">Krebs, Gunt
er. <a rel="nofollow" class="exte
rnal text" href="http://space.sky
rocket.de/doc_lau_det/falcon-9_v1
-2_ex.htm">"Falcon-9 v1.2(ex) (Fa
lcon-9FT(ex))"</a>. Gunter's Spac
e Page<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">26 June</span> 2018</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&amp;rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&amp;rft.btitl
e=Falcon-9+v1.2%28ex%29+%28Falcon
-9FT%28ex%29%29&amp;rft.pub=Gunte
r%27s+Space+Page&amp;rft.aulast=K
rebs&amp;rft.aufirst=Gunter&amp;r
ft_id=http%3A%2F%2Fspace.skyrocke
t.de%2Fdoc_lau_det%2Ffalcon-9_v1-
2_ex.htm&amp;rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988"></span></span>
</li>
<li id="cite_note-spn-echostar-17

```

```

4"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-spn-echo
star_174-0">^</a></b></span> <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFde_Se
lding2016" class="citation news c
s1">de Selding, Peter B. (24 Nove
mber 2016). <a rel="nofollow" cla
ss="external text" href="http://s
pacenews.com/echostar-expects-jan
-8-or-9-spacex-launch-confronts-b
razil-and-eu-deadlines/">"EchoSta
r expects January 8 or 9 SpaceX l
aunch, confronts Brazil and EU de
adlines"</a>. SpaceNews<span clas
s="reference-accessdate">. Retriev
ed <span class="nowrap">24 Novem
ber</span> 2016</span>.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&amp;rft.genre
=article&amp;rft.atitle=EchoStar+
expects+January+8+or+9+SpaceX+lau
nch%2C+confronts+Brazil+and+EU+de
adlines&amp;rft.date=2016-11-24&a
mp;rft.aulast=de+Selding&amp;rft.
aufirst=Peter+B.&amp;rft_id=http%
3A%2F%2Fspacenews.com%2Fechostar-

```

```

expects-jan-8-or-9-spacex-launch-
confronts-brazil-and-eu-deadline
s%2F&amp;rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-175"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-175">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation news cs
1">Clark, Stephen (13 March 201
7). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2017/03/13/photos-falc
on-9-booster-minus-landing-legs-a
nd-grid-fins-poised-for-launc
h/">"Falcon 9 booster minus landi
ng legs and grid fins poised for
launch"</a>. Spaceflight Now<spa
n class="reference-accessdate">.
Retrieved <span class="nowrap">1
7 August</span> 2017</span>.</cit
e><span title="ctx_ver=Z39.88-200
4&amp;rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Ajournal&amp;rft.g

```

```

enre=article&rft.atitle=Falcon
n+9+booster+minus+landing+legs+an
d+grid+fins+poised+for+launch&am
p;rft.date=2017-03-13&rft.aul
ast=Clark&rft.aufirst=Stephen
&rft_id=https%3A%2F%2Fspacefl
ightnow.com%2F2017%2F03%2F13%2Fph
otos-falcon-9-booster-minus-landi
ng-legs-and-grid-fins-poised-for-
launch%2F&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988"></span></span>
</li>
<li id="cite_note-ses-date-sfn-17
6"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-ses-date
-sfn_176-0">^</a></b></span> <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFClark
2017" class="citation news cs1">C
lark, Stephen (17 January 2017).
<a rel="nofollow" class="externa
l text" href="http://spaceflightn
ow.com/2017/01/17/ses-10-telecom-
satellite-in-florida-for-launch-o
n-reused-spacex-rocket/">"SES 10
telecom satellite in Florida for

```


launch on reused SpaceX rocket". Spaceflight Now. Retrieved 18 January 2017.</cite>

<li id="cite_note-airbusds-pr20140220-177">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class

```
= "citation web cs1"><a rel="nofollow" class="external text" href
="https://web.archive.org/web/20170116181004/https://airbusdefence
andspace.com/newsroom/news-and-fe
atures/airbus-defence-and-space-s
igns-a-new-satellite-contract-wit
h-ses/">"Airbus Defence and Space
signs a new satellite contract wi
th SES"</a>. <i>airbusdefenceands
pace.com</i>. 20 February 2014. A
rchived from <a rel="nofollow" cl
ass="external text" href="http
s://airbusdefenceandspace.com/new
sroom/news-and-features/airbus-de
fence-and-space-signs-a-new-satel
lite-contract-with-ses/">the orig
inal</a> on 16 January 2017<span
class="reference-accessdate">. R
etrieved <span class="nowrap">31
August</span> 2016</span>.</cite
><span title="ctx_ver=Z39.88-2004
&amp;rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Ajournal&amp;rft.g
enre=unknown&amp;rft.jtitle=airbu
sdefenceandspace.com&amp;rft.atit
le=Airbus+Defence+and+Space+signs
+a+new+satellite+contract+with+SE
S&amp;rft.date=2014-02-20&amp;rft
_id=https%3A%2F%2Fairbusdefencean
```

dspace.com%2Fnewsroom%2Fnews-and-features%2Fairbus-defence-and-space-signs-a-new-satellite-contract-with-ses%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-thevergeflight32-178">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGrush2017" class="citation news cs1">Grush, Loren (30 March 2017). "SpaceX makes aerospace history with successful landing of a used rocket". The Verge. Retrieved <span class="nowra

11 November 2017

.</cite>

<li id="cite_note-179">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFMasunaga2016" class="citation news cs1">Masunaga, Samantha (30 August 2016). <a rel="nofollow" class="external text" href="https://www.latimes.com/business/la-fi-spac

```
ex-rocket-20160829-snap-story.html">"SpaceX signs first customer for launch of a reused rocket"</a>
>. <i>The Los Angeles Times</i><span class="reference-accessdate">. Retrieved <span class="nowrap">30 August</span> 2016</span>.
</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=The+Los+Angeles+Times&rft.atitle=SpaceX+signs+first+customer+for+launch+of+a+reused+rocket&rft.date=2016-08-30&rft.auiast=Masunaga&rft.aufirst=Samantha&rft_id=https%3A%2F%2Fwww.latimes.com%2Fbusiness%2Fla-fi-spacex-rocket-20160829-snap-story.html&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-180"><span class="mw-cite-backlink"><b><a href="#cite_ref-180">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
```

```

r1067248974"/><cite id="CITEREFLo
patto2017" class="citation news c
s1">Lopatto, Elizabeth (30 March
  2017). <a rel="nofollow" class
="external text" href="https://ww
w.theverge.com/2017/3/30/1513231
4/spacex-launch-fairing-landing-f
alcon-9-thruster-parachutes">"Spa
ceX even landed the nose cone fro
m its historic used Falcon 9 rock
et launch"</a>. The Verge<span cl
ass="reference-accessdate">. Retr
ieved <span class="nowrap">31 Mar
ch</span> 2017</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.atitle=SpaceX+even
+landed+the+nose+cone+from+its+hi
storic+used+Falcon+9+rocket+launc
h&rft.date=2017-03-30&rft
t.aulast=Lopatto&rft.aufirst=
Elizabeth&rft_id=https%3A%2F%
2Fwww.theverge.com%2F2017%2F3%2F3
0%2F15132314%2Fspacex-launch-fair
ing-landing-falcon-9-thruster-par
achutes&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>

```

```
</li>
<li id="cite_note-181"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-181">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGe
bhardt2017" class="citation web c
s1">Gebhardt, Chris (30 March 201
7). <a rel="nofollow" class="exte
rnal text" href="http://forum.nas
aspaceflight.com/index.php?topic=
42544.msg1661124#msg1661124">"SES
-10 with reuse of CRS-8 Booster S
N 1021"</a>. NASASpaceFlight.com<
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">31 March</span> 2017</span>.</
cite><span title="ctx_ver=Z39.88-
2004&amp;rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&amp;rft.g
enre=unknown&amp;rft.btitle=SES-1
0+with+reuse+of+CRS-8+Booster+SN+
1021&amp;rft.pub=NASASpaceFlight.
com&amp;rft.date=2017-03-30&amp;r
ft.aulast=Gebhardt&amp;rft.aufirs
t=Chris&amp;rft_id=http%3A%2F%2Ff
orum.nasaspaceflight.com%2Findex.
php%3Ftopic%3D42544.msg1661124%23
```

```

msg1661124&rf_r_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988"></span></span>
</li>
<li id="cite_note-nrol-76-182"><s
pan class="mw-cite-backlink"><b><
a href="#cite_ref-nrol-76_182-0">
^</a></b></span> <span class="ref
erence-text"><link rel="mw-dedupl
icated-inline-style" href="mw-dat
a:TemplateStyles:r1067248974"/><c
ite id="CITEREFGruss2016" class
="citation news cs1">Gruss, Mike
  (18 May 2016). <a rel="nofollow"
class="external text" href="htt
p://spacenews.com/nro-discloses-p
reviously-unannounced-launch-cont
ract-for-spacex/">"NRO discloses
  previously unannounced launch co
ntract for SpaceX"</a>. SpaceNews
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">11 November</span> 2017</span>
>. <q>SpaceX is under contract to
launch NROL-76 in March 2017 from
Cape Canaveral [...] for a smalle
r mission.</q></cite><span title
="ctx_ver=Z39.88-2004&rf_t_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt

```



```

x%3Ajournal&rft.genre=article
&rft.atitle=NR0+discloses+pre
viously+unannounced+launch+contra
ct+for+SpaceX&rft.date=2016-0
5-18&rft.aulast=Gruss&rft
t.aufirst=Mike&rft_id=http%3
A%2F%2Fspacenews.com%2Fnro-disclo
ses-previously-unannounced-launch
-contract-for-spacex%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988"></span>
</span>
</li>
<li id="cite_note-183"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-183">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKl
otz2017" class="citation news cs
1">Klotz, Irene (30 April 2017).
  <a rel="nofollow" class="externa
l text" href="http://www.space.co
m/36668-spy-satellite-orbit-space
x-launch-license.html">"Secret U.
S. Spy Satellite Heading to Low-E
arth Orbit, SpaceX Launch License
Shows"</a>. Space.com<span class

```

```

="reference-accessdate">. Retrieved
<span class="nowrap">30 April
</span> 2017</span>.</cite><span
  title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&amp;rft.genre=ar
ticle&amp;rft.atitle=Secret+U.S.
+Spy+Satellite+Heading+to+Low-Ear
th+Orbit%2C+SpaceX+Launch+License
+Shows&amp;rft.date=2017-04-30&am
p;rft.aulast=Klotz&amp;rft.aufirs
t=Irene&amp;rft_id=http%3A%2F%2Fw
ww.space.com%2F36668-spy-satellit
e-orbit-spacex-launch-license.htm
l&amp;rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88"></span></span>
</li>
<li id="cite_note-184"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-184">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBe
rger2017" class="citation news cs
1">Berger, Eric (1 May 2017). <a
rel="nofollow" class="external t
ext" href="https://arstechnica.co

```

m/science/2017/05/watch-live-spac
 exs-second-attempt-to-launch-its-
 first-spy-satellite/">"SpaceX suc
 cessfully launches its first spy
 satellite". Ars Technica<spa
 n class="reference-accessdate">.

Retrieved 1
 May 2017.</cite><sp
 an title="ctx_ver=Z39.88-2004&am
 p;rft_val_fmt=info%3Aofi%2Ffmt%3A
 kev%3Amtx%3Ajournal&rft.genre
 =article&rft.atitle=SpaceX+su
 ccessfully+launches+its+first+spy
 +satellite&rft.date=2017-05-0
 1&rft.aulast=Berger&rft.a
 ufirst=Eric&rft_id=https%3A%2
 F%2Farstechnica.com%2Fscience%2F2
 017%2F05%2Fwatch-live-spacexs-sec
 ond-attempt-to-launch-its-first-s
 py-satellite%2F&rfr_id=info%3
 Asid%2Fen.wikipedia.org%3AList+of
 +Falcon+9+and+Falcon+Heavy+launch
 es" class="Z3988">

<li id="cite_note-185"><span clas
 s="mw-cite-backlink">^
 <lin
 k rel="mw-deduplicated-inline-sty
 le" href="mw-data:TemplateStyles:

```

r1067248974"/><cite id="CITEREFSh
alal2015" class="citation web cs
1">Shalal, Andrea (26 May 2015).
  <a rel="nofollow" class="externa
l text" href="https://www.reuter
s.com/article/us-usa-military-spa
ce/u-s-air-force-certifies-spacex
-for-national-security-launches-i
dUSKBN00B2M020150526">"U.S. Air F
orce certifies SpaceX for nationa
l security launches"</a>. <i>Reut
ers</i>.</cite><span title="ctx_v
er=Z39.88-2004&amp;rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&amp;rft.genre=unknown&amp;rft
.jtitle=Reuters&amp;rft.atitle=
U.S.+Air+Force+certifies+SpaceX+f
or+national+security+launches&am
p;rft.date=2015-05-26&amp;rft.aul
ast=Shalal&amp;rft.aufirst=Andrea
&amp;rft_id=https%3A%2F%2Fwww.reu
ters.com%2Farticle%2Fus-usa-milit
ary-space%2Fu-s-air-force-certifi
es-spacex-for-national-security-l
aunches-idUSKBN00B2M020150526&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>

```

```
<li id="cite_note-186"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-186">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFWh
itwam2017" class="citation web cs
1">Whitwam, Ryan (1 May 2017). <a
rel="nofollow" class="external te
xt" href="https://www.extremetec
h.com/extreme/248573-spacex-launc
hes-spy-satellite-streams-full-fa
lcon-9-landing">"SpaceX Launches
Spy Satellite, Streams Full Falc
on 9 Landing"</a>. ExtremeTech<sp
an class="reference-accessdate">.
Retrieved <span class="nowrap">11
November</span> 2017</span>.</cit
e><span title="ctx_ver=Z39.88-200
4&amp;rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&amp;rft.genr
e=unknown&amp;rft.btitle=SpaceX+L
aunches+Spy+Satellite%2C+Streams+
Full+Falcon+9+Landing&amp;rft.pub
=ExtremeTech&amp;rft.date=2017-05
-01&amp;rft.aulast=Whitwam&amp;rft
.aufirst=Ryan&amp;rft_id=https%3
A%2F%2Fwww.extremetech.com%2Fextr
eme%2F248573-spacex-launches-spy-
```

satellite-streams-full-falcon-9-landing&#amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-187">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREBergin2017" class="citation news cs1">Bergin, Chris (3 May 2017). "SpaceX improving launch cadence, testing new goals". NASASpaceFlight.com. Retrieved 5 May 2017</cite><span title="ctx_ver=Z39.88-2004&#amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&#amp;rft.genre=article&#amp;rft.atitle=SpaceX+improving+launch+cadence%2C+testing+new+goals&#amp;rft.date=2017-05-0

```

3&rft.aulast=Bergin&rft.a
ufirst=Chris&rft_id=https%3A%
2F%2Fwww.nasaspaceflight.com%2F20
17%2F05%2Fspacex-launch-cadence-n
ew-goals%2F&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span></span>
</li>
<li id="cite_note-spacenews201407
02-188"><span class="mw-cite-back
link"><b><a href="#cite_ref-space
news20140702_188-0">^</a></b></sp
an> <span class="reference-text">
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1067248974"/><cite id="CITER
EFde_Selding2014" class="citation
web cs1">de Selding, Peter B. (2
July 2014). <a rel="nofollow" cl
ass="external text" href="http://
www.spacenews.com/article/launch-
report/41121inmarsat-books-falcon-
heavy-for-up-to-three-launches
s">"Inmarsat Books Falcon Heavy f
or up to Three Launches"</a>. Spa
ceNews<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">6 August</span> 2014</s
pan>.</cite><span title="ctx_ver=

```

Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Inmarsat+Books+Falcon+Heavy+for+up+to+Three+Launches&rft.pub=SpaceNews&rft.date=2014-07-02&rft.aulast=de+Selding&rft.aufirst=Peter+B.&rft_id=http%3A%2F%2Fwww.spacenews.com%2Farticle%2Flaunch-report%2F41121inmarsat-books-falcon-heavy-for-up-to-three-launches&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-gunter-inmarsat5-189">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. "Inmarsat-5 F1, 2, 3, 4". Gunter's Space Page<sp


```

an class="reference-accessdate">.
Retrieved <span class="nowrap">16
April</span> 2017</span>.</cite><
span title="ctx_ver=Z39.88-2004&
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&amp;rft.genre=u
nknown&amp;rft.btitle=Inmarsat-5+
F1%2C+2%2C+3%2C+4&amp;rft.pub=Gun
ter%27s+Space+Page&amp;rft.aulast
=Krebs&amp;rft.aufirst=Gunter&am
p;rft_id=http%3A%2F%2Fspace.skyro
cket.de%2Fdoc_sdat%2Finmarsat-5.h
tm&amp;rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988"></span></span>
</li>
<li id="cite_note-sn-190"><span c
lass="mw-cite-backlink"><b><a hre
f="#cite_ref-sn_190-0">^</a></b>
</span> <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFde_Selding2016" class="cita
tion news cs1">de Selding, Peter
B. (3 November 2016). <a rel="no
follow" class="external text" hre
f="http://spacenews.com/inmarsat-
juggling-two-launches-says-spacex

```

```

-to-return-to-flight-in-decembe
r/">"Inmarsat, juggling two launc
hes, says SpaceX to return to fli
ght in December"</a>. SpaceNews<s
pan class="reference-accessdat
e">. Retrieved <span class="nowra
p">11 November</span> 2017</span
>.</cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=article&amp;rft.atit
le=Inmarsat%2C+juggling+two+launc
hes%2C+says+SpaceX+to+return+to+f
light+in+December&amp;rft.date=20
16-11-03&amp;rft.aulast=de+Seldin
g&amp;rft.aufirst=Peter+B.&amp;rft
_id=http%3A%2F%2Fspacenews.com%2
Finmarsat-juggling-two-launches-s
ays-spacex-to-return-to-flight-in
-december%2F&amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span></span>
</li>
<li id="cite_note-191"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-191">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:

```

```

r1067248974"/><cite class="citation
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.universetoday.com/tag/inmarsa
t-5-f4/">"Digital Society Boosted
by Stunning SpaceX Launch Deliver
ing Inmarsat Mobile Broadband Sat
ellite to Orbit"</a>. <i>universe
today.com</i><span class="referen
ce-accessdate">. Retrieved <span
class="nowrap">17 August</span>
2020</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&amp;rft.genre=unknown
&amp;rft.jtitle=universetoday.com
&amp;rft.atitle=Digital+Society+B
oosted+by+Stunning+SpaceX+Launch+
Delivering+Inmarsat+Mobile+Broadb
and+Satellite+to+Orbit&amp;rft_id
=https%3A%2F%2Fwww.universetoday.
com%2Ftag%2Finmarsat-5-f4%2F&amp;
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span></span>
</li>
<li id="cite_note-192"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-192">^</a></b></span>

```

```
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark" class="citation web cs1">Clark, Stephen. <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2017/05/16/fourth-satellite-for-inmarsats-global-broadband-network-launched-by-spacex/">"Fourth satellite for Inmarsat's global broadband network launched by SpaceX"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">25 March</span> 2020</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Fourth+satellite+for+Inmarsat%27s+global+broadband+network+launched+by+SpaceX&rft.pub=Spaceflight+Now&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2017%2F05%2F16%2Ffourth-satellite-for-inmarsats-global-broadband-network-launched-by-spacex%2F&rfr_id=info%3Asid%2Fen.wikip
```

```
edia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-nsf-20170528-193"><span class="mw-cite-backlink">^ <a href="#cite_ref-nsf-20170528_193-0"><sup><i><b>a</b></i></sup></a> <a href="#cite_ref-nsf-20170528_193-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGebhardt2017" class="citation news cs1">Gebhardt, Chris (28 May 2017). <a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2017/05/spacex-static-fire-crs-11-falcon-9/">"SpaceX static fires CRS-11 Falcon 9 Sunday ahead of ISS mission"</a>. NASASpaceFlight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">30 May</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.at
```

```

itle=SpaceX+static+fires+CRS-11+F
alcon+9+Sunday+ahead+of+ISS+missi
on&rft.date=2017-05-28&rft
.t.aulast=Gebhardt&rft.aufirst
=Chris&rft_id=https%3A%2F%2Fw
ww.nasaspaceflight.com%2F2017%2F0
5%2Fspacex-static-fire-crs-11-fal
con-9%2F&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988"></span></span>
</li>
<li id="cite_note-194"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-194">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (3 June 2017).
  <a rel="nofollow" class="externa
l text" href="https://spaceflight
now.com/2017/06/03/cargo-manifest
-for-spacexs-11th-resupply-missio
n-to-the-space-station/">"Cargo m
anifest for SpaceX's 11th resuppl
y mission to the space station"</
a>. Spaceflight Now<span class="r
eference-accessdate">. Retrieved

```

```

<span class="nowrap">11 November
</span> 2017</span>.</cite><span
  title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&amp;rft.genre=unkn
own&amp;rft.btitle=Cargo+manifest
+for+SpaceX%27s+11th+resupply+mis
sion+to+the+space+station&amp;rft
t.pub=Spaceflight+Now&amp;rft.dat
e=2017-06-03&amp;rft.aulast=Clark
&amp;rft.aufirst=Stephen&amp;rft_
id=https%3A%2F%2Fspaceflightnow.c
om%2F2017%2F06%2F03%2Fcargo-manif
est-for-spacexs-11th-resupply-mis
sion-to-the-space-station%2F&amp;
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span></span>
</li>
<li id="cite_note-nasa-nicer-mani
fest-195"><span class="mw-cite-ba
cklink"><b><a href="#cite_ref-nas
a-nicer-manifest_195-0">^</a></b>
</span> <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite class
="citation web cs1"><a rel="nofol
low" class="external text" href

```

```
= "https://heasarc.gsfc.nasa.gov/docs/nicer/">"The Neutron star Interior Composition ExploreR Mission"</a>. NASA<span class="reference-accessdate">. Retrieved <span class="nowrap">26 February</span> 2016</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=The+Neutron+star+Interior+Composition+ExploreR+Mission&rft.pub=NASA&rft_id=https%3A%2F%2Fheasarc.gsfc.nasa.gov%2Fdocs%2Fnicer%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This
```


article incorporates text from this source, which is in the [public domain](/wiki/Public_domain "Public domain").

[^](#cite_ref-196)

reference-text link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/> cite class="citation web cs1"> a rel="nofollow" class="external text" href="http://www.nasa.gov/mission_pages/station/research/experiments/1282.html">"Multiple User System for Earth Sensing Facility (MUSES)". NASA. 29 June 2016reference-accessdate. Retrieved nowrap26 August2016.span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Multiple+User+System+for+Earth+Sensing+Facility+%28MUSES%29&rft.pub=NASA&rft.date=2016-06-29&rft_id=htt

p%3A%2F%2Fwww.nasa.gov%2Fmission_pages%2Fstation%2Fresearch%2Fexperiments%2F1282.html&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-197">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:

r1067248974"/><cite class="citation on web cs1">"Roll-Out Solar Array". NASA. 18 August 2016. Retrieved 26 August 2016.</cite> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-workshop-matsew20160517-198">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>}

<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKenolLove2016" class="citation conference cs1">Kenol, Jules; Love, John (17 May 2016). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20160816035139/http://www.asi.it/sit

es/default/files/attach/evento/material_science_workshop_italy_version2.pdf"><i>Research Capability of ISS for a Wide Spectrum of Science Disciplines, Including Materials Science</i> (PDF). Materials in the Space Environment Workshop, Italian Space Agency, Rome. NASA. p. 33. Archived from the original (PDF) on 16 August 2016. Retrieved 26 August 2016.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=conference&rft.btitle=Research+Capability+of+ISS+for+a+Wide+Spectrum+of+Science+Disciplines%2C+Including+Materials+Science&rft.pages=33&rft.pub=NASA&rft.date=2016-05-17&rft.aulast=Kenol&rft.aufirst=Jules&rft

```
t.au=Love%2C+John&#amp;rft_id=htt
p%3A%2F%2Fwww.asi.it%2Fsites%2Fde
fault%2Ffiles%2Fattach%2Fevento%2
Fmaterial_science_workshop_italy_
version2.pdf&#amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span>  <i>This art
icle incorporates text from this
source, which is in the <a href
="/wiki/Public_domain" title="Pub
lic domain">public domain</a></i>
<i>.</i></span>
</li>
<li id="cite_note-199"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-199">^</a></b></span>
<span class="reference-text"><lin
```

```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGebhardt2017" class="citation news
cs1">Gebhardt, Chris (5 June 2017). <a rel="nofollow" class="external
text" href="https://www.nasa.gov/spacexs-crs-11-dragon-station-arrival/">"S
paceX's CRS-11 Dragon captured by Station for a second time"</a>. N
ASASpaceFlight.com<span class="reference-accessdate">. Retrieved <
span class="nowrap">5 June</span> 2017</span>.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
journal&rft.genre=article&rft.atitle=SpaceX%27s+CRS-11+Dragon+captured+by+Station+for+a+se
cond+time&rft.date=2017-06-05&rft.aulast=Gebhardt&rft.aufirst=Chris&rft_id=https%3
A%2F%2Fwww.nasaspaceflight.com%2F2017%2F06%2Fspacexs-crs-11-dragon
-station-arrival%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></span></span>

```

```

</li>
<li id="cite_note-dragon-reuse-200"><span class="mw-cite-backlink"><b><a href="#cite_ref-dragon-reuse_200-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFFoust2016" class="citation news cs1">Foust, Jeff (14 October 2016). <a rel="nofollow" class="external text" href="http://spacenews.com/spacex-to-reuse-dragon-capsules-on-cargo-missions/">"SpaceX to reuse Dragon capsules on cargo missions"</a>. SpaceNews<span class="reference-accessdate">. Retrieved <span class="nowrap">11 November</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+to+reuse+Dragon+capsules+on+cargo+missions&amp;rft.date=2016-10-14&amp;rft.aulast=Foust&amp;rft.aufirst=Jeff&amp;rft_id=http%3A%2F%2Fspacenews.com%2Fspacex-to-reuse-dragon-capsules-on-cargo-missions%2F&am

```



```

p;rfr_id=info%3Asid%2Fen.wikipedia
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-201"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-201">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGe
bhardt2017" class="citation web c
s1">Gebhardt, Chris (5 June 201
7). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2017/06/spacexs-c
rs-11-dragon-station-arrival/">"S
paceX's CRS-11 Dragon captured by
Station for a second time"</a>. N
ASASpaceFlight.com.</cite><span t
itle="ctx_ver=Z39.88-2004&amp;rft
_val_fmt=info%3Aofi%2Ffmt%3Akev%3
Amtx%3Abook&amp;rft.genre=unknown
&amp;rft.btitle=SpaceX%27s+CRS-11
+Dragon+captured+by+Station+for+a
+second+time&amp;rft.pub=NASASpac
eFlight.com&amp;rft.date=2017-06-
05&amp;rft.aulast=Gebhardt&amp;rft
.aufirst=Chris&amp;rft_id=https%

```

```

3A%2F%2Fwww.nasaspaceflight.com%2
F2017%2F06%2Fspacexs-crs-11-drago
n-station-arrival%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3ALi
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></span></s
pan>
</li>
<li id="cite_note-Amsat-202"><spa
n class="mw-cite-backlink"><b><a
href="#cite_ref-Amsat_202-0">^</
a></b></span> <span class="refere
nce-text"><link rel="mw-deduplica
ted-inline-style" href="mw-data:T
emplateStyles:r1067248974"/><cite
class="citation web cs1"><a rel
="nofollow" class="external text"
href="https://amsat-uk.org/2017/0
7/07/birds-1-cubesats-deploye
d/">"BIRDS-1 constellation of fiv
e CubeSats deployed"</a>. AMSAT-U
K. 7 July 2017<span class="refere
nce-accessdate">. Retrieved <span
class="nowrap">8 July</span> 2017
</span>.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=BIRDS-1+constellation+of+fiv
e+CubeSats+deployed&rft.pub=A

```

MSAT-UK&rft.date=2017-07-07&rft_id=https%3A%2F%2Famsat-uk.org%2F2017%2F07%2F07%2Fbirds-1-cubesats-deployed%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-sfn-20170505-203">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2017" class="citation news cs1">Clark, Stephen (5 May 2017). "Bulgaria's first communications satellite to

ride SpaceX's second reused rocket". Spaceflight Now 2017.</cite>

<li id="cite_note-ssloral20140908-204">^

<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyle

```

s:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://www.sslmda.com/html/pressreleases/pr20140908b.html">"SSL Selected To Provide Direct Broadcast Satellite To Bulgaria Satellite"</a>. Space Systems/Loral. 8 September 2014<span class="reference-accessdate">. Retrieved <span class="nowrap">9 September</span> 2014</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SSL+Selected+To+Provide+Direct+Broadcast+Satellite+To+Bulgaria+Satellite&amp;rft.pub=Space+Systems%2FLoral&amp;rft.date=2014-09-08&amp;rft_id=http%3A%2F%2Fwww.sslmda.com%2Fhtml%2Fpressreleases%2Fpr20140908b.html&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-205"><span class="mw-cite-backlink"><b><a href="#cite_ref-205">^</a></b></span>

```

```

<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKr
ebs" class="citation web cs1">Kre
bs, Gunter. <a rel="nofollow" cla
ss="external text" href="http://s
pace.skyrocket.de/doc_sdat/bulgari
asat-1.htm">"BulgariaSat 1"</a>.
Gunter's Space Page<span class="r
eference-accessdate">. Retrieved
  <span class="nowrap">5 June</spa
n> 2017</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=BulgariaSat+1&amp;rft
.pub=Gunter%27s+Space+Page&amp;r
ft.aulast=Krebs&amp;rft.aufirst=G
unter&amp;rft_id=http%3A%2F%2Fspa
ce.skyrocket.de%2Fdoc_sdat%2Fbulg
ariasat-1.htm&amp;rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988"></span></span>
</li>
<li id="cite_note-nsf-20170624-20
6"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-nsf-2017
0624_206-0">^</a></b></span> <spa

```

```

n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFGraha
m2017" class="citation news cs1">
Graham, William (24 June 2017). <
a rel="nofollow" class="external
text" href="https://www.nasaspac
eflight.com/2017/06/spacex-falcon
-9-iridium-next-2-launch/">"Space
X Doubleheader Part 2 – Falcon 9
conducts Iridium NEXT-2 launch"
</a>. NASASpaceFlight.com<span cl
ass="reference-accessdate">. Retr
ieved <span class="nowrap">3 July
</span> 2017</span>.</cite><span
title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&amp;rft.genre=a
rticle&amp;rft.atitle=SpaceX+Doub
leheader+Part+2+%E2%80%93+Falcon+
9+conducts+Iridium+NEXT-2+launch&
amp;rft.date=2017-06-24&amp;rft.a
ulast=Graham&amp;rft.aufirst=Will
iam&amp;rft_id=https%3A%2F%2Fwww.
nasaspaceflight.com%2F2017%2F06%2
Fspacex-falcon-9-iridium-next-2-l
aunch%2F&amp;rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla

```

```

ss="Z3988"></span></span>
</li>
<li id="cite_note-207"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-207">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFo
ust2017" class="citation web cs
1">Foust, Jeff (25 June 2017). <a
rel="nofollow" class="external te
xt" href="http://spacenews.com/sp
acex-launches-second-batch-of-iri
dium-satellites/">"SpaceX launch
s second batch of Iridium satell
ites"</a>. SpaceNews<span class="r
eference-accessdate">. Retrieved
<span class="nowrap">11 November
</span> 2017</span>.</cite><span
title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&amp;rft.genre=unkn
own&amp;rft.btitle=SpaceX+launch
s+second+batch+of+Iridium+satelli
tes&amp;rft.pub=SpaceNews&amp;rft
.date=2017-06-25&amp;rft.aulast=
Foust&amp;rft.aufirst=Jeff&amp;rft
_id=http%3A%2F%2Fspacenews.com%2
Fspacex-launches-second-batch-of-

```



```

iridium-satellites%2F&rf_rfr_id=
info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></span></
span>
</li>
<li id="cite_note-nsf-20170629-20
8"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-nsf-2017
0629_208-0">^</a></b></span> <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFBergi
n2017" class="citation news cs1">
Bergin, Chris (29 June 2017). <a
rel="nofollow" class="external t
ext" href="https://www.nasaspacef
light.com/2017/06/spacex-returns-
boosters-third-static-fire-tes
t/">"SpaceX returns two boosters,
fires up a third for Static Fire
test"</a>. NASASpaceFlight.com<s
pan class="reference-accessdat
e">. Retrieved <span class="nowra
p">2 July</span> 2017</span>.</ci
te><span title="ctx_ver=Z39.88-20
04&rf_rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Ajournal&rf_rft.
genre=article&rf_rft.atitle=Spac

```

eX+returns+two+boosters%2C+fires+up+a+third+for+Static+Fire+test&rft.date=2017-06-29&rft.au last=Bergin&rft.aufirst=Chris &rft_id=https%3A%2F%2Fwww.nas aspaceflight.com%2F2017%2F06%2Fsp acex-returns-boosters-third-stati c-fire-test%2F&rfr_id=info%3A sid%2Fen.wikipedia.org%3AList+of+ Falcon+9+and+Falcon+Heavy+launche s" class="Z3988">

<li id="cite_note-sfn-20160830-20 9">^ <spa n class="reference-text"><link re l="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r10 67248974"/><cite id="CITEREFClark 2016" class="citation web cs1">Cl ark, Stephen (30 August 2016). "SES agrees to laun ch satellite on "flight-proven" F alcon 9 rocket". Spaceflight Now<span class="reference-access

```

date">. Retrieved <span class="no
wrap">11 November</span> 2017</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=SES+agrees+to+launch+satellite+
on+%22flight-proven%22+Falcon+9+r
ocket&rft.pub=Spaceflight+Now
&rft.date=2016-08-30&rft.
aulast=Clark&rft.aufirst=Step
hen&rft_id=http%3A%2F%2Fspace
flightnow.com%2F2016%2F08%2F30%2F
ses-agrees-to-launch-satellite-on
-flight-proven-falcon-9-rocket%2F
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-210"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-210">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (29 June 2017).
<a rel="nofollow" class="external

```

```

text" href="https://spaceflightnow.com/2017/06/29/falcon-9-intelsat-35e-launch-preps/">"Live coverage: SpaceX's next Falcon 9 rocket set for launch Sunday"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">11 November</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Live+coverage%3A+SpaceX%27s+next+Falcon+9+rocket+set+for+launch+Sunday&rft.pub=Spaceflight+Now&rft.date=2017-06-29&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2017%2F06%2F29%2Ffalcon-9-intelsat-35e-launch-preps%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-211"><span class="mw-cite-backlink"><b><a href="#cite_ref-211">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-sty

```

```
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFEv
ans2017" class="citation web cs
1">Evans, Ben (5 July 2017). <a r
el="nofollow" class="external tex
t" href="http://www.americaspace.
com/2017/07/05/third-times-a-char
m-as-spacex-launches-10th-mission
-of-2017-with-intelsat-35e/">"Thi
rd Time's a Charm as SpaceX Launc
hes 10th Mission of 2017 with Int
elsat 35e"</a>. AmericaSpace.</ci
te><span title="ctx_ver=Z39.88-20
04&amp;rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Abook&amp;rft.gen
re=unknown&amp;rft.btitle=Third+T
ime%27s+a+Charm+as+SpaceX+Launche
s+10th+Mission+of+2017+with+Intel
sat+35e&amp;rft.pub=AmericaSpace&
amp;rft.date=2017-07-05&amp;rft.a
ulast=Evans&amp;rft.aufirst=Ben&a
mp;rft_id=http%3A%2F%2Fwww.americ
aspace.com%2F2017%2F07%2F05%2Fthi
rd-times-a-charm-as-spacex-launch
es-10th-mission-of-2017-with-inte
lsat-35e%2F&amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span></span>
</li>
```

```
<li id="cite_note-gunter-falcon-ex-212"><span class="mw-cite-backlink"><b><a href="#cite_ref-gunter-falcon-ex_212-0">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. <a rel="nofollow" class="external text" href="http://space.skyrocket.de/doc_lau_det/falcon-9_v1-2_ex.htm">"Falcon-9 v1.2(ex) (Falcon(ex))"</a>. Gunter's Space Page<span class="reference-accessdate">. Retrieved <span class="nowrap">16 April</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Falcon-9+v1.2%28ex%29+%28Falcon%28ex%29%29&rft.pub=Gunter%27s+Space+Page&rft.aulast=Krebs&rft.aufirst=Gunter&rft_id=http%3A%2F%2Fspace.skyrocket.de%2Fdoc_lau_det%2Ffalcon-9_v1-2_ex.htm&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" cl
```

```
ass="Z3988"></span></span>
</li>
<li id="cite_note-213"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-213">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@e
lonmusk2017" class="citation web
cs1">@elonmusk (6 July 2017). <a
rel="nofollow" class="external te
xt" href="https://twitter.com/elo
nmusk/status/88276113317779046
4">"Thanks @INTELSAT! Really prou
d of the rocket and SpaceX team t
oday. Minimum apogee requirement
was 28,000 km, Falcon 9 achieved
43,000 km"</a> (Tweet)<span class
="reference-accessdate">. Retriev
ed <span class="nowrap">7 July</s
pan> 2017</span> &#8211; via <a h
ref="/wiki/Twitter" title="Twitte
r">Twitter</a>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=Thanks+%40INTELSAT%2
1+Really+proud+of+the+rocket+and+
SpaceX+team+today.+Minimum+apogee
```

```
+requirement+was+28%2C000+km%2C+F
alcon+9+achieved+43%2C000+km.&am
p;rft.date=2017-07-06&amp;rft.au
=%40elonmusk&amp;rft_id=https%3A%
2F%2Ftwitter.com%2Felonmusk%2Fsta
tus%2F882761133177790464&amp;rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988"></span
></span>
</li>
<li id="cite_note-214"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-214">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
space.skyrocket.de/cgi-bin/searc
h.pl">"Comparing masses of all In
telsat satellites, Intelsat 35e i
s the heaviest with 6761 kg"</a>.
<i>Gunter's Space Page</i><span c
lass="reference-accessdate">. Ret
rieved <span class="nowrap">16 Au
gust</span> 2020</span>.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
```



```

kev%3Amtx%3Ajournal&rft.genre
=unknown&rft.jtitle=Gunter%27
s+Space+Page&rft.atitle=Compa
ring+masses+of+all+Intelsat+satel
lites%2C+Intelsat+35e+is+the+heav
iest+with+6761+kg&rft_id=http
s%3A%2F%2Fspace.skyrocket.de%2Fcg
i-bin%2Fsearch.pl&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-nsf-20170814-21
5"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf-20170
814_215-0"><sup><i><b>a</b></i></
sup></a> <a href="#cite_ref-nsf-2
0170814_215-1"><sup><i><b>b</b></
i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFGraham2017"
class="citation news cs1">Graha
m, William (14 August 2017). <a r
el="nofollow" class="external tex
t" href="https://www.nasaspacefli
ght.com/2017/08/spacex-falcon-9-l
aunch-crs-12-dragon-mission-is

```

```

s/">"SpaceX Falcon 9 launches CRS
-12 Dragon mission to the ISS"</a
>. NASASpaceFlight.com<span class
="reference-accessdate">. Retriev
ed <span class="nowrap">14 August
</span> 2017</span>.</cite><span
title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&amp;rft.genre=a
rticle&amp;rft.atitle=SpaceX+Falc
on+9+launches+CRS-12+Dragon+missi
on+to+the+ISS&amp;rft.date=2017-0
8-14&amp;rft.aulast=Graham&amp;rft
.aufirst=William&amp;rft_id=http
s%3A%2F%2Fwww.nasaspaceflight.co
m%2F2017%2F08%2Fspacex-falcon-9-l
aunch-crs-12-dragon-mission-iss%2
F&amp;rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88"></span></span>
</li>
<li id="cite_note-nsf-20170726-21
6"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-nsf-2017
0726_216-0">^</a></b></span> <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFGebha

```

```

rdt2017" class="citation news cs
1">Gebhardt, Chris (26 July 201
7). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2017/07/tdrs-prio
rity-crs-12-dragon-launch-dates-r
ealign/">"TDRS-M given priority o
ver CRS-12 Dragon as launch dates
realign"</a>. NASASpaceFlight.com
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">26 July</span> 2017</span>.</c
ite><span title="ctx_ver=Z39.88-2
004&amp;rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&amp;rft
.genre=article&amp;rft.atitle=TD
RS-M+given+priority+over+CRS-12+D
ragon+as+launch+dates+realign&am
p;rft.date=2017-07-26&amp;rft.aul
ast=Gebhardt&amp;rft.aufirst=Chri
s&amp;rft_id=https%3A%2F%2Fwww.na
spaceflight.com%2F2017%2F07%2Ft
drs-priority-crs-12-dragon-launch
-dates-realign%2F&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-nsf-20170819-21

```

```

7"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-nsf-2017
0819_217-0">^</a></b></span> <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFGebha
rdt2017" class="citation news cs
1">Gebhardt, Chris (19 August 201
7). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2017/08/spacex-st
atic-fire-formosat-5-falcon-9-asd
s-landing/">"SpaceX static fire F
ormosat-5 Falcon 9, aims for anot
her ASDS landing"</a>. NASASpaceF
light.com<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">20 August</span> 2017
</span>.</cite><span title="ctx_v
er=Z39.88-2004&amp;rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&amp;rft.genre=article&amp;rft
.atitle=SpaceX+static+fire+Formo
sat-5+Falcon+9%2C+aims+for+anothe
r+ASDS+landing&amp;rft.date=2017-
08-19&amp;rft.aulast=Gebhardt&am
p;rft.aufirst=Chris&amp;rft_id=ht
tps%3A%2F%2Fwww.nasaspaceflight.c
om%2F2017%2F08%2Fspacex-static-fi

```

```

re-formosat-5-falcon-9-asds-landi
ng%2F&amp;rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-eoportal-formos
at5-218"><span class="mw-cite-bac
klink"><b><a href="#cite_ref-eopo
rtal-formosat5_218-0">^</a></b></
span> <span class="reference-tex
t"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1067248974"/><cite class
="citation web cs1"><a rel="nofol
low" class="external text" href
="https://directory.eoportal.org/
web/eoportal/satellite-missions/
f/formosat-5#launch">"FormoSat-5"
</a>. European Space Agency<span
class="reference-accessdate">. R
etrieved <span class="nowrap">16
February</span> 2016</span>.</ci
te><span title="ctx_ver=Z39.88-20
04&amp;rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Abook&amp;rft.gen
re=unknown&amp;rft.btitle=FormoSa
t-5&amp;rft.pub=European+Space+Ag
ency&amp;rft_id=https%3A%2F%2Fdir
ectory.eoportal.org%2Fweb%2Feopor

```

```

tal%2Fsatellite-missions%2Ff%2Ffo
rmosat-5%23launch&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-Formosat5_homep
age-219"><span class="mw-cite-bac
klink"><b><a href="#cite_ref-Form
osat5_homepage_219-0">^</a></b></
span> <span class="reference-tex
t"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1067248974"/><cite class
="citation web cs1"><a rel="nofol
low" class="external text" href
="http://www.nspo.narl.org.tw/en2
016/projects/FORMOSAT-5/program-d
escription.html">"Formosat 5 prog
ram description"</a>. National Sp
ace Organization<span class="refe
rence-accessdate">. Retrieved <sp
an class="nowrap">3 November</spa
n> 2017</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=Formosat+5+program+d
escription&amp;rft.pub=National+S

```

pace+Organization&rft_id=htt
p%3A%2F%2Fwww.nspo.narl.org.tw%2F
en2016%2Fprojects%2FFORMOSAT-5%2F
program-description.html&rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988"></span
><sup class="noprint Inline-Templ
ate"><span style="white-space: no
wrap;">[<i><a href="/wiki/Wik
ipedia:Link_rot" title="Wikipedi
a:Link rot"><span title=" De
ad link tagged February 2021">per
manent dead link</i>&#
93;</sup>

<li id="cite_note-gunter-formosat
5-220"><span class="mw-cite-backl
ink"><a href="#cite_ref-gunter
-formosat5_220-0">^</span
> <l
ink rel="mw-deduplicated-inline-s
tyle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
Krebs" class="citation web cs1">K
rebs, Gunter. <a rel="nofollow" c
lass="external text" href="htt
p://space.skyrocket.de/doc_sdat/f
ormosat-5.htm">"Formosat-5".
Gunter's Space Page<span class

```

="reference-accessdate">. Retrieved
<span class="nowrap">24 August
</span> 2017</span>.</cite><span
  title="ctx_ver=Z39.88-2004&amp;r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&amp;rft.genre=unkn
own&amp;rft.btitle=Formosat-5&am
p;rft.pub=Gunter%27s+Space+Page&a
mp;rft.aulast=Krebs&amp;rft.aufir
st=Gunter&amp;rft_id=http%3A%2F%2
Fspace.skyrocket.de%2Fdoc_sdat%2F
formosat-5.htm&amp;rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988"></span></span>
</li>
<li id="cite_note-221"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-221">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://web.archive.org/web/201703031
24033/http://www.spaceflight.com/
message-spaceflight-president-cur
t-blake-formosat-5sherpa-launc
h/">"A Message from Spaceflight P

```



```
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSeemangal2017" class="citation web cs1">Seemangal, Robin (24 August 2017). <a rel="nofollow" class="external text" href="https://www.wired.com/story/spacex-will-lose-millions-on-its-taiwanese-satellite-launch/">"SpaceX Will Lose Millions on Its Taiwanese Satellite Launch"</a>. <i>Wired</i>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Wired&amp;rft.atitle=SpaceX+Will+Lose+Millions+on+Its+Taiwanese+Satellite+Launch&amp;rft.date=2017-08-24&amp;rft.aulast=Seemangal&amp;rft.aufirst=Robin&amp;rft_id=https%3A%2F%2Fwww.wired.com%2Fstory%2Fspace-x-will-lose-millions-on-its-taiwanese-satellite-launch%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>></span></li>
```

```
<li id="cite_note-223"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-223">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (7 September 20
17). <a rel="nofollow" class="ext
ernal text" href="https://spacefl
ightnow.com/2017/09/07/spacex-bea
ts-hurricane-with-smooth-launch-o
f-militarys-x-37b-spaceplane/">"S
paceX beats hurricane with smooth
launch of military's X-37B spacep
lane"</a>. Spaceflight Now<span c
lass="reference-accessdate">. Ret
rieved <span class="nowrap">7 Sep
tember</span> 2017</span>.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Abook&amp;rft.genre=
unknown&amp;rft.btitle=SpaceX+bea
ts+hurricane+with+smooth+launch+o
f+military%27s+X-37B+spaceplane&a
mp;rft.pub=Spaceflight+Now&amp;rft
.date=2017-09-07&amp;rft.aulast=
Clark&amp;rft.aufirst=Stephen&am
p;rft_id=https%3A%2F%2Fspacefligh
```

tnow.com%2F2017%2F09%2F07%2Fspace-x-beats-hurricane-with-smooth-launch-of-militarys-x-37b-spaceplane%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-224">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFRichardson2017" class="citation web cs1">Richardson, Derek (6 September 2017). "As Hurricane Irma looms, X-37B poised for first flight atop SpaceX Falcon 9". Spaceflight Insider. Retrieved 7 September 2017</cite><span title="ctx_ver=Z39.88-2004&

```

rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=As+Hurricane+Irma+looms%2C+X-37B+poised+for+first+flight+atop+SpaceX+Falcon+9&rft.pub=Spaceflight+Insider&rft.date=2017-09-06&rft.auiast=Richardson&rft.aufirst=Derek&rft_id=http%3A%2F%2Fwww.spaceflightinsider.com%2Forganizations%2Fspace-exploration-technologies%2Fx-37b-set-first-launch-atop-spacex-falcon-9%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-cnbc_2017_06_06-225"><span class="mw-cite-backlink"><b><a href="#cite_ref-cnbc_2017_06_06_225-0">^</a></b></span>
  <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://web.archive.org/web/20170607023011/https://www.cnn.com/2017/0

```

6/06/spacex-launches-us-air-force-x-37b-space-plane.html">"SpaceX wins launch of U.S. Air Force X-37B space plane". CNBC. 6 June 2017. Archived from the original on 7 June 2017. Retrieved 7 June 2017.</cite><li id="cite_note-nsf-20170607-226"><a href="#cite_ref-nsf-2017

0607_226-0">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGebhardt2017" class="citation news cs 1">Gebhardt, Chris (7 June 2017). "Bulgariasat launch realigns; SpaceX secures X-37B launch contract". NASASpaceFlight.com. Retrieved 9 July 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Bulgariasat+launch+realigns%3B+SpaceX+secures+X-37B+launch+contract&rft.date=2017-06-07&rft.aulast=Gebhardt&rft.aufirst=Chris&rft_id=https%3A%2F%2Fwww.nasaspacespaceflight.com%2F2017%2F06%2Fbulgariasat-launch-spacex-secures-x-37b-contract%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+F

alcon+9+and+Falcon+Heavy+launches" class="Z3988">

 <li id="cite_note-nsf-20170925-227">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBergin2017" class="citation news cs1">Bergin, Chris (25 September 2017). "SpaceX realign near-term manifest a head of double launch salvo". NASASpaceFlight.com. Retrieved 3 October 2017.</cite>


```

mtx%3Ajournal&rft.genre=artic
le&rft.atitle=SpaceX+realign+
near-term+manifest+ahead+of+doubl
e+launch+salvo&rft.date=2017-
09-25&rft.aulast=Bergin&r
ft.aufirst=Chris&rft_id=http
s%3A%2F%2Fwww.nasaspaceflight.co
m%2F2017%2F09%2Fspacex-realign-ma
nifest-double-launch-salvo%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-ses11-reuse-22
8"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-ses11-reu
se_228-0"><sup><i><b>a</b></i></s
up></a> <a href="#cite_ref-ses11-
reuse_228-1"><sup><i><b>b</b></i>
</sup></a></span> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite id="CITEREFClark2017" class
="citation news cs1">Clark, Steph
en (4 August 2017). <a rel="nofol
low" class="external text" href
="https://spaceflightnow.com/201
7/08/04/ses-agrees-to-launch-anot

```

her-satellite-on-a-previously-flown-falcon-9-booster/">"SES agrees to launch another satellite on previously-flown Falcon 9 booster". Spaceflight Now. Retrieved 4 August 2017.</cite>

<li id="cite_note-229">^<link rel="mw-deduplicated-inline-sty

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (12 October 201
7). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2017/10/12/spacex-laun
ches-its-15th-mission-of-the-yea
r/">"SpaceX launches its 15th mis
sion of the year"</a>. Spacefligh
t Now.</cite><span title="ctx_ver
=Z39.88-2004&amp;rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&amp;rft.bti
tle=SpaceX+launches+its+15th+miss
ion+of+the+year&amp;rft.pub=Space
flight+Now&amp;rft.date=2017-10-1
2&amp;rft.aulast=Clark&amp;rft.au
first=Stephen&amp;rft_id=https%3
A%2F%2Fspaceflightnow.com%2F2017%
2F10%2F12%2Fspacex-launches-its-1
5th-mission-of-the-year%2F&amp;rf
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-spacenews201405
12-230"><span class="mw-cite-back
link"><b><a href="#cite_ref-space

```

news20140512_230-0">^
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFde_Selding2014" class="citation web cs1">de Selding, Peter B. (12 May 2014). "KT Sat Picks Thales Alenia over Orbital Sciences for Two-satellite Order".

SpaceNews. Retrieved 17 December 2014.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=KT+Sat+Picks+Thales+Alenia+over+Orbital+Sciences+for+Two-satellite+Order&rft.pub=SpaceNews&rft.date=2014-05-12&rft.aulast=de+Selding&rft.aufirst=Peter+B.&rft_id=http%3A%2F%2Fspacenews.com%2F40540kt-sat-picks-thales-alenia-over-orbital-sciences-for-two-satellite%2F&

```
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span></span>
</li>
<li id="cite_note-koreasat5a-23
1"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-koreasat
5a_231-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFLeahy20
17" class="citation web cs1">Leah
y, Bart (25 September 2017). <a r
el="nofollow" class="external tex
t" href="http://www.spaceflightin
sider.com/organizations/space-exp
loration-technologies/spacex-gear
s-up-busy-autumn/">"SpaceX gears
up for a busy autumn"</a>. Space
flight Insider<span class="refere
nce-accessdate">. Retrieved <span
class="nowrap">25 September</span
> 2017</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=SpaceX+gears+up+for+
a+busy+autumn&amp;rft.pub=Spacefl
```

```

ight+Insider&amp;rft.date=2017-09
-25&amp;rft.aulast=Leahy&amp;rft.
aufirst=Bart&amp;rft_id=http%3A%2
F%2Fwww.spaceflightinsider.com%2F
organizations%2Fspace-exploration
-technologies%2Fspacex-gears-up-b
usy-autumn%2F&amp;rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988"></span></span>
</li>
<li id="cite_note-232"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-232">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (30 October 201
7). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2017/10/30/spacex-laun
ches-and-lands-third-rocket-in-th
ree-weeks/">"SpaceX launches – an
d lands – third rocket in three w
eeks"</a>. Spaceflight Now.</cite
><span title="ctx_ver=Z39.88-2004
&amp;rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&amp;rft.genr

```

```

e=unknown&rft.btitle=SpaceX+la
unches+%E2%80%94+and+lands+%E2%8
0%94+third+rocket+in+three+weeks&
amp;rft.pub=Spaceflight+Now&r
ft.date=2017-10-30&rft.aulast
=Clark&rft.aufirst=Stephen&am
p;rft_id=https%3A%2F%2Fspacefligh
tnow.com%2F2017%2F10%2F30%2Fspace
x-launches-and-lands-third-rocket
-in-three-weeks%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-233"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-233">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
web.archive.org/web/2018040705373
2/https://dailyenterpriser.com/sp
acex-falcon-9-block-5-will-certain
ly-introduce-brand-new-age-fast-
reuse-rockets-1463.html">"SpaceX
Falcon 9 Block 5 will certainly

```

introduce a brand-new age of fast reuse rockets". Daily Enterpriser. 25 March 2018. Archived from the original on 7 April 2018. Retrieved 7 April 2018.</cite>


```
<li id="cite_note-234"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-234">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (15 December 20
17). <a rel="nofollow" class="ext
ernal text" href="https://spacefl
ightnow.com/2017/12/15/spacexs-50
th-falcon-rocket-launch-kicks-off
-station-resupply-mission/">"Spac
eX's 50th Falcon rocket launch ki
cks off station resupply mission"
</a>. Spaceflight Now<span class
="reference-accessdate">. Retriev
ed <span class="nowrap">16 Decemb
er</span> 2017</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX%27s+50t
h+Falcon+rocket+launch+kicks+off+
station+resupply+mission&rft.
pub=Spaceflight+Now&rft.date=
2017-12-15&rft.aulast=Clark&
mp;rft.aufirst=Stephen&rft_id
=https%3A%2F%2Fspaceflightnow.co
```

```

m%2F2017%2F12%2F15%2Fspacexs-50th
-falcon-rocket-launch-kicks-off-s
tation-resupply-mission%2F&rf
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-nsf-20171111-23
5"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf-20171
111_235-0"><sup><i><b>a</b></i></
sup></a> <a href="#cite_ref-nsf-2
0171111_235-1"><sup><i><b>b</b></
i></sup></a> <a href="#cite_ref-n
sf-20171111_235-2"><sup><i><b>c</
b></i></sup></a></span> <span cla
ss="reference-text"><link rel="mw
-deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREFGebhardt20
17" class="citation web cs1">Gebh
ardt, Chris (11 November 2017). <
a rel="nofollow" class="external
text" href="https://www.nasaspac
eflight.com/2017/11/spacex-static
-fire-zuma-falcon-9-engine-no-iss
ue-manifest/">"SpaceX static fire
s Zuma Falcon 9; engine test anom
aly no issue for manifest"</a>. N

```

ASASpaceFlight.com. Retrieved 12 November 2017.</cite><li id="cite_note-236">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGrush2017" class="citation web cs

1">Grush, Loren (15 December 2017). "SpaceX launches and lands its first used rocket for NASA". The Verge. Retrieved 15 December 2017.</cite><li id="cite_note-sfn_iridium4-237"><span class="mw-cite-backlin

```

k"><b><a href="#cite_ref-sfn_iridium4_237-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2017" class="citation web cs1">Clark, Stephen (22 December 2017). <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2017/12/22/falcon-9-iridium-next-4-mission-status-center/">"SpaceX's Falcon 9 rocket makes its final launch of the year"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">22 December</span> 2017</span></cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX%27s+Falcon+9+rocket+makes+its+final+launch+of+the+year&rft.pub=Spaceflight+Now&rft.date=2017-12-22&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2017%2F12%2F22%2Ffalcon-9-iridium-next-4-mission-status-center%2F&rfr

```

```

_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-Iridium_NEXT-4_SN-238"><span class="mw-cite-backlink">^ <a href="#cite_ref-Iridium_NEXT-4_SN_238-0"><sup><i><b>a</b></i></sup></a> <a href="#cite_ref-Iridium_NEXT-4_SN_238-1"><sup><i><b>b</b></i></sup></a></span>
  <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFHenry2017" class="citation web cs1">Henry, Caleb (22 December 2017). <a rel="nofollow" class="external text" href="https://spacenews.com/spacex-concludes-2017-with-fourth-iridium-next-launch/">"SpaceX concludes 2017 with fourth Iridium Next launch - SpaceNews.com"</a>. <i>spacenews.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">25 July</span> 2018</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3A

```

```

kev%3Amtx%3Ajournal&rft.genre
=unknown&rft.jtitle=spacene
s.com&rft.atitle=SpaceX+concl
udes+2017+with+fourth+Iridium+Nex
t+launch+-+SpaceNews.com&rft.
date=2017-12-22&rft.aulast=He
nry&rft.aufirst=Caleb&rft
_id=https%3A%2F%2Fspacenews.com%2
Fspacex-concludes-2017-with-fourt
h-iridium-next-launch%2F&rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988"></span
></span>
</li>
<li id="cite_note-239"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-239">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2017" class="citation web cs
1">Clark, Stephen (23 December 20
17). <a rel="nofollow" class="ext
ernal text" href="https://spacefl
ightrightnow.com/2017/12/23/spacex-lau
nch-dazzles-delivering-10-more-sa
tellites-for-iridium/">"SpaceX la
unch dazzles, delivering 10 more

```

satellites for Iridium". Spaceflight Now.

<li id="cite_note-nsf_iridium-240">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGebhardt2017" class="citation news cs1">Gebhardt, Chris (19 October 2017). <a rel="nofollow" class="exte


```

rnal text" href="https://www.nasa
spaceflight.com/2017/10/iridium-4
-flight-proven-falcon-9-rtls-vand
enberg-delayed/">"Iridium-4 switc
hes to flight-proven Falcon 9, RT
LS at Vandenberg delayed"</a>. NA
SASpaceFlight.com<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">19 October</sp
an> 2017</span>.</cite><span titl
e="ctx_ver=Z39.88-2004&amp;rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&amp;rft.genre=article
&amp;rft.atitle=Iridium-4+switche
s+to+flight-proven+Falcon+9%2C+RT
LS+at+Vandenberg+delayed&amp;rft.
date=2017-10-19&amp;rft.aulast=Ge
bhardt&amp;rft.aufirst=Chris&amp;
rft_id=https%3A%2F%2Fwww.nasaspac
eflight.com%2F2017%2F10%2Firidium
-4-flight-proven-falcon-9-rtls-va
ndenberg-delayed%2F&amp;rfr_id=in
fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></span></sp
an>
</li>
<li id="cite_note-241"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-241">^</a></b></span>

```

```

<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFWa
ll2017" class="citation news cs
1">Wall, Mike (22 December 2017).
<a rel="nofollow" class="external
text" href="https://www.space.co
m/39184-spacex-used-rocket-satell
ite-launch-landing.html">"Used Sp
aceX Rocket Launches 10 Communica
tions Satellites Once Again"</a>.
Space.com<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">23 December</span> 201
7</span>.</cite><span title="ctx_
ver=Z39.88-2004&amp;rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&amp;rft.genre=article&amp;rft
.atitle=Used+SpaceX+Rocket+Launc
hes+10+Communications+Satellites+
Once+Again&amp;rft.date=2017-12-2
2&amp;rft.aulast=Wall&amp;rft.auf
irst=Mike&amp;rft_id=https%3A%2F%
2Fwww.space.com%2F39184-spacex-us
ed-rocket-satellite-launch-landin
g.html&amp;rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>

```

```
</li>
<li id="cite_note-242"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-242">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFMa
lik2017" class="citation news cs
1">Malik, Tariq (23 December 201
7). <a rel="nofollow" class="exte
rnal text" href="https://www.spac
e.com/39197-spacex-spectacular-ro
cket-launch-views.html">"SpaceX's
Jaw-Dropping Rocket Launch Wows S
pectators Across Southern Califor
nia"</a>. Space.com<span class="r
eference-accessdate">. Retrieved
<span class="nowrap">23 December
</span> 2017</span>.</cite><span
title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX%27s+Jaw-Dropping+Rocket+Launch+Wows+Spectators+Across+Southern+California&rft.date=2017-12-23&rft.aulast=Malik&rft.aufirst=Tariq&rft_id=https%3A%2F%2Fwww.space.com%2F39197-spacex-specta
```

```
cular-rocket-launch-views.html&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-243"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-243">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http://
spacenews.com/spacex-aims-to-foll
ow-a-banner-year-with-an-even-fas
ter-2018-launch-cadence/">"SpaceX
aims to follow a banner year with
an even faster 2018 launch cadenc
e"</a>. SpaceNews. 21 November 20
17<span class="reference-accessda
te">. Retrieved <span class="nowr
ap">22 November</span> 2017</span
>.</cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=article&amp;rft.atit
le=SpaceX+aims+to+follow+a+banner
+year+with+an+even+faster+2018+la
```

```

unch+cadence&rft.date=2017-11
-21&rft_id=http%3A%2F%2Fspace
news.com%2Fspacex-aims-to-follow-
a-banner-year-with-an-even-faster
-2018-launch-cadence%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988"></span>
</span>
</li>
<li id="cite_note-244"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-244">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
space.skyrocket.de/doc_chr/lau201
8.htm">"Orbital Launches of 2018"
</a>. Gunter's Space Page<span cl
ass="reference-accessdate">. Retr
ieved <span class="nowrap">11 Jan
uary</span> 2020</span>.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Orbital+Laun
ches+of+2018&rft.pub=Gunter%2

```

```

7s+Space+Page&rft_id=https%3
A%2F%2Fspace.skyrocket.de%2Fdoc_c
hr%2F1au2018.htm&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988"></span></span>
</li>
<li id="cite_note-245"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-245">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFWa
ll2018" class="citation web cs1">
Wall, Mike (7 January 2018). <a r
el="nofollow" class="external tex
t" href="https://www.space.com/38
826-spacex-launches-secret-zuma-m
ission-lands-rocket.html">"SpaceX
Launches Secret Zuma Mission for
U.S. Government, Lands Rocket"</
a>. Space.com<span class="referen
ce-accessdate">. Retrieved <span
class="nowrap">24 April</span> 2
018</span>.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ab
ook&rft.genre=unknown&rft
t.btitle=SpaceX+Launches+Secret+Z

```

```

uma+Mission+for+U.S.+Government%2
C+Lands+Rocket&amp;rft.pub=Space.
com&amp;rft.date=2018-01-07&amp;r
ft.aulast=Wall&amp;rft.aufirst=Mi
ke&amp;rft_id=https%3A%2F%2Fwww.s
pace.com%2F38826-spacex-launches-
secret-zuma-mission-lands-rocket.
html&amp;rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-zuma-246"><span
class="mw-cite-backlink">^ <a hre
f="#cite_ref-zuma_246-0"><sup><i>
<b>a</b></i></sup></a> <a href="#
cite_ref-zuma_246-1"><sup><i><b>b
</b></i></sup></a> <a href="#cite
_ref-zuma_246-2"><sup><i><b>c</b>
</i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFGebhardt201
7" class="citation news cs1">Gebh
ardt, Chris (16 October 2017). <a
rel="nofollow" class="external te
xt" href="https://www.nasaspacefl
ight.com/2017/10/spacex-zuma-irid
ium-4-aims-vandenberg-landing/?

```

```

1">"SpaceX adds mystery "Zuma" mission, Iridium-4 aims for Vandenberg landing"</a>. NASASpaceFlight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">17 October</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+adds+mystery+%22Zuma%22+mission%2C+Iridium-4+aims+for+Vandenberg+landing&amp;rft.date=2017-10-16&amp;rft.aulast=Gebhardt&amp;rft.aufirst=Chris&amp;rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2017%2F10%2Fspacex-zuma-iridium-4-aims-vandenberg-landing%2F%3F1&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-247"><span class="mw-cite-backlink"><b><a href="#cite_ref-247">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFCl

```



```
ark2017" class="citation news cs
1">Clark, Stephen (15 October 201
7). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2017/10/14/regulatory-
filings-suggest-spacex-plans-nove
mber-launch-with-mystery-payloa
d/">"Regulatory filings suggest S
paceX plans November launch with
mystery payload"</a>. Spacefligh
t Now<span class="reference-acces
sdate">. Retrieved <span class="n
owrap">15 October</span> 2017</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&amp;rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&amp;rft.ati
tle=Regulatory+filings+suggest+Sp
aceX+plans+November+launch+with+m
ystery+payload&amp;rft.date=2017-
10-15&amp;rft.aulast=Clark&amp;rft
.aufirst=Stephen&amp;rft_id=http
s%3A%2F%2Fspaceflightnow.com%2F20
17%2F10%2F14%2Fregulatory-filings
-suggest-spacex-plans-november-la
unch-with-mystery-payload%2F&amp;
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span></span>
```

```
</li>
<li id="cite_note-248"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-248">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSp
aceX2017" class="citation web cs
1">SpaceX (29 September 2017). <a
rel="nofollow" class="external te
xt" href="https://apps.fcc.gov/oe
tcf/els/reports/STA_Print.cfm?mod
e=current&application_seq=805
68">"Federal Communications Commi
ssion – Application for Special T
emporary Authority"</a>. FCC<span
class="reference-accessdate">. Re
trieved <span class="nowrap">14 O
ctober</span> 2017</span>.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Abook&application_seq=
unknown&rft.btitle=Federal+Co
mmunications+Commission+%E2%80%93
+Application+for+Special+Temporar
y+Authority&rft.pub=FCC&rft.date=2017-09-29&rft.au=Spa
ceX&rft_id=https%3A%2F%2Fapp
s.fcc.gov%2Foetcf%2Fels%2Freport
```

```
s%2FSTA_Print.cfm%3Fmode%3Dcurrent%26application_seq%3D80568&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public_domain" title="Public domain">public domain</a></i><i>.</i></span></li><li id="cite_note-250"><span class="mw-cite-backlink"><b><a href="#cite_ref-250">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSh
```

```

otwell2018" class="citation web c
s1"><a href="/wiki/Gwynne_Shotwel
l" title="Gwynne Shotwell">Shotwe
ll, Gwynne</a> (9 January 2018).
  <a rel="nofollow" class="externa
l text" href="http://spaceref.co
m/news/viewpr.html?pid=52053">"St
atement From Gwynne Shotwell, Pre
sident and COO of SpaceX on Zuma
Launch"</a>. SpaceRef.com<span c
lass="reference-accessdate">. Ret
rieved <span class="nowrap">23 Ja
nuary</span> 2018</span>.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&amp;rft.genre=u
nknown&amp;rft.btitle=Statement+F
rom+Gwynne+Shotwell%2C+President+
and+COO+of+SpaceX+on+Zuma+Launch&
amp;rft.pub=SpaceRef.com&amp;rft.
date=2018-01-09&amp;rft.aulast=Sh
otwell&amp;rft.aufirst=Gwynne&am
p;rft_id=http%3A%2F%2Fspaceref.co
m%2Fnews%2Fviewpr.html%3Fpid%3D52
053&amp;rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988"></span></span>
</li>
<li id="cite_note-zuma-presskit2-

```

251">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Zuma Mission press kit" (PDF). SpaceX. Archived from the original (PDF) on 7 January 2018. Retrieved 7 January 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=

```

Zuma+Mission+press+kit&#x26;rft.pu
b=SpaceX&#x26;rft_id=http%3A%2F%2F
www.spacex.com%2Fsites%2Fspacex%2
Ffiles%2Fzumapresskit_2018.pdf&#x
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-ZumaVerge2-25
2"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-ZumaVerge
2_252-0"><sup><i><b>a</b></i></su
p></a> <a href="#cite_ref-ZumaVer
ge2_252-1"><sup><i><b>b</b></i></
sup></a> <a href="#cite_ref-ZumaV
erge2_252-2"><sup><i><b>c</b></i>
</sup></a> <a href="#cite_ref-Zum
aVerge2_252-3"><sup><i><b>d</b></
i></sup></a> <a href="#cite_ref-Z
umaVerge2_252-4"><sup><i><b>e</b>
</i></sup></a> <a href="#cite_ref
-ZumaVerge2_252-5"><sup><i><b>f</
b></i></sup></a></span> <span cla
ss="reference-text"><link rel="mw
-deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREFGrush2018"
class="citation news cs1">Grush,
Loren (9 January 2018). <a rel

```

```
= "nofollow" class="external text"
href="https://www.theverge.com/20
18/1/9/16866806/spacex-zuma-missi
on-failure-northrop-grumman-class
ified-falcon-9-rocket">"Did Space
X's secret Zuma mission actually
fail?"</a>. The Verge<span class
="reference-accessdate">. Retriev
ed <span class="nowrap">10 Januar
y</span> 2018</span>. <q>Rumors s
tarted circulating on Monday that
the satellite malfunctioned when
it reached orbit, and both the <
i>Wall Street Journal</i> and <i>
Bloomberg</i> have reported that
Zuma actually fell back to Earth
and burned up in the planet's atm
osphere. [...] SpaceX said that t
he Falcon 9 rocket, which carried
Zuma to orbit, performed as it wa
s supposed to. [...] "For clarit
y: after review of all data to da
te, Falcon 9 did everything corre
ctly on Sunday night", [Gwynne Sh
otwell] said. "If we or others fi
nd otherwise based on further rev
iew, we will report it immediatel
y. Information published that is
contrary to this statement is ca
tegorically false". She added tha
```

t the company cannot comment further due to the classified nature of the mission. [...] Of course, Northrop Grumman won't comment on the launch.

<li id="cite_note-253">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2018" class="citation news cs1">Clark, Stephen (30 January 201


```

8). <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2018/01/30/falcon-9-govsat-1-mission-status-center/">"SpaceX scrubs Falcon 9 launch attempt"</a>. SpaceFlight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">31 January</span> 2018</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+scrubs+Falcon+9+launch+attempt&amp;rft.date=2018-01-30&amp;rft.aualst=Clark&amp;rft.aufirst=Stephen&amp;rft_id=https%3A%2F%2Fspaceflightnow.com%2F2018%2F01%2F30%2Ffalcon-9-govsat-1-mission-status-center%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-sfn-20180111-254"><span class="mw-cite-backlink">^ <a href="#cite_ref-sfn-20180111_254-0"><sup><i><b>a</b></i></sup></a> <a href="#cite_ref-sfn-20180111_254-1"><sup><i><b>b</b></i></sup></a>

```

```

i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFClark2018" c
lass="citation news cs1">Clark, S
tephen (11 January 2018). <a rel
="nofollow" class="external text"
href="https://spaceflightnow.com/
2018/01/11/after-zuma-spacex-keep
s-pace-in-preps-for-next-falcon-9
-launch/">"After Zuma, SpaceX kee
ps pace in preps for next Falcon
  9 launch"</a>. Spaceflight Now<s
pan class="reference-accessdat
e">. Retrieved <span class="nowra
p">11 January</span> 2018</span>.
</cite><span title="ctx_ver=Z39.8
8-2004&amp;rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Ajournal&am
p;rft.genre=article&amp;rft.atitl
e=After+Zuma%2C+SpaceX+keeps+pace
+in+preps+for+next+Falcon+9+launc
h&amp;rft.date=2018-01-11&amp;rft
t.au1ast=Clark&amp;rft.au1first=St
ephen&amp;rft_id=https%3A%2F%2Fsp
aceflightnow.com%2F2018%2F01%2F1
1%2Fafter-zuma-spacex-keeps-pace-
in-preps-for-next-falcon-9-launc
h%2F&amp;rfr_id=info%3Asid%2Fen.w

```

```
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-ses20150225-25
5"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-ses20150
225_255-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFPayer20
15" class="citation pressrelease
cs1">Payer, Marcus (25 February
2015). <a rel="nofollow" class
="external text" href="https://ww
w.ses.com/press-release/ses-annou
nces-two-launch-agreements-space
x">"SES announces two launch agre
ements with SpaceX"</a> (Press re
lease). SES (SES S.A.)<span class
="reference-accessdate">. Retriev
ed <span class="nowrap">26 Decemb
er</span> 2017</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SES+announces+
two+launch+agreements+with+SpaceX
&rft.pub=SES+%28SES+S.A.%29&a
```

```

mp;rft.date=2015-02-25&rft.au
last=Payer&rft.aufirst=Marcus
&rft_id=https%3A%2F%2Fwww.se
s.com%2Fpress-release%2Fses-annou
nces-two-launch-agreements-spacex
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-256"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-256">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKr
ebs" class="citation web cs1">Kre
bs, Gunter. <a rel="nofollow" cla
ss="external text" href="http://s
pace.skyrocket.de/doc_sdat/ses-1
6.htm">"GovSat-1 (SES-16)"</a>. G
unter's Space Page<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">6 October</sp
an> 2019</span>.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=GovSat-1+%28SES-16%2

```

```

9&rft.pub=Gunter%27s+Space+Pa
ge&rft.aulast=Krebs&rft.a
ufirst=Gunter&rft_id=http%3A%
2F%2Fspace.skyrocket.de%2Fdoc_sda
t%2Fses-16.htm&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988"></span></span>
</li>
<li id="cite_note-Govsat_SN-257">
<span class="mw-cite-backlink">^
  <a href="#cite_ref-Govsat_SN_257
-0"><sup><i><b>a</b></i></sup></a
> <a href="#cite_ref-Govsat_SN_25
7-1"><sup><i><b>b</b></i></sup></
a></span> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFHenry2018" class="citati
on web cs1">Henry, Caleb (31 Janu
ary 2018). <a rel="nofollow" clas
s="external text" href="https://s
pacenews.com/spacex-launches-govs
at-1-with-previously-flown-falcon
-9-booster/">"SpaceX launches Gov
Sat-1 with previously flown Falco
n 9 booster"</a>. <i>spacenews.co
m</i>. SpaceNews<span class="refe
rence-accessdate">. Retrieved <sp

```

```

an class="nowrap">25 July</span>
  2018</span>.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=spacenews.com&am
p;rft.atitle=SpaceX+launches+GovS
at-1+with+previously+flown+Falcon
+9+booster&rft.date=2018-01-3
1&rft.aulast=Henry&rft.au
first=Caleb&rft_id=https%3A%2
F%2Fspacenews.com%2Fspacex-launch
es-govsat-1-with-previously-flown
-falcon-9-booster%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></span></s
pan>
</li>
<li id="cite_note-258"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-258">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSa
ggio2019" class="citation web cs
1">Saggio, Jessica (5 September 2
019). <a rel="nofollow" class="ex
ternal text" href="https://www.us

```

```
atoday.com/story/tech/nation-now/2018/02/05/gently-used-spacex-rocket-sale-craigslist-did-elon-musk-post-there/309293002/">"A "gently used" SpaceX rocket is for sale on Craigslist. Did Elon Musk post it there?"</a>. <i>USA Today</i><span class="reference-accessdate">. Retrieved <span class="nowrap">22 July</span> 2019</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=USA+Today&amp;rft.atitle=A+%22gently+used%22+SpaceX+rocket+is+for+sale+on+Craigslist.+Did+Elon+Musk+post+it+there%3F&amp;rft.date=2019-09-05&amp;rft.aulast=Saggio&amp;rft.aufirst=Jessica&amp;rft_id=https%3A%2F%2Fwww.usatoday.com%2Fstory%2Ftech%2Fnation-now%2F2018%2F02%2F05%2Fgently-used-spacex-rocket-sale-craigslist-did-elon-musk-post-there%2F309293002%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>
```

```
<li id="cite_note-259"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-259">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@E
mreKelly2018" class="citation web
cs1">@EmreKelly (9 February 201
8). <a rel="nofollow" class="exte
rnal text" href="https://twitter.
com/EmreKelly/status/962089727871
643649">"Full SpaceX statement on
#GovSat1: "While the Falcon 9 fir
st stage for the GovSat-1 mission
was expendable, it initially surv
ived splashdown in the Atlantic O
cean. However, the stage broke ap
art before we could complete an u
nplanned recovery effort for this
mission"<span class="cs1-kern-rig
ht"></span>"</a> (Tweet) &#8211;
  via <a href="/wiki/Twitter" titl
e="Twitter">Twitter</a>.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&amp;rft.genre=un
known&amp;rft.btitle=Full+SpaceX+
statement+on+%23GovSat1%3A+%22Whi
le+the+Falcon+9+first+stage+for+t
```


he+GovSat-1+mission+was+expendabl
e%2C+it+initially+survived+splash
down+in+the+Atlantic+Ocean.+Howev
er%2C+the+stage+broke+apart+befor
e+we+could+complete+an+unplanned+
recovery+effort+for+this+mission%
22.&rft.date=2018-02-09&r
ft.au=%40EmreKelly&rft_id=htt
ps%3A%2F%2Ftwitter.com%2FEmreKell
y%2Fstatus%2F962089727871643649&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-260"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
forum.nasaspaceflight.com/index.p
hp?topic=36807.220">"SpaceX Falco
n 9: GovSat-1 (SES-16): 31 Januar
y 2018 - Discussion". <i>nasa
spaceflight.com</i><span class="r
eference-accessdate">. Retrieved

25 March
2020.

^

<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Luxembourg's GovSat-1 in Orbit after Flawless Boost by Flight-Proven SpaceX Falcon 9". <i>spaceflight101.

com</i>. Retrieved 25 March 2020.</cite>

<li id="cite_note-262">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF@elonmusk2018" class="citation web cs1">@elonmusk (6 February 2018). <a rel="nofollow" class="external text" href="https://twitter.com/elonmusk/status/9609492449820

```

18049">"Launch auto-sequence init
iated (aka the holy mouse-click)
  for 03:45 liftoff #FalconHeavy"
</a> (Tweet) &#8211; via <a href
="/wiki/Twitter" title="Twitter">
Twitter</a>.</cite><span title="c
tx_ver=Z39.88-2004&amp;rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&amp;rft.genre=unknown&amp;rft
.btitle=Launch+auto-sequence+ini
tiated+%28aka+the+holy+mouse-clic
k%29+for+03%3A45+liftoff+%23Falcon
Heavy&amp;rft.date=2018-02-06&am
p;rft.au=%40elonmusk&amp;rft_id=h
ttps%3A%2F%2Ftwitter.com%2Felonmu
sk%2Fstatus%2F960949244982018049&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-263"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-263">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBe
rger2017" class="citation news cs
1">Berger, Eric (4 December 201

```

```

7). <a rel="nofollow" class="external text" href="https://arstechnica.com/science/2017/12/with-bowie-playing-on-the-radio-elon-musk-plans-to-launch-his-tesla-to-mars/">"SpaceX will attempt to launch a red Tesla to the red planet Mars"</a>. Ars Technica<span class="reference-accessdate">. Retrieved <span class="nowrap">4 December</span> 2017</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+will+attempt+to+launch+a+red+Tesla+to+the+red+planet+Mars&rft.date=2017-12-04&rft.aulast=Berger&rft.aufirst=Eric&rft_id=https%3A%2F%2Farstechnica.com%2Fscience%2F2017%2F12%2Fwith-bowie-playing-on-the-radio-elon-musk-plans-to-launch-his-tesla-to-mars%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-264"><span class="mw-cite-backlink"><b><a href

```

```
= "#cite_ref-264">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFFo  
ust2018" class="citation web cs  
1">Foust, Jeff (5 February 2018).  
<a rel="nofollow" class="external  
text" href="http://spacenews.com/  
spacex-set-for-falcon-heavy-debu  
t/">"SpaceX set for Falcon Heavy  
debut"</a>. SpaceNews<span class  
="reference-accessdate">. Retriev  
ed <span class="nowrap">6 October  
</span> 2019</span>.</cite><span  
title="ctx_ver=Z39.88-2004&amp;r  
ft_val_fmt=info%3Aofi%2Ffmt%3Ake  
v%3Amtx%3Abook&amp;rft.genre=unkn  
own&amp;rft.btitle=SpaceX+set+for  
+Falcon+Heavy+debut&amp;rft.pub=S  
paceNews&amp;rft.date=2018-02-05&  
amp;rft.aulast=Foust&amp;rft.aufi  
rst=Jeff&amp;rft_id=http%3A%2F%2F  
spacenews.com%2Fspacex-set-for-fa  
lcon-heavy-debut%2F&amp;rfr_id=in  
fo%3Asid%2Fen.wikipedia.org%3AList  
+of+Falcon+9+and+Falcon+Heavy+la  
unches" class="Z3988"></span></sp  
an>  
</li>
```

```

<li id="cite_note-teslaorbit-26
5"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-teslaorbi
t_265-0"><sup><i><b>a</b></i></su
p></a> <a href="#cite_ref-teslaor
bit_265-1"><sup><i><b>b</b></i></
sup></a></span> <span class="refe
rence-text"><link rel="mw-dedupli
cated-inline-style" href="mw-dat
a:TemplateStyles:r1067248974"/><c
ite class="citation web cs1"><a r
el="nofollow" class="external tex
t" href="https://ssd.jpl.nasa.go
v/horizons_batch.cgi?batch=1&
COMMAND=-143205">"Tesla Roadster
(AKA: Starman, 2018-017A)"</a>.
<i>ssd.jpl.nasa.gov</i>. NASA. 1
March 2018<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">15 March</span> 2018
</span>.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=unknown&rft
.jtitle=ssd.jpl.nasa.gov&rft
.atitle=Tesla+Roadster+%28AKA%3A
+Starman%2C+2018-017A%29&rft.
date=2018-03-01&rft_id=https%
3A%2F%2Fssd.jpl.nasa.gov%2Fhorizo
ns_batch.cgi%3Fbatch%3D1%26COMMAN

```

D%3D-143205&rf_rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches"
class="Z3988"> <i>This article incorporates text from this source, which is in the public domain</i> <i>.</i>

<li id="cite_note-NYT_Heavy-266">
^
^{<i>a</i>}
> ^{<i>b</i>}
^{<i>c</i>}

 <link rel="mw-deduplicate-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFChang2018" class="citation news cs1">Chang, Kenneth (6 February 2018). "Falcon Heavy, SpaceX's Big New Rocket, Succeeds in Its First Test Launch". <i>The New York Times</i>. Retrieved 6 February 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=The+New+York+Times&rft.atitle=Falcon+Heavy%2C+SpaceX%27s+Big+New+Rocket%2C+Succeeds+in+Its+First+Test+Launch&rft.date=2018-02-06&rft.aulast=Chang&rft.aufirst=Kenneth&rft._id=https%3A%2F%2Fwww.nytimes.com%2F2018%2F02%2F06%2Fscience%2Ffalcon-heavy-spacex-launch.html&rfr_id=info%3Asid%2Fen.wikipedia

```

a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-267"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-267">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGe
bhardt2017" class="citation news
cs1">Gebhardt, Chris (12 April 2
017). <a rel="nofollow" class="ex
ternal text" href="https://www.na
saspacesflight.com/2017/04/falcon-
heavy-build-up-slc-40-pad-rebuild-
progressing/">"Falcon Heavy buil
d up begins; SLC-40 pad rebuild p
rogressing well"</a>. NASASpaceFl
ight.com<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">17 April</span> 2017</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&amp;rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&amp;rft.genre=article&amp;rft.at
itle=Falcon+Heavy+build+up+begin
s%3B+SLC-40+pad+rebuild+progressi
ng+well&amp;rft.date=2017-04-12&a

```

```

mp;rft.au:last=Gebhardt&rft.au
first=Chris&rft_id=https%3A%2
F%2Fwww.nasaspaceflight.com%2F201
7%2F04%2Ffalcon-heavy-build-up-sl
c-40-pad-rebuild-progressing%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-268"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-268">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.theverge.com/2018/1/24/168415
80/spacex-falcon-heavy-rocket-sta
tic-fire-first-launch">"SpaceX pe
rforms crucial test fire of Falco
n Heavy, potentially paving way f
or launch"</a>. The Verge. 24 Jan
uary 2018<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">4 November</span> 2017
</span>.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in

```

```

fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=SpaceX+performs+crucial+test
+fire+of+Falcon+Heavy%2C+potentia
lly+paving+way+for+launch&rft
t.pub=The+Verge&rft.date=2018
-01-24&rft_id=https%3A%2F%2Fww
ww.theverge.com%2F2018%2F1%2F24%2
F16841580%2Fspacex-falcon-heavy-r
ocket-static-fire-first-launch&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-269"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-269">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http://
spaceflight101.com/falcon-heavy-l
aunches-on-inaugural-flight/">"Su
ccessful Falcon Heavy Test Fligh
t: "Starman" Reaches Orbit, 2/3 R
ocket Cores Recovered"</a>. Space
flight101. 7 February 2018<span c

```

```

lass="reference-accessdate">. Retrieved <span class="nowrap">7 February</span> 2018</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Successful+Falcon+Heavy+Test+Flight%3A+%22Starman%22+Reaches+Orbit%2C+2%2F3+Rocket+Cores+Recovered&amp;rft.date=2018-02-07&amp;rft_id=http%3A%2F%2Fspaceflight101.com%2Ffalcon-heavy-launches-on-inaugural-flight%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-middle-booster-270"><span class="mw-cite-backlink">^ <a href="#cite_ref-middle-booster_270-0"><sup><i><b>a</b></i></sup></a> <a href="#cite_ref-middle-booster_270-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGrush2018" class="citation news cs1">Grush,

```

Loren (6 February 2018). ["The middle booster of Space X's Falcon Heavy rocket failed to land on its drone ship"](https://www.theverge.com/2018/2/6/16980954/spacex-falcon-heavy-rocket-middle-core-failed-landing). The Verge. Retrieved 6 February 2018.</cite><li id="cite_note-271"><span clas

```
s="mw-cite-backlink"><b><a href
="#cite_ref-271">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFMusk,
_Elon_&#91;@elonmusk&#93;2018"
class="citation web cs1">Musk, El
on [@elonmusk] (6 February 2018).
<a rel="nofollow" class="external
text" href="https://twitter.com/e
lonmusk/status/96098852715979571
2">"Upper stage restart nominal,
apogee raised to 7000 km. Will s
pend 5 hours getting zapped in Va
n Allen belts and then attempt fi
nal burn for Mars"</a> (Tweet)<sp
an class="reference-accessdate">.
Retrieved <span class="nowrap">6
February</span> 2018</span> &#82
11; via <a href="/wiki/Twitter" t
itle="Twitter">Twitter</a>.</cite
><span title="ctx_ver=Z39.88-2004
&amp;rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&amp;rft.genr
e=unknown&amp;rft.btitle=Upper+st
age+restart+nominal%2C+apogee+rai
sed+to+7000+km.+Will+spend+5+hour
s+getting+zapped+in+Van+Allen+bel
ts+and+then+attempt+final+burn+fo
```

r+Mars.&rft.date=2018-02-06∓rft.au=Musk%2C+Elon+%5B%40elonmusk%5D&rft_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F960988527159795712&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-272">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF@elonmusk2018" class="citation web cs1">@elonmusk (6 February 2018). "Third burn successful. Exceeded Mars orbit and kept going to the Asteroid Belt" (Tweet) – via Twitter.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&


```

rft.genre=unknown&rft.btitle=
Third+burn+successful.+Exceeded+M
ars+orbit+and+kept+going+to+the+A
steroid+Belt.&rft.date=2018-0
2-06&rft.au=%40elonmusk&r
ft_id=https%3A%2F%2Ftwitter.com%2
Felonmusk%2Fstatus%2F961083704230
674438&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>
<li id="cite_note-horizons-273"><
span class="mw-cite-backlink"><b>
<a href="#cite_ref-horizons_273-
0">^</a></b></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://ssd.jpl.n
asa.gov/horizons.cgi#results">"Sp
aceX Roadster (spacecraft) (Tesl
a) &#91;-143205&#93;"</a>. <i>HOR
IZONS Web-Interface</i>. Jet Prop
ulsion Laboratory<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">19 February</s
pan> 2018</span>.</cite><span tit

```

```

le="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=HORIZONS+Web-Interface&rft.atitle=SpaceX+Roadster+%28spacecraft%29+%28Tesla%29+%5B-143205%5D&rft_id=https%3A%2F%2Fssd.jpl.nasa.gov%2Fhorizons.cgi%23results&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public_domain" title="Public domain">public domain</a></i>><i>.</i></span>
</li>

```

```

<li id="cite_note-274"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-274">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSi
ngleton2018" class="citation web
cs1">Singleton, Micah (6 Februar
y 2018). <a rel="nofollow" class
="external text" href="https://ww
w.theverge.com/2018/2/6/16981730/
spacex-falcon-heavy-launch-youtub
e-live-stream-record">"SpaceX's F
alcon Heavy launch was YouTube's
second biggest live stream ever"
</a>. The Verge<span class="refer
ence-accessdate">. Retrieved <spa
n class="nowrap">6 October</span>
2019</span>.</cite><span title="c
tx_ver=Z39.88-2004&amp;rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&amp;rft.genre=unknown&amp;rft
.btitle=SpaceX%27s+Falcon+Heavy+
launch+was+YouTube%27s+second+big
gest+live+stream+ever&amp;rft.pub
=The+Verge&amp;rft.date=2018-02-0
6&amp;rft.aulast=Singleton&amp;rft
.aufirst=Micah&amp;rft_id=https%
3A%2F%2Fwww.theverge.com%2F2018%2

```

```

F2%2F6%2F16981730%2Fspacex-falcon
-heavy-launch-youtube-live-stream
-record&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>
<li id="cite_note-floridatoday.co
m-275"><span class="mw-cite-backl
ink"><b><a href="#cite_ref-florid
atoday.com_275-0">^</a></b></span
> <span class="reference-text"><l
ink rel="mw-deduplicated-inline-s
tyle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
Kelly2018" class="citation web cs
1">Kelly, Emre (5 June 2018). <a
rel="nofollow" class="external t
ext" href="https://eu.floridatoda
y.com/story/tech/science/space/20
18/06/05/spacex-air-force-targeti
ng-fall-next-falcon-heavy-launch-
ksc-florida/669651002/">"SpaceX F
alcon Heavy with Block 5 boosters
targeted for fall launch from KS
C"</a>. <i>Florida Today</i><span
class="reference-accessdate">. Re
trieved <span class="nowrap">6 Oc
tober</span> 2019</span>.</cite><
span title="ctx_ver=Z39.88-2004&a

```

mp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=Florida+Today&rft.atitle=SpaceX+Falcon+Heavy+with+Block+5+boosters+targeted+for+fall+launch+from+KSC&rft.date=2018-06-05&rft.auiast=Kelly&rft.aufirst=Emre&rft_id=https%3A%2F%2Fen.floridatoday.com%2Fstory%2Ftech%2Fscience%2Fspace%2F2018%2F06%2F05%2Fspacex-air-force-targeting-fall-next-falcon-heavy-launch-ksc-florida%2F669651002%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-276">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX laun

ches Falcon 9 with PAZ, Starlink demo and new fairing". NASASpaceFlight.com. 22 February 2018. Retrieved 25 February 2018.</cite>

<li id="cite_note-gunter-f9-277">
 ^
 ^{<i>a</i>}
 ^{<i>b</i>}
 ^{<i>c</i>}

[^d](#cite_ref-gunter-f9_277-3)
[^e](#cite_ref-gunter-f9_277-4)
[^f](#cite_ref-gunter-f9_277-5)
[^g](#cite_ref-gunter-f9_277-6)
[^h](#cite_ref-gunter-f9_277-7)
[ⁱ](#cite_ref-gunter-f9_277-8)
[^j](#cite_ref-gunter-f9_277-9)
[^k](#cite_ref-gunter-f9_277-10)

[Krebs, Gunter. \["Falcon-9"\]\(https://space.skyrocket.de/doc_lau/falcon-9.htm\). *Gunter's Space Page*. Retrieved 19 November 2018.](mw-data:TemplateStyles:r1067248974)

```

="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=Gunter%27s+Space+
Page&rft.atitle=Falcon-9&
rft.aulast=Krebs&rft.aufirst=
Gunter&rft_id=https%3A%2F%2Fs
pace.skyrocket.de%2Fdoc_lau%2Ffal
con-9.htm&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988"></span></span>
</li>
<li id="cite_note-paz-278"><span
class="mw-cite-backlink">^ <a hr
ef="#cite_ref-paz_278-0"><sup><i>
<b>a</b></i></sup></a> <a href="#
cite_ref-paz_278-1"><sup><i><b>b
</b></i></sup></a></span> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation ne
ws cs1 cs1-prop-foreign-lang-sour
ce"><a rel="nofollow" class="exte
rnal text" href="http://www.infoe
spacial.com/es/2017/03/07/noticia
-spacex-lanzara-satelite-hisdesat
-finales.html">"SpaceX lanzará el
satélite Paz de Hisdesat a finale

```


s de año" [SpaceX will launch the Paz satellite of Hisdesat at the end of the year] (in Spanish). Infoespacial.com. 7 March 2017. Retrieved 9 March 2017.</cite>

<li id="cite_note-gunter-microsat2-279">^ ^{<i>a</i>} ^{<i>b</i>} <sp

```

an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFKrebs"
class="citation web cs1">Krebs, G
unter. <a rel="nofollow" class="e
xternal text" href="http://space.
skyrocket.de/doc_sdat/microsat-2.
htm">"MicroSat 2a, 2b"</a>. Gunte
r's Space Page<span class="refere
nce-accessdate">. Retrieved <span
class="nowrap">17 January</span>
2018</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=MicroSat+2a%2C+2b&am
p;rft.pub=Gunter%27s+Space+Page&a
mp;rft.aulast=Krebs&amp;rft.aufir
st=Gunter&amp;rft_id=http%3A%2F%2
Fspace.skyrocket.de%2Fdoc_sdat%2F
microsat-2.htm&amp;rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988"></span></span>
</li>
<li id="cite_note-Paz_SN-280"><sp
an class="mw-cite-backlink">^ <a
href="#cite_ref-Paz_SN_280-0"><s
up><i><b>a</b></i></sup></a> <a h

```

```
ref="#cite_ref-Paz_SN_280-1"><sup><i><b>b</b></i></sup></a> <a href="#cite_ref-Paz_SN_280-2"><sup><i><b>c</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:1067248974"/><cite id="CITEREFHenry2018" class="citation web cs1">Henry, Caleb (22 February 2018).
```

```
<a rel="nofollow" class="external text" href="https://spacenews.com/spacex-launches-pair-of-its-demo-internet-satellites-with-spanish-radar-satellite/">"SpaceX launches pair of its demo internet satellites with Spanish radar satellite"</a>. <i>spacenews.com</i>.
```

```
SpaceNews<span class="reference-accessdate">. Retrieved <span class="nowrap">25 July</span> 2018</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=spacenews.com&amp;rft.atitle=SpaceX+launches+pair+of+its+demo+internet+satellites+with+Spanish+radar+satellite&amp;rft.date=2018-02-22&amp;rft.aulast=Henry&am
```

p;rft.aufirst=Caleb&rft_id=ht
tps%3A%2F%2Fspacenews.com%2Fspace
x-launches-pair-of-its-demo-inter
net-satellites-with-spanish-radar
-satellite%2F&rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-281"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFfo
rd" class="citation web cs1">For
d, Matt. <a rel="nofollow" class
="external text" href="https://we
b.archive.org/web/20180327023643/
https://www.euroweeklynews.com/ne
ws/on-euro-weekly-news/spain-news
-in-english/1471561-elon-musk-s-s
pacex-to-launch-spain-s-first-mil
itary-spy-satellite">"Elon Musk's
SpaceX to launch Spain's first mi
litary spy satellite". Archiv
ed from <a rel="nofollow" class
="external text" href="https://ww
w.euroweeklynews.com/news/on-euro

-weekly-news/spain-news-in-english/1471561-elon-musk-s-spacex-to-launch-spain-s-first-military-spy-satellite">the original on 27 March 2018. Retrieved 26 March 2018.</cite><li id="cite_note-nsf-20180211-282">^ ^{<i>a</i>} <a href="#cite_ref-nsf-2

0180211_282-1">^{<i>b</i>} <link rel="mw-eduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFAtkinson2018" class="citation news cs1">Atkinson, Ian (11 February 2018). "Falcon 9 static fires at Vandenberg ahead of Paz + Starlink launch". NASASpaceFlight.com. Retrieved 12 February 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Falcon+9+static+fires+at+Vandenberg+ahead+of+Paz+%2B+Starlink+launch&rft.date=2018-02-11&rft.aulast=Atkinson&rft.aufirst=Ian&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2018%2F02%2Ffalcon-9-static-fire-vandenberg-paz-starlink%2F&rfr_id=i

nfo%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-283">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1">"SpaceX Falcon 9 set for PAZ launch with Starlink demo and new fairing". NASASpaceFlight.com.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+Falcon+9+set+for+PAZ+launch+with+Starlink+demo+and+new+fairing&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2018%2F02%2Fspacex-falcon-9-paz-launch-starlink-demo-new-fairing%2F&rfr_id=info%3A

sid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-284">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFMusk,_Elon_[@elonmusk]2018" class="citation web cs1">Musk, Elon [@elonmusk] (22 February 2018). "Missed by a few hundred meters, but fairing landed intact in water. Should be able catch it with slightly bigger chutes to slow down descent" (Tweet). Retrieved 15 August 2018 – via Twitter.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=i


```

nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&#amp;rft.genre=unknown&#amp;rft.b
title=Missed+by+a+few+hundred+met
ers%2C+but+fairing+landed+intact+
in+water.+Should+be+able+catch+it
+with+slightly+bigger+chutes+to+s
low+down+descent.&#amp;rft.date=20
18-02-22&#amp;rft.au=Musk%2C+Elon
+%5B%40elonmusk%5D&#amp;rft_id=htt
ps%3A%2F%2Ftwitter.com%2Felonmus
k%2Fstatus%2F966692641533390848&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-:1-285"><span c
lass="mw-cite-backlink"><b><a hre
f="#cite_ref-:1_285-0">^</a></b>
</span> <span class="reference-te
xt"><link rel="mw-duplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFKelly,_Emre_&#91;@EmreKelly
&#93;2018" class="citation web cs
1">Kelly, Emre [@EmreKelly] (2 Ma
rch 2018). <a rel="nofollow" clas
s="external text" href="https://t
witter.com/EmreKelly/status/96960
1674150137856">"Confirmed by rang

```

```
e: 12:33 a.m."</a> (Tweet)<span c
lass="reference-accessdate">. Ret
rieved <span class="nowrap">2 Mar
ch</span> 2018</span> &#8211; via
<a href="/wiki/Twitter" title="Tw
itter">Twitter</a>.</cite><span t
itle="ctx_ver=Z39.88-2004&amp;rft
_val_fmt=info%3Aofi%2Ffmt%3Akev%3
Amtx%3Abook&amp;rft.genre=unknown
&amp;rft.btitle=Confirmed+by+rang
e%3A+12%3A33+a.m.&amp;rft.date=20
18-03-02&amp;rft.au=Kelly%2C+Emre
+%5B%40EmreKelly%5D&amp;rft_id=ht
tps%3A%2F%2Ftwitter.com%2FEmreKel
ly%2Fstatus%2F969601674150137856&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-spx20150914-28
6"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-spx201509
14_286-0"><sup><i><b>a</b></i></s
up></a> <a href="#cite_ref-spx201
50914_286-1"><sup><i><b>b</b></i>
</sup></a></span> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
```

```

cite class="citation pressrelease
cs1"><a rel="nofollow" class="ext
ernal text" href="https://web.arc
hive.org/web/20160122040619/http
s://www.spacex.com/press/2015/09/
14/spacex-signs-new-commercial-la
unch-contracts">"SpaceX signs new
commercial launch contracts"</a>
(Press release). SpaceX. 14 Sept
ember 2015. Archived from <a rel
="nofollow" class="external text"
href="http://www.spacex.com/pres
s/2015/09/14/spacex-signs-new-com
mercial-launch-contracts">the ori
ginal</a> on 22 January 2016<span
class="reference-accessdate">. Re
trieved <span class="nowrap">6 Ja
nuary</span> 2016</span>.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&amp;rft.genre=u
nknown&amp;rft.btitle=SpaceX+sign
s+new+commercial+launch+contracts
&amp;rft.pub=SpaceX&amp;rft.date=
2015-09-14&amp;rft_id=http%3A%2F%
2Fwww.spacex.com%2Fpress%2F2015%2
F09%2F14%2Fspacex-signs-new-comme
rcial-launch-contracts&amp;rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy

```

```
+launches" class="Z3988"></span>
</span>
</li>
<li id="cite_note-287"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-287">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceflightnow.com/2018/03/12/spa
cexs-most-recent-launch-carried-a
-secret-military-funded-experimen
t/">"SpaceX's most recent launch
carried a secret military-funded
experiment"</a>. Spaceflight Now.
12 March 2018.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=SpaceX%27s+most+rece
nt+launch+carried+a+secret+milita
ry-funded+experiment&amp;rft.pub=
Spaceflight+Now&amp;rft.date=2018
-03-12&amp;rft_id=https%3A%2F%2Fs
paceflightnow.com%2F2018%2F03%2F1
2%2Fspacexs-most-recent-launch-ca
rried-a-secret-military-funded-ex
```

periment%2F&#amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-gunter-hispasat
30w6-288"><span class="mw-cite-ba
cklink"><a href="#cite_ref-gun
ter-hispasat30w6_288-0">^
 <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFKrebs" class="citation web
cs1">Krebs, Gunter. <a rel="nofo
llow" class="external text" href
="http://space.skyrocket.de/doc_s
dat/hispasat-1f.htm">"Hispasat 30
W-6 (Hispasat)". Gunter's Spa
ce Page<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">3 August 2017</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&#amp;rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&#
amp;rft.genre=unknown&#amp;rft.btitl
e=Hispasat+30W-6+%28Hispasat%29&#
amp;rft.pub=Gunter%27s+Space+Page&
#amp;rft.aulast=Krebs&#amp;rft.aufi
rst=Gunter&#amp;rft_id=http%3A%2F%

2Fspace.skyrocket.de%2Fdoc_sdat%2Fhispasat-1f.htm&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-Hispasat_SFN-289">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2018" class="citation web cs1">Clark, Stephen (6 March 2018). "Hefty Hispasat satellite rides SpaceX rocket into orbit". <i>Spaceflight Now</i>. Retrieved 25 July 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=Spaceflight+N

```

ow&rft.atitle=Hefty+Hispasat+
satellite+rides+SpaceX+rocket+int
o+orbit&rft.date=2018-03-06&
mp;rft.aulast=Clark&rft.aufir
st=Stephen&rft_id=https%3A%2
F%2Fspaceflightnow.com%2F2018%2F0
3%2F06%2Fhefty-hispasat-satellite
-rides-spacex-rocket-into-orbit%2
F&rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88"></span></span>
</li>
<li id="cite_note-nsf-20180305-29
0"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf-20180
305_290-0"><sup><i><b>a</b></i></
sup></a> <a href="#cite_ref-nsf-2
0180305_290-1"><sup><i><b>b</b></
i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFGraham2018"
class="citation news cs1">Graha
m, William (5 March 2018). <a rel
="nofollow" class="external text"
href="https://www.nasaspaceligh
t.com/2018/03/spacex-50-falcon-9-
heavy-hispasat-launch/">"SpaceX c

```

conducts 50th Falcon 9 launch with heavy Hispasat deployment". N ASASpaceFlight.com class="reference-accessdate">. Retrieved 6 April > 2018.</cite>

<li id="cite_note-cnbc-20180306-291">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKharpa


```

12018" class="citation news cs1">
Kharpal, Arjun (6 March 2018). <a
rel="nofollow" class="external te
xt" href="https://www.cnbc.com/20
18/03/06/spacex-falcon-9-50th-lau
nch-biggest-satellite-ever.htm
l">"SpaceX launches its largest s
atellite so far which is nearly t
he size of a bus"</a>. CNBC<span
class="reference-accessdate">. R
etrieved <span class="nowrap">4 A
pril</span> 2018</span>.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&rft.genre
=article&rft.atitle=SpaceX+la
unches+its+largest+satellite+so+f
ar+which+is+nearly+the+size+of+a+
bus&rft.date=2018-03-06&r
ft.aulast=Kharpal&rft.aufirst
=Arjun&rft_id=https%3A%2F%2Fw
ww.cnbc.com%2F2018%2F03%2F06%2Fsp
acex-falcon-9-50th-launch-biggest
-satellite-ever.html&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></span></s
pan>
</li>
<li id="cite_note-292"><span clas

```

```
s="mw-cite-backlink"><b><a href
="#cite_ref-292">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceflightnow.com/2018/03/03/spa
cex-launch-with-spanish-satellite
-planned-for-early-tuesday/">"Spa
ceX signs new commercial launch c
ontracts"</a>. Spaceflight Now. 3
March 2018<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">4 March</span> 2018</
span>.</cite><span title="ctx_ver
=Z39.88-2004&amp;rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&amp;rft.bti
tle=SpaceX+signs+new+commercial+l
aunch+contracts&amp;rft.pub=Space
flight+Now&amp;rft.date=2018-03-0
3&amp;rft_id=https%3A%2F%2Fspacef
lightnow.com%2F2018%2F03%2F03%2Fs
pacex-launch-with-spanish-satelli
te-planned-for-early-tuesday%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
```

```
8"></span></span>
</li>
<li id="cite_note-293"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-293">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation web cs1">Cla
rk, Stephen. <a rel="nofollow" cl
ass="external text" href="http
s://spaceflightnow.com/2018/03/0
5/falcon-9-launch-timeline-with-h
ispasat-30w-6/">"Falcon 9 launch
  timeline with Hispasat 30W-6"</a
>. Spaceflight Now<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">25 March</spa
n> 2020</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=Falcon+9+launch+time
line+with+Hispasat+30W-6&amp;rft.
pub=Spaceflight+Now&amp;rft.aulas
t=Clark&amp;rft.aufirst=Stephen&a
mp;rft_id=https%3A%2F%2Fspaceflig
htnow.com%2F2018%2F03%2F05%2Ffalc
on-9-launch-timeline-with-hispassa
```

t-30w-6%2F&rf_r_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-294">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFDesch,_Matt_[@IridiumBoss]2018" class="citation web cs1">Desch, Matt [@IridiumBoss] (27 March 2018). "Positive update to our satellite and launch delay. Just been apprised there has been a technical resolution; satellites and F9 are in great shape and ready to go! Was ground harness test cable issue - now fixed. Launch now pulled back to Friday, 3/30 at 7:14 am PDT! #GoTeam!" (Tweet) – via Twitter.</cite><span title="ctx_ve

```

r=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
&rft.genre=unknown&rft.btitle=Positive+update+to+our+satellite+and+launch+delay.+Just+been+apprised+there+has+been+a+technical+resolution%3B+satellites+and+F9+are+in+great+shape+and+ready+to+go%21+Was+ground+harness+test+cable+issue+-+now+fixed.+Launch+now+pulled+back+to+Friday%2C+3%2F30+at+7%3A14+am+PDT%21+%23GoTeam%21&
&rft.date=2018-03-27&rft.au=Desch%2C+Matt+%5B%40IridiumBoss%5D&rft_id=https%3A%2F%2Ftwitter.com%2FIridiumBoss%2Fstatus%2F978795278118653952&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-Iridium_NEXT_5_NSF-295"><span class="mw-cite-backlink"><b><a href="#cite_ref-Iridium_NEXT_5_NSF_295-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:Template Styles:r1067248974"/><cite id="CI

```

TEREFGraham2018" class="citation web cs1">Graham, William (29 March 2018). "Iridium NEXT-5 satellites ride to orbit on SpaceX Falcon 9". NASASpaceFlight.com. Retrieved 25 July 2018.</cite><li id="cite_note-296"><span clas

```
s="mw-cite-backlink"><b><a href
="#cite_ref-296">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on pressrelease cs1"><a rel="nofo
llow" class="external text" href
="https://web.archive.org/web/201
80406230322/http://www.spacex.co
m/sites/spacex/files/iridium-5_pr
ess_kit_2018.pdf">"Iridium-5 NEXT
Mission"</a> <span class="cs1-for
mat">(PDF)</span> (Press releas
e). SpaceX. March 2018. Archived
  from <a rel="nofollow" class="ex
ternal text" href="http://www.spa
cex.com/sites/spacex/files/iridiu
m-5_press_kit_2018.pdf">the origi
nal</a> <span class="cs1-format">
(PDF)</span> on 6 April 2018<span
class="reference-accessdate">. Re
trieved <span class="nowrap">6 Ap
ril</span> 2018</span>. <q>SpaceX
will not attempt to recover Falco
n 9's first stage after launch.</
q></cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&amp;
rft.genre=unknown&amp;rft.btitle=
```

```

Iridium-5+NEXT+Mission&#x26;rft.pub=SpaceX&#x26;rft.date=2018-03&#x26;rft_id=http%3A%2F%2Fwww.spacex.com%2Fsites%2Fspacex%2Ffiles%2Firidium-5_press_kit_2018.pdf&#x26;rft_r_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-297"><span class="mw-cite-backlink"><b><a href="#cite_ref-297">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSheetz2018" class="citation web cs1">Sheetz, Michael (30 March 2018). <a rel="nofollow" class="external text" href="https://www.cnbc.com/2018/03/30/spacex-falcon-9-iridium-5-mission-success.html">"SpaceX completes sixth successful launch of 2018"</a>.</cite><span title="ctx_ver=Z39.88-2004&#x26;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&#x26;rft.genre=unknown&#x26;rft.btitle=SpaceX+completes+sixth+successful+launch+of+

```


2018&rft.date=2018-03-30&rft.aulast=Sheetz&rft.aufirst=Michael&rft_id=https%3A%2F%2Fwww.cnn.com%2F2018%2F03%2F30%2Fspacex-falcon-9-iridium-5-mission-success.html&rfr_id=info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-298">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX pushes boundaries of fairing recovery with breathtaking sunrise launch [photos]". <i>teslarati.com</i>. Teslarati.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=teslarati.com&rft.at

```

itle=SpaceX+pushes+boundaries+of+
fairing+recovery+with+breathtakin
g+sunrise+launch+%5Bphotos%5D&am
p;rft_id=https%3A%2F%2Fwww.teslar
ati.com%2Fspacex-fairing-recovery
-iridium-launch-photos%2F&amp;rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-299"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-299">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFMu
sk,_Elon_&#91;@elonmusk&#93;2018"
class="citation web cs1"><a href
="/wiki/Elon_Musk" title="Elon Mu
sk">Musk, Elon [@elonmusk]</a> (2
April 2018). <a rel="nofollow" cl
ass="external text" href="http
s://twitter.com/elonmusk/status/9
80647734888681472">"Oh yeah, forg
ot to mention it actually landed
fine, just not on Mr Steven"</a>
(Tweet)<span class="reference-acc
essdate">. Retrieved <span class

```

```

="nowrap">15 August</span> 2018</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Oh+yeah%2C+forgot+to+mention+it+actually+landed+fine%2C+just+not+on+Mr+Steven&amp;rft.date=2018-04-02&amp;rft.au=Musk%2C+Elon+%5B%40elonmusk%5D&amp;rft_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F980647734888681472&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-300"><span class="mw-cite-backlink"><b><a href="#cite_ref-300">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="http://www.spaceflightinsider.com/organizations/space-exploration-technol

```

ogies/spacex-crs-14-dragon-heading-toward-iss-successful-falcon-9-launch">"SpaceX CRS-14 Dragon heading toward ISS after successful Falcon 9 launch". Spaceflight Insider. 2 April 2018. Retrieved 7 April 2018.</cite>><li id="cite_note-nsf-20180328-301">^ ^{<i>a</i>}

```
sup></a> <a href="#cite_ref-nsf-20180328_301-1"><sup><i><b>b</b></i></sup></a> <a href="#cite_ref-nsf-20180328_301-2"><sup><i><b>c</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBergin2018" class="citation news cs1">Bergin, Chris (28 March 2018). <a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2018/03/falcon-9-crs-14-mission-static-fire-testing/">"Falcon 9 set for CRS-14 mission completes Static Fire testing"</a>. NASASpaceFlight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">28 March</span> 2018</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Falcon+9+set+for+CRS-14+mission+completes+Static+Fire+testing&rft.date=2018-03-28&rft.aulast=Bergin&rft.aufirst=Chris&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F201
```

8%2F03%2Ffalcon-9-crs-14-mission-static-fire-testing%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"><li id="cite_note-302">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGebhardt2018" class="citation web cs1">Gebhardt, Chris (4 April 2018). "CRS-14 Dragon arrives at Space Station with science bonanza". ASASpaceFlight.com. Retrieved 25 July 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=CRS-14+Dragon+

```

arrives+at+Space+Station+with+sci
ence+bonanza&rft.pub=ASASpace
Flight.com&rft.date=2018-04-0
4&rft.aulast=Gebhardt&rft
t.aufirst=Chris&rft_id=https%
3A%2F%2Fwww.nasaspaceflight.com%2
F2018%2F04%2Fcrs-14-dragon-space-
station-science-bonanza%2F&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-CRS-14_NSF-30
3"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-CRS-14_N
SF_303-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFGraham2
018" class="citation web cs1">Gra
ham, William (2 April 2018). <a r
el="nofollow" class="external tex
t" href="https://www.nasaspacefli
ght.com/2018/04/crs-14-spacex-fal
con-9-second-flight-previously-fl
own-dragon/">"CRS-14: SpaceX Falc
on 9 conducts second flight with
previously flown Dragon"</a>. NA

```

SASpaceFlight.com. Retrieved 25 July 2018.</cite>

<li id="cite_note-304">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" cla


```
ss="external text" href="http://www.alphaspace.com/about-misse-ff.html">"About the Materials International Space Station Experiment Facility"</a>. Alpha Space<span class="reference-accessdate">. Retrieved <span class="nowrap">26 August</span> 2016</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=About+the+Materials+International+Space+Station+Experiment+Facility&amp;rft.pub=Alpha+Space&amp;rft_id=http%3A%2F%2Fwww.alphaspace.com%2Fabout-misse-ff.html&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-305"><span class="mw-cite-backlink"><b><a href="#cite_ref-305">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" cla
```

```

ss="external text" href="http://www.nasa.gov/mission_pages/station/research/experiments/778.html">"Robotic Refueling Mission (RRM)"</a>. NASA. 14 July 2016<span class="reference-accessdate">. Retrieved <span class="nowrap">26 August</span> 2016</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Robotic+Refueling+Mission+%28RRM%29&amp;rft.pub=NASA&amp;rft.date=2016-07-14&amp;rft_id=http%3A%2F%2Fwww.nasa.gov%2Fmission_pages%2Fstation%2Fresearch%2Fexperiments%2F778.html&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span></li>

<li id="cite\_note-306"><span class="mw-cite-backlink"><b><a href="#cite\_ref-306">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://lasp.colorado.edu/home/missions-projects/quick-facts-tsis/">"Quick Facts: Total and Spectral Solar Irradiance Sensor (TSIS)"</a>. Laboratory for Atmospheric and Space Physics (LASP), University of Colorado<span class="reference-accessdate">. Retrieved <span class="nowrap">17 August</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook

```

&rft.genre=unknown&rft.btitle=Quick+Facts%3A+Total+and+Spectral+Solar+Irradiance+Sensor+%28TSIS%29&rft.pub=Laboratory+for+Atmospheric+and+Space+Physics+%28LASP%29%2C+University+of+Colorado&rft_id=http%3A%2F%2Fasp.colorado.edu%2Fhome%2Fmissions-projects%2Fquick-facts-tsis%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-307">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Dragon Mission to Carry CASIS-Sponsored Experiments to Space Station". Parabolic Arc. 22 March 2018.</cite><span title="ctx_ver=Z3

```

9.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Dragon+Mission+to+Carry+CASIS-Sponsored+Experiments+to+Space+Station&rft.pub=Parabolic+Arc&rft.date=2018-03-22&rft\_id=http%3A%2F%2Fwww.parabolicarc.com%2F2018%2F03%2F22%2Fdragon-mission-carry-casis-sponsored-experiments-space-station%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-308"><span class="mw-cite-backlink"><b><a href="#cite\_ref-308">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="http://time.com/5225670/spacex-space-junk-cleaner-launch/">"Falcon 9 Launched a Space Junk Sweeper Into Orbit"</a>. <i>time.com</i>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%

```

3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=time.com&rft.atitle=Falcon+9+Launched+a+Space+Junk+Sweeper+Into+Orbit&rft_id=http%3A%2F%2Ftime.com%2F5225670%2Fspacex-space-junk-cleaner-launch%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-baylor-20180403-309">^
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBaylor,_Michael_[@nextspaceflight]2018" class="citation web cs1">Baylor, Michael [@nextspaceflight] (3 April 2018). "Jensen on the first stage: It was a hard landing in the ocean. We were mostly focused on the re entry data" (Tweet)<span clas

```

```
s="reference-accessdate">. Retrieved 5 April
 2018 – via <
a href="/wiki/Twitter" title="Twit
ter">Twitter.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Abook&rft.genre=unknown&
amp;rft.btitle=Jensen+on+the+firs
t+stage%3A+It+was+a+hard+landing+
in+the+ocean.+We+were+mostly+focu
sed+on+the+reentry+data.&rft.
date=2018-04-03&rft.au=Baylo
r%2C+Michael+%5B%40nextspacefligh
t%5D&rft_id=https%3A%2F%2Ftwi
tter.com%2Fnextspaceflight%2Fstat
us%2F980937660893220864&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-310"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
```

```

ss="external text" href="http://w
ww.ticotimes.net/2018/04/03/watch
-the-full-launch-of-the-first-sat
ellite-designed-and-built-in-cost
a-rica">"Watch the full launch of
the first satellite designed and
built in Costa Rica". 3 Apri
l 2018.</cite><span title="ctx_ve
r=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&rft.bti
tle=Watch+the+full+launch+of+the+
first+satellite+designed+and+buil
t+in+Costa+Rica&rft.date=2018
-04-03&rft_id=http%3A%2F%2Fww
w.ticotimes.net%2F2018%2F04%2F03%
2Fwatch-the-full-launch-of-the-fi
rst-satellite-designed-and-built-
in-costa-rica&rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-311"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKr

```



```

ebs" class="citation web cs1">Kre
bs, Gunter. <a rel="nofollow" cla
ss="external text" href="http://s
pace.skyrocket.de/doc_sdat/1kuns-
pf.htm">"1KUNS-PF". Gunter's
 Space Page.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
t.btitle=1KUNS-PF&rft.pub=Gun
ter%27s+Space+Page&rft.aulast
=Krebs&rft.aufirst=Gunter&am
p;rft_id=http%3A%2F%2Fspace.skyro
cket.de%2Fdoc_sdat%2F1kuns-pf.htm
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">

<li id="cite_note-nsf20180418-31
2"><span class="mw-cite-backlin
k"><a href="#cite_ref-nsf20180
418_312-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFGebhard
t2018" class="citation news cs1">
Gebhardt, Chris (18 April 2018).
 <a rel="nofollow" class="externa

```

```

l text" href="https://www.nasasp
aceflight.com/2018/04/tess-launch-
mission-search-near-earth-exoplan
ets/">"SpaceX successfully launch
es TESS on a mission to search fo
r near-Earth exoplanets". NAS
ASpaceFlight.com<span class="refe
rence-accessdate">. Retrieved <sp
an class="nowrap">20 May 2
018.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Aj
ournal&rft.genre=article&
rft.atitle=SpaceX+successfully+la
unches+TESS+on+a+mission+to+searc
h+for+near-Earth+exoplanets&r
ft.date=2018-04-18&rft.aulast
=Gebhardt&rft.aufirst=Chris&a
mp;rft_id=https%3A%2F%2Fwww.nasas
paceflight.com%2F2018%2F04%2Ftess
-launch-mission-search-near-earth
-exoplanets%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-NASA_C14-313"><
span class="mw-cite-backlink">
<a href="#cite_ref-NASA_C14_313-
0">^ <span class

```

```
= "reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFBeckDiller20
14" class="citation pressrelease
cs1">Beck, Joshua; Diller, Georg
e H. (16 December 2014). <a rel
="nofollow" class="external text"
href="http://www.nasa.gov/press/2
014/december/nasa-awards-launch-s
ervices-contract-for-transiting-e
xoplanet-survey-satellite/">"NASA
Awards Launch Services Contract f
or Transiting Exoplanet Survey Sa
tellite" (Press release). NAS
A<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">17 December 2014</span
>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
NASA+Awards+Launch+Services+Contr
act+for+Transiting+Exoplanet+Surv
ey+Satellite&rft.pub=NASA&am
p;rft.date=2014-12-16&rft.aul
ast=Beck&rft.aufirst=Joshua&a
mp;rft.au=Diller%2C+George+H.&am
p;rft_id=http%3A%2F%2Fwww.nasa.go
v%2Fpress%2F2014%2Fdecember%2Fnas
```

a-awards-launch-services-contract-for-transiting-exoplanet-survey-satellite%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i> <i>.</i></span>

</li>

<li id="cite\_note-tess-flight-314"><span class="mw-cite-backlink">^ <a href="#cite\_ref-tess-flight\_314-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-tess-flight\_314-1"><sup><i><b>b</b></i>

```

</sup> <link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Flight Profile - TESS". <i>spaceflight101.com</i>. Spaceflight101.</cite>

<li id="cite_note-TESS_NSF-315">^ ^{<i>a</i>}
^{<i>b</i>}
<a href="#cite_ref-TESS_NSF_315-

```

2"><sup><i><b>c</b></i></sup></a>  
 </span> <span class="reference-te  
 xt"><link rel="mw-deduplicated-in  
 line-style" href="mw-data:Templat  
 eStyles:r1067248974"/><cite id="C  
 ITEREFGebhardt2018" class="citati  
 on web cs1">Gebhardt, Chris (18 A  
 pril 2018). <a rel="nofollow" cla  
 ss="external text" href="https://  
 www.nasaspaceflight.com/2018/04/t  
 ess-launch-mission-search-near-ea  
 rth-exoplanets/">"SpaceX successf  
 ully launches TESS on a mission t  
 o search for near-Earth exoplanet  
 s – NASASpaceFlight.com"</a>. <i>  
 nasaspaceflight.com</i><span clas  
 s="reference-accessdate">. Retrie  
 ved <span class="nowrap">25 July  
 </span> 2018</span>.</cite><span  
 title="ctx\_ver=Z39.88-2004&amp;r  
 ft\_val\_fmt=info%3Aofi%2Ffmt%3Ake  
 v%3Amtx%3Ajournal&amp;rft.genre=u  
 nknown&amp;rft.jtitle=nasaspacefl  
 ight.com&amp;rft.atitle=SpaceX+su  
 ccessfully+launches+TESS+on+a+mis  
 sion+to+search+for+near-Earth+exo  
 planets+%E2%80%93+NASASpaceFligh  
 t.com&amp;rft.date=2018-04-18&am  
 p;rft.aulast=Gebhardt&amp;rft.auf  
 first=Chris&amp;rft\_id=https%3A%2

```

F%2Fwww.nasaspaceflight.com%2F201
8%2F04%2Ftess-launch-mission-sear
ch-near-earth-exoplanets%2F&r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-316"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKe
esey2013" class="citation web cs
1">Keesey, Lori (31 July 2013). <
a rel="nofollow" class="external
text" href="http://www.nasa.gov/
content/goddard/new-explorer-miss
ion-chooses-the-just-right-orbi
t/">"New Explorer Mission Chooses
the 'Just-Right' Orbit". NAS
A.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
New+Explorer+Mission+Chooses+the
+%27Just-Right%27+Orbit&rft.p
ub=NASA&rft.date=2013-07-31&a

```

mp;rft.aulast=Keesey&rft.aufi  
rst=Lori&rft\_id=http%3A%2F%2F  
www.nasa.gov%2Fcontent%2Fgoddard%  
2Fnew-explorer-mission-chooses-th  
e-just-right-orbit%2F&rfr\_id=  
info%3Asid%2Fen.wikipedia.org%3AL  
ist+of+Falcon+9+and+Falcon+Heavy+  
launches" class="Z3988"></span> <  
img alt="Public Domain" src="//up  
load.wikimedia.org/wikipedia/en/t  
humb/6/62/PD-icon.svg/12px-PD-ico  
n.svg.png" decoding="async" width  
="12" height="12" class="noviewe  
r" srcset="//upload.wikimedia.or  
g/wikipedia/en/thumb/6/62/PD-ico  
n.svg/18px-PD-icon.svg.png 1.5x,  
//upload.wikimedia.org/wikipedi  
a/en/thumb/6/62/PD-icon.svg/24px-  
PD-icon.svg.png 2x" data-file-wid  
th="196" data-file-height="196" /  
> <i>This article incorporates te  
xt from this source, which is in  
the <a href="/wiki/Public\_domai  
n" title="Public domain">public d  
omain</a></i><i>.</i></span>  
</li>  
<li id="cite\_note-317"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-317">^</a></b></span>  
<span class="reference-text"><lin



```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"NASA certifies Falcon 9 for science missions". SpaceNews. 16 February 2018.</cite><li id="cite_note-318">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
```

```

r1067248974"/><cite class="citation
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceflightnow.com/2018/04/11/spa
cex-rocket-test-fired-at-cape-can
averal-for-nasa-telescope-launc
h/">"SpaceX rocket test-fired at
Cape Canaveral for NASA telescop
e launch". 11 April 2018. Re
trieved 14 A
pril 2018.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=SpaceX+rocke
t+test-fired+at+Cape+Canaveral+fo
r+NASA+telescope+launch&rft.d
ate=2018-04-11&rft_id=https%3
A%2F%2Fspaceflightnow.com%2F2018%
2F04%2F11%2Fspacex-rocket-test-fi
red-at-cape-canaveral-for-nasa-te
lescope-launch%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-319"><span clas
s="mw-cite-backlink"><a href

```

```
= "#cite_ref-319">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceflightnow.com/2018/05/11/spa
cex-debuts-an-improved-human-rate
d-model-of-the-falcon-9-rocke
t/">"SpaceX debuts new model of t
he Falcon 9 rocket designed for a
stronauts". 11 May 2018<span
class="reference-accessdate">. R
etrieved 12
May 2018.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=SpaceX+debut
s+new+model+of+the+Falcon+9+rocke
t+designed+for+astronauts&rft
.date=2018-05-11&rft_id=http
s%3A%2F%2Fspaceflightnow.com%2F20
18%2F05%2F11%2Fspacex-debuts-an-i
mproved-human-rated-model-of-the-
falcon-9-rocket%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
```

```
n>

<li id="cite_note-320"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http://
www.americaspace.com/2018/02/19/s
pacexs-long-awaited-falcon-9-bloc
k-5-heads-to-texas-for-testin
g/">"SpaceX's Long-Awaited Falcon
9 'Block 5' Heads to Texas for Te
sting". America Space. 19 Feb
ruary 2018.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Aj
ournal&rft.genre=article&
rft.atitle=SpaceX%27s+Long-Awaite
d+Falcon+9+%27Block+5%27+Heads+to
+Texas+for+Testing&rft.date=2
018-02-19&rft_id=http%3A%2F%2
Fwww.americaspace.com%2F2018%2F0
2%2F19%2Fspacexs-long-awaited-fal
con-9-block-5-heads-to-texas-for-
testing%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
```

on+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-dhakatribune-321"><span class="mw-cite-backlink"><b><a href="#cite\_ref-dhakatribune\_321-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFShowkat\_KallolHusain2017" class="citation news cs1">Showkat Kallol, Asif; Husain, Ishtiaq (30 January 2017). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20170206022222/http://archive.dhakatribune.com/bangladesh/2017/jan/30/thales-use-spacexs-falcon-9-launch">"Thales to use SpaceX's Falcon 9 to launch"</a>. <i>Dhaka Tribune</i>. Archived from <a rel="nofollow" class="external text" href="http://archive.dhakatribune.com/bangladesh/2017/jan/30/thales-use-spacexs-falcon-9-launch">the original</a> on 6 February 2017<span class="reference-accessdate">. Retrieved <span class="nowrap">5 February</sp

```

an> 2017.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.jtitle=Dhaka+Tribune&am
p;rft.atitle=Thales+to+use+Space
X%27s+Falcon+9+to+launch&rft.
date=2017-01-30&rft.aulast=Sh
owkat+Kallol&rft.aufirst=Asif
&rft.au=Husain%2C+Ishtiaq&am
p;rft_id=http%3A%2F%2Farchive.dha
katribune.com%2Fbangladesh%2F201
7%2Fjan%2F30%2Fthales-use-spacexs
-falcon-9-launch&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988">

<li id="cite_note-gunter-bd1-32
2"><span class="mw-cite-backlin
k"><a href="#cite_ref-gunter-b
d1_322-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFKrebs"
class="citation web cs1">Krebs,
Gunter. <a rel="nofollow" class
="external text" href="http://spa
ce.skyrocket.de/doc_sdat/bangaban

```

```
dhu-1.htm">"Bangabandhu 1 (BD 1)"
. Gunter's Space Page<span cl
ass="reference-accessdate">. Retr
ieved 22 Nov
ember 2016.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&rft.genre=u
nknown&rft.btitle=Bangabandhu
+1+%28BD+1%29&rft.pub=Gunter%
27s+Space+Page&rft.aulast=Kre
bs&rft.aufirst=Gunter&rft
_id=http%3A%2F%2Fspace.skyrocket.
de%2Fdoc_sdat%2Fbangabandhu-1.htm
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">

<li id="cite_note-323"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2018/05/f
irst-block-5-falcon-9-static-fire
```

```

-bangabandhu-1/">"First Block 5 F
alcon 9 readying for static fire
 ahead of Bangabandhu-1 launch"</
a>. NASASpaceFlight.com. May 201
8.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
First+Block+5+Falcon+9+readying+f
or+static+fire+ahead+of+Bangaband
hu-1+launch&rft.pub=NASASpace
Flight.com&rft.date=2018-05&a
mp;rft_id=https%3A%2F%2Fwww.nasas
paceflight.com%2F2018%2F05%2Ffirs
t-block-5-falcon-9-static-fire-ba
ngabandhu-1%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-Bangabandhu-1_A
T-324"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-Bangaba
ndhu-1_AT_324-0"><sup><i>a
</i></sup> <a href="#cite_ref
-Bangabandhu-1_AT_324-1"><sup><i>
b</i></sup> <a href="#
cite_ref-Bangabandhu-1_AT_324-2">
^{<i>c</i>}</s
pan> <span class="reference-tex

```



```

t"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1067248974"/><cite class
="citation web cs1"><a rel="nofol
low" class="external text" href
="https://www.aerospace-technolog
y.com/news/spacex-launches-bangab
andhu-satellite-1-space/">"SpaceX
launches Bangabandhu Satellite-1
into space". Aerospace Techn
ology. 14 May 2018<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">25 July 2018.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=SpaceX+launches+Bang
abandhu+Satellite-1+into+space&am
p;rft.pub=Aerospace+Technology&am
p;rft.date=2018-05-14&rft_id=
https%3A%2F%2Fwww.aerospace-techn
ology.com%2Fnews%2Fspacex-launche
s-bangabandhu-satellite-1-space%2
F&rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">

<li id="cite_note-325"><span clas

```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://s
pacenews.com/how-bangladesh-becam
e-spacexs-first-block-5-falcon-9-
customer/">"How Bangladesh became
SpaceX's first Block 5 Falcon 9 c
ustomer". SpaceNews. 9 May 20
18.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
How+Bangladesh+became+SpaceX%27s+
first+Block+5+Falcon+9+customer&a
mp;rft.pub=SpaceNews&rft.date
=2018-05-09&rft_id=http%3A%2
F%2Fspacenews.com%2Fhow-banglades
h-became-spacexs-first-block-5-fa
lcon-9-customer%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-326"><span clas
```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://w
ww.thedailystar.net/science/space
-science/bangabandhu-satellite-de
al-inked-french-firm-170728">"Ban
gabandhu satellite deal inked wit
h French firm". <i>The Daily
Star</i>. 11 November 2015.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Ajournal&rft.g
enre=unknown&rft.jtitle=The+D
aily+Star&rft.atitle=Bangaban
dhu+satellite+deal+inked+with+Fre
nch+firm&rft.date=2015-11-11&
amp;rft_id=http%3A%2F%2Fwww.theda
ilystar.net%2Fscience%2Fspace-sci
ence%2Fbangabandhu-satellite-deal
-inked-french-firm-170728&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

```

```
<li id="cite_note-327"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2018/05/f
irst-block-5-falcon-9-static-fire
-bangabandhu-1/">"First Block 5 F
alcon 9 readying for static fire
ahead of Bangabandhu-1 launch"</
a>. NASASpaceFlight.com.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=First+Block+
5+Falcon+9+readying+for+static+fi
re+ahead+of+Bangabandhu-1+launch&
amp;rft.pub=NASASpaceFlight.com&a
mp;rft_id=https%3A%2F%2Fwww.nasas
paceflight.com%2F2018%2F05%2Ffirs
t-block-5-falcon-9-static-fire-ba
ngabandhu-1%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

```

```
<li id="cite_note-328"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSp
aceX2018" class="citation cs2">Sp
aceX (7 May 2018), <a rel="nofoll
ow" class="external text" href="h
ttps://www.youtube.com/watch?v=yY
JWeK-kVB0"><i>Bangabandhu Satelli
te-1</i><span class="referenc
e-accessdate">, retrieved <span c
lass="nowrap">10 May 2018
</cite><span title="ctx_ve
r=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=book&rft.btitle
=Bangabandhu+Satellite-1&rft.
date=2018-05-07&rft.au=SpaceX
&rft_id=https%3A%2F%2Fwww.you
tube.com%2Fwatch%3Fv%3DyYJWeK-kVB
0&rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">

<li id="cite_note-329"><span clas
s="mw-cite-backlink"><a href
```

```

="#cite_ref-329">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.aerospace-technology.com/proj
ects/bangabandhu-1-bd-1-communica
tion-satellite/">"Bangabandhu-1
 (BD-1) Communication Satellite"
. Aerospace Technology<span c
lass="reference-accessdate">. Ret
rieved 16 Se
ptember 2018.</cite
><span title="ctx_ver=Z39.88-2004
&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=Bangaban
dhu-1+%28BD-1%29+Communication+Sa
tellite&rft.pub=Aerospace+Tec
hnology&rft_id=https%3A%2F%2F
www.aerospace-technology.com%2Fpr
ojects%2Fbangabandhu-1-bd-1-commu
nication-satellite%2F&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></
span>


```

```
<li id="cite_note-330"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://www.nasaspaceflight.com/2018/
05/falcon-9-iridium-next-6-grace-
fo-launch/">"Falcon 9 launches Ir
idium NEXT 6 and GRACE-FO". 2
2 May 2018<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">25 July 2018</
span>.</cite><span title="ctx_ver
=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajourn
al&rft.genre=article&rft.
atitle=Falcon+9+launches+Iridium+
NEXT+6+and+GRACE-FO&rft.date=
2018-05-22&rft_id=https%3A%2
F%2Fwww.nasaspaceflight.com%2F201
8%2F05%2Ffalcon-9-iridium-next-6-
grace-fo-launch%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>
```

```


<li id="cite_note-331"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBa
ylor,_Michael_[@nextspaceflig
ht]2018" class="citation web
cs1">Baylor, Michael [@nextspace
flight] (21 March 2018). <a rel
="nofollow" class="external text"
href="https://twitter.com/nextspa
ceflight/status/97657829297013145
6">"Is it the Zuma core? That's c
urrently our best guess" (Twe
et)<span class="reference-accessd
ate">. Retrieved <span class="now
rap">15 August 2018
– via <a href="/wiki/Twitte
r" title="Twitter">Twitter.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=Is+it
+the+Zuma+core%3F+That%27s+curren
tly+our+best+guess&rft.date=2
018-03-21&rft.au=Baylor%2C+Mi
chael+%5B%40nextspaceflight%5D&am

```



p;rft\_id=https%3A%2F%2Ftwitter.com%2Fnextspaceflight%2Fstatus%2F976578292970131456&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span><br /><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFDesch,\_Matt\_&#91;@IridiumBoss&#93;2018" class="citation web cs1">Desch, Matt [@IridiumBoss] (23 March 2018). <a rel="nofollow" class="external text" href="https://twitter.com/IridiumBoss/status/976966633636941824">"You guys don't need me..."</a> (Tweet)<span class="reference-accessdate">. Retrieved <span class="nowrap">15 August</span> 2018</span> &#8211; via Twitter.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=You+guys+don%E2%80%99t+need+me...&rft.date=2018-03-23&rft.au=Desch%2C+Matt+%5B%40IridiumBoss%5D&rft\_id=https%3A%2F%2Ftwitter.com%2FIridiumBoss%2Fstatus%2F976966633636941824&rft

```

r_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-iridium-rideshare-332">^ ^{<i>a</i>} ^{<i>b</i>}
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFde_Selding2017" class="citation news cs1">de Selding, Peter B. (2 February 2017). "Iridium subcontracts ride share aboard SpaceX Falcon 9". Space Intel Report. Retrieved 28 July 2017.</cite><span title="ctx_ver=Z39.88-2

```

```

004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&rft
t.genre=article&rft.atitle=Ir
idium+subcontracts+ride+share+abo
ard+SpaceX+Falcon+9&rft.date=
2017-02-02&rft.aulast=de+Seld
ing&rft.aufirst=Peter+B.&
rft_id=https%3A%2F%2Fwww.spaceint
elreport.com%2Firidium&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-grace-fo-launch
-333"><span class="mw-cite-backli
nk"><a href="#cite_ref-grace-f
o-launch_333-0">^
 <li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite class="cita
tion web cs1"><a rel="nofollow" c
lass="external text" href="htt
p://www.gfz-potsdam.de/en/sectio
n/global-geomonitoring-and-gravit
y-field/topics/development-operat
ion-and-analysis-of-gravity-field
-satellite-missions/grace-fo/laun
ch-vehicle-system/">"GRACE-FO / L

```

aunch Vehicle System"</a>. GFZ Helmholtz Centre Potsdam. 28 November 2016<span class="reference-accessdate">. Retrieved <span class="nowrap">13 December</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=GRACE-FO+%2F+Launch+Vehicle+System&amp;rft.pub=GFZ+Helmholtz+Centre+Potsdam&amp;rft.date=2016-11-28&amp;rft\_id=http%3A%2F%2Fwww.gfz-potsdam.de%2Fen%2Fsection%2Fglobal-geomonitoring-and-gravity-field%2Ftopics%2Fdevelopment-operation-and-analysis-of-gravity-field-satellite-missions%2Fgrace-f-o%2Flaunch-vehicle-system%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-gunter-iridium-334"><span class="mw-cite-backlink"><b><a href="#cite\_ref-gunter-iridium\_334-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-styl

```
e" href="mw-data:TemplateStyles:r
1067248974"/><cite id="CITEREFKre
bs" class="citation web cs1">Kreb
s, Gunter. <a rel="nofollow" clas
s="external text" href="http://sp
ace.skyrocket.de/doc_sdat/iridium
-next.htm">"Iridium-NEXT". Gu
nter's Space Page<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">22 May
2018.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Iridium-NEXT&rft
t.pub=Gunter%27s+Space+Page&r
ft.aulast=Krebs&rft.aufirst=G
unter&rft_id=http%3A%2F%2Fspa
ce.skyrocket.de%2Fdoc_sdat%2Firid
ium-next.htm&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-gunter-grace-33
5"><span class="mw-cite-backlin
k"><a href="#cite_ref-gunter-g
race_335-0">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
```

```

href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFKreb
s" class="citation web cs1">Kreb
s, Gunter. <a rel="nofollow" clas
s="external text" href="http://sp
ace.skyrocket.de/doc_sdat/grace-f
o.htm">"GRACE-FO". Gunter's S
pace Page<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">22 May 2018</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=GRACE-FO&rft.pub=Gunter%27s
+Space+Page&rft.aulast=Krebs&
amp;rft.aufirst=Gunter&rft_id
=http%3A%2F%2Fspace.skyrocket.de%
2Fdoc_sdat%2Fgrace-fo.htm&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-337"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:

```

```

r1067248974"/><cite id="CITEREFBregin2018" class="citation web cs
1">Bregin, Chris (22 May 2018). <
a rel="nofollow" class="external
text" href="https://www.nasaspac
eflight.com/2018/05/falcon-9-iridium-next-6-grace-fo-launch/">"Fal
con 9 launches Iridium NEXT 6 and
GRACE-FO". NASASpaceFlight.co
m<span class="reference-accessdat
e">. Retrieved <span class="nowrap"
>25 July 2018.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Abook&rft.ge
nre=unknown&rft.btitle=Falcon
+9+launches+Iridium+NEXT+6+and+GR
ACE-FO&rft.pub=NASASpaceFligh
t.com&rft.date=2018-05-22&am
p;rft.aulast=Bregin&rft.aufir
st=Chris&rft_id=https%3A%2F%2
Fwww.nasaspaceflight.com%2F2018%2
F05%2Ffalcon-9-iridium-next-6-gra
ce-fo-launch%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-338"><span clas
s="mw-cite-backlink"><a href

```

```

="#cite_ref-338">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFDe
sch,_Matt_[@IridiumBoss]2
017" class="citation web cs1">Des
ch, Matt [@IridiumBoss] (5 Septem
ber 2017). <a rel="nofollow" clas
s="external text" href="https://t
witter.com/IridiumBoss/status/904
855169657171968">"Ten. Always 10,
except Launch 6 will be a ridesha
re with GRACE, and that one will
 launch 5" (Tweet)<span class
="reference-accessdate">. Retriev
ed 16 Septem
ber 2017 – vi
a <a href="/wiki/Twitter" title
="Twitter">Twitter.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Ten.+Always+
10%2C+except+Launch+6+will+be+a+r
ideshare+with+GRACE%2C+and+that+o
ne+will+launch+5.&rft.date=20
17-09-05&rft.au=Desch%2C+Matt
+%5B%40IridiumBoss%5D&rft_id=
https%3A%2F%2Ftwitter.com%2FIridi

```



umBoss%2Fstatus%2F904855169657171968&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-339"><span class="mw-cite-backlink"><b><a href="#cite\_ref-339">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2018/04/spacexs-may-manifest-takes-shape-block-5-debut/">"SpaceX's May launch manifest takes shape; company prepares for Block 5 debut"</a>. NASASpaceFlight.com. April 2018.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX%27s+May+launch+manifest+take+s+shape%3B+company+prepares+for+Block+5+debut&rft.pub=NASASpaceFlight.com&rft.date=2018-04&rft\_id=https%3A%2F%2Fwww.nasa

spaceflight.com%2F2018%2F04%2Fspace  
cxs-may-manifest-takes-shape-blo  
ck-5-debut%2F&rfr\_id=info%3As  
id%2Fen.wikipedia.org%3AList+of+F  
alcon+9+and+Falcon+Heavy+launche  
s" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-340"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-340">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite class="citati  
on news cs1"><a rel="nofollow" cl  
ass="external text" href="http  
s://www.floridatoday.com/story/te  
ch/science/space/2018/06/04/space  
x-falcon-9-delivers-commercial-sa  
tellite-orbit-cape/658801002/">"S  
paceX Falcon 9 delivers massive c  
ommercial satellite to orbit from  
Cape Canaveral"</a>. <i>Florida T  
oday</i>. 4 June 2018<span class  
="reference-accessdate">. Retriev  
ed <span class="nowrap">4 June</s  
pan> 2018</span>.</cite><span tit  
le="ctx\_ver=Z39.88-2004&rft\_v  
al\_fmt=info%3Aofi%2Ffmt%3Akev%3Am  
tx%3Ajournal&rft.genre=articl

```

e&rft.jtitle=Florida+Today&
p;rft.atitle=SpaceX+Falcon+9+deli
vers+massive+commercial+satellite
+to+orbit+from+Cape+Canaveral&
p;rft.date=2018-06-04&rft_id=
https%3A%2F%2Fwww.floridatoday.co
m%2Fstory%2Ftech%2Fscience%2Fspac
e%2F2018%2F06%2F04%2Fspacex-falco
n-9-delivers-commercial-satellite
-orbit-cape%2F658801002%2F&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-SES12-341"><spa
n class="mw-cite-backlink">^ <a h
ref="#cite_ref-SES12_341-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w
eb cs1"><a rel="nofollow" class
="external text" href="https://ww
w.ses.com/our-coverage/satellite
s/365">"SES-12". SES S.A. Re

```

```

trieved 28 A
ugust 2017.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&rft.genre=u
nknown&rft.btitle=SES-12&
rft.pub=SES+S.A.&rft_id=http
s%3A%2F%2Fwww.ses.com%2Four-cover
age%2Fsatellites%2F365&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-nsf-20180531-34
2"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf-20180
531_342-0"><sup><i>a</i></
sup> <a href="#cite_ref-nsf-2
0180531_342-1"><sup><i>b</
i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFGraham2018"
class="citation news cs1">Graha
m, William (31 May 2018). <a rel
="nofollow" class="external text"
href="https://www.nasaspacefligh
t.com/2018/05/falcon-9-cape-canav

```

```

eral-night-launch-ses-12/">"Falcon 9 launch with SES-12 delayed to June 4". NASASpaceFlight.com. Retrieved 31 May 2018.</cite>

<li id="cite_note-343">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFDean2018" class="citation news cs

```

```
1">Dean, James (4 June 2018). <a
 rel="nofollow" class="external t
 ext" href="https://www.floridatod
 ay.com/story/tech/science/space/2
 018/06/04/spacex-falcon-9-deliver
 s-commercial-satellite-orbit-cap
 e/658801002/">"SpaceX Falcon 9 de
 livers massive commercial satell
 ite to orbit from Cape Canaveral"
. <i>Florida Today</i><span c
 lass="reference-accessdate">. Ret
 rieved 4 Jun
 e 2018.</cite><span
 title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=Florida+Today&rft.atitle=SpaceX+Falcon+9+delivers+massive+commercial+satellite+to+orbit+from+Cape+Canaveral&rft.date=2018-06-04&rft.aulast=Dean&rft.aufirst=James&rft_id=https%3A%2F%2Fwww.floridatoday.com%2Fstory%2Ftech%2Fscience%2Fspace%2F2018%2F06%2F04%2Fspacex-falcon-9-delivers-commercial-satellite-orbit-cape%2F658801002%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class
```

```
= "Z3988">

<li id="cite_note-344"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2018" class="citation news cs
1">Clark, Stephen (4 June 2018).
 <a rel="nofollow" class="externa
l text" href="https://spaceflight
now.com/2018/06/04/multi-mission-
telecom-craft-launched-by-spacex-
for-ses/">"Multi-mission telecom
craft launched by SpaceX for SE
S". Spaceflight Now<span clas
s="reference-accessdate">. Retriev
ed 5 June</
span> 2018.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Ajournal&rft.genre=artic
le&rft.atitle=Multi-mission+t
elecom+craft+launched+by+SpaceX+f
or+SES&rft.date=2018-06-04&am
p;rft.aulast=Clark&rft.aufirs
t=Stephen&rft_id=https%3A%2F%
2Fspaceflightnow.com%2F2018%2F06%
```

```

2F04%2Fmulti-mission-telecom-craf
t-launched-by-spacex-for-ses%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-345"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://www.nasaspaceflight.com/2018/
06/final-block-4-falcon-9-crs-15-
dragon-launch/">"Final Block 4 Fa
lcon 9 launches CRS-15 Dragon". NASASpaceFlight.com. 28 June 2
018.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&rft.ati
tle=Final+Block+4+Falcon+9+launch
es+CRS-15+Dragon&rft.date=201
8-06-28&rft_id=https%3A%2F%2F
www.nasaspaceflight.com%2F2018%2F
06%2Ffinal-block-4-falcon-9-crs-1

```



5-dragon-launch%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-346"><span class="mw-cite-backlink"><b><a href="#cite\_ref-346">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBaylor,\_Michael\_&#91;@nextspaceflight&#93;2018" class="citation web cs1">Baylor, Michael [@nextspaceflight] (15 April 2018). <a rel="nofollow" class="external text" href="https://twitter.com/nextspaceflight/status/985540438512857089">"Koenigsmann: This TESS booster is planned to fly again on the next CRS mission pending NASA approval"</a> (Tweet) &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Koenigsmann%3A+Thi

s+TESS+booster+is+planned+to+fly+again+on+the+next+CRS+mission+pending+NASA+approval.&rft.date=2018-04-15&rft.au=Baylor%2C+Michael+%5B%40nextspaceflight%5D&rft\_id=https%3A%2F%2Ftwitter.com%2Fnextspaceflight%2Fstatus%2F985540438512857089&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-347"><span class="mw-cite-backlink"><b><a href="#cite\_ref-347">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2018" class="citation news cs1">Clark, Stephen (28 June 2018). <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2018/06/28/commercial-space-x-cargo-capsule-readied-for-launch-friday/">"Commercial SpaceX cargo capsule readied for launch Friday"</a>. Spaceflight Now<span class="reference-accessdate">. Retr

```

ieved 29 Jun
e 2018.</cite>

```

```

```

```

<li id="cite_note-348">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2018" class="citation news cs1">Clark, Stephen (29 June 2018).
<a rel="nofollow" class="external text" href="https://spaceflightnow.com/2018/06/29/spacex-launches-

```

ai-enabled-robot-companion-vegetation-monitor-to-space-station/">"SpaceX launches AI-enabled robot companion, vegetation monitor to space station"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">4 July</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+launches+AI-enabled+robot+companion%2C+vegetation+monitor+to+space+station&amp;rft.date=2018-06-29&amp;rft.aulast=Clark&amp;rft.aufirst=Stephen&amp;rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2018%2F06%2F29%2Fspacex-launches-ai-enabled-robot-companion-vegetation-monitor-to-space-station%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z39.88"></span></span>  
</li>  
<li id="cite\_note-block4retirement-349"><span class="mw-cite-backlink"><b><a href="#cite\_ref-block4retirement\_349-0">^</a></b></span>

```
> <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFRalph2018" class="citation news cs1">Ralph, Eric (5 June 2018). "SpaceX will transition all launches to Falcon 9 Block 5 rockets after next mission". Teslarati.com. Retrieved 5 June 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+will+transition+all+launches+to+Falcon+9+Block+5+rockets+after+next+mission&rft.date=2018-06-05&rft.aulast=Ralph&rft.aufirst=Eric&rft_id=https%3A%2F%2Fwww.teslarati.com%2Fspacex-transition-all-falcon-9-block-5-launches%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class
```

```
= "Z3988">

<li id="cite_note-350"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://www.nasaspaceflight.com/2018/
07/spacex-falcon-9-telstar-19v-la
unch/">"SpaceX Falcon 9 sets new
record with Telstar 19V launch f
rom SLC-40". 21 July 2018<spa
n class="reference-accessdate">.
Retrieved 2
2 July 2018.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Ajournal&rft.gen
re=article&rft.atitle=SpaceX+
Falcon+9+sets+new+record+with+Tel
star+19V+launch+from+SLC-40&r
ft.date=2018-07-21&rft_id=htt
ps%3A%2F%2Fwww.nasaspaceflight.co
m%2F2018%2F07%2Fspacex-falcon-9-t
elstar-19v-launch%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3ALi
```

st+of+Falcon+9+and+Falcon+Heavy+1  
aunches" class="Z3988"></span></s  
pan>  
</li>  
<li id="cite\_note-sfn-20160226-35  
1"><span class="mw-cite-backlin  
k">^ <a href="#cite\_ref-sfn-20160  
226\_351-0"><sup><i><b>a</b></i></  
sup></a> <a href="#cite\_ref-sfn-2  
0160226\_351-1"><sup><i><b>b</b></  
i></sup></a></span> <span class  
="reference-text"><link rel="mw-d  
eduplicated-inline-style" href="m  
w-data:TemplateStyles:r106724897  
4"/><cite id="CITEREFClark2016" c  
lass="citation news cs1">Clark, S  
tephen (26 February 2016). <a rel  
="nofollow" class="external text"  
href="http://spaceflightnow.com/2  
016/02/26/telesat-launch-agreemen  
ts-awarded-to-spacex/">"Telesat l  
aunch agreements awarded to Space  
X"</a>. Spaceflight Now<span clas  
s="reference-accessdate">. Retrie  
ved <span class="nowrap">29 Febru  
ary</span> 2016</span>. <q>A spok  
esperson for the Ottawa-based com  
pany said the new satellites, nam  
ed Telstar 18 Vantage and Telstar  
19 Vantage, would fly aboard Falc

on 9 rockets. Telstar 18V and 19V are both due for launch in early 2018. The Telstar satellites could take off from SpaceX's launch facilities at Cape Canaveral, Florida, or a launch pad under construction near [Brownsville, Texas](/wiki/Brownsville,_Texas "Brownsville, Texas"), to be operational in 2018.

</span></span></li><li id="cite\_note-352"><span class="mw-cite-backlink"><b><a href="#cite\_ref-352">^</a></b></span><span class="reference-text"><lin



```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. "Telstar 19V (Telstar 19 Vantage)". Gunter's Space Page. Retrieved 7 August 2018>.</cite>>

<li id="cite_note-sfn-20180722-353">^ <a href="#cite_ref-sfn-20180

```

```

722_353-0">^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1">"SpaceX delivers for Telesat with successful early morning launch". 22 July 2018. Retrieved 22 July 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+delivers+for+Telesat+with+successful+early+morning+launch&rft.date=2018-07-22&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2018%2F07%2F22%2Fspacex-delivers-for-telesat-with-succ

```

essful-early-morning-launch%2F&am  
 p;rfr\_id=info%3Asid%2Fen.wikipedi  
 a.org%3AList+of+Falcon+9+and+Falc  
 on+Heavy+launches" class="Z3988">  
 </span></span>  
 </li>  
 <li id="cite\_note-Telstar\_19V\_SFI  
 -354"><span class="mw-cite-backli  
 nk">^ <a href="#cite\_ref-Telstar\_  
 19V\_SFI\_354-0"><sup><i><b>a</b></  
 i></sup></a> <a href="#cite\_ref-T  
 elstar\_19V\_SFI\_354-1"><sup><i><b>  
 b</b></i></sup></a></span> <span  
 class="reference-text"><link rel  
 ="mw-deduplicated-inline-style" h  
 ref="mw-data:TemplateStyles:r1067  
 248974"/><cite id="CITEREFRichard  
 son2018" class="citation web cs  
 1">Richardson, Darek (22 July 201  
 8). <a rel="nofollow" class="exte  
 rnal text" href="http://www.space  
 flightinsider.com/organizations/s  
 pace-exploration-technologies/tel  
 star-19v-communications-satellite  
 -orbited-by-spacex-falcon-9/">"Te  
 lstar 19V communications satellit  
 e orbited by SpaceX Falcon 9"</a  
 >. SpaceFlight Insider<span class  
 ="reference-accessdate">. Retriev  
 ed <span class="nowrap">25 July</

```
span> 2018.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Abook&rft.genre=unknown&
&rft.btitle=Telstar+19V+commun
ications+satellite+orbited+by+Spa
ceX+Falcon+9&rft.pub=SpaceFli
ght+Insider&rft.date=2018-07-
22&rft.aulast=Richardson&
rft.aufirst=Darek&rft_id=htt
p%3A%2F%2Fwww.spaceflightinsider.
com%2Forganizations%2Fspace-explo
ration-technologies%2Ftelstar-19v
-communications-satellite-orbited
-by-spacex-falcon-9%2F&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-355"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.telesat.com/news-events/teles
```

```

at-orders-new-telstar-19-vantage-
high-throughput-satellite-ssl">"T
elesat Orders New Telstar 19 VANT
AGE High Throughput Satellite fro
m SSL". <i>telesat.com</i>.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Ajournal&rft.
genre=unknown&rft.jtitle=te
lesat.com&rft.atitle=Telesat+
Orders+New+Telstar+19+VANTAGE+Hig
h+Throughput+Satellite+from+SSL&a
mp;rft_id=https%3A%2F%2Fwww.teles
at.com%2Fnews-events%2Ftelesat-or
ders-new-telstar-19-vantage-high-
throughput-satellite-ssl&rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988">

<li id="cite_note-356"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://

```

spaceflightnow.com/2018/07/21/record-setting-commercial-satellite-awaits-blastoff-from-cape-canaveral/">"Record-setting commercial satellite awaits blastoff from Cape Canaveral"</a>. Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">25 July</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Record-setting-commercial-satellite-awaits-blastoff-from-Cape-Canaveral&amp;rft.pub=Spaceflight+Now&amp;rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2018%2F07%2F21%2Frecord-setting-commercial-satellite-awaits-blastoff-from-cape-canaveral%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-357"><span class="mw-cite-backlink"><b><a href="#cite\_ref-357">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-sty

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGr
aham2018" class="citation web cs
1">Graham, William (21 July 201
8). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2018/07/spacex-fa
lcon-9-telstar-19v-launch/">"Spac
eX Falcon 9 sets new record with
Telstar 19V launch from SLC-40"
. NASASpaceFlight.com<span cl
ass="reference-accessdate">. Retr
ieved 25 Jul
y 2018.</cite>>

```

```

<li id="cite_note-358"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://spacenews.com/spacex-launches
-penultimate-iridium-next-missio
n/">"SpaceX launches penultimate
Iridium Next mission". 25 Ju
ly 2018<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">25 July 2018</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&rft.ati
tle=SpaceX+launches+penultimate+I
ridium+Next+mission&rft.date=
2018-07-25&rft_id=https%3A%2
F%2Fspacenews.com%2Fspacex-launch
es-penultimate-iridium-next-missi
on%2F&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988">
```



```


<li id="cite_note-iridiumboosters-359">^
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFStephen_Clark_[@StephenClark1]2018" class="citation web cs1">Stephen Clark [@StephenClark1] (14 May 2018). "Iridium's Desch: Launch next week will use a previously-flown booster, and our final two Iridium Next missions will fly on new Block 5 boosters" (Tweet) – via Twitter.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Iridium%27s+Desch%3A+Launch+next+week+will+use+a+previously-flown+booster%2C+and+our+final+two+Iridium+Next+missi

```

```

ons+will+fly+on+new+Block+5+boost
ers.&rft.date=2018-05-14&
rft.au=Stephen+Clark+%5B%40Stephe
nClark1%5D&rft_id=https%3A%2
F%2Ftwitter.com%2FStephenClark1%2
Fstatus%2F996038112437506048&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-360"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://www.teslarati.com/spacex-falc
on-9-block-5-texas-static-fire-te
sts/">"SpaceX's third Block 5 roc
ket heads to Texas test site as l
aunch marathon nears". 13 Jun
e 2018<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">13 June 2018</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3

```

```

Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&rft.ati
tle=SpaceX%27s+third+Block+5+rock
et+heads+to+Texas+test+site+as+la
unch+marathon+nears&rft.date=
2018-06-13&rft_id=https%3A%2
F%2Fwww.teslarati.com%2Fspacex-fa
lcon-9-block-5-texas-static-fire-
tests%2F&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-Iridium_NEXT-7_
SN-361"><span class="mw-cite-back
link">^ <a href="#cite_ref-Iridiu
m_NEXT-7_SN_361-0"><sup><i>a</
b></i></sup> <a href="#cite_r
ef-Iridium_NEXT-7_SN_361-1"><sup>
<i>b</i></sup> <a href
="#cite_ref-Iridium_NEXT-7_SN_361
-2">^{<i>c</i>}
> <a href="#cite_ref-Iridium_NEXT
-7_SN_361-3"><sup><i>d</i>
</sup> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite id="CITEREFClark2018" class
="citation web cs1">Clark, Stephe

```

```
n (25 July 2018). "SpaceX's second launch in three days lofts 10 more Iridium satellites". <i>spaceflightnow.com</i>. Spaceflight Now. Retrieved 25 July 2018.</cite>
```

```
<li id="cite_note-Iridium_NEXT-7_
space-362"><span class="mw-cite-b
acklink">^ <a href="#cite_ref-Iri
dium_NEXT-7_space_362-0"><sup><i>
a</i></sup> <a href="#
cite_ref-Iridium_NEXT-7_space_362
-1">^{<i>b</i>}
> <a href="#cite_ref-Iridium_NEXT
-7_space_362-2"><sup><i>c
</i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFBartels2018"
class="citation web cs1">Bartels,
Meghan (25 July 2018). <a rel="no
follow" class="external text" hre
f="https://www.space.com/41273-sp
acex-launch-iridium-satellites-ha
rsh-weather.html">"SpaceX Lands R
ocket in Harshest Conditions to D
ate and Attempts to Catch Fairin
g". <i>Space.com</i><span cla
ss="reference-accessdate">. Retri
eved 25 July
 2018.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=Space.com&a
```

```

mp;rft.atitle=SpaceX+Lands+Rocket
+in+Harshest+Conditions+to+Date+a
nd+Attempts+to+Catch+Fairing&
rft.date=2018-07-25&rft.aulas
t=Bartels&rft.aufirst=Meghan&
&rft_id=https%3A%2F%2Fwww.spac
e.com%2F41273-spacex-launch-iridi
um-satellites-harsh-weather.html&
&rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-363"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSh
anklin2018" class="citation news
cs1">Shanklin, Emily (6 August 2
018). <a rel="nofollow" class="ex
ternal text" href="https://web.ar
chive.org/web/20200516081219/http
s://www.spacex.com/news/2018/08/0
6/merah-putih-mission">"Merah Put
ih Mission". <i>SpaceX</i>. A
rchived from <a rel="nofollow" cl
ass="external text" href="http

```

s://www.spacex.com/news/2018/08/06/merah-putih-mission">the original</a> on 16 May 2020<span class="reference-accessdate">. Retrieved <span class="nowrap">7 August </span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.jtitle=SpaceX&amp;rft.atitle=Merah+Putih+Mission&amp;rft.date=2018-08-06&amp;rft.aulast=Shanklin&amp;rft.aufirst=Emily&amp;rft\_id=https%3A%2F%2Fwww.spacex.com%2Fnews%2F2018%2F08%2F06%2Fmerah-putih-mission&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-Ralph-20180727-364"><span class="mw-cite-backlink"><b><a href="#cite\_ref-Ralph-20180727\_364-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFRalph2018" class="citation news cs

1">Ralph, Eric (27 July 2018). <a rel="nofollow" class="external text" href="https://www.teslarati.com/spacex-first-falcon-9-block-5-reuse-drone-ship-turnaround-record/">"SpaceX's first Falcon 9 Block 5 reuse will also be its quickest drone ship turnaround"</a>. <i>Teslarati.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">27 July</span> > 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.jtitle=Teslarati.com&amp;rft.atitle=SpaceX%27s+first+Falcon+9+Block+5+reuse+will+also+be+its+quickest+drone+ship+turnaround&amp;rft.date=2018-07-27&amp;rft.aulast=Ralph&amp;rft.aufirst=Eric&amp;rft\_id=https%3A%2F%2Fwww.teslarati.com%2Fspacex-first-falcon-9-block-5-reuse-drone-ship-turnaround-record%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>  
<li id="cite\_note-365"><span clas



```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFNu
rrachman2018" class="citation new
s cs1 cs1-prop-foreign-lang-sourc
e">Nurrachman, Kemas (22 April 20
18). <a rel="nofollow" class="ext
ernal text" href="https://techno.
okezone.com/read/2018/04/22/207/1
889936/meluncur-agustus-2018-sate
lit-telkom-4-rampung-99">"Meluncu
r Agustus 2018, Satelit Telkom 4
Rampung 99%" [Launching
in August 2018, Telkom 4 satellit
e is 99% completed] (in Indo
nesian). Okezone.com<span class
="reference-accessdate">. Retriev
ed 22 June</
span> 2018.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Ajournal&rft.genre=artic
le&rft.atitle=Meluncur+Agustu
s+2018%2C+Satelit+Telkom+4+Rampun
g+99%25&rft.date=2018-04-22&a
mp;rft.aulast=Nurrachman&rft.
aufirst=Kemas&rft_id=https%3
```

A%2F%2Ftechno.okezone.com%2Fread%2F2018%2F04%2F22%2F207%2F1889936%2Fmeluncur-agustus-2018-satelit-telkom-4-rampung-99&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-366"><span class="mw-cite-backlink"><b><a href="#cite\_ref-366">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFAgung2017" class="citation news cs1 cs1-prop-foreign-lang-source">Agung, Bintoro (30 January 2017). <a rel="nofollow" class="external text" href="http://www.cnnindonesia.com/teknologi/20170130174006-213-190081/satelit-telkom-berikutnya-bakal-gandeng-spacex/">"Satelit Telkom Berikutnya Bakal Gandeng SpaceX"</a> &#91;Next Telkom satellite will be launched by SpaceX&#93; (in Indonesian). <a href="/wiki/CNN\_Indonesia" title="CNN Indonesia">CNN Indonesia</a><span cla

```

ss="reference-accessdate">. Retrieved 14 February 2017.</cite>

<li id="cite_note-367">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. <a rel="nofollow" class="external text" href="http://space.skyrocket.de/doc_sdat/telkom

```

```

-4.htm">"Telkom 4 (Merah Putih)"
. <i>Gunter's Space Page</i>.
Gunter<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">7 August 2018</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=unknown&rft.jt
itle=Gunter%27s+Space+Page&rft
.atitle=Telkom+4+%28Merah+Putih%
29&rft.aulast=Krebs&rft.a
ufirst=Gunter&rft_id=http%3A%
2F%2Fspace.skyrocket.de%2Fdoc_sda
t%2Ftelkom-4.htm&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988">

<li id="cite_note-TelcomI_S.com-3
68"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-TelcomI_
S.com_368-0"><sup><i>a</i>
</sup> <a href="#cite_ref-Tel
comI_S.com_368-1"><sup><i>b
</i></sup> <span clas
s="reference-text"><link rel="mw-
deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREFWall2018"

```

```

class="citation web cs1">Wall, M
ike (7 August 2018). <a rel="nofo
llow" class="external text" href
="https://www.space.com/41395-spa
cex-launches-used-block-5-rocket-
nails-landing.html">"SpaceX Re-La
unches 'Block 5' Rocket for 1st T
ime, Nails Landing Again". <i
>space.com</i><span class="refere
nce-accessdate">. Retrieved 7 August 20
18.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajo
urnal&rft.genre=unknown&r
ft.jtitle=space.com&rft.atitl
e=SpaceX+Re-Launches+%27Block+5%2
7+Rocket+for+1st+Time%2C+Nails+La
nding+Again&rft.date=2018-08-
07&rft.aulast=Wall&rft.au
first=Mike&rft_id=https%3A%2
F%2Fwww.space.com%2F41395-spacex-
launches-used-block-5-rocket-nail
s-landing.html&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-369"><span clas
s="mw-cite-backlink"><a href

```

```
= "#cite_ref-369">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://e
n.industry.co.id/read/1206/telkom
-4-satellite-launch-accelerated-f
rom-schedule">"Telkom 4 Satellite
Launch Accelerated from Schedule"
. <i>industry.co.id</i>. 12 S
eptember 2017.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=industry.co.id&am
p;rft.atitle=Telkom+4+Satellite+L
aunch+Accelerated+from+Schedule&a
mp;rft.date=2017-09-12&rft_id
=http%3A%2F%2Fen.industry.co.id%2
Fread%2F1206%2Ftelkom-4-satellite
-launch-accelerated-from-schedule
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">

<li id="cite_note-370"><span clas
s="mw-cite-backlink"><a href
```

```
= "#cite_ref-370">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2018/08/s
pacex-falcon-9-merah-putih-block-
5-reflight/">"SpaceX Falcon 9 lau
nches Merah Putih for first Block
5 reflight". NASASpaceFlight.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft.
genre=unknown&rft.btitle=Sp
aceX+Falcon+9+launches+Merah+Puti
h+for+first+Block+5+reflight&
rft.pub=NASASpaceFlight&rft_i
d=https%3A%2F%2Fwww.nasaspaceflig
ht.com%2F2018%2F08%2Fspacex-falco
n-9-merah-putih-block-5-reflight%
2F&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-sfn-20180910-37
1"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sfn-20180
```

910\_371-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-sfn-20180910\_371-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-sfn-20180910\_371-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-sfn-20180910\_371-3"><sup><i><b>d</b></i></sup></a> <a href="#cite\_ref-sfn-20180910\_371-4"><sup><i><b>e</b></i></sup></a> <a href="#cite\_ref-sfn-20180910\_371-5"><sup><i><b>f</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2018" class="citation news cs1">Clark, Stephen (10 September 2018). <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2018/09/10/spacex-telesat-achieve-repeat-success-with-midnight-hour-launch/">"SpaceX, Telesat achieve repeat success with midnight-hour launch"</a>. <i>Spaceflight Now</i><span class="reference-accessdate">. Retrieved <span class="nowrap">10 September</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rf



```

t_val_fmt=info%3Aofi%2Ffmt%3Akev%
3Amtx%3Ajournal&rft.genre=art
icle&rft.jtitle=Spaceflight+N
ow&rft.atitle=SpaceX%2C+Teles
at+achieve+repeat+success+with+mi
dnight-hour+launch&rft.date=2
018-09-10&rft.aulast=Clark&am
p;rft.aufirst=Stephen&rft_id=
https%3A%2F%2Fspaceflightnow.com%
2F2018%2F09%2F10%2Fspacex-telesat
-achieve-repeat-success-with-midn
ight-hour-launch%2F&rfr_id=in
fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></sp
an>

<li id="cite_note-372"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://s
pacenews.com/telesat-and-apt-part
ner-on-replacement-of-jointly-own
ed-satellite/">"Telesat, APT Part
ner on Replacement of Joint Satel

```

lite - SpaceNews.com". Spacenews.com. 25 December 2015.

<span title="ctx\_ver=Z39.88-2004& rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Telesat%2C+APT+Partner+on+Replacement+of+Joint+Satellite+-+SpaceNews.com&rft.pub=Spacenews.com&rft.date=2015-12-25&rft\_id=http%3A%2F%2Fspacenews.com%2Ftelesat-and-apt-partner-on-replacement-of-jointly-owned-satellite%2F&rft\_rft\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-nsf-20181008-373"><span class="mw-cite-backlink">^ <a href="#cite\_ref-nsf-20181008\_373-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-nsf-20181008\_373-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-nsf-20181008\_373-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-nsf-20181008\_373-3"><sup><i><b>d</b></i></sup></a> <a href="#cite\_ref-nsf-20181008\_373-4"><sup><

***e***

<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:1067248974"/><cite id="CITEREFGraham2018" class="citation news cs 1">Graham, William (8 October 2018). <a rel="nofollow" class="external text" href="https://www.nasa.gov/spacex-falcon-9-saocom-1a-launch-west-coast-landing/">"SpaceX Falcon 9 launches with SAOCOM 1A and nails first West Coast landing"</a>. NASA's spaceflight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">9 October</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+Falcon+9+launches+with+SAOCOM+1A+and+nails+first+West+Coast+landing&rft.date=2018-10-08&rft.aulast=Graham&rft.aufirst=William&rft\_id=https%3A%2F%2Fwww.nasa.gov/spacex-falcon-9-saocom-1a-launch-west-coast-landing%2F&rft\_id=info%3Asid%2

```

Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-374"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2018/08/s
aocom-1a-ships-vandenberg-falcon-
9-first-west-coast-rtls/">"SAOCOM
1A ships to Vandenberg as Falcon
 9 prepares for the first west co
ast RTLS". <i>nasaspacefligh
t.com</i><span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">1 August 2018</
span>.</cite><span title="ctx_ver
=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajourn
al&rft.genre=unknown&rft.
jtitle=nasaspaceflight.com&rft.
atitle=SAOCOM+1A+ships+to+Vande
nberg+as+Falcon+9+prepares+for+th
e+first+west+coast+RTLS&rft_i

```

d=https%3A%2F%2Fwww.nasaspaceflight.com%2F2018%2F08%2Fsaocom-1a-ships-vandenberg-falcon-9-first-west-coast-rtls%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-SAOCOM20090416-375"><span class="mw-cite-backlink">^ <a href="#cite\_ref-SAOCOM20090416\_375-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-SAOCOM20090416\_375-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation press release cs1"><a rel="nofollow" class="external text" href="http://web.archive.org/web/20171027192425/http://www.spacex.com/press/2012/12/19/spacex-signs-argentinas-space-agency-two-falcon-9-launches">"Spacex signs Argentina's space agency for two Falcon 9 launches"</a> (Press release). <a href="/wiki/SpaceX" title="Space X">SpaceX</a>. 16 April 2009. Arc

hived from <a rel="nofollow" class="external text" href="http://www.spacex.com/press/2012/12/19/spacex-signs-argentinas-space-agency-two-falcon-9-launches">the original</a> on 27 October 2017<span class="reference-accessdate">. Retrieved <span class="nowrap">21 October</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Spacex+signs+Argentina%27s+space+agency+for+two+Falcon+9+launches&amp;rft.pub=SpaceX&amp;rft.date=2009-04-16&amp;rft\_id=http%3A%2F%2Fwww.spacex.com%2Fpress%2F2012%2F12%2F19%2Fspacex-signs-argentinas-space-agency-two-falcon-9-launches&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-saocom\_revision-376"><span class="mw-cite-backlink"><b><a href="#cite\_ref-saocom\_revision\_376-0">^</a></b></span>

<span class="reference-text"><li

```

nk rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1 cs1-prop-foreign-language-source">"Exitosa Revisión de la Misión SAOCOM" (in Spanish). CONAE. 12 April 2016. Archived from the original on 17 April 2016. Retrieved 20 June 2016.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Exitosa+Revisi%C3%B3n+de+la+Misi%C3%B3n+SAOCOM&rft.pub=CONAE&rft.date=2016-04-12&rft_id=http%3A%2F%2Fwww.conae.gov.ar%2Findex.php%2Fespanol%2F2016%2F834-revision-saocom-abril2016&rfr_id=

```

```
info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-377">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGraham2018" class="citation news cs1">Graham, William (15 November 2018). "SpaceX Falcon 9 launches Es'Hail-2 from 39A". NASASpaceFlight.com. Retrieved 15 November 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+Falcon+9+launches+Es%2
```



```

7Hail-2+from+39A&rft.date=201
8-11-15&rft.aulast=Graham&#x
p;rft.aufirst=William&rft_id=
https%3A%2F%2Fwww.nasaspacefligh
t.com%2F2018%2F11%2Fspacex-falcon
-9-launch-eshail-2-39a%2F&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-eshail2-378"><s
pan class="mw-cite-backlink">^ <s
up><i>a</i></sup> <a h
ref="#cite_ref-eshail2_378-1"><su
p><i>b</i></sup> <l
ink rel="mw-deduplicated-inline-s
tyle" href="mw-data:TemplateStyle
s:r1067248974"/><cite id="CITEREF
Clark2014" class="citation news c
s1">Clark, Stephen (29 December 2
014). <a rel="nofollow" class="ex
ternal text" href="http://spacefl
ightnow.com/2014/12/29/spacex-sel
ected-for-launch-of-qatari-satell
ite/">"SpaceX selected for launch
of Qatari satellite". <i>Spac
eflight Now</i><span class="refer

```

```
ence-accessdate">. Retrieved 29 December 2014.</cite><li id="cite_note-379">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2018/11/15/spacex-launches-qatars-eshail-2-comm
```

unications-satellite/">"SpaceX launches Qatar's Es'hail 2 communications satellite"</a>. <i>spaceflightnow.com</i>. 15 November 2018<span class="reference-accessdate">. Retrieved <span class="nowrap">17 November</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=spaceflightnow.com&amp;rft.atitle=SpaceX+launches+Qatar%27s+Es%27hail+2+communications+satellite&amp;rft.date=2018-11-15&amp;rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2018%2F11%2F15%2Fspacex-launches-qatars-eshail-2-communications-satellite%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-spacenews20181115-380"><span class="mw-cite-backlink">^ <a href="#cite\_ref-spacenews20181115\_380-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-spacenews20181115\_380-1"><sup><i><b>b</b></i></sup></a></span>

```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFHenry2018" class="citation news cs1">Henry, Caleb (15 November 2018). "SpaceX launches Es'hail-2 satellite, ties launch record". <i>spacenews.com</i>. Retrieved 15 November 2018</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=spacenews.com&rft.atitle=SpaceX+launches+Es%27hail-2+satellite%2C+ties+launch+record&rft.date=2018-11-15&rft.aulast=Henry&rft.aufirst=Caleb&rft_id=https%3A%2F%2Fspacenews.com%2Fspacex-launches-eshail-2-satellite-ties-launch-record&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z
```

```
3988">

<li id="cite_note-381"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/spacex-landing-mish
ap-wont-affect-upcoming-launches
/">"SpaceX landing mishap won't
affect upcoming launches". <
i>spaceflightnow.com</i>. 5 Decem
ber 2018<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">6 December 2018
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=unknown&rft
.jtitle=spaceflightnow.com&rft
.atitle=SpaceX+landing+mishap+w
on%27t+affect+upcoming+launches&a
mp;rft.date=2018-12-05&rft_id
=https%3A%2F%2Fspacenews.com%2Fsp
acex-landing-mishap-wont-affect-u
pcoming-launches%2F&rfr_id=in
```

```

fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></sp
an>

<li id="cite_note-382"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2018" class="citation news cs
1">Clark, Stephen (3 December 201
8). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2018/12/03/spacex-laun
ches-swarm-of-satellites-re-flies
-rocket-for-third-time/">"SpaceX
launches swarm of satellites, fl
ies rocket for third time". <
i>Spaceflight Now</i><span class
="reference-accessdate">. Retriev
ed 19 Decemb
er 2018.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.jtitle=Spaceflight
+Now&rft.atitle=SpaceX+launch

```

```

es+swarm+of+satellites%2C+flies+r
ocket+for+third+time&rft.date
=2018-12-03&rft.aulast=Clark&
&rft.aufirst=Stephen&rft_i
d=https%3A%2F%2Fspaceflightnow.co
m%2F2018%2F12%2F03%2Fspacex-launc
hes-swarm-of-satellites-re-flies-
rocket-for-third-time%2F&rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988">

<li id="cite_note-spacenews201812
03-383"><span class="mw-cite-back
link">^ <a href="#cite_ref-spacen
ews20181203_383-0"><sup><i>a</
b></i></sup> <a href="#cite_r
ef-spacenews20181203_383-1"><sup>
<i>b</i></sup>
 <li
nk rel="mw-deduplicated-inline-st
yle" href="mw-data:TemplateStyle
s:r1067248974"/><cite class="cita
tion web cs1"><a rel="nofollow" c
lass="external text" href="http
s://spacenews.com/spacex-launches
-all-smallsat-falcon-9-missio
n/">"SpaceX launches all-smallsat
Falcon 9 mission". <i>spacene

```

ws.com</i>. SpaceNews. 3 December 2018<span class="reference-access date">. Retrieved <span class="no wrap">4 December</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=spacenews.com&amp;rft.atitle=SpaceX+launches+all-smallsat+Falcon+9+mission&amp;rft.date=2018-12-03&amp;rft\_id=https%3A%2F%2Fspace news.com%2Fspacex-launches-all-smallsat-falcon-9-mission%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-spaceflight-rideshare-384"><span class="mw-cite-backlink"><b><a href="#cite\_ref-spaceflight-rideshare\_384-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation pressrelease cs1"><a rel="nofollow" class="external text" href="http://www.spacefligh



t.com/spaceflight-purchases-space-x-falcon-9-rocket-to-provide-more-frequent-cost-effective-rideshare-availability-for-small-satellite-industry/">"Spaceflight purchases SpaceX Falcon 9 rocket to provide more frequent, cost-effective rideshare availability for small satellite industry"</a> (Press release). Spaceflight Industries.

30 September 2015<span class="reference-accessdate">. Retrieved <span class="nowrap">7 January</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Spaceflight+purchase+SpaceX+Falcon+9+rocket+to+provide+more+frequent%2C+cost-effective+rideshare+availability+for+small+satellite+industry&amp;rft.pub=Spaceflight+Industries&amp;rft.date=2015-09-30&amp;rft\_id=http%3A%2F%2Fwww.spaceflight.com%2Fspaceflight-purchases-spacex-falcon-9-rocket-to-provide-more-frequent-cost-effective-rideshare-availability-for-small-satellite-industry%2F&amp;rfr\_id=info%3Asid%2Fen.wiki

```

pedia.org%3Alist+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">

<li id="cite_note-:2-385"><span c
lass="mw-cite-backlink">^
 <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFSorensen2018" class="citati
on web cs1">Sorensen, Jodi (6 Aug
ust 2018). <a rel="nofollow" clas
s="external text" href="http://sp
aceflight.com/spaceflight-prepare
s-historic-launch-of-more-than-70
-spacecraft-aboard-spacex-falcon-
9/">"Spaceflight prepares histori
c launch of more than 70 spacecra
ft aboard SpaceX Falcon9". Sp
aceflight Industries<span class
="reference-accessdate">. Retriev
ed 6 August
 2018.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=Spaceflight+pr
epares+historic+launch+of+more+th

```

```

an+70+spacecraft+aboard+SpaceX+Falcon9&rft.pub=Spaceflight+Industries&rft.date=2018-08-06&rft.aulast=Sorensen&rft.aufirst=Jodi&rft_id=http%3A%2F%2Fspaceflight.com%2Fspaceflight-prepares-historic-launch-of-more-than-70-spacecraft-aboard-spacex-falcon-9%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-:3-386">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBusiness" class="citation news cs1">Business, Jackie Wattles. "SpaceX launched 64 satellites in record-breaking mission". CNN. Retrieved 4 Dec

```

```

ember 2018.</cite><
span title="ctx_ver=Z39.88-2004&
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Ajournal&rft.genr
e=article&rft.atitle=SpaceX+l
aunched+64+satellites+in+record-b
reaking+mission&rft.aulast=Bu
siness&rft.aufirst=Jackie+Wat
tles&rft_id=https%3A%2F%2Fww
w.cnn.com%2F2018%2F12%2F03%2Ftec
h%2Fspacex-record-sso-a-mission%2
Findex.html&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-eucropis-387"><
span class="mw-cite-backlink">
<a href="#cite_ref-eucropis_387-
0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="http://www.parabo
licarc.com/2017/02/07/dlr-launch-
cosmic-greenhouses-orbit/#more-60
627">"DLR to Launch Cosmic Greenh
ouses into Orbit". Parabolic

```

Arc. 7 February 2017</li>  
<li id="cite\_note-:4-388"><span class="mw-cite-backlink"><b><a href="#cite\_ref-:4\_388-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc\_sdat/hiber-1.htm">"Hiber 1, 2"</a>

```

>. <i>space.skyrocket.de</i>. Re
trieved 24 O
ctober 2018.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Ajournal&rft.gen
re=unknown&rft.jtitle=space.s
kyrocket.de&rft.atitle=Hiber+
1%2C+2&rft_id=https%3A%2F%2Fs
pace.skyrocket.de%2Fdoc_sdat%2Fhi
ber-1.htm&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-:5-389"><span c
lass="mw-cite-backlink"><a hre
f="#cite_ref-:5_389-0">^
 <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFKrebs" class="citation web
cs1">Krebs, Gunter. <a rel="nofo
llow" class="external text" href
="https://space.skyrocket.de/doc_
sdat/itasat-1.htm">"ITASAT 1". <i>Gunter's Space Page</i><spa
n class="reference-accessdate">.

```

```

Retrieved 3
August 2018.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Ajournal&rft.gen
re=unknown&rft.jtitle=Gunter%
27s+Space+Page&rft.atitle=ITA
SAT+1&rft.aulast=Krebs&rft
t.aufirst=Gunter&rft_id=http
s%3A%2F%2Fspace.skyrocket.de%2Fdo
c_sdat%2Fitasat-1.htm&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></
span>

<li id="cite_note-nsf-20180129-39
0"><span class="mw-cite-backlin
k"><a href="#cite_ref-nsf-2018
0129_390-0">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFBaylo
r2018" class="citation news cs1">
Baylor, Michael (29 January 201
8). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2018/01/planet-la
bs-targets-search-engine-worl

```

```

d/">"Planet Labs targets a search
engine of the world". NASASpa
ceFlight.com<span class="referenc
e-accessdate">. Retrieved <span c
lass="nowrap">30 January 2
018.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Aj
ournal&rft.genre=article&
rft.atitle=Planet+Labs+targets+a+
search+engine+of+the+world&rft
.date=2018-01-29&rft.aulast=
Baylor&rft.aufirst=Michael&am
p;rft_id=https%3A%2F%2Fwww.nasasp
aceflight.com%2F2018%2F01%2Fplane
t-labs-targets-search-engine-worl
d%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-Upcoming-ELaNa-
391"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-Upcoming-
ELaNa_391-0"><sup><i>a</i>
</sup> <a href="#cite_ref-Upc
oming-ELaNa_391-1"><sup><i>b</
b></i></sup> <a href="#cite_r
ef-Upcoming-ELaNa_391-2"><sup><i>
c</i></sup> <sp

```



```
an class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Upcoming ELana CubeSat Launches". NASA. 22 May 2020. Retrieved 14 June 2020.</cite> <i>This article incorporates
text from this source, which is
in the <a href="/wiki/Public_dom
ain" title="Public domain">public
domain</i><i>.</i>

<li id="cite_note-392"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFHa
mbletonJordan2018" class="citatio
n pressrelease cs1">Hambleton, Ka
thryn; Jordan, Gary (5 December 2
018). <a rel="nofollow" class="ex
ternal text" href="https://www.na
sa.gov/press-release/nasa-sends-n
ew-research-hardware-to-space-sta
tion-on-spacex-mission">"NASA Sen
ds New Research, Hardware to Spac
e Station on SpaceX Mission"
(Press release). NASA<span class

```

```
= "reference-accessdate">. Retrieved 29 December 2018.</cite> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-Grush-20181205-393">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGrush2018" class="citation news cs1">Grush, Loren (5 December 2018). "For the first time ever, a SpaceX Falcon 9 rocket fails to stick a ground landing". The Verge. Retrieved <span

```

```
class="nowrap">6 December
2018.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
journal&rft.genre=article&am
p;rft.atitle=For+the+first+time+e
ver%2C+a+SpaceX+Falcon+9+rocket+f
ails+to+stick+a+ground+landing&am
p;rft.date=2018-12-05&rft.aul
ast=Grush&rft.aufirst=Loren&a
mp;rft_id=https%3A%2F%2Fwww.theve
rge.com%2F2018%2F12%2F5%2F1812763
0%2Fspacex-falcon-9-rocket-landin
g-failure-ground-cape-canaveral&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-394"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKr
ebs" class="citation web cs1">Kre
bs, Gunter. <a rel="nofollow" cla
ss="external text" href="https://
space.skyrocket.de/doc_sdat/gedi.
```

```
htm">"GEDI". <i>Gunter's Space Page</i>. Retrieved 22 August 2018.</cite>

<li id="cite_note-395">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFRalph2018" class="citation web cs1">Ralph, Eric (7 December 2018). <a rel="nofollow" class="external text" href="https://www.teslarati.com/spacex-first-falcon-9-block
```

-5-booster-casualty-battered-but-intact/">"SpaceX's first Falcon 9 Block 5 booster casualty battered but still intact in aerial photos"</a>. <i>teslarati.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">7 December</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=teslarati.com&amp;rft.atitle=SpaceX%27s+first+Falcon+9+Block+5+booster+casualty+battered+but+still+intact+in+aerial+photos&amp;rft.date=2018-12-07&amp;rft.aulast=Ralph&amp;rft.aufirst=Eric&amp;rft\_id=http%3A%2F%2Fwww.teslarati.com%2Fspacex-first-falcon-9-block-5-booster-casualty-battered-but-intact%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-spacenews20181223-396"><span class="mw-cite-backlink">^ <a href="#cite\_ref-spacenews20181223\_396-0"><sup><i><b>a</b></i></sup></a></li>

```

b></i></sup> <sup>
<i>b</i></sup> ^{<i>c</i>}
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX launches first GPS 3 satellite". spacenews.com. 23 December 2018. Retrieved
23 December
 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+launches+first+GPS+3+satellite&rft.pub=spacenews.com&rft.date=2018-12-23&rft_id=https%3A%2F%2Fspacenews.com%2Fspacex-launches-first-gps-3-satellite%2F&rfr_i

```



```

d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-nsf-20181022-39
7"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf-20181
022_397-0"><sup><i>a</i></
sup> <a href="#cite_ref-nsf-2
0181022_397-1"><sup><i>b</
i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFBaylor2018"
class="citation news cs1">Baylo
r, Michael (22 October 2018). <a
rel="nofollow" class="external t
ext" href="https://www.nasaspacef
light.com/2018/10/spacex-lines-fi
ve-launches-2018/">"SpaceX lines
up five launches to close out 20
18". NASASpaceFlight.com. Re
trieved 25 O
ctober 2018.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Ajournal&rft.gen

```

```

re=article&rft.atitle=SpaceX+
lines+up+five+launches+to+close+o
ut+2018&rft.date=2018-10-22&a
mp;rft.aulast=Baylor&rft.aufi
rst=Michael&rft_id=https%3A%2
F%2Fwww.nasaspaceflight.com%2F201
8%2F10%2Fspacex-lines-five-launch
es-2018%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988">

<li id="cite_note-sfn-20181217-39
8"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sfn-20181
217_398-0"><sup><i>a</i></
sup> <a href="#cite_ref-sfn-2
0181217_398-1"><sup><i>b</
i></sup> <a href="#cite_ref-s
fn-20181217_398-2"><sup><i>c</
b></i></sup> <span cla
ss="reference-text"><link rel="mw
-deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREFClark2018"
class="citation news cs1">Clark,
Stephen (17 December 2018). <a r
el="nofollow" class="external tex
t" href="https://spaceflightnow.c
om/2018/12/17/air-force-requireme

```

nts-will-keep-spacex-from-recover-  
ing-falcon-9-booster-after-gps-la  
unch/">"Air Force requirements wi  
ll keep SpaceX from landing Falco  
n 9 booster after GPS launch"</a  
>. <i>SpaceFlight Now</i><span cl  
ass="reference-accessdate">. Retr  
ieved <span class="nowrap">18 Dec  
ember</span> 2018</span>.</cite><  
span title="ctx\_ver=Z39.88-2004&a  
mp;rft\_val\_fmt=info%3Aofi%2Ffmt%3  
Akev%3Amtx%3Ajournal&amp;rft.genr  
e=article&amp;rft.jtitle=SpaceFli  
ght+Now&amp;rft.atitle=Air+Force+  
requirements+will+keep+SpaceX+fro  
m+landing+Falcon+9+booster+after+  
GPS+launch&amp;rft.date=2018-12-1  
7&amp;rft.aulast=Clark&amp;rft.au  
first=Stephen&amp;rft\_id=https%3  
A%2F%2Fspaceflightnow.com%2F2018%  
2F12%2F17%2FAir-force-requirement  
s-will-keep-spacex-from-recoverin  
g-falcon-9-booster-after-gps-laun  
ch%2F&amp;rfr\_id=info%3Asid%2Fen.  
wikipedia.org%3AList+of+Falcon+9+  
and+Falcon+Heavy+launches" class  
="Z3988"></span></span>  
</li>  
<li id="cite\_note-399"><span clas  
s="mw-cite-backlink"><b><a href

```

="#cite_ref-399">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/congressional-audit
ors-raise-red-flags-on-eelv-costs
-national-security-launch-industr
ial-base/">"Congressional auditor
s raise red flags on EELV costs,
national security launch industr
ial base". <i>spacenews.com</
i>. 25 April 2018.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Ajournal&rft.genre=unkno
wn&rft.jtitle=spacenews.com&a
mp;rft.atitle=Congressional+audit
ors+raise+red+flags+on+EELV+cost
s%2C+national+security+launch+ind
ustrial+base&rft.date=2018-04
-25&rft_id=https%3A%2F%2Fspac
enews.com%2Fcongressional-audit
s-raise-red-flags-on-eelv-costs-n
ational-security-launch-industria
l-base%2F&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl

```

```

ass="Z3988">

<li id="cite_note-sn-20160427-40
0"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sn-201604
27_400-0"><sup><i>a</i></s
up> <a href="#cite_ref-sn-201
60427_400-1"><sup><i>b</i>
</sup> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite id="CITEREFGruss2016" class
="citation news cs1">Gruss, Mike
 (27 April 2016). <a rel="nofollo
w" class="external text" href="ht
tp://spacenews.com/spacex-wins-82
-million-contract-for-2018-falcon
-9-launch-of-gps-3-satellite/">"S
paceX wins US$82 million contract
for 2018 Falcon 9 launch of GPS 3
satellite". SpaceNews<span cl
ass="reference-accessdate">. Retr
ieved 29 Apr
il 2016.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&
rft.genre=article&
rft.atitle=SpaceX+wins
+US%2482+million+contract+for+201

```

```

8+Falcon+9+launch+of+GPS+3+satellite&rft.date=2016-04-27&rft.aulast=Gruss&rft.aufirst=Mike&rft_id=http%3A%2F%2Fspace
news.com%2Fspacex-wins-82-million
-contract-for-2018-falcon-9-launch-of-gps-3-satellite%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-gunter-b5ex-401">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. "Falcon-9 v 1.2 (Block 5)(ex) (Falcon-9FT (Block 5)(ex))". Gunter's Space Page. Retrieved 9 November 2018</sp

```

```

an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&
p;rft.genre=unknown&rft.btitl
e=Falcon-9+v1.2+%28Block+5%29%28e
x%29+%28Falcon-9FT+%28Block+5%29%
28ex%29%29&rft.pub=Gunter%27s
+Space+Page&rft.aulast=Krebs&
&rft.aufirst=Gunter&rft_id
=https%3A%2F%2Fspace.skyrocket.d
e%2Fdoc_lau_det%2Ffalcon-9_v1-2_b
5_ex.htm&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-402"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2018" class="citation web cs
1">Ralph, Eric (13 December 201
8). <a rel="nofollow" class="exte
rnal text" href="https://www.tesl
arati.com/spacex-first-expendable
-falcon-9-block-5-launch-usaf-sat
ellite-fairing-encapsulation/">"S

```

paceX's Falcon 9 Block 5 set for first expendable launch with USAF satellite". *Teslarati.com*

<li id="cite\_note-403"><span class="mw-cite-backlink"><b><a href="#cite\_ref-403">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:



r1067248974"/><cite class="citation on web cs1"><a rel="nofollow" class="external text" href="https://www.schriever.af.mil/News/Article-Display/Article/2057321/2nd-space-operations-squadron-sets-svn-74-healthy-and-active/">"2nd Space Operations Squadron sets SVN-74 healthy and active"</a>. <i>Schriever Air Force Base</i>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Schriever+Air+Force+Base&amp;rft.atitle=2nd+Space+Operations+Squadron+sets+SVN-74+healthy+and+active&amp;rft\_id=https%3A%2F%2Fwww.schriever.af.mil%2FNews%2FArticle-Display%2FArticle%2F2057321%2F2nd-space-operations-squadron-sets-svn-74-healthy-and-active%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public_domain" title="Public domain">public domain</a></i><i>.</i></span>
</li>
<li id="cite_note-404"><span class="mw-cite-backlink"><b><a href="#cite_ref-404">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF@jeff_foust2019" class="citation web cs1">@jeff_foust (7 May 2019).
  <a rel="nofollow" class="external text" href="https://twitter.com/jeff_foust/status/1125848289260314624">"Shotwell: expecting 18-21 launches this year; Starlink missions would be on top of that. Plenty of production capacity to handle it. #SATShow"</a> (Tweet) &
```

```
#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Shotwell%3A+expecting+18-21+launches+this+year%3B+Starlink+missions+would+be+on+top+of+that.+Plenty+of+production+capacity+to+handle+it.+%23SATShow&amp;rft.date=2019-05-07&amp;rft.au=%40jeff_foust&amp;rft_id=https%3A%2F%2Ftwitter.com%2Fjeff_foust%2Fstatus%2F1125848289260314624&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-405"><span class="mw-cite-backlink"><b><a href="#cite_ref-405">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc_chr/lau2019.htm">"Orbital Launches of 2019"
```

. Gunters space page. Retrieved 8 January 2020.</cite>

<li id="cite_note-406">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Iridium boss reflects as final NEXT satellite constellation launches". 11

January 2019

<li id="cite_note-407">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFDesch,_Matt_[@IridiumBoss]2018" class="citation web cs1">Desch, Matt [@IridiumBoss] (18 October 2018). <a rel="nofollow" class

```

="external text" href="https://twitter.com/IridiumBoss/status/1052938928687370240">"I understand it's 1049-2"</a> (Tweet)<span class="reference-accessdate">. Retrieved <span class="nowrap">18 October</span> 2018</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=I+understand+it%27s+1049-2&amp;rft.date=2018-10-18&amp;rft.au=Desch%2C+Matt+%5B%40IridiumBoss%5D&amp;rft_id=https%3A%2F%2Ftwitter.com%2FIridiumBoss%2Fstatus%2F1052938928687370240&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-408"><span class="mw-cite-backlink"><b><a href="#cite_ref-408">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citati

```

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2019/02/s
pacex-indonesian-launch-israeli-m
oon-mission/">"SpaceX launches In
donesian satellite launch and Isr
aeli moon mission"</a>. 21 Februa
ry 2019<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">22 February</span> 2019
</span>.</cite><span title="ctx_v
er=Z39.88-2004&amp;rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&amp;rft.genre=unknown&amp;rft.bt
itle=SpaceX+launches+Indonesian+s
atellite+launch+and+Israeli+moon+
mission&amp;rft.date=2019-02-21&a
mp;rft_id=https%3A%2F%2Fwww.nasas
paceflight.com%2F2019%2F02%2Fspac
ex-indonesian-launch-israeli-moon
-mission%2F&amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span></span>
</li>
<li id="cite_note-409"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-409">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty

```

le" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Nusantara Satu Mission" (PDF). <i>spacex.com</i>. 21 February 2019. Archived from the original (PDF) on 21 February 2019. Retrieved 21 February 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=spacex.com&rft.atitle=Nusantara+Satu+Mission&rft.date=2019-02-21&rft_id=https%3A%2F%2Fwww.spacex.com%2Fsites%2Fspacex%2Ffiles%2Fnusantara_satu_press_kit.pdf&rfr_id=info%3Asid%2Fen.wikipe

dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-jls-201801012-4
10"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-jls-20180
1012_410-0"><sup><i>a</i>
</sup> <a href="#cite_ref-jls
-201801012_410-1"><sup><i>b
></i></sup> <span clas
s="reference-text"><link rel="mw-
deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREFSchuster20
18" class="citation web cs1">Schu
ster, John (2 January 2018). <a r
el="nofollow" class="external tex
t" href="http://www.jlscapitalstr
ategies.com/news/2018/1/2/pasifik
-satelit-nusantara-psn-vi-projec
t">"Pasifik Satelit Nusantara - P
SN VI project". JLS Capital S
trategies<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">12 September 20
18.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Abo
ok&rft.genre=unknown&rft.

```

btitle=Pasifik+Satelit+Nusantara+
-+PSN+VI+project&rft.pub=JLS+
Capital+Strategies&rft.date=2
018-01-02&rft.aulast=Schuster
&rft.aufirst=John&rft_id=
http%3A%2F%2Fwww.jlscapitalstrate
gies.com%2Fnews%2F2018%2F1%2F2%2F
pasifik-satelit-nusantara-psn-vi-
project&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>
<li id="cite_note-sn-20181218-41
1"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-sn-20181
218_411-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFFoust20
18" class="citation news cs1">Fou
st, Jeff (18 December 2018). <a r
el="nofollow" class="external tex
t" href="https://spacenews.com/sp
aceil-completes-lunar-lander-for-
february-launch/">"SpaceIL comple
tes lunar lander for February lau
nch"</a>. Space News<span class
="reference-accessdate">. Retrie

```

```

ed <span class="nowrap">19 Decemb
er</span> 2018</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.atitle=SpaceIL+com
pletes+lunar+lander+for+February+
launch&rft.date=2018-12-18&
p;rft.aulast=Foust&rft.aufirs
t=Jeff&rft_id=https%3A%2F%2Fs
pacenews.com%2Fspaceil-completes-
lunar-lander-for-february-launch%
2F&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988"></span></span>
</li>
<li id="cite_note-sn150219-412"><
span class="mw-cite-backlink">^ <
a href="#cite_ref-sn150219_412-
0"><sup><i><b>a</b></i></sup></a>
<a href="#cite_ref-sn150219_412-
1"><sup><i><b>b</b></i></sup></a>
</span> <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite class
="citation web cs1"><a rel="nofol
low" class="external text" href
="https://spacenews.com/air-force

```

```

-smallsat-to-fly-on-upcoming-falcon-9-launch/">"Air Force smallsat to fly on upcoming Falcon 9 launch"</a>. SpaceNews. 15 February 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">21 February</span> 2019</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Air+Force+smallsat+to+fly+on+upcoming+Falcon+9+launch&amp;rft.pub=SpaceNews&amp;rft.date=2019-02-15&amp;rft_id=https%3A%2F%2Fspacenews.com%2Fair-force-smallsat-to-fly-on-upcoming-falcon-9-launch%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-sn200219-413"><span class="mw-cite-backlink">^ <a href="#cite_ref-sn200219_413-0"><sup><i><b>a</b></i></sup></a>
<a href="#cite_ref-sn200219_413-1"><sup><i><b>b</b></i></sup></a>
</span> <span class="reference-text"><link rel="mw-deduplicated-in

```

```

line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite class
="citation web cs1"><a rel="nofol
low" class="external text" href
="https://spacenews.com/falcon-9-
launch-the-final-leg-of-indonesia
n-satellites-roundabout-journe
y/">"Falcon 9 launch the final le
g of Indonesian satellite's round
about journey"</a>. 20 February 2
019<span class="reference-accessd
ate">. Retrieved <span class="now
rap">22 February</span> 2019</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&amp;
rft.genre=unknown&amp;rft.btitle=
Falcon+9+launch+the+final+leg+of+
Indonesian+satellite%27s+roundabo
ut+journey&amp;rft.date=2019-02-2
0&amp;rft_id=https%3A%2F%2Fspacen
ews.com%2Ffalcon-9-launch-the-fin
al-leg-of-indonesian-satellites-r
oundabout-journey%2F&amp;rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></span></s
pan>
</li>
<li id="cite_note-sn-20150605-41

```

```

4"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-sn-20150
605_414-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFde_Seld
ing2015" class="citation web cs
1">de Selding, Peter B. (5 June 2
015). <a rel="nofollow" class="ex
ternal text" href="https://spacen
ews.com/falcon-9-co-passenger-fou
nd-for-ssl-built-psn-6-satellit
e/">"Falcon 9 Co-passenger Found
  for SS/L-built PSN-6 Satellite"
</a>. SpaceNews<span class="refer
ence-accessdate">. Retrieved <spa
n class="nowrap">11 September</sp
an> 2018</span>.</cite><span titl
e="ctx_ver=Z39.88-2004&amp;rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&amp;rft.genre=unknown&am
p;rft.btitle=Falcon+9+Co-passenge
r+Found+for+SS%2FL-built+PSN-6+Sa
tellite&amp;rft.pub=SpaceNews&am
p;rft.date=2015-06-05&amp;rft.aul
ast=de+Selding&amp;rft.aufirst=Pe
ter+B.&amp;rft_id=https%3A%2F%2Fs
pacenews.com%2Ffalcon-9-co-passen
ger-found-for-ssl-built-psn-6-sat

```

```
ellite%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-415"><span class="mw-cite-backlink"><b><a href="#cite_ref-415">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://psn.co.id/nsatu/">"Satellite Specifications"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">13 January</span> <span>2019</span></span></cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Satellite+Specifications&amp;rft_id=https%3A%2F%2Fpsn.co.id%2Fnsatu%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>
```

```
<li id="cite_note-moon-race-first-launch-deal-416"><span class="mw-cite-backlink"><b><a href="#cite_ref-moon-race-first-launch-deal_416-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWall2015" class="citation news cs1">Wall, Mike (7 October 2015). <a rel="nofollow" class="external text" href="http://www.space.com/30763-private-moon-race-google-lunar-xprize-spaceil.html">"Private Moon Race Heats Up with 1st Verified Launch Deal"</a>. Space.com<span class="reference-accessdate">. Retrieved <span class="nowrap">7 January</span> 2016</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Private+Moon+Race+Heats+Up+with+1st+Verified+Launch+Deal&rft.date=2015-10-07&rft.aulast=Wall&rft.aufirst=Mike&rft_id=http%3A%2F%2Fwww.space.com%2F30763-private-moon-race-google-lunar-xprize-sp
```



```

aceil.html&#amp;rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988"></span></span>
</li>
<li id="cite_note-haaretz-2018071
1-417"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-haaretz
-20180711_417-0"><sup><i><b>a</b>
</i></sup></a> <a href="#cite_ref
-haaretz-20180711_417-1"><sup><i>
<b>b</b></i></sup></a></span> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFRonel2
018" class="citation news cs1">Ro
nel, Asaf (11 July 2018). <a rel
="nofollow" class="external text"
href="https://www.haaretz.com/am
p/israel-news/.premium-first-isra
eli-spacecraft-to-the-moon-to-lau
nch-in-december-1.6264356">"First
Israeli Spacecraft to Head to Moo
n on Back of Elon Musk's SpaceX R
ocket"</a>. Haaretz<span class="r
eference-accessdate">. Retrieved
<span class="nowrap">15 July</sp
an> 2018</span>.</cite><span titl
e="ctx_ver=Z39.88-2004&#amp;rft_va

```

```

l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=First+Israeli+Spa
cecraft+to+Head+to+Moon+on+Back+o
f+Elon+Musk%27s+SpaceX+Rocket&am
p;rft.date=2018-07-11&rft.aul
ast=Ronel&rft.aufirst=Asaf&am
p;rft_id=https%3A%2F%2Fwww.haaret
z.com%2Famp%2Fisrael-news%2F.prem
ium-first-israeli-spacecraft-to-t
he-moon-to-launch-in-december-1.6
264356&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>
<li id="cite_note-bridenstine-isr
ael-418"><span class="mw-cite-bac
klink">^ <a href="#cite_ref-bride
nstine-israel_418-0"><sup><i><b>a
</b></i></sup></a> <a href="#cite
_ref-bridenstine-israel_418-1"><s
up><i><b>b</b></i></sup></a></spa
n> <span class="reference-text"><
link rel="mw-deduplicated-inline-
style" href="mw-data:TemplateStyl
es:r1067248974"/><cite id="CITERE
FFoust2018" class="citation news
cs1">Foust, Jeff (13 July 2018).
<a rel="nofollow" class="external

```

```
text" href="https://spacenews.com/bridenstine-visits-israel-on-first-foreign-trip/">"Bridenstine visits Israel on first foreign trip"</a>. Space News<span class="reference-accessdate">. Retrieved <span class="nowrap">15 July</span> <span class="nowrap">2018</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Bridenstine+visits+Israel+on+first+foreign+trip&amp;rft.date=2018-07-13&amp;rft.aulast=Foust&amp;rft.aufirst=Jeff&amp;rft_id=https%3A%2F%2Fspacenews.com%2Fbridenstine-visits-israel-on-first-foreign-trip%2F&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-419"><span class="mw-cite-backlink"><b><a href="#cite_ref-419">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citati
```

on web cs1">"SpaceIL and IAI Now Have Communications with Just Launched Beresheet Spacecraft – Maneuvering to Follow".

22 February 2019. Retrieved 22 February 2019.</cite>

<li id="cite_note-Shoshanna-420">^ <span class

```
= "reference-text"><link rel="mw-d  
eduplicated-inline-style" href="m  
w-data:TemplateStyles:r106724897  
4"/><cite id="CITEREFWinnerSolomo  
n2018" class="citation news cs1">  
Winner, Stewart; Solomon, Shoshan  
na (10 July 2018). <a rel="nofoll  
ow" class="external text" href="h  
ttps://www.timesofisrael.com/in-f  
irst-israeli-spacecraft-set-for-t  
rip-to-the-moon/">"Israeli spacec  
raft aims for historic Moon landi  
ng... within months"</a>. <i>The  
Times of Israel</i><span class  
="reference-accessdate">. Retriev  
ed <span class="nowrap">11 July</  
span> 2018</span>.</cite><span ti  
tle="ctx_ver=Z39.88-2004&amp;rft_  
val_fmt=info%3Aofi%2Ffmt%3Akev%3A  
mtx%3Ajournal&amp;rft.genre=artic  
le&amp;rft.jtitle=The+Times+of+Is  
rael&amp;rft.atitle=Israeli+space  
craft+aims+for+historic+Moon+land  
ing...+within+months&amp;rft.date  
=2018-07-10&amp;rft.aulast=Winner  
&amp;rft.aufirst=Stewart&amp;rft.  
au=Solomon%2C+Shoshanna&amp;rft_i  
d=https%3A%2F%2Fwww.timesofisrae  
l.com%2Fin-first-israeli-spacecra  
ft-set-for-trip-to-the-moon%2F&am
```

p;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-421">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFIsrael_To_The_Moon_[@TeamSpaceIL]2019" class="citation web cs1">Israel To The Moon [@TeamSpaceIL] (11 April 2019). "Don't stop believing! We came close but unfortunately didn't succeed with the landing process. More updates to follow. #SpaceIL #Beresheetpic.twitter.com/QnLAWEdKRv" (Tweet). Retrieved 11 April 2019 – via Twitter.</cite><span title="ctx_ver

```
=Z39.88-2004&#x26;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&#x26;rft.genre=unknown&#x26;rft.btitle=Don%27t+stop+believing%21+We+came+close+but+unfortunately+didn%27t+succeed+with+the+landing+process.+More+updates+to+follow.+%23SpaceIL+%23Beresheetpic.twitter.com%2FQnLAWEdKRv&#x26;rft.date=2019-04-11&#x26;rft.au=Israel+To+The+Moon+%5B%40TeamSpaceIL%5D&#x26;rft_id=https%3A%2F%2Ftwitter.com%2FTeamSpaceIL%2Fstatus%2F1116430572551852032&#x26;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-:7-422"><span class="mw-cite-backlink"><b><a href="#cite_ref-:7_422-0">^</a></b>
</span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://www.bbc.co.uk/news/science-environment-47414390">"SpaceX astronaut capsule demo for Nasa l
```

ifts off". BBC. 2 March 2019. Retrieved 2 March 2019.</cite>

<li id="cite_note-nac-ccp-423">^ <link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFLueders2018" class="citation web cs1">Lueders, Kathryn (26 March 2018). <a rel="nofollow" class="external text" href="https://www.nasa.gov/sites/default/files/atoms/files/ccp_present

ation_for_nac_public_session.pdf">"Commercial Crew Program Status to NASA Advisory Council Human Exploration and Operations Committee" (PDF). NASA. Retrieved 27 March 2018.</cite> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i><li id="cite_note-nsf20150305-424">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBergin2015" class="citation news cs1">Bergin, Chris (5 March 2015). <a rel="nofollow" class="external text"
```

href="http://www.nasaspaceflight.com/2015/03/commercial-crew-demo-missions-dragon-cst-100/">"Commercial crew demo missions manifested for Dragon 2 and CST-100"</a>.

NASASpaceFlight.com<span class="reference-accessdate">. Retrieved <span class="nowrap">7 March</span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Commercial+crew+demo+missions+manifested+for+Dragon+2+and+CST-100&amp;rft.date=2015-03-05&amp;rft.aulast=Bergin&amp;rft.aufirst=Chris&amp;rft\_id=http%3A%2F%2Fwww.nasaspaceflight.com%2F2015%2F03%2Fcommercial-crew-demo-missions-dragon-cst-100%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-Clark-425"><span class="mw-cite-backlink"><b><a href="#cite\_ref-Clark\_425-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplica

```

ted-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark" class="citation web cs1">Clark, Stephen. "Space X's Crew Dragon ready for first test flight". Spaceflight Now. Retrieved 2 March 2019.</cite>

<li id="cite_note-427"><span clas

```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.spaceflightinsider.com/organi
zations/space-exploration-technol
ogies/falcon-9-with-crew-dragon-v
ertical-at-launch-complex-39
a/">"Falcon 9 with crew dragon ve
rtical at launch complex 39A". 5 January 2019<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">23 February</s
pan> 2019.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Abook&rft.genre=unknown&a
mp;rft.btitle=Falcon+9+with+crew+
dragon+vertical+at+launch+complex
+39A&rft.date=2019-01-05&
rft_id=https%3A%2F%2Fwww.spacefli
ghtinsider.com%2Forganizations%2F
space-exploration-technologies%2F
falcon-9-with-crew-dragon-vertica
l-at-launch-complex-39a%2F&rft
r_id=info%3Asid%2Fen.wikipedia.or
```

g%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-428"><span class="mw-cite-backlink"><b><a href="#cite\_ref-428">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spacenews.com/crew-dragon-docks-with-iss/">"Crew Dragon docks with ISS"</a>. <i>spacenews.com</i>. 3 March 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">13 June</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=spacenews.com&amp;rft.atitle=Crew+Dragon+docks+with+ISS&amp;rft.date=2019-03-03&amp;rft\_id=https%3A%2F%2Fspacenews.com%2Fcrew-dragon-docks-with-iss%2F&amp;rft\_r\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+H

```
eavy+launches" class="Z3988">

<li id="cite_note-429">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWall2019" class="citation web cs1">
Wall, Mike (8 March 2019). "SpaceX Crew Dragon Splashes
Down in Atlantic to Cap Historic Test Flight". <i>space.com</i>
. Retrieved 13 June 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=space.com&rft.atitle=SpaceX+Crew+Dragon+Splashes+Down+in+Atlantic+to+Cap+Historic+Test+Flight&rft.date=2019-03-08&rft.auiast=Wall&rft.aufirst=Mike&am
```

p;rft\_id=https%3A%2F%2Fwww.space.com%2Fspacex-crew-dragon-returns-to-earth.html&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-:11-430"><span class="mw-cite-backlink">^ <a href="#cite\_ref-:11\_430-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-:11\_430-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBerger2019" class="citation news cs1">Berger, Eric (25 April 2019). <a rel="nofollow" class="external text" href="https://arstechnica.com/science/2019/04/nasa-safety-panel-offers-more-detail-on-dragon-anomaly-urges-patience/">"NASA safety panel offers more detail on Dragon anomaly, urges patience"</a>. Ars Technica<span class="reference-accessdate">. Retrieved <span class="nowrap">4 May</span> 2019</span>.</cite><span title="ctx\_ver



```
=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=NASA+safety+panel+offers+more+detail+on+Dragon+anomaly%2C+urges+patience&rft.date=2019-04-25&rft.aulast=Berger&rft.aufirst=Eric&rft_id=https%3A%2F%2Farstechnica.com%2Fscience%2F2019%2F04%2Fnasa-safety-panel-offers-more-detail-on-dragon-anomaly-urges-patience%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-nsf-20190306-431">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} ^{<i>d</i>} ^{<i>e</i>} <a href
```

```
= "#cite_ref-nsf-20190306_431-5">^{<i>f</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBaylor2019" class="citation news cs1">Baylor, Michael (6 March 2019). "Falcon Heavy and Starlink headline SpaceX's upcoming manifest". <i>NASASpaceFlight</i>. Retrieved 7 March 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=NASASpaceFlight&rft.atitle=Falcon+Heavy+and+Starlink+headline+SpaceX%27s+upcoming+manifest&rft.date=2019-03-06&rft.aulast=Baylor&rft.aufirst=Michael&rft_id=https%3A%
```

```

2F%2Fwww.nasaspaceflight.com%2F20
19%2F03%2Ffalcon-heavy-starlink-h
eadline-spacexs-manifest%2F&r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-nsf-20190411-43
2"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nsf-20190
411_432-0"><sup><i>a</i></
sup> <a href="#cite_ref-nsf-2
0190411_432-1"><sup><i>b</
i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://www.nasas
paceflight.com/2019/04/spacex-fal
con-heavy-second-launch-arabsat-6
a/">"SpaceX Falcon Heavy launches
Arabsat-6A". 11 April 2019<sp
an class="reference-accessdate">.
Retrieved 11
April 2019.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3

```

```

Akev%3Amtx%3Abook&rft.genre=u
nknown&rft.btitle=SpaceX+Falc
on+Heavy+launches+Arabsat-6A&
rft.date=2019-04-11&rft_id=ht
tps%3A%2F%2Fwww.nasaspaceflight.c
om%2F2019%2F04%2Fspacex-falcon-he
avy-second-launch-arabsat-6a%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-sfn-20150429-43
3"><span class="mw-cite-backlin
k"><a href="#cite_ref-sfn-2015
0429_433-0">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFClark
2015" class="citation news cs1">C
lark, Stephen (29 April 2015). <a
rel="nofollow" class="external te
xt" href="https://spaceflightnow.
com/2015/04/29/arabsat-contracts-
go-to-lockheed-martin-arianespace
-and-spacex/">"Arabsat contracts
go to Lockheed Martin, Arianespa
ce and SpaceX". Spaceflight N
ow<span class="reference-accessda

```

```

te">. Retrieved 11 November 2017
>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
rft.genre=article&rft.atitle=Arabsat+contracts+go+to+Lockheed+Martin%2C+Arianespace+and+SpaceX&rft.date=2015-04-29&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2015%2F04%2F29%2Farabsat-contracts-go-to-lockheed-martin-arianespace-and-spacex%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-434">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Arabsat 6A". <i>G

```

unter's Space Page</i><span class="reference-accessdate">. Retrieved <span class="nowrap">13 April </span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Gunter%27s+Space+Page&amp;rft.atitle=Arabsat+6A&amp;rft\_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc\_sdat%2Farabsat-6a.htm&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-435"><span class="mw-cite-backlink"><b><a href="#cite\_ref-435">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGrush" class="citation web cs1">Grush, Loren. <a rel="nofollow" class="external text" href="https://www.theverge.com/2019/4/15/18311945/spacex-falcon-heavy-center-core-drone-ship-rough-ocean">"SpaceX loses the center core of its Fal

con Heavy rocket due to choppy seas". *THE VERGE*. Vox Media  

</li>  
<li id="cite\_note-fanblog20190413-437"><span class="mw-cite-backlink"><b><a href="#cite\_ref-fanblog20190413\_437-0">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="cita

```

tion web cs1"><a rel="nofollow" c
lass="external text" href="http
s://spacexfanstore.com/blogs/spac
ex/arabsat-6a-falcon-heavy-launch
-guide-landing-3-boosters-block-5
-configuration-and-much-more">"Ar
absat 6A Falcon Heavy Launch Guid
e"<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">13 April 2019</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Arabsat+6A+Falcon+Heavy+Launch+
Guide&rft_id=https%3A%2F%2Fsp
acexfanstore.com%2Fblogs%2Fspace
x%2Farabsat-6a-falcon-heavy-launc
h-guide-landing-3-boosters-block-
5-configuration-and-much-more&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-lost_at_sea-43
8"><span class="mw-cite-backlin
k"><a href="#cite_ref-lost_at_
sea_438-0">^ <link rel

```



```
= "mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWall2019" class="citation web cs1">Wall, Mike (15 April 2019). "SpaceX's Center Core Booster for Falcon Heavy Rocket Is Lost at Sea". <i>space.com</i>. Retrieved 17 April 2019.</cite>
```

```

<li id="cite_note-439"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2019" class="citation web cs
1">Ralph, Eric (16 April 2019). <
a rel="nofollow" class="external
text" href="https://www.teslarat
i.com/spacex-falcon-heavy-booster
-overboard/">"SpaceX's Falcon Hea
vy center core goes overboard, El
on Musk still hopeful". <i>te
slarati.com</i><span class="refer
ence-accessdate">. Retrieved <spa
n class="nowrap">17 April
2019.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=teslarati.com&am
p;rft.atitle=SpaceX%27s+Falcon+He
avy+center+core+goes+overboard%2C
+Elon+Musk+still+hopeful&rft.
date=2019-04-16&rft.aulast=Ra
lph&rft.aufirst=Eric&rft_
id=https%3A%2F%2Fwww.teslarati.co
```

```

m%2Fspacex-falcon-heavy-booster-o
verboard%2F&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-440"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFEl
on_Musk_[@elonmusk]2019"
class="citation web cs1">Elon Mu
sk [@elonmusk] (11 April 2019). <
a rel="nofollow" class="external
text" href="https://twitter.com/
elonmusk/status/11165140683936808
96">"Both fairing halves recovere
d. Will be flown on Starlink miss
ion later this year. pic.twitter.
com/ouz1aqW3Mm" (Tweet) ̵
1; via <a href="/wiki/Twitter" ti
tle="Twitter">Twitter.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Abook&rft.genre=
unknown&rft.btitle=Both+fairi
ng+halves+recovered.+Will+be+flow

```

n+on+Starlink+mission+later+this+year.+pic.twitter.com%2Fouz1aqW3Mm&rft.date=2019-04-11&rft.au=Elon+Musk+%5B%40elonmusk%5D&rft\_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F1116514068393680896&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-:14-441"><span class="mw-cite-backlink">^ <a href="#cite\_ref-:14\_441-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-:14\_441-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://www.cnbc.com/2019/10/27/spacex-president-we-will-land-starship-on-moon-before-2022.html">"SpaceX wants to land Starship on the moon within three years, president says, with people soon after"</a>. 27 October 2019.</cite><span title="c

```

tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
journal&rft.genre=article&am
p;rft.atitle=SpaceX+wants+to+land
+Starship+on+the+moon+within+thre
e+years%2C+president+says%2C+with
+people+soon+after&rft.date=2
019-10-27&rft_id=https%3A%2F%
2Fwww.cnn.com%2F2019%2F10%2F27%2
Fspacex-president-we-will-land-st
arship-on-moon-before-2022.html&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-442"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRu
ssell2018" class="citation web cs
1">Russell, Kendall (22 February
2018). <a rel="nofollow" class
="external text" href="https://ww
w.satellitetoday.com/telecom/201
8/02/22/arabsats-newest-satellite
-lockheed-martins-advanced-ye

```

t/">"Arabsat-6A Satellite Moves Closer to Launch"</a>. Satellite Today<span class="reference-access date">. Retrieved <span class="no wrap">23 September</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Arabsat-6A+Satellite+Moves+Closer+to+Launch&rft.pub=Satellite+Today&rft.date=2018-02-22&rft.aulast=Russell&rft.aufirst=Kendall&rft\_id=https%3A%2F%2Fwww.satellitetoday.com%2Ftelecom%2F2018%2F02%2F22%2Farabsats-newest-satellite-lockheed-martins-advanced-yet%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-443"><span class="mw-cite-backlink"><b><a href="#cite\_ref-443">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark" class="citation web cs1">Cla

```
rk, Stephen. <a rel="nofollow" class="external text" href="http
s://spaceflightnow.com/2019/04/1
1/spacexs-falcon-heavy-successful
-in-commercial-debut/">"SpaceX's
Falcon Heavy successful in comme
rcial debut". <i>spaceflightn
ow.com</i><span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">19 February 20
20.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajo
urnal&rft.genre=unknown&r
ft.jtitle=spaceflightnow.com&
rft.atitle=SpaceX%27s+Falcon+Heav
y+successful+in+commercial+debut&
amp;rft.aulast=Clark&rft.aufi
rst=Stephen&rft_id=https%3A%2
F%2Fspaceflightnow.com%2F2019%2F0
4%2F11%2Fspacexs-falcon-heavy-suc
cessful-in-commercial-debut%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-:8-444"><span c
lass="mw-cite-backlink">^ <sup><i>
```

```

a</i></sup> ^{<i>b</i>} <link rel="mw-eduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFThompson2019" class="citation news cs1">Thompson, Amy (3 May 2019). "SpaceX Delays Dragon Cargo Ship Launch for NASA Due to Drone Ship Glitch". <i>space.com</i>. Retrieved 4 May 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=space.com&rft.atitle=SpaceX+Delays+Dragon+Cargo+Ship+Launch+for+NASA+Due+to+Drone+Ship+Glitch&rft.date=2019-05-03&rft.aulast=Thompson&rft.aufirst=Amy&rft_id=https%3A%2F%2Fwww.space.com%2Fspacex-dragon-cargo-ship-crs17-launch-delay.html&am

```



```
p;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-445">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark" class="citation web cs1">Clark, Stephen. "Space X likely to move next rocket landing to drone ship". Spaceflight Now. Retrieved 4 May 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+likely+to+move+next+rocket+landing+to+drone+ship&rft.pub=Spaceflight+Now&rft.aulast=
```

Clark&rft.aufirst=Stephen&rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2019%2F04%2F23%2Fspace-x-likely-to-move-next-rocket-landing-to-drone-ship%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-446"><span class="mw-cite-backlink"><b><a href="#cite\_ref-446">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBaylor,\_Michael\_&#91;@nextspaceflight&#93;2019" class="citation web cs1">Baylor, Michael [@nextspaceflight] (14 May 2019). <a rel="nofollow" class="external text" href="https://twitter.com/nextspaceflight/status/1128115159187316737">"The Falcon 9 static fire for #Starlink could be coming up at the top of the hour. The first stage booster is B1049.3"</a> (Tweet)<span class="reference-accessdate">. Retrieved <span class="now

```

rap">14 May 2019 &#
8211; via <a href="/wiki/Twitter"
title="Twitter">Twitter.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=The+Falc
on+9+static+fire+for+%23Starlink+
could+be+coming+up+at+the+top+of+
the+hour.+The+first+stage+booster
+is+B1049.3.&rft.date=2019-05
-14&rft.au=Baylor%2C+Michael
+%5B%40nextspaceflight%5D&rft
_id=https%3A%2F%2Ftwitter.com%2Fn
extspaceflight%2Fstatus%2F1128115
159187316737&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-sn20190426-44
7"><span class="mw-cite-backlin
k"><a href="#cite_ref-sn201904
26_447-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFHenry20
19" class="citation news cs1">Hen
ry, Caleb (26 April 2019). <a rel

```

```

="nofollow" class="external text"
href="https://spacenews.com/fcc-oks-lower-orbit-for-some-starlink-satellites/">"FCC OKs lower orbit for some Starlink satellites". SpaceNews. Retrieved 28 April 2019.</cite>

<li id="cite_note-448">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:

```

```

r1067248974"/><cite id="CITEREFEl
on_Musk_[@elonmusk]2019"
 class="citation web cs1">Elon Mu
sk [@elonmusk] (11 May 2019). <a
 rel="nofollow" class="external t
ext" href="https://twitter.com/el
onmusk/status/112738883836237824
1">"First 60 @SpaceX Starlink sat
ellites loaded into Falcon fairin
g. Tight fit. pic.twitter.com/gZq
8gHg9uK" (Tweet) – via
 <a href="/wiki/Twitter" title="T
witter">Twitter.</cite><span
 title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=First+60+%40Sp
aceX+Starlink+satellites+loaded+i
nto+Falcon+fairing.+Tight+fit.+pi
c.twitter.com%2FgZq8gHg9uK&rft
.date=2019-05-11&rft.au=Elon
+Musk+%5B%40elonmusk%5D&rft_i
d=https%3A%2F%2Ftwitter.com%2Felo
nmusk%2Fstatus%2F1127388838362378
241&rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">

<li id="cite_note-449"><span clas

```

```

s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFEl
on_Musk_[@elonmusk]2019"
class="citation web cs1">Elon Mu
sk [@elonmusk] (11 May 2019). <a
rel="nofollow" class="external t
ext" href="https://twitter.com/el
onmusk/status/112739062011108147
3">"These are production design,
unlike our earlier Tintin demo s
ats" (Tweet) – via <a h
ref="/wiki/Twitter" title="Twitte
r">Twitter.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=These+are+production
+design%2C+unlike+our+earlier+Tin
tin+demo+sats&rft.date=2019-0
5-11&rft.au=Elon+Musk+%5B%40e
lonmusk%5D&rft_id=https%3A%2
F%2Ftwitter.com%2Felonmusk%2Fstat
us%2F1127390620111081473&rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988"></span

```

```
>

<li id="cite_note-450"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
web.archive.org/web/2019051509190
0/https://www.spacex.com/sites/sp
acex/files/starlink_press_kit.pd
f">"Starlink Mission - SpaceX pre
ss kit" <span class="cs1-form
at">(PDF). Archived from <
a rel="nofollow" class="external
text" href="https://www.spacex.c
om/sites/spacex/files/starlink_pr
ess_kit.pdf">the original <sp
an class="cs1-format">(PDF) on 15 May 2019<span class="refe
rence-accessdate">. Retrieved <sp
an class="nowrap">15 May 2
019.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ab
ook&rft.genre=unknown&rft
t.btitle=Starlink+Mission+-+Space
```

```

X+press+kit&rft_id=https%3A%2
F%2Fwww.spacex.com%2Fsites%2Fspac
ex%2Ffiles%2Fstarlink_press_kit.p
df&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-451"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRo
ulette2019" class="citation news
cs1">Roulette, Joey (24 May 201
9). <a rel="nofollow" class="exte
rnal text" href="https://www.reut
ers.com/article/us-space-explorat
ion-spacex-idUSKCN1SU07Y">"First
satellites for Musk's Starlink i
nternet venture launched into orb
it". <i>Reuters</i><span clas
s="reference-accessdate">. Retriev
ed 29 May</
span> 2019.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Ajournal&rft.genre=artic

```



```

le&rft.jtitle=Reuters&rft.
atitle=First+satellites+for+Mus
k%27s+Starlink+internet+venture+l
aunched+into+orbit&rft.date=2
019-05-24&rft.aulast=Roulette
&rft.aufirst=Joey&rft_id=
https%3A%2F%2Fwww.reuters.com%2Fa
rticle%2Fus-space-exploration-spa
cex-idUSKCN1SU07Y&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-452"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@e
lonmusk2019" class="citation web
cs1">@elonmusk (24 May 2019). <a
rel="nofollow" class="external te
xt" href="https://twitter.com/elo
nmusk/status/113178377539690905
6">"Fairing halves recovered"
(Tweet)<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">29 May 2019</spa

```

```

n> – via <a href="/wiki/Twi
tter" title="Twitter">Twitter.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Fairing+halves+recovered&rft.
date=2019-05-24&rft.au=%40elo
nmusk&rft_id=https%3A%2F%2Ftw
itter.com%2Felonmusk%2Fstatus%2F1
131783775396909056&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-453"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
web.archive.org/web/2020050414343
4/https://www.spacex.com/sites/sp
acex/files/sixth_starlink_press_k
it.pdf">"Starlink press kit"
(PDF)</

```

span>. Archived from <a rel="nofollow" class="external text" href="https://www.spacex.com/sites/spacex/files/sixth\_starlink\_press\_kit.pdf">the original</a> class="cs1-format">(PDF)</span> on 4 May 2020class="reference-accessdate">. Retrieved class="nowrap">14 March</span> 2020</span>.</cite>class="Z3988"></span></span>

</li>

<li id="cite\_note-454">class="mw-cite-backlink"><b><a href="#cite\_ref-454">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2019" class="citation news cs

```

1">Clark, Stephen (24 May 2019).
 <a rel="nofollow" class="external text" href="https://spaceflight
now.com/2019/05/24/spacexs-first-60-starlink-broadband-satellites-
deployed-in-orbit/">"SpaceX's fir
st 60 Starlink broadband satellit
es deployed in orbit". Spacef
light Now<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">29 May 2019</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&rft.ati
tle=SpaceX%27s+first+60+Starlink+
broadband+satellites+deployed+in+
orbit&rft.date=2019-05-24&am
p;rft.aulast=Clark&rft.aufirs
t=Stephen&rft_id=https%3A%2F%
2Fspaceflightnow.com%2F2019%2F05%
2F24%2Fspacexs-first-60-starlink-
broadband-satellites-deployed-in-
orbit%2F&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-:9-455"><span c
lass="mw-cite-backlink">^ <a href

```

```
= "#cite_ref-:9_455-0"><sup><i>
a</i></sup> <a href="#cit
e_ref-:9_455-1"><sup><i>b
</i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="http://www.asc-cs
a.gc.ca/eng/satellites/radarsat/t
echnical-features/radarsat-compar
ison.asp">"RADARSAT satellites: T
echnical comparison". <i>asc-
csa.gc.ca</i>. 21 January 2011<sp
an class="reference-accessdate">.
Retrieved 12
June 2019.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&rft.genre
=unknown&rft.jtitle=asc-csa.g
c.ca&rft.atitle=RADARSAT+sate
llites%3A+Technical+comparison&am
p;rft.date=2011-01-21&rft_id=
http%3A%2F%2Fwww.asc-csa.gc.ca%2F
eng%2Fsatellites%2Fradarsat%2Ftec
hnical-features%2Fradarsat-compar
ison.asp&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
```

```
+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-456">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFPugliese" class="citation web cs1">
Pugliese, David. "Radarsat Constellation to track ships, provide surveillance over Arctic and other regions - satellites successfully launched". Ottawa Citizen. Retrieved 17 August 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Radarsat+Constellation+to+track+ships%2C+provid
```

e+surveillance+over+Arctic+and+ot  
her+regions+-+satellites+successf  
ully+launched&#x26;rft.pub=Ottawa+  
Citizen&#x26;rft.aulast=Pugliese&  
mp;rft.aufirst=David&#x26;rft\_id=h  
ttps%3A%2F%2Fottawacitizen.com%2F  
news%2Fnational%2Fdefence-watch%2  
Fradarsat-constellation-to-track-  
ships-provide-surveillance-over-a  
rctic-and-other-regions&#x26;rfr\_i  
d=info%3Asid%2Fen.wikipedia.org%3  
AList+of+Falcon+9+and+Falcon+Heav  
y+launches" class="Z3988"></span>  
</span>  
</li>  
<li id="cite\_note-457"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-457">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFRa  
lph2019" class="citation web cs  
1">Ralph, Eric (12 June 2019). <a  
rel="nofollow" class="external te  
xt" href="https://www.teslarati.c  
om/spacex-falcon-9-radarsat-launc  
h-watch-live/">"SpaceX's Falcon 9  
sticks foggy booster recovery at  
California landing zone"</a>. <i

```

>teslarati.com</i>.</cite><span t
itle="ctx_ver=Z39.88-2004&rft
_val_fmt=info%3Aofi%2Ffmt%3Akev%3
Amtx%3Ajournal&rft.genre=unkn
own&rft.jtitle=teslarati.com&
amp;rft.atitle=SpaceX%27s+Falcon+
9+sticks+foggy+booster+recovery+a
t+California+landing+zone&rft
t.date=2019-06-12&rft.aulast=
Ralph&rft.aufirst=Eric&rft
t_id=https%3A%2F%2Fwww.teslarati.
com%2Fspacex-falcon-9-radarsat-la
unch-watch-live%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-458"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph" class="citation web cs1">Ral
ph, Eric. <a rel="nofollow" class
="external text" href="https://ww
w.teslarati.com/spacex-readies-fa
lcon-9-radarsat-california-launc

```



h/">"SpaceX Falcon 9 and \$1B satellite trio set for first California launch in months"</a>. <i>teslarati.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">5 June</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=teslarati.com&amp;rft.atitle=SpaceX+Falcon+9+and+%241B+satellite+trio+set+for+first+California+launch+in+months&amp;rft.aulast=Ralph&amp;rft.aufirst=Eric&amp;rft\_id=https%3A%2F%2Fwww.teslarati.com%2Fspacex-readies-falcon-9-radarsat-california-launch%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-459"><span class="mw-cite-backlink"><b><a href="#cite\_ref-459">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citati

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.thesouthafrican.com/lifestyl
e/spacex-falcon-9-rocket-launchin
g-most-expensive-payload-eve
r/">"SpaceX Falcon 9 rocket is la
unching its most expensive payloa
d to date"<span class="refere
nce-accessdate">. Retrieved 5 June 2020
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=SpaceX+Falcon+9+rocket+is+la
unching+its+most+expensive+payloa
d+to+date&rft_id=https%3A%2F%
2Fwww.thesouthafrican.com%2Flifes
tyle%2Fspacex-falcon-9-rocket-lau
nching-most-expensive-payload-eve
r%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-460"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty

```

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation web cs1">Cla
rk, Stephen. <a rel="nofollow" cl
ass="external text" href="http
s://spaceflightnow.com/2017/06/0
2/ariane-5-succeeds-in-launch-of-
two-high-value-communications-sat
ellites/">"Arianne 5 succeeds in l
aunch of two high-value communica
tions satellites". Spacefligh
t Now<span class="reference-acces
sdate">. Retrieved <span class="n
owrap">22 January 2020</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Arianne+5+succeeds+in+launch+of+
two+high-value+communications+sat
ellites&rft.pub=Spaceflight+N
ow&rft.aulast=Clark&rft.a
ufirst=Stephen&rft_id=https%3
A%2F%2Fspaceflightnow.com%2F2017%
2F06%2F02%2Fariane-5-succeeds-in-
launch-of-two-high-value-communic
ations-satellites%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3ALi
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s

```

```
pan>

<li id="cite_note-461"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2019/06/s
pacex-falcon-heavy-stp-2-missio
n/">"SpaceX completes most-challe
nging flight with Falcon Heavy's
 STP-2 mission". 24 June 2019
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">25 June 2019.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Abook&rft.ge
nre=unknown&rft.btitle=SpaceX
+completes+most-challenging+fligh
t+with+Falcon+Heavy%27s+STP-2+mis
sion&rft.date=2019-06-24&
rft_id=https%3A%2F%2Fwww.nasaspac
eflight.com%2F2019%2F06%2Fspacex-
falcon-heavy-stp-2-mission%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
```

```

a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-STP2-462"><a hr
ef="#cite_ref-STP2_462-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite cla
ss="citation web cs1"><a rel="nof
ollow" class="external text" href
="https://spaceflightnow.com/201
8/03/01/rideshare-mission-for-u-s
-military-confirmed-as-second-fal
con-heavy-launch/">"Rideshare mis
sion for U.S. military confirmed
as second Falcon Heavy launch"</
a>. 1 March 2018<span class="refe
rence-accessdate">. Retrieved <sp
an class="nowrap">24 April
2018.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
.btitle=Rideshare+mission+for+U.
S.+military+confirmed+as+second+F
alcon+Heavy+launch&rft.date=2
018-03-01&rft_id=https%3A%2F%

```

2Fspaceflightnow.com%2F2018%2F03%2F01%2Frideshare-mission-for-u-s-military-confirmed-as-second-falcon-heavy-launch%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-fbo-463"><span class="mw-cite-backlink"><b><a href="#cite\_ref-fbo\_463-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.fbo.gov/utis/view?id=36de6af7670d2636c8c195173dd500e1">"Mission Requirements Document (MRD) FA8818-12-R-0026 T.O. SM-2.4"</a>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Mission+Requirements+Document+%28MRD%29+FA8818-12-R-0026+T.O.+SM-2.4&rft\_id=https%3A%2F%2Fwww.fbo.gov%2Futis%2Fview%3Fi

```
d%3D36de6af7670d2636c8c195173dd50
0e1&rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">

<li id="cite_note-planetary-socie
ty-20170602-464"><span class="mw-
cite-backlink"><a href="#cite_
ref-planetary-society-20170602_46
4-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFDavis2017" c
lass="citation web cs1">Davis, Ja
son (2 June 2017). <a rel="nofoll
ow" class="external text" href="h
ttp://www.planetary.org/blogs/jas
on-davis/2017/20170602-prox-1-shi
ps.html">"LightSail 2 partner spa
cecraft ships safely to New Mexic
o". Planetary Society<span cl
ass="reference-accessdate">. Retr
ieved 8 June
 2017.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=LightSail+2+pa
```

```

rtner+spacecraft+ships+safely+to+
New+Mexico&rft.pub=Planetary+
Society&rft.date=2017-06-02&
mp;rft.aulast=Davis&rft.aufir
st=Jason&rft_id=http%3A%2F%2F
www.planetary.org%2Fblogs%2Fjason
-davis%2F2017%2F20170602-prox-1-s
hips.html&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-GPIM-465"><a hr
ef="#cite_ref-GPIM_465-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite cla
ss="citation web cs1"><a rel="nof
ollow" class="external text" href
="http://www.nasa.gov/sites/defau
lt/files/files/GreenPropellantInf
usionMissionProject_v2.pdf">"Gree
n Propellant Infusion Mission Pro
ject" <span class="cs1-forma
t">(PDF). NASA. July 2013<
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">26 February 2014

```



```
>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Green+Propellant+Infusion+Mission
+Project&rft.pub=NASA&rft
t.date=2013-07&rft_id=http%3
A%2F%2Fwww.nasa.gov%2Fsites%2Fdef
ault%2Ffiles%2Ffiles%2FGreenPrope
llantInfusionMissionProject_v2.pd
f&rft_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88"> <i>This article inco
rporates text from this source, w
hich is in the <a href="/wiki/Pub
lic_domain" title="Public domai
n">public domain</i><i>.</i>
```

```


<li id="cite_note-DSAC-466"><a hr
ef="#cite_ref-DSAC_466-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite cla
ss="citation news cs1"><a rel="no
follow" class="external text" hre
f="http://www.jpl.nasa.gov/news/n
ews.php?feature=4567">"Deep Space
Atomic Clock". NASA JPL. 27 A
pril 2015<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">28 October 2015
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft
.atitle=Deep+Space+Atomic+Clock&
amp;rft.date=2015-04-27&rft_i
d=http%3A%2F%2Fwww.jpl.nasa.gov%2
Fnews%2Fnews.php%3Ffeature%3D4567
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8"> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-467">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBrown2019" class="citation web cs1">Brown, Katherine (15 May 2019). <a rel="nofollow" class="external text" href="http://www.nasa.gov/press-release/media-invited-to-spacex-falcon-heavy-launch-of-f

our-nasa-missions">"Media Invited to SpaceX Falcon Heavy Launch of Four NASA Missions". NASA.</cite> <i>This article in
corporates text from this source,
which is in the <a href="/wiki/Pu
blic_domain" title="Public domai
n">public domain</i><i>.</i>

<li id="cite_note-spacexstp2-46
8"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-spacexstp
2_468-0"><sup><i>a</i></su
p> <a href="#cite_ref-spacexs
tp2_468-1"><sup><i>b</i></
sup> <span class="refe
rence-text"><link rel="mw-dedupli
cated-inline-style" href="mw-dat
a:TemplateStyles:r1067248974"/><c
ite class="citation web cs1"><a r
el="nofollow" class="external tex
t" href="https://web.archive.org/
web/20190419130527/https://www.sp
acex.com/stp-2">"STP-2 Mission"</
a>. <i>SpaceX</i>. Archived from
<a rel="nofollow" class="externa
l text" href="https://www.spacex.
com/stp-2">the original on 19
April 2019<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">17 April 2019
.</cite><span title="ctx_v

```

```

er=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=SpaceX&rft.atitle=STP-2+Mission&rft_id=https%3A%2F%2Fwww.spacex.com%2Fstp-2&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-469">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFHowell2019" class="citation web cs1">Howell, Elizabeth (14 April 2019). "Space X Falcon Heavy to Launch Cutting-Edge NASA Space Tech". <i>space.com</i>. Retrieved 23 September 2020.</cite><span title="ct

```

```

x_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=space.com&rft.atitle=SpaceX+Falcon+Heavy+to+Launch+Cutting-Edge+NASA+Space+Tech&rft.date=2019-04-14&rft.aulast=Howell&rft.aufirst=Elizabeth&rft_id=https%3A%2F%2Fwww.space.com%2Fnext-falcon-heavy-rocket-carries-nasa-payloads.html&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-470">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFNye2015" class="citation audio-visual cs1">Nye, Bill (12 May 2015).
 <i>Kickstart LightSail</i>. Event occurs at 3:20<span class="refer

```

ence-accessdate">. Retrieved <span class="nowrap">15 May</span> 2015</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Kickstart+LightSail&amp;rft.date=2015-05-12&amp;rft.aulast=Nye&amp;rft.aufirst=Bill&amp;rft\_id=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3DkDBzRa9RzfM&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-471"><span class="mw-cite-backlink"><b><a href="#cite\_ref-471">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF\_AF\_SMC\_&#91;@AF\_SMC&#93;2019" class="citation web cs1">AF SMC [@AF\_SMC] (18 June 2019). <a rel="nofollow" class="external text" href="https://twitter.com/AF\_SMC/status/1141099481628364808">"The 3700 kg Integrated Payload Stack (IPS)



for #STP2 has been completed! Have a look before it blasts off on the first #DoD Falcon Heavy launch! #SMC #SpaceStartsHere [pic.twitter.com/sEUUDx5ksw](https://pic.twitter.com/sEUUDx5ksw)" (Tweet) [via](#) [Twitter](#).

</span></span></li><li id="cite\_note-472"><span class="mw-cite-backlink"><b><a href="#cite\_ref-472">^</a></b></span><span class="reference-text"><lin

```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFRalph2018" class="citation web cs1">Ralph, Eric (10 June 2018). "SpaceX Falcon Heavy with Block 5 rockets targets November launch debut". <i>teslarati.com</i>. Retrieved 16 September 2018.</cite>
```

```

<li id="cite_note-473"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
apps.fcc.gov/oetcf/els/reports/ST
A_Print.cfm?mode=current&appl
ication_seq=93066&RequestTime
out=1000">"OET Special Temporary
 Authority Report". <i>apps.f
cc.gov</i><span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">13 July 2019</
span>.</cite><span title="ctx_ver
=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajourn
al&rft.genre=unknown&rft.
jtitle=apps.fcc.gov&rft.atitl
e=OET+Special+Temporary+Authority
+Report&rft_id=https%3A%2F%2F
apps.fcc.gov%2Foetcf%2Fels%2Frepo
rts%2FSTA_Print.cfm%3Fmode%3Dcurr
ent%26application_seq%3D93066%26R
equestTimeout%3D1000&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3ALi
```

```

st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"> <i
mg alt="Public Domain" src="//upl
oad.wikimedia.org/wikipedia/en/th
umb/6/62/PD-icon.svg/12px-PD-ico
n.svg.png" decoding="async" width
="12" height="12" class="noviewe
r" srcset="//upload.wikimedia.or
g/wikipedia/en/thumb/6/62/PD-ico
n.svg/18px-PD-icon.svg.png 1.5x,
//upload.wikimedia.org/wikipedi
a/en/thumb/6/62/PD-icon.svg/24px-
PD-icon.svg.png 2x" data-file-wid
th="196" data-file-height="196" /
> <i>This article incorporates te
xt from this source, which is in
the <a href="/wiki/Public_domai
n" title="Public domain">public d
omain</i><i>.</i>

<li id="cite_note-474"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2019" class="citation web cs
1">Ralph, Eric (26 June 2019). <a
rel="nofollow" class="external te

```

```

xt" href="https://www.teslarati.com/spacex-ceo-elon-musk-explains-falcon-heavy-missed-landing/">"SpaceX CEO Elon Musk explains why Falcon Heavy's center core missed the drone ship". <i>teslarati.com</i>. Retrieved 26 June 2019.</cite>

<li id="cite_note-475">^

```

```

<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2019" class="citation web cs
1">Ralph, Eric (25 June 2019). <a
rel="nofollow" class="external te
xt" href="https://www.teslarati.c
om/spacex-first-successful-falcon
-fairing-catch-mr-steven-ms-tre
e/">"SpaceX successfully catches
first Falcon Heavy fairing in M
r. Steven's/Ms. Tree's net".
<i>teslarati.com</i><span class
="reference-accessdate">. Retriev
ed 25 June</
span> 2019.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Ajournal&rft.genre=unkno
wn&rft.jtitle=teslarati.com&a
mp;rft.atitle=SpaceX+successfully
+catches+first+Falcon+Heavy+fairi
ng+in+Mr.+Steven%27s%2FMs.+Tree%2
7s+net&rft.date=2019-06-25&am
p;rft.aulast=Ralph&rft.aufirs
t=Eric&rft_id=https%3A%2F%2Fw
ww.teslarati.com%2Fspacex-first-s
uccessful-falcon-fairing-catch-mr
-steven-ms-tree%2F&rfr_id=inf

```

```

o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-auto5-476"><spa
n class="mw-cite-backlink">^ <a h
ref="#cite_ref-auto5_476-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFspacef
light" class="citation web cs1">S
paceflight, Amy Thompson 2019-07-
25T22:27:56Z. <a rel="nofollow" c
lass="external text" href="http
s://www.space.com/spacex-crs-18-l
aunch-third-dragon-flight.htm
l">"SpaceX Launches Used Dragon C
apsule on Historic 3rd Cargo Run
to Space Station". <i>space.
com</i><span class="reference-acc
essdate">. Retrieved <span class
="nowrap">26 July 2019</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&

```

```

&rft.genre=unknown&rft.jtitle=space.com&rft.atitle=SpaceX+Launches+Used+Dragon+Capsule+on+Historic+3rd+Cargo+Run+to+Space+Station&rft.aulast=Spaceflight&rft.aufirst=Amy+Thompson+2019-07-25T22%3A27%3A56Z&rft_id=https%3A%2F%2Fwww.space.com%2Fspacex-crs-18-launch-third-dragon-flight.html&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-B1056use-477">^ <link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX Falcon 9 nears NASA's first flight-proven Block 5 launch after static fire delays". Teslarati. 19 July 2019.</cite><

```



```

span title="ctx_ver=Z39.88-2004&
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=SpaceX+Falc
on+9+nears+NASA%27s+first+flight-
proven+Block+5+launch+after+stati
c+fire+delays&rft.pub=Teslara
ti&rft.date=2019-07-19&rft
_id=https%3A%2F%2Fwww.teslarati.
com%2Fspacex-falcon-9-flight-prov
en-nasa-launch-static-fire%2F&
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-478"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKo
oser" class="citation web cs1">Ko
oser, Amanda. <a rel="nofollow" c
lass="external text" href="http
s://www.cnet.com/news/spacex-laun
ches-dragon-resupply-mission-to-t
he-iss-after-weather-delay/">"Spa
ceX launches Dragon resupply miss

```

ion to the ISS after weather delay">. <i>CNET</i><span class="reference-accessdate">. Retrieved <span class="nowrap">26 July</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=CNET&rft.atitle=SpaceX+launches+Dragon+resupply+mission+to+the+ISS+after+weather+delay&rft.aulast=Kooser&rft.aufirst=Amanda&rft\_id=https%3A%2F%2Fwww.cnet.com%2Fnews%2Fspacex-launches-dragon-resupply-mission-to-the-iss-after-weather-delay%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-479"><span class="mw-cite-backlink"><b><a href="#cite\_ref-479">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://

1291/1892

```
r1067248974"/><cite id="CITEREFRalph2019" class="citation web cs1">Ralph, Eric (5 May 2019). "SpaceX's latest Falcon 9 booster returns to port as NASA hints at "vested interest"". <i>teslarati.com</i>. Retrieved 28 November 2019.</cite>
```

```


<li id="cite_note-:12-481"><a h
ref="#cite_ref-:12_481-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREF@spacex2019" class="cita
tion web cs1">@spacex (19 July 20
19). <a rel="nofollow" class="ext
ernal text" href="https://twitte
r.com/spacex/status/1152361282982
465536">"The Dragon spacecraft su
pporting this mission previously
visited the @space_station in Ap
ril 2015 and December 2017"
(Tweet)<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">22 July 2019</sp
an> – via <a href="/wiki/Tw
itter" title="Twitter">Twitter.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
The+Dragon+spacecraft+supporting+
this+mission+previously+visited+t
he+%40space_station+in+April+2015
+and+December+2017&rft.date=2

```

```

019-07-19&rft.au=%40spacex&
p;rft_id=https%3A%2F%2Ftwitter.co
m%2Fspacex%2Fstatus%2F11523612829
82465536&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-482"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2019/07/f
alcon-9-launch-dragon-third-crs-1
8/">"Falcon 9 dodges weather and
launches CRS-18 Dragon to the IS
S". NASASpaceFlight<span clas
s="reference-accessdate">. Retrie
ved 26 July
 2019.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=Falcon+9+dodge
s+weather+and+launches+CRS-18+Dra

```

```

gon+to+the+ISS&rft.pub=NASASpaceFlight&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2019%2F07%2Ffalcon-9-launch-dragon-third-crs-18%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-483">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"AMOS-17 launch, Eastern Range debuts rapid launch support". 6 August 2019. Retrieved 7 August 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=AMOS-17+launc

```

```

h%2C+Eastern+Range+debuts+rapid+l
aunch+support&rft.date=2019-0
8-06&rft_id=https%3A%2F%2Fww
w.nasaspaceflight.com%2F2019%2F0
8%2Famos-17-launch-debut-ranges-r
apid-support%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-484"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://n
extspaceflight.com/launches/detai
ls/85">"Falcon 9 Block 5 | AMOS-1
7". <i>nextspaceflight.com</i
><span class="reference-accessdat
e">. Retrieved <span class="nowrap"
>22 July 2019.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&rft
.genre=unknown&rft.jtitle=ne
xtspaceflight.com&rft.atitle=

```



Falcon+9+Block+5+%7C+AMOS-17& rft\_id=http%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F85& rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-485"><span class="mw-cite-backlink"><b><a href="#cite\_ref-485">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation pressrelease cs1"><a rel="nofollow" class="external text" href="http://amos-spacecom.com/press/spacecoms-amos-17-satellite-successfully-completes-critical-design-review-cdr/">"AMOS-17 Scheduled for Launch in 2019 via SpaceX Falcon-9"</a> (Press release). Spacecom. 6 November 2017<span class="reference-accessdate">. Retrieved <span class="nowrap">26 May</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&a

```

mp;rft.btitle=AMOS-17+Scheduled+f
or+Launch+in+2019+via+SpaceX+Falc
on-9&rft.pub=Spacecom&rft
t.date=2017-11-06&rft_id=htt
p%3A%2F%2Famos-spacecom.com%2Fpre
ss%2Fspacecoms-amos-17-satellite-
successfully-completes-critical-d
esign-review-cdr%2F&rfr_id=in
fo%3Aid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"></sp
an>

<li id="cite_note-1047expended-48
6"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-1047expen
ded_486-0"><sup><i>a</i></
sup> <a href="#cite_ref-1047e
xpended_486-1"><sup><i>b</
i></sup> <a href="#cite_ref-1
047expended_486-2"><sup><i>c</
b></i></sup> <span cla
ss="reference-text"><link rel="mw
-deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREF@SpaceXUpd
ates2019" class="citation web cs
1">@SpaceXUpdates (28 July 2019).
<a rel="nofollow" class="external
text" href="https://twitter.com/S

```

paceXUpdates/status/1155418099438559232">"AMOS-17 is a big one. At 6500 kg, we're not gonna be seeing a booster recovery"</a> (Tweet) &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=AMOS-17+is+a+big+one.+At+6500+kg%2C+we%27re+not+gonna+be+seeing+a+booster+recovery&amp;rft.date=2019-07-28&amp;rft.au=%40SpaceXUpdates&amp;rft\_id=https%3A%2F%2Ftwitter.com%2FSpaceXUpdates%2Fstatus%2F1155418099438559232&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-487"><span class="mw-cite-backlink"><b><a href="#cite\_ref-487">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://

[https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module\\_1\\_L2/jupyter-labs-webscraping.ipynb?lti=true](https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true)

ad-spacex-launch/">"AMOS-8 to be built by SSL ahead of SpaceX launch"</a>. NASASpaceFlight<span class="reference-accessdate">. Retrieved <span class="nowrap">26 May</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=AMOS-8+to+be+built+by+SSL+ahead+of+SpaceX+launch&amp;rft.date=2018-03-26&amp;rft.aulast=Bergin&amp;rft.aufirst=Chris&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2018%2F03%2Famos-8-ssl-ahead-spacex-launch%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-489"><span class="mw-cite-backlink"><b><a href="#cite\_ref-489">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFRalph2019" class="citation web cs1">Ralph, Eric (30 July 2019). <a

```

rel="nofollow" class="external text" href="https://www.teslarati.com/spacex-falcon-9-block-5-second-expendable-launch/">"SpaceX transports Falcon 9 to launch site ahead of Block 5's second expendable launch ever". <i>teslarati.com</i>. Retrieved 7 August 2019.</cite>

<li id="cite_note-490"><a href

```

```
= "#cite_ref-490">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://techcrunch.com/2019/08/06/spa
cex-successfully-launches-twice-r
e-flown-falcon-9-for-amos-17-miss
ion/">"SpaceX successfully launch
es twice-flown Falcon 9, catches
fairing at sea"<span class
="reference-accessdate">. Retriev
ed 6 August
 2019.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=a
rticle&rft.atitle=SpaceX+succ
essfully+launches+twice-flown+Fal
con+9%2C+catches+fairing+at+sea&a
mp;rft_id=https%3A%2F%2Ftechcrunc
h.com%2F2019%2F08%2F06%2Fspacex-s
uccessfully-launches-twice-re-flo
wn-falcon-9-for-amos-17-mission%2
F&rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">
```

```

<li id="cite_note-491"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2019/11/s
pacex-cape-return-first-operation
al-starlink-mission/">"SpaceX and
Cape Canaveral Return to Action w
ith First Operational Starlink Mi
ssion". 10 November 2019. Re
trieved 11 N
ovember 2019.</cite
><span title="ctx_ver=Z39.88-2004
&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=SpaceX+a
nd+Cape+Canaveral+Return+to+Actio
n+with+First+Operational+Starlink
+Mission&rft.date=2019-11-10&
amp;rft_id=https%3A%2F%2Fwww.nasa
spaceflight.com%2F2019%2F11%2Fspa
cex-cape-return-first-operational
-starlink-mission%2F&rfr_id=i
```



```

nfo%3Asid%2Fen.wikipedia.org%3ALi
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s
pan>

<li id="cite_note-:13-492"><a h
ref="#cite_ref-:13_492-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFClark" class="citation w
eb cs1">Clark, Stephen. <a rel="n
ofollow" class="external text" hr
ef="https://spaceflightnow.com/20
19/10/11/spacexs-next-launch-to-m
ark-another-incremental-step-in-r
ocket-reusability/">"SpaceX's nex
t launch to mark another incremen
tal step in rocket reusability"</
a>. Spaceflight Now<span class="r
eference-accessdate">. Retrieved
 14 October
 2019.</cite><span
 title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX%27s+nex
t+launch+to+mark+another+incremen

```

```

tal+step+in+rocket+reusability&am
p;rft.pub=Spaceflight+Now&rft
.t.aulast=Clark&rft.aufirst=St
ephen&rft_id=https%3A%2F%2Fsp
aceflightnow.com%2F2019%2F10%2F1
1%2Fspacexs-next-launch-to-mark-a
nother-incremental-step-in-rocket
-reusability%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-493"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/falcon-9-launches-d
ragon-cargo-spacecraft-to-iss-
2/">"Falcon 9 launches Dragon car
go spacecraft to ISS". 5 Dece
mber 2019<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">5 December 2019
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in

```

```
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Falcon+9+launches+Dragon+car
go+spacecraft+to+ISS&rft.date
=2019-12-05&rft_id=https%3A%2
F%2Fspacenews.com%2Ffalcon-9-laun
ches-dragon-cargo-spacecraft-to-i
ss-2%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-:02-494">^ <a hr
ef="#cite_ref-:02_494-0"><sup><i>
a</i></sup> <a href="#
cite_ref-:02_494-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFBaylor,
Michael[@nextspaceflight	
3;2019" class="citation web cs1">
Baylor, Michael [@nextspacefligh
t] (26 November 2019). <a rel="no
follow" class="external text" hre
f="https://twitter.com/nextspacef
light/status/119935886175441715
2">"The CRS-19 mission will use a
```

new first stage, B1059-1. B1056-3, originally penciled in for CRS-19, is now expected to be used for JCSAT, but core assignments are always subject to change. SpaceX" (Tweet). [Archived](https://web.archive.org/web/20201116015009/https://twitter.com/nextspaceflight/status/1199358861754417152) from the original on 16 November 2020 class="reference-accessdate">. Retrieved class="nowrap">3 March 2021; via [Twitter](/wiki/Twitter "Twitter").

title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=The+CRS-19+mission+will+use+a+new+first+stage%2C+B1059-1.+B1056-3%2C+originally+penciled+in+for+CRS-19%2C+is+now+expected+to+be+used+for+JCSAT%2C+but+core+assignments+are+always+subject+to+change.+%23SpaceX&rft.date=2019-11-26&rft.au=Baylor%2C+Michael+%5B%40nextspaceflight%5D&rft\_id=https%3A%2F%2Ftwitt

```

er.com%2Fnextspaceflight%2Fstatu
s%2F1199358861754417152&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-spn-201602242-4
95"><span class="mw-cite-backlin
k"><a href="#cite_ref-spn-2016
02242_495-0">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFde_Sel
ding2016" class="citation news cs
1">de Selding, Peter B. (24 Febru
ary 2016). <a rel="nofollow" clas
s="external text" href="http://sp
acenews.com/spacex-wins-5-new-spa
ce-station-cargo-missions-in-nasa
-contract-estimated-at-700-millio
n/">"SpaceX wins 5 new space stat
ion cargo missions in NASA contra
ct estimated at $700 million". SpaceNews. Slide shows yearly
breakdown of NASA missions from
2016 to 2021<span class="referen
ce-accessdate">. Retrieved 25 February</span

```

```
> 2016.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=SpaceX+wins+5+new
+space+station+cargo+missions+in+
NASA+contract+estimated+at+%24700
+million&rft.pages=Slide+show
s+yearly+breakdown+of+NASA+missio
ns+from+2016+to+2021.&rft.dat
e=2016-02-24&rft.aulast=de+Se
lding&rft.aufirst=Peter+B.&am
p;rft_id=http%3A%2F%2Fspacenews.c
om%2Fspacex-wins-5-new-space-stat
ion-cargo-missions-in-nasa-contr
act-estimated-at-700-million%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-496"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSp
aceX_[@SpaceX]2019" class
="citation web cs1"><a href="/wik
```

```
i/SpaceX" title="SpaceX">SpaceX
 [@SpaceX] (26 November 201
9). <a rel="nofollow" class="exte
rnal text" href="https://twitter.
com/SpaceX/status/119946390525859
0208">"The Dragon spacecraft supp
orting this mission previously fl
ew in support of our fourth and e
leventh commercial resupply missi
ons t.co/P6ceGX9Pz1" (Tweet).
<a rel="nofollow" class="external
text" href="https://web.archive.o
rg/web/20201111215514/https://twi
tter.com/SpaceX/status/1199463905
258590208">Archived from the
 original on 11 November 2020<spa
n class="reference-accessdate">.
 Retrieved 3
March 2021 –
 via <a href="/wiki/Twitter" titl
e="Twitter">Twitter.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=The+Dragon+s
pacecraft+supporting+this+mission
+previously+flew+in+support+of+ou
r+fourth+and+eleventh+commercial+
resupply+missions+t.co%2FP6ceGX9P
z1&rft.date=2019-11-26&rft
```

```

t.au=SpaceX+%5B%40SpaceX%5D&r
ft_id=https%3A%2F%2Ftwitter.com%2
FSpaceX%2Fstatus%2F11994639052585
90208&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-:152-497">^ <sup><i>
a</i></sup> <a href="#
cite_ref-:152_497-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFJohnson
2019" class="citation web cs1">Jo
hnson, Michael (19 November 201
9). <a rel="nofollow" class="exte
rnal text" href="http://www.nasa.
gov/mission_pages/station/researc
h/news/spx19-research">"SpaceX La
unching Research for Better Earth
Images, Easier Leak Checks".
<i>NASA</i><span class="referenc
e-accessdate">. Retrieved <span c
lass="nowrap">3 December 2
019.</cite><span title="ct

```



```
x_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=NASA&rft.atitle=SpaceX+Launching+Research+for+Bette
r+Earth+Images%2C+Easier+Leak+Che
cks&rft.date=2019-11-19&rft.aulast=Johnson&rft.aufirst=Michael&rft_id=http%3A%2F%2F
www.nasa.gov%2Fmission_pages%2Fsta
tion%2Fresearch%2Fnews%2Fspx19-r
esearch&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"> <i>This artic
le incorporates text from this so
urce, which is in the <a href="/w
iki/Public_domain" title="Public
```

```

 domain">public domain</i><i>
>.</i>

<li id="cite_note-sjcs-498">^ <sup><i>
a</i></sup> <a href="#
cite_ref-sjcs_498-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFThompso
n2019" class="citation web cs1">T
hompson, Amy (17 December 2019).
 <a rel="nofollow" class="externa
l text" href="https://www.space.c
om/spacex-falcon-9-jcsat-18-launc
h-landing-success.html">"SpaceX F
alcon 9 Launches Heavyweight Sate
llite Into Orbit, Nails Rocket La
nding". Space.com<span class
="reference-accessdate">. Retriev
ed 17 Decemb
er 2019.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX+Falcon+
9+Launches+Heavyweight+Satellite+

```

Into+Orbit%2C+Nails+Rocket+Landin  
g&rft.pub=Space.com&rft.d  
ate=2019-12-17&rft.aulast=Tho  
mpson&rft.aufirst=Amy&rft  
\_id=https%3A%2F%2Fwww.space.com%2  
Fspacex-falcon-9-jcsat-18-launch-  
landing-success.html&rfr\_id=i  
nfo%3Asid%2Fen.wikipedia.org%3Ali  
st+of+Falcon+9+and+Falcon+Heavy+l  
aunches" class="Z3988"></span></s  
pan>  
</li>  
<li id="cite\_note-sn-20170905-49  
9"><span class="mw-cite-backlin  
k"><b><a href="#cite\_ref-sn-20170  
905\_499-0">^</a></b></span> <span  
class="reference-text"><link rel  
="mw-deduplicated-inline-style" h  
ref="mw-data:TemplateStyles:r1067  
248974"/><cite id="CITEREFHenry20  
17" class="citation web cs1">Henr  
y, Caleb (5 September 2017). <a r  
el="nofollow" class="external tex  
t" href="http://spacenews.com/spa  
cex-wins-kacific-sky-perfect-jsat  
-condosat-launch/">"SpaceX wins K  
acific, Sky Perfect Jsat condosat  
launch, new or used rocket TBD"</  
a>. SpaceNews<span class="referen  
ce-accessdate">. Retrieved <span

```

class="nowrap">14 September
2017.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=SpaceX+wins+Kacific%
2C+Sky+Perfect+Jsat+condosat+laun
ch%2C+new+or+used+rocket+TBD&
rft.pub=SpaceNews&rft.date=20
17-09-05&rft.aulast=Henry&am
p;rft.aufirst=Caleb&rft_id=ht
tp%3A%2F%2Fspacenews.com%2Fspacex
-wins-kacific-sky-perfect-jsat-co
ndosat-launch%2F&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988">


```

```

<li id="cite_note-500"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKr
ebs" class="citation web cs1">Kre
bs, Gunter. <a rel="nofollow" cla
ss="external text" href="http://s
pace.skyrocket.de/doc_sdat/jcsat-
18_kacific-1.htm">"JCSat 18 / Kac

```

ific 1"</a>. Gunter's Space Page<span class="reference-accessdate">. Retrieved <span class="nowrap">5 September</span> 2017</span>>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=JCSat+18+%2F+Kacific+1&amp;rft.pub=Gunter%27s+Space+Page&amp;rft.aulast=Krebs&amp;rft.aufirst=Gunter&amp;rft\_id=http%3A%2F%2Fspace.skyrocket.de%2Fdoc\_sdat%2Fjcsat-18\_kacific-1.htm&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-501"><span class="mw-cite-backlink"><b><a href="#cite\_ref-501">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2019/12/spacex-falcon-9-launch-jcsat-18-kacific-1/">"SpaceX Falcon 9 launch

es JCSAT-18/Kacific-1"</a>. <i>masaspaceFlight.com</i>. 16 December 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">17 December</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=masaspaceFlight.com&amp;rft.atitle=SpaceX+Falcon+9+launches+JCSAT-18%2FKacific-1&amp;rft.date=2019-12-16&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2019%2F12%2Fspacex-falcon-9-launch-jcsat-18-kacific-1%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-spacenews-spacex-plans-24-starlink-launches-next-year-502"><span class="mw-cite-backlink"><b><a href="#cite\_ref-spacenews-spacex-plans-24-starlink-launches-next-year\_502-0">^</a></b></span> <span class="reference-text"><a rel="nofollow" class="external free" href="https://spacen

ews.com/spacex-plans-24-starlink-launches-next-year/">https://spacenews.com/spacex-plans-24-starlink-launches-next-year/</a></span></li>

<li id="cite\_note-503"><span class="mw-cite-backlink"><b><a href="#cite\_ref-503">^</a></b></span><span class="reference-text"><a rel="nofollow" class="external free" href="https://space.skyrocket.de/doc\_chr/lau2020.htm">https://space.skyrocket.de/doc\_chr/lau2020.htm</a></span></li>

<li id="cite\_note-504"><span class="mw-cite-backlink"><b><a href="#cite\_ref-504">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2020/01/07/spacex-launches-more-starlink-satellites-tests-design-change-for-astronomers/">"SpaceX launches more Starlink satellites, tests design change for astronomers"</a>. spa

ceflightnow. 7 January 2020.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+launches+more+Starlink+satellites%2C+tests+design+change+for+astronomers&rft.pub=spaceflightnow&rft.date=2020-01-07&rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F01%2F07%2Fspacex-launches-more-starlink-satellites-tests-design-change-for-astronomers%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-505"><span class="mw-cite-backlink"><b><a href="#cite\_ref-505">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spacenews.com/spacex-working-on-fix-for-starlink-satellites-so-the-y-dont-disrupt-astronomy/">"Space



X working on fix for Starlink satellites so they don't disrupt astronomy". 7 December 2019 class="reference-accessdate">. Retrieved  class="nowrap">10 December</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+working+on+fix+for+Starlink+satellites+so+they+don%27t+disrupt+astronomy&amp;rft.date=2019-12-07&amp;rft\_id=https%3A%2F%2Fspacenews.com%2Fspacex-working-on-fix-for-starlink-satellites-so-they-dont-disrupt-astronomy%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-506"><span class="mw-cite-backlink"><b><a href="#cite\_ref-506">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark" class="citation web cs1">Cla

```
rk, Stephen. "Live coverage: SpaceX successfully performs Crew Dragon abort test". Spaceflight Now.</cite>

<li id="cite_note-sn20150702-507">^ <link rel
```

```

="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFFoust2015" class="citation news cs1">Foust, Jeff (2 July 2015). "NASA and SpaceX Delay Dragon In-Flight Abort Test". SpaceNews. Retrieved 3 May 2016.</cite>
<li id="cite_note-508"><a href

```

```

="#cite_ref-508">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFPi
etrobon2020" class="citation web
cs1">Pietrobon, Steven (18 Janua
ry 2020). <a rel="nofollow" class
="external text" href="https://ww
w.sworld.com.au/steven/space/ussu
b-man.txt">"UNITED STATES SUBORBI
TAL LAUNCH MANIFEST (18 January 2
020)". Steven Pietrobon's Spa
ce Archive<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">18 January 202
0.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&rft.genre=unknown&rft.b
title=UNITED+STATES+SUBORBITAL+LA
UNCH+MANIFEST+%2818+January+2020%
29&rft.pub=Steven+Pietrobon%2
7s+Space+Archive&rft.date=202
0-01-18&rft.aulast=Pietrobon&
amp;rft.aufirst=Steven&rft_id
=https%3A%2F%2Fwww.sworld.com.au%
2Fsteven%2Fspace%2Fussub-man.txt&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa

```

```
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-CCD6-509">^ <sup><i>
a</i></sup> <a href="#
cite_ref-CCD6_509-1"><sup><i>b
</i></sup> <a href="#cite
_ref-CCD6_509-2"><sup><i>c
</i></sup> <a href="#cite_ref
-CCD6_509-3"><sup><i>d</i>
</sup> <a href="#cite_ref-CCD
6_509-4"><sup><i>e</i></su
p> <a href="#cite_ref-CCD6_50
9-5">^{<i>f</i>}</
a> <a href="#cite_ref-CCD6_509-
6">^{<i>g</i>}
<s
up><i>h</i></sup> <a h
ref="#cite_ref-CCD6_509-8"><sup><
i>i</i></sup> <sup><i><
b>j</i></sup> <a href="#c
ite_ref-CCD6_509-10"><sup><i>k
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation we
```

```

b cs1"><a rel="nofollow" class="e
xternal text" href="https://www.g
ovconwire.com/2017/01/boeing-spac
ex-secure-additional-crewed-missi
ons-under-nasas-commercial-space-
transport-program/">"Boeing, Spac
eX Secure Additional Crewed Missi
ons Under NASA's Commercial Space
Transport Program". 4 January
2017<span class="reference-access
date">. Retrieved <span class="no
wrap">7 March 2017.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft
.genre=unknown&rft.btitle=Bo
eing%2C+SpaceX+Secure+Additional+
Crewed+Missions+Under+NASA%27s+Co
mmercial+Space+Transport+Program&
amp;rft.date=2017-01-04&rft_i
d=https%3A%2F%2Fwww.govconwire.co
m%2F2017%2F01%2Fboeing-spacex-sec
ure-additional-crewed-missions-un
der-nasas-commercial-space-transp
ort-program%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-nsf-20170811-51

```

```

0"><span class="mw-cite-backlin
k"><a href="#cite_ref-nsf-2017
0811_510-0">^ <spa
n class="reference-text"><link re
l="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r10
67248974"/><cite id="CITEREFGebha
rdt2017" class="citation news cs
1">Gebhardt, Chris (11 August 201
7). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2017/08/spacex-bo
eing-home-stretch-commercial-crew
-readiness/">"SpaceX and Boeing i
n home stretch for Commercial Cre
w readiness". NASASpaceFlight
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">17 August 2017.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Ajournal&am
p;rft.genre=article&rft.atitl
e=SpaceX+and+Boeing+in+home+stret
ch+for+Commercial+Crew+readiness&
amp;rft.date=2017-08-11&rft.a
ulast=Gebhardt&rft.aufirst=Ch
ris&rft_id=https%3A%2F%2Fwww.
nasaspaceflight.com%2F2017%2F08%2
Fspacex-boeing-home-stretch-comme

```

rcial-crew-readiness%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-sfn\_crewdragon\_may19-511"><span class="mw-cite-backlink"><b><a href="#cite\_ref-sfn\_crewdragon\_may19\_511-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWilliam\_Harwood2019" class="citation web cs1">William Harwood (28 May 2019). <a rel="nofollow" class="external text" href="https://spaceflightnow.com/2019/05/28/nasa-says-spacex-readying-crew-dragon-capsule-for-possible-piloted-test-flight-by-end-of-year/">"NASA says SpaceX readying Crew Dragon capsule for possible piloted test flight by end of year"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">29 May</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3A



```

ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
NASA+says+SpaceX+readying+Crew+Dr
agon+capsule+for+possible+piloted
+test+flight+by+end+of+year&r
ft.date=2019-05-28&rft.au=Wil
liam+Harwood&rft_id=https%3A%
2F%2Fspaceflightnow.com%2F2019%2F
05%2F28%2Fnasa-says-spacex-readyi
ng-crew-dragon-capsule-for-possib
le-piloted-test-flight-by-end-of-
year%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-512"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFAt
kinson2020" class="citation web c
s1">Atkinson, Ian (17 January 202
0). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2020/01/spacex-cr
ew-dragon-in-flight-abort-tes
t/">"SpaceX conducts successful C

```

```

rew Dragon In-Flight Abort Test"
. NASASpaceFlight.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX+conduct
s+successful+Crew+Dragon+In-Fligh
t+Abort+Test&rft.pub=NASASpac
eFlight&rft.date=2020-01-17&a
mp;rft.aulast=Atkinson&rft.au
first=Ian&rft_id=https%3A%2F%
2Fwww.nasaspaceflight.com%2F2020%
2F01%2Fspacex-crew-dragon-in-flig
ht-abort-test%2F&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988">

<li id="cite_note-513"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/spacex-launches-fou
rth-batch-of-starlink-satellites-
tweaks-satellite-design/">"SpaceX

```

launches fourth batch of Starlink satellites, tweaks satellite design". 29 January 2020 class="reference-accessdate">. Retrieved class="nowrap">31 January 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+launches+fourth+batch+of+Starlink+satellites%2C+tweaks+satellite+design&amp;rft.date=2020-01-29&amp;rft\_id=https%3A%2F%2Fspacenews.com%2Fspacex-launches-fourth-batch-of-starlink-satellites-tweaks-satellite-design%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-catch3-514"><span class="mw-cite-backlink"><b><a href="#cite\_ref-catch3\_514-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text"

```

href="https://arstechnica.com/sci
ence/2020/01/weather-permitting-s
pacex-to-launch-third-starlink-mi
ssion-monday-morning/">"SpaceX la
unches 60 Starlink satellites, ca
tches a fairing". 18 December
2019.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=SpaceX+launches+60+Starlink+sat
ellites%2C+catches+a+fairing&
rft.date=2019-12-18&rft_id=ht
tps%3A%2F%2Farstechnica.com%2Fsci
ence%2F2020%2F01%2Fweather-permit
ting-spacex-to-launch-third-starl
ink-mission-monday-morning%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-515"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla

```

```

ss="external text" href="https://
www.space.com/spacex-starlink-4-l
aunch-success-misses-rocket-landi
ng.html">"SpaceX launches 60 Star
link satellites for new megaconst
ellation, misses rocket landing"
. <i>space.com</i>. 17 Februa
ry 2020<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">18 February 2020
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=unknown&rft
.jtitle=space.com&rft.atitle
=SpaceX+launches+60+Starlink+sate
llites+for+new+megaconstellation%
2C+misses+rocket+landing&rft.
date=2020-02-17&rft_id=https%
3A%2F%2Fwww.space.com%2Fspacex-st
arlink-4-launch-success-misses-ro
cket-landing.html&rft_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-516"><span clas
s="mw-cite-backlink">^

```

```

<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2020/02/s
pacex-falcon-reusability-record-f
ifth-starlink-launch/">"SpaceX su
ccessfully conducts fifth Starlin
k launch - booster misses drone s
hip". 17 February 2020.</cite
><span title="ctx_ver=Z39.88-2004
&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=SpaceX+s
uccessfully+conducts+fifth+Starli
nk+launch+-+booster+misses+drone+
ship&rft.date=2020-02-17&
rft_id=https%3A%2F%2Fwww.nasaspac
eflight.com%2F2020%2F02%2Fspacex-
falcon-reusability-record-fifth-s
tarlink-launch%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-517"><span clas
s="mw-cite-backlink"><a href

```

```

="#cite_ref-517">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFMu
sk,_Elon_[@elonmusk]2020"
class="citation web cs1"><a href
="/wiki/Elon_Musk" title="Elon Mu
sk">Musk, Elon [@elonmusk] (6
March 2020). <a rel="nofollow" cl
ass="external text" href="http
s://twitter.com/elonmusk/status/1
236117435905785856">"@Alejandro_D
ebH Recent missed landing (at se
a) was due to incorrect wind dat
a. If this (land) landing fails,
it will most likely be for a dif
ferent reason" (Tweet). <a re
l="nofollow" class="external tex
t" href="https://web.archive.org/
web/20201116015026/https://twitte
r.com/elonmusk/status/12361174359
05785856">Archived from the o
riginal on 16 November 2020. R
etrieved 3 M
arch 2021 – v
ia <a href="/wiki/Twitter" title
="Twitter">Twitter.</cite><sp
an title="ctx_ver=Z39.88-2004&am

```

```
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=%40Alejandro
_DebH+Recent+missed+landing+%28at
+sea%29+was+due+to+incorrect+wind
+data.+If+this+%28land%29+landing
+fails%2C+it+will+most+likely+be+
for+a+different+reason.&rft.d
ate=2020-03-06&rft.au=Musk%2C
+Elon+%5B%40elonmusk%5D&rft_i
d=https%3A%2F%2Ftwitter.com%2Felo
nmusk%2Fstatus%2F1236117435905785
856&rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">

<li id="cite_note-518"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGr
ay2020" class="citation web cs1">
Gray, Tyler (9 March 2020). <a re
l="nofollow" class="external tex
t" href="https://www.nasaspacefli
ght.com/2020/03/spacex-final-drag
on-1-mission-iss/">"CRS-20 - Fina
```



```

1 Dragon 1 arrives at the ISS". <i>nasaspaceflight.com</i>. NA
SASpaceflight<span class="referen
ce-accessdate">. Retrieved 14 May 202
0.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&rft.genre=unknown&rft
.jtitle=nasaspaceflight.com&
rft.atitle=CRS-20+%E2%80%93+Final
+Dragon+1+arrives+at+the+ISS&
rft.date=2020-03-09&rft.aulas
t=Gray&rft.aufirst=Tyler&
rft_id=https%3A%2F%2Fwww.nasaspac
eflight.com%2F2020%2F03%2Fspacex-
final-dragon-1-mission-iss%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-519"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla

```

```
ss="external text" href="https://
www.nasa.gov/sites/default/files/
atoms/files/spacex_crs-20_mission
_overview.pdf">"SpX-20 Mission Ov
erview" <span class="cs1-form
at">(PDF). NASA. 6 March 2
020.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=SpX-20+Mission+Overview&rft
t.pub=NASA&rft.date=2020-03-0
6&rft_id=https%3A%2F%2Fwww.na
sa.gov%2Fsites%2Fdefault%2Ffiles%
2Fatoms%2Ffiles%2Fspacex_crs-20_m
ission_overview.pdf&rft_id=in
fo%3Asid%2Fen.wikipedia.org%3ALis
t+of+Falcon+9+and+Falcon+Heavy+la
unches" class="Z3988"> <im
g alt="Public Domain" src="//uplo
ad.wikimedia.org/wikipedia/en/thu
mb/6/62/PD-icon.svg/12px-PD-icon.
svg.png" decoding="async" width
="12" height="12" class="noviewe
r" srcset="//upload.wikimedia.or
g/wikipedia/en/thumb/6/62/PD-ico
n.svg/18px-PD-icon.svg.png 1.5x,
//upload.wikimedia.org/wikipedi
a/en/thumb/6/62/PD-icon.svg/24px-
PD-icon.svg.png 2x" data-file-wid
```

```
th="196" data-file-height="196" /
> <i>This article incorporates te
xt from this source, which is in
the <a href="/wiki/Public_domai
n" title="Public domain">public d
omain</i><i>.</i>

<li id="cite_note-520"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
space.skyrocket.de/doc_sdat/barto
lomeo.htm">"Bartolomeo (CEPHFIS
S)". <i>space.skyrocket.de</i
>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=unknown&rft.jtit
le=space.skyrocket.de&rft.ati
tle=Bartolomeo+%28CEPHFISS%29&am
p;rft_id=https%3A%2F%2Fspace.skyr
ocket.de%2Fdoc_sdat%2Fbartolomeo.
htm&rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
```

```
3988">

<li id="cite_note-521"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation news cs1">Cl
ark, Stephen. <a rel="nofollow" c
lass="external text" href="http
s://spaceflightnow.com/2020/02/2
6/spacex-swaps-upper-stage-for-ne
xt-falcon-9-launch/">"SpaceX swap
s upper stage for next Falcon 9 l
aunch". Spaceflight Now. R
etrieved 27
October 2020.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Ajournal&rft.g
enre=article&rft.atitle=Space
X+swaps+upper+stage+for+next+Falc
on+9+launch&rft.aulast=Clark&
amp;rft.aufirst=Stephen&rft_i
d=https%3A%2F%2Fspaceflightnow.co
m%2F2020%2F02%2F26%2Fspacex-swaps
-upper-stage-for-next-falcon-9-la
```

```

unch%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-522"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.space.com/spacex-launches-sta
rlink-5-satellites-misses-rocket-
landing.html">"SpaceX launches 60
Starlink satellites into orbit, m
isses rocket landing". <i>spa
ce.com</i>. 18 March 2020<span cl
ass="reference-accessdate">. Retr
ieved 20 Mar
ch 2020.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=space.com&a
mp;rft.atitle=SpaceX+launches+60+
Starlink+satellites+into+orbit%2C
+misses+rocket+landing&rft.da

```

```

te=2020-03-18&rft_id=https%3A%2F%2Fwww.space.com%2Fspacex-launches-starlink-5-satellites-missiles-rocket-landing.html&rft_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-523">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSpaceX_[@SpaceX]2020" class="citation web cs1">SpaceX
 [[@SpaceX] (13 March 2020). "The fairing previously flew on the Starlink launch in May 2019 t.co/AtYq6Omuku" (Tweet). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20200602182004/https://twitter.com/SpaceX/status/12386102872

```

56723456">Archived</a> from the original on 2 June 2020<span class="reference-accessdate">. Retrieved <span class="nowrap">3 March</span> 2021</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=The+fairing+previously+flew+on+the+Starlink+launch+in+May+2019+t.co%2FAtYq60muku&amp;rft.date=2020-03-13&amp;rft.au=SpaceX+%5B%40SpaceX%5D&amp;rft\_id=https%3A%2F%2Ftwitter.com%2FSpaceX%2Fstatus%2F1238610287256723456&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-524"><span class="mw-cite-backlink"><b><a href="#cite\_ref-524">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFElon\_Musk\_&#91;@elonmusk&#93;2020"

```

class="citation web cs1">Elon Mu
sk [@elonmusk] (18 March 2020). <
a rel="nofollow" class="external
text" href="https://twitter.com/
elonmusk/status/12402626365471006
72">"There was also an early engi
ne shutdown on ascent, but it did
n't affect orbit insertion. Shows
value of having 9 engines! Thorough
investigation needed before ne
xt mission" (Tweet) – v
ia <a href="/wiki/Twitter" title
="Twitter">Twitter.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=There+was+al
so+an+early+engine+shutdown+on+as
cent%2C+but+it+didn%27t+affect+or
bit+insertion.+Shows+value+of+hav
ing+9+engines%21+Thorough+investi
gation+needed+before+next+missio
n.&rft.date=2020-03-18&rft
.au=Elon+Musk+%5B%40elonmusk%5D&
amp;rft_id=https%3A%2F%2Ftwitter.
com%2Felonmusk%2Fstatus%2F1240262
636547100672&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

```



```

<li id="cite_note-525"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://techcrunch.com/2020/04/22/spa
cex-engine-issue-on-last-starlink
-mission-caused-by-cleaning-fluid
-according-to-elon-musk/">"SpaceX
engine issue on last Starlink mis
sion caused by cleaning fluid acc
ording to Elon Musk". 23 Apri
l 2020.</cite><span title="ctx_ve
r=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=article&rft.
atitle=SpaceX+engine+issue+on+las
t+Starlink+mission+caused+by+clea
ning+fluid+according+to+Elon+Musk
&rft.date=2020-04-23&rft_
id=https%3A%2F%2Ftechcrunch.com%2
F2020%2F04%2F22%2Fspacex-engine-i
ssue-on-last-starlink-mission-cau
sed-by-cleaning-fluid-according-t
o-elon-musk%2F&rfr_id=info%3A
```

sid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-526"><span class="mw-cite-backlink"><b><a href="#cite\_ref-526">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2020/04/22/spacexs-starlink-network-surpasses-400-satellite-mark-after-successful-launch/">"SpaceX's Starlink network surpasses 400-satellite mark after successful launch"</a>. 22 April 2020<span class="reference-accessdate">. Retrieved <span class="nowrap">22 April</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX%27s+Starlink+network+surpasses+400-satellite+mark+after+successful+launch&amp;rft.date=2020-04-22&amp;rft\_id=htt

```

ps%3A%2F%2Fspaceflightnow.com%2F2
020%2F04%2F22%2Fspacexs-starlink-
network-surpasses-400-satellite-m
ark-after-successful-launch%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-leader-527"><sp
an class="mw-cite-backlink">^</
a> <span class="refere
nce-text"><link rel="mw-deduplica
ted-inline-style" href="mw-data:T
emplateStyles:r1067248974"/><cite
class="citation web cs1"><a rel
="nofollow" class="external text"
href="https://www.nasaspaceligh
t.com/2020/04/falcon-9-us-leader-
starlink/">"Falcon 9 to become U.
S. rocket leader; Starlink "where
are they now" edition". NASAS
paceFlight. 21 April 2020<span cl
ass="reference-accessdate">. Retr
ieved 22 Apr
il 2020.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn

```

```

own&rft.btitle=Falcon+9+to+be
come+U.S.+rocket+leader%3B+Starli
nk+%22where+are+they+now%22+editi
on&rft.pub=NASASpaceFlight&am
p;rft.date=2020-04-21&rft_id=
https%3A%2F%2Fwww.nasaspacefligh
t.com%2F2020%2F04%2Ffalcon-9-us-l
eader-starlink%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-528"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation web cs1">Cla
rk, Stephen. <a rel="nofollow" cl
ass="external text" href="http
s://spaceflightnow.com/2020/04/1
7/spacex-test-fires-rocket-for-st
arlink-launch-next-week/">"SpaceX
test-fires rocket for Starlink la
unch next week". Spaceflight
Now<span class="reference-access
date">. Retrieved <span class="no

```

```

wrap">13 June 2020.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft.
genre=unknown&rft.btitle=SpaceX+test-fires+rocket+for+Starlink+launch+next+week&rft.pub=Spaceflight+Now&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F04%2F17%2Fspacex-test-fires-rocket-for-starlink-launch-next-week%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-529">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Making history, astronauts r

```

ide commercial capsule to space station"</a>. 31 May 2020<span class="reference-accessdate">. Retrieved <span class="nowrap">31 May </span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Making+history%2C+astronauts+ride+commercial+capsule+to+space+station&amp;rft.date=2020-05-31&amp;rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F05%2F31%2Fmaking-history-astronauts-ride-commercial-capsule-to-space-station%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-nsf\_2Aug19-530"><span class="mw-cite-backlink"><b><a href="#cite\_ref-nsf\_2Aug19\_530-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBergin2019" class="citation news cs1">Bergin, Chris (2 August 2019). <a r

```

el="nofollow" class="external text" href="https://www.nasaspaceflight.com/2019/08/spacex-retesting-boosters-planning-starship-pad/">"SpaceX present to future: From retesting boosters to planning a Starship pad". NASASpaceFlight]]. Retrieved 2 August 2019.</cite>

<li id="cite_note-531">^

```

```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFHeiney" class="citation web cs1">Heiney, Anna. "Top 10 Things to Know for NASA's SpaceX Demo-2 Return". <i>nasa.gov</i>. Retrieved 24 July 2020. <q>At the time of undock, Dragon Endeavour and its trunk weigh approximately 27,600 pounds</q></cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=nasa.gov&rft.atitle=Top+10+Things+to+Know+for+NASA%27s+SpaceX+Demo-2+Return&rft.aulast=Heiney&rft.aufirst=Anna&rft_id=https%3A%2F%2Fwww.nasa.gov%2Ffeature%2Ftop-10-things-to-know-for-nasa-s-spacex-demo-2-return&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Fa
```



lcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i> <i>.</i></span> </li> <li id="cite\_note-532"><span class="mw-cite-backlink"><b><a href="#cite\_ref-532">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGohd2020" class="citation news cs 1">Gohd, Chelsea (28 May 2020). <a rel="nofollow" class="external

```

text" href="https://www.space.com/spacex-demo-2-astronaut-launch-big-crowds-nasa-warnings.html">"SpaceX's historic astronaut launch try draws huge crowds despite NASA warnings". Space.com. Retrieved 2 June 2020.</cite>

<li id="cite_note-:16-533">^ <link rel="mw-deduplicated-

```

```
inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFFletcherGray" class="citation web cs1">Fletcher, Colin; Gray, Tyler. "SpaceX Launches Eighth Starlink Mission, Read The Instructions With East Coast Droneship Debut". <i>nasaspaceflight.com</i>.</cite>
```

```

<li id="cite_note-NAS280420-534">
<a href="#cite_ref-NAS280420_534
-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://web.archi
ve.org/web/20200429223257/http
s://www.spacex.com/news/2020/04/2
8/starlink-update">"Starlink Disc
ussion | National Academy of Scie
nces". 28 April 2020. Archive
d from <a rel="nofollow" class="e
xternal text" href="https://www.s
pacex.com/news/2020/04/28/starlin
k-update">the original on 29
April 2020<span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">29 April 2020
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Starlink+Discussion+%7C+Nati
onal+Academy+of+Sciences&rft.
date=2020-04-28&rft_id=https%
```

```

3A%2F%2Fwww.spacex.com%2Fnews%2F2
020%2F04%2F28%2Fstarlink-update&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-:17-535">^ <a hr
ef="#cite_ref-:17_535-0"><sup><i>
a</i></sup> <a href="#
cite_ref-:17_535-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation we
b cs1"><a rel="nofollow" class="e
xternal text" href="https://www.n
asaspaceflight.com/2020/06/spacex
-launch-first-starlink-rideshare-
planet-labs/">"SpaceX to launch f
irst Starlink rideshare mission w
ith Planet Labs". NASASpaceFl
ight.com. 12 June 2020<span class
="reference-accessdate">. Retriev
ed 13 June</
span> 2020.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A

```

```

mtx%3Abook&rf.t.genre=unknown&
&rf.t.btitle=SpaceX+to+launch+first+Starlink+rideshare+mission+with+Planet+Labs&rf.t.pub=NASASpaceFlight.com&rf.t.date=2020-06-12&rf.t_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2020%2F06%2Fspacex-launch-first-starlink-rideshare-planet-labs%2F&rf.r_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-nsf20200612-536">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGray2020" class="citation news cs1">Gray, Tyler (12 June 2020). <a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2020/06/spacex-launch-first-starlink

```

```

-rideshare-planet-labs/">"SpaceX
 launches first Starlink rideshar
 e mission with Planet Labs".
 NASASpaceFlight<span class="refe
 rence-accessdate">. Retrieved <sp
 an class="nowrap">14 June
 2020.</cite><span title
 ="ctx_ver=Z39.88-2004&rft_val
 _fmt=info%3Aofi%2Ffmt%3Akev%3Amt
 x%3Ajournal&rft.genre=article
 &rft.atitle=SpaceX+launches+f
 irst+Starlink+rideshare+mission+w
 ith+Planet+Labs&rft.date=2020
 -06-12&rft.aulast=Gray&rft
 .aufirst=Tyler&rft_id=https%
 3A%2F%2Fwww.nasaspaceflight.com%2
 F2020%2F06%2Fspacex-launch-first-
 starlink-rideshare-planet-labs%2F
 &rfr_id=info%3Asid%2Fen.wikip
 edia.org%3AList+of+Falcon+9+and+F
 alcon+Heavy+launches" class="Z398
 8">

<li id="cite_note-537"><span clas
 s="mw-cite-backlink">^
 <lin
 k rel="mw-deduplicated-inline-sty
 le" href="mw-data:TemplateStyles:
 r1067248974"/><cite id="CITEREF@S

```

```

paceX2020" class="citation web cs
1">@SpaceX (11 June 2020). <a rel
="nofollow" class="external text"
href="https://twitter.com/SpaceX/
status/1271116917420388352">"Targ
eting Saturday, 13 June 13 at 05:
21 EDT for launch of 58 Starlink
satellites and 3 @planetlabs spa
cecraft – the first SpaceX SmallS
at Rideshare Program launch"
(Tweet) – via <a href="/wi
ki/Twitter" title="Twitter">Twitt
er.</cite><span title="ctx_ve
r=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&rft.bti
tle=Targeting+Saturday%2C+13+June
+13+at+05%3A21+EDT+for+launch+of+
58+Starlink+satellites+and+3+%40p
lanetlabs+spacecraft+%E2%80%93+th
e+first+SpaceX+SmallSat+Rideshare
+Program+launch&rft.date=2020
-06-11&rft.au=%40SpaceX&r
ft_id=https%3A%2F%2Ftwitter.com%2
FSpaceX%2Fstatus%2F12711169174203
88352&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988">


```



```
<li id="cite_note-:15-538">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} <link rel="mw-eduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBurghardt2020" class="citation web cs1">Burghardt, Thomas (13 May 2020). "Planet Labs SkySats to rideshare with SpaceX Starlink launches". <i>nasaspaceflight.com</i>. Retrieved 13 May 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=nasaspaceflight.com&rft.atitle=Planet+Labs+SkySats+to
```

```
+rideshare+with+SpaceX+Starlink+laun
ches&rft.date=2020-05-13&rft.a
ulast=Burghardt&rft.aufirst=Thomas&
amp;rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F
2020%2F05%2Fplanet-labs-skysats-t
o-rideshare-with-spacex-starlink-
launches%2F&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-539"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@S
paceX2020" class="citation web cs
1">@SpaceX (12 June 2020). <a rel
="nofollow" class="external text"
href="https://twitter.com/SpaceX/
status/1271116917420388352">"Targ
eting Saturday, June 13 at 05:21
EDT for launch of 58 Starlink sa
tellites and 3 @planetlabs spacec
raft – the first SpaceX SmallSat
Rideshare Program launch" (T
weet)<span class="reference-acces
```

sdate">. Retrieved <span class="n  
owrap">26 June</span> 2020</span>  
&#8211; via <a href="/wiki/Twitte  
r" title="Twitter">Twitter</a>.</  
cite><span title="ctx\_ver=Z39.88-  
2004&amp;rft\_val\_fmt=info%3Aofi%2  
Ffmt%3Akev%3Amtx%3Abook&amp;rft.g  
enre=unknown&amp;rft.btitle=Targe  
ting+Saturday%2C+June+13+at+05%3A  
21+EDT+for+launch+of+58+Starlink+  
satellites+and+3+%40planetlabs+sp  
acecraft+%E2%80%93+the+first+Spac  
eX+SmallSat+Rideshare+Program+lau  
nch&amp;rft.date=2020-06-12&amp;r  
ft.au=%40SpaceX&amp;rft\_id=https%  
3A%2F%2Ftwitter.com%2FSpaceX%2Fst  
atus%2F1271116917420388352&amp;rft  
r\_id=info%3Asid%2Fen.wikipedia.or  
g%3AList+of+Falcon+9+and+Falcon+H  
eavy+launches" class="Z3988"></sp  
an></span>  
</li>  
<li id="cite\_note-540"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-540">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFGr  
ay2020" class="citation web cs1">

Gray, Tyler (12 June 2020). [rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2020/06/spacex-launch-first-starlink-rideshare-planet-labs/"><a re](https://www.nasaspaceflight.com/2020/06/spacex-launch-first-starlink-rideshare-planet-labs/)

l="nofollow" class="external text" href="https://www.nasaspaceflight.com/2020/06/spacex-launch-first-starlink-rideshare-planet-labs/">"SpaceX to launch first Starlink rideshare mission with Planet Labs"</a>. *nasaspaceflight.com*  
</i><span class="reference-access date">. Retrieved <span class="no wrap">13 June</span> 2020</span>.  
</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=nasaspaceflight.com&amp;rft.attitle=SpaceX+to+launch+first+Starlink+rideshare+mission+with+Planet+Labs&amp;rft.date=2020-06-12&amp;rft.aulast=Gray&amp;rft.aufirst=Tyler&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2020%2F06%2Fspacex-launch-first-starlink-rideshare-planet-labs%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  
></span>  
</li>  
<li id="cite\_note-541"><span clas

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSp
aceX_[@SpaceX]2020" class
="citation web cs1">SpaceX [@Spac
eX] (30 June 2020). <a rel="nofol
low" class="external text" href
="https://twitter.com/SpaceX/stat
us/1278049470639296512">"New T-0
of 4:10 p.m. EDT due to upper-le
vel winds; vehicle and payload lo
ok good for launch" (Tweet) &
#8211; via <a href="/wiki/Twitte
r" title="Twitter">Twitter.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=New+T
-0+of+4%3A10+p.m.+EDT+due+to+uppe
r-level+winds%3B+vehicle+and+payl
oad+look+good+for+launch&rft.
date=2020-06-30&rft.au=SpaceX
+%5B%40SpaceX%5D&rft_id=http
s%3A%2F%2Ftwitter.com%2FSpaceX%2F
status%2F1278049470639296512&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
```

```
+Heavy+launches" class="Z3988">

<li id="cite_note-clark-20200630-542">^ ^{<i>a</i>} ^{<i>b</i>} ^{<i>c</i>} ^{<i>d</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2020" class="citation news cs1">Clark, Stephen (30 June 2020). "SpaceX launches its first mission for the U.S. Space Force". Spaceflight Now. Retrieved 1 July 2020.</cite><sp
```

```

an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&rft.genre
=article&rft.atitle=SpaceX+la
unches+its+first+mission+for+the+
U.S.+Space+Force&rft.date=202
0-06-30&rft.aulast=Clark&
rft.aufirst=Stephen&rft_id=ht
tps%3A%2F%2Fspaceflightnow.com%2F
2020%2F06%2F30%2Fspacex-launches-
its-first-mission-for-u-s-space-f
orce%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-gps_34_manufact
uring-543"><span class="mw-cite-b
acklink">^ <a href="#cite_ref-gps
_34_manufacturing_543-0"><sup><i>
a</i></sup> <a href="#
cite_ref-gps_34_manufacturing_543
-1">^{<i>b</i>}
 <span class="reference-t
ext"><link rel="mw-deduplicated-i
nline-style" href="mw-data:Templa
teStyles:r1067248974"/><cite clas
s="citation web cs1"><a rel="nofo
llow" class="external text" href
="http://www.lockheedmartin.com/u

```

s/news/press-releases/2012/january/0112\_ss\_gps.html">"U.S. Air Force Awards Lockheed Martin Contract for Third and Fourth GPS III Satellites"</a>. Lockheed Martin. 12 January 2012<span class="reference-accessdate">. Retrieved <span class="nowrap">3 January</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=U.S.+Air+Force+Awards+Lockheed+Martin+Contract+for+Third+and+Fourth+GPS+III+Satellites&amp;rft.pub=Lockheed+Martin&amp;rft.date=2012-01-12&amp;rft\_id=http%3A%2F%2Fwww.lockheedmartin.com%2Fus%2Fnews%2Fpress-releases%2F2012%2Fjanuary%2F0112\_ss\_gps.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-gpsworld\_20171127-544"><span class="mw-cite-backlink"><b><a href="#cite\_ref-gpsworld\_20171127\_544-0">^</a></b></span> <span class="reference-text">



```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFCozzens2017" class="citation web cs1">Cozzens, Tracy (27 November 2017). "Lockheed Martin assembles third U.S. Air Force GPS III satellite". <i>gpsworld.com</i>. North Coast Media LLC. Retrieved 1 December 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=gpsworld.com&rft.atitle=Lockheed+Martin+assemblies+third+U.S.+Air+Force+GPS+III+satellite&rft.date=2017-11-27&rft.aulast=Cozzens&rft.aufirst=Tracy&rft_id=http%3A%2F%2Fgpsworld.com%2Flockheed-martin-assemblies-third-u-s-air-force-gps-iii-satellite%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Fal
```

```

con+Heavy+launches" class="Z398
8">

<li id="cite_note-gleckel-2017-11-545">^
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGleckel2017" class="citation web cs1">Gleckel, Gerry (15 November 2017). "GPS Status and Modernization Progress" (PDF). <i>gps.gov</i>. Retrieved 1 December 2017.</cite><span title="ctx_ver=Z39.88-2004& rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=gps.gov&rft.atitle=GPS+Status+and+Modernization+Progress&rft.date=2017-11-15&rft.aulast=Gleckel&a

```

mp;rft.aufirst=Gerry&rft\_id=h  
 ttps%3A%2F%2Fwww.gps.gov%2Fgovern  
 ance%2Fadvisory%2Fmeetings%2F2017  
 -11%2Fgleckel.pdf&rfr\_id=inf  
 o%3Asid%2Fen.wikipedia.org%3AList  
 +of+Falcon+9+and+Falcon+Heavy+lau  
 nches" class="Z3988"></span>  <i>This  
 article incorporates text from th  
 is source, which is in the <a href  
 ="/wiki/Public\_domain" title="Pu  
 blic domain">public domain</a></i  
 ><i>.</i></span>  
 </li>  
 <li id="cite\_note-gps\_status\_2018  
 0926-546"><span class="mw-cite-ba  
 cklink">^ <a href="#cite\_ref-gps\_  
 status\_20180926\_546-0"><sup><i><b  
 ></b></i></sup></a> <a href="#ci

te\_ref-gps\_status\_20180926\_546-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.gps.gov/cgsic/meetings/2018/schaub.pdf">"GPS Status and Modernization Progress: Service, Satellites, Control Segment, and Military GPS User Equipment"</a> <span class="cs1-format">(PDF)</span>. US Air Force Space and Missile Systems Center. 26 September 2018<span class="reference-accessdate">. Retrieved <span class="nowrap">10 November</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=GPS+Status+and+Modernization+Progress%3A+Service%2C+Satellites%2C+Control+Segment%2C+and+Military+GPS+User+Equipment&amp;rft.pub=US+Air+Force+Space+and+Missile+Systems+Center&amp;rft.date=2018-09-26&amp;rft\_id=https%3A%2F%2Fww

w.gps.gov%2Fcgsic%2Fmeetings%2F2018%2Fschaub.pdf&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span>

</li>

<li id="cite\_note-547"><span class="mw-cite-backlink"><b><a href="#cite\_ref-547">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citati

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/spacex-wins-its-sec
ond-gps-3-launch-contract-1/">"Sp
aceX wins its second GPS 3 launch
contract". SpaceNews. 14 Marc
h 2017<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">10 November 2018
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=SpaceX+wins+its+second+GPS+3
+launch+contract&rft.pub=Spac
eNews&rft.date=2017-03-14&am
p;rft_id=https%3A%2F%2Fspacenews.
com%2Fspacex-wins-its-second-gps-
3-launch-contract-1%2F&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-548"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:

```

```
r1067248974"/><cite id="CITEREFErwin2020" class="citation web cs1">Erwin, Sandra (28 June 2020).
 "Space Force more receptive to reusable rockets as it continues to review SpaceX missions". SpaceNews. Retrieved 23 September 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Space+Force+more+receptive+to+reusable+rockets+as+it+continues+to+review+SpaceX+missions&rft.pub=SpaceNews&rft.date=2020-06-28&rft.aulast=Erwin&rft.aufirst=Sandra&rft_id=https%3A%2F%2Fspacenews.com%2Fspace-force-more-receptive-to-reusable-rockets-as-it-continues-to-review-spacex-missions%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launch
```

```
es" class="Z3988">

<li id="cite_note-549"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.losangeles.af.mil/News/Articl
e-Display/Article/2082387/gps-iii
-space-vehicle-03-columbus-safely
-arrives-in-florida/">"GPS III Sp
ace Vehicle 03 "Columbus" safely
arrives in Florida". Los Ang
eles Air Force Base.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=GPS+III+Space+
Vehicle+03+%22Columbus%22+safely+
arrives+in+Florida&rft.pub=Lo
s+Angeles+Air+Force+Base&rft_
id=https%3A%2F%2Fwww.losangeles.a
f.mil%2FNews%2FArticle-Display%2F
Article%2F2082387%2Fgps-iii-space
-vehicle-03-columbus-safely-arriv
es-in-florida%2F&rfr_id=info%
```



3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span></li>

<li id="cite\_note-sn20200407-550"><span class="mw-cite-backlink"><b><a href="#cite\_ref-sn20200407\_550-0">^</a></b></span> <span class="reference-text"><a rel="nofollow" class="external text" href="https://spacenews.com/spacex-launch-of-gps-satellite-delayed-due-to-pandemic/">SpaceX launch of

GPS satellite delayed due to pandemic

Sandra Erwin, SpaceNews, 7 April 2020, Retrieved 7 April 2020

**[SpaceX's Successful Launch of GPS-III and in Honor of Colonel Thomas G. Falzarano](#)**, SpaceNews, 30 June 2020, retrieved 1 July 2020.

**[Air Force](#)**

space wing commander dies at Peterson Air Force Base</a>, <a href="/wiki/Stars\_and\_Stripes\_(newspaper)" title="Stars and Stripes (newspaper)">Stars and Stripes</a>, 13 May 2020, Retrieved 1 July 2020.</span>

</li>

<li id="cite\_note-GPS-553"><span class="mw-cite-backlink">^ <a href="#cite\_ref-GPS\_553-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-GPS\_553-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-GPS\_553-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-GPS\_553-3"><sup><i><b>d</b></i></sup></a></span> <span class="reference-text"><a rel="nofollow" class="external free" href="https://spaceflightnow.com/2020/10/02/space-force-announces-new-nicknames-for-gps-satellites/">https://spaceflightnow.com/2020/10/02/space-force-announces-new-nicknames-for-gps-satellites/</a></span>

</li>

<li id="cite\_note-554"><span class="mw-cite-backlink"><b><a href

```

="#cite_ref-554">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2020/06/s
pacex-launch-third-gps-block-iii-
satellite/">"SpaceX launches thir
d GPS Block III satellite". N
asaspaceflight. 30 June 2020. Re
trieved 8 Ju
ly 2020.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX+launche
s+third+GPS+Block+III+satellite&
rft.pub=Nasaspaceflight&rft
.date=2020-06-30&rft_id=http
s%3A%2F%2Fwww.nasaspaceflight.co
m%2F2020%2F06%2Fspacex-launch-thi
rd-gps-block-iii-satellite%2F&
rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">


```

```

<li id="cite_note-SFN20200720-55
5"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-SFN202007
20_555-0"><sup><i>a</i></s
up> <a href="#cite_ref-SFN202
00720_555-1"><sup><i>b</i>
</sup> <span class="re
ference-text"><link rel="mw-dedup
licated-inline-style" href="mw-da
ta:TemplateStyles:r1067248974"/><
cite class="citation web cs1"><a
rel="nofollow" class="external t
ext" href="https://spaceflightno
w.com/2020/07/20/falcon-9-anasis-
2-mission-status-center/">"Live c
overage: South Korean military sa
tellite to launch today from Flor
ida". Spaceflight Now. 20 Jul
y 2020<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">20 July 2020</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Live+coverage%3A+South+Korean+m
ilitary+satellite+to+launch+today
+from+Florida&rft.pub=Spacefl
ight+Now&rft.date=2020-07-20&
amp;rft_id=https%3A%2F%2Fspacefli

```

ghtnow.com%2F2020%2F07%2F20%2Ffalcon-9-anasis-2-mission-status-center%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-Gunter-556"><span class="mw-cite-backlink">^ <a href="#cite\_ref-Gunter\_556-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-Gunter\_556-1"><sup><i><b>b</b></i></sup></a></span>

<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc\_lau\_det/falcon-9\_v1-2\_b5.htm">"Falcon-9 v1.2 (Block 5) (Falcon-9FT (Block 5"

</a>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Falcon-9+v1.2+%28Block+5%29+%28Falcon-9FT+%28Block+5&rft\_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc\_lau\_det%2Ffalcon-9\_v1-2\_b5.

```

htm&#rfr_id=info%3Asid%2Fen.wi
kipedia.org%3AList+of+Falcon+9+an
d+Falcon+Heavy+launches" class="Z
3988">|access-date=June 2
4, 2020|publisher=Gunter's Space
Page}}

<li id="cite_note-557"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
space.skyrocket.de/doc_sdat/kmils
atcom-1.htm">"Anasis 2 (K-Milsat-
1)". <i>space.skyrocket.de</i
>.</cite><span title="ctx_ver=Z3
9.88-2004&#rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=unknown&#rft.jtit
le=space.skyrocket.de&#rft.ati
tle=Anasis+2+%28K-Milsat-1%29&am
p;rft_id=https%3A%2F%2Fspace.skyr
ocket.de%2Fdoc_sdat%2Fkmilsatcom-
1.htm&#rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class

```

```
= "Z3988">

<li id="cite_note-558"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation web cs1">Cla
rk, Stephen. <a rel="nofollow" cl
ass="external text" href="http
s://spaceflightnow.com/2020/07/2
1/spacex-shares-video-of-first-do
uble-fairing-catch/">"SpaceX shar
es video of first double fairing
catch". <i>Spaceflight Now</
i><span class="reference-accessda
te">. Retrieved <span class="nowr
ap">22 July 2020.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Ajournal&rft
.genre=unknown&rft.jtitle=Sp
aceflight+Now&rft.atitle=Spac
eX+shares+video+of+first+double+f
airing+catch&rft.aulast=Clark
&rft.aufirst=Stephen&rft_
id=https%3A%2F%2Fspaceflightnow.c
om%2F2020%2F07%2F21%2Fspacex-shar
```



```

es-video-of-first-double-fairing-
catch%2F&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-559"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2020" class="citation web cs
1">Ralph, Eric (20 July 2020). <a
rel="nofollow" class="external te
xt" href="https://www.teslarati.c
om/spacex-falcon-9-shuttle-record
-nosecone-catch">"SpaceX Falcon 9
breaks NASA Shuttle reuse record,
catches full rocket nosecone". Teslarati<span class="referenc
e-accessdate">. Retrieved <span c
lass="nowrap">23 September
2020.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
.btitle=SpaceX+Falcon+9+breaks+N
ASA+Shuttle+reuse+record%2C+catch

```

es+full+rocket+nosecone&#x26;rft.p  
ub=Teslarati&#x26;rft.date=2020-07  
-20&#x26;rft.aulast=Ralph&#x26;rft.  
aufirst=Eric&#x26;rft\_id=https%3A%  
2F%2Fwww.teslarati.com%2Fspacex-f  
alcon-9-shuttle-record-nosecone-c  
atch&#x26;rfr\_id=info%3Asid%2Fen.w  
ikipedia.org%3AList+of+Falcon+9+a  
nd+Falcon+Heavy+launches" class  
="Z3988"></span></span>  
</li>  
<li id="cite\_note-560"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-560">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFMu  
sk,\_Elon\_&#x27;@elonmusk&#x27;2020"  
class="citation web cs1"><a href  
="/wiki/Elon\_Musk" title="Elon Mu  
sk">Musk, Elon [@elonmusk]</a> (2  
0 July 2020). <a rel="nofollow" c  
lass="external text" href="http  
s://twitter.com/elonmusk/status/1  
285338582849208320">"Both fairing  
halves caught from space by @Spac  
eX ships!"</a> (Tweet). <a rel="n  
ofollow" class="external text" hr  
ef="https://web.archive.org/web/2

0200930132841/https://twitter.com/elonmusk/status/1285338582849208320">Archived</a> from the original on 30 September 2020<span class="reference-accessdate">. Retrieved <span class="nowrap">3 March </span> 2021</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Both+fairing+halves+caught+from+space+by+%40SpaceX+ships%21&amp;rft.date=2020-07-20&amp;rft.au=Musk%2C+Elon+%5B%40elonmusk%5D&amp;rft\_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F1285338582849208320&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-561"><span class="mw-cite-backlink"><b><a href="#cite\_ref-561">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:

```

r1067248974"/><cite class="citation
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2020/08/s
pacex-launch-starlink-v1-0-l9-mis
sion/">"SpaceX successfully condu
cts Starlink v1.0 L9 launch".
NASASpaceFlight.com. 6 August 202
0<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">7 August 2020.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=Space
X+successfully+conducts+Starlink+
v1.0+L9+launch&rft.pub=NASASp
aceFlight.com&rft.date=2020-0
8-06&rft_id=https%3A%2F%2Fww
w.nasaspaceflight.com%2F2020%2F0
8%2Fspacex-launch-starlink-v1-0-l
9-mission%2F&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-562"><span clas
s="mw-cite-backlink">^
<lin

```

```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://
spacenews.com/blacksky-launching-
two-satellites-on-june-starlink-m
ission/">"BlackSky launching two
satellites on June Starlink miss
ion". SpaceNews. 5 June 2020<
span class="reference-accessdate"
">. Retrieved <span class="nowrap"
">5 June 2020.</ci
te><span title="ctx_ver=Z39.88-20
04&rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Abook&rft.gen
re=unknown&rft.btitle=BlackSk
y+launching+two+satellites+on+Jun
e+Starlink+mission&rft.pub=Sp
aceNews&rft.date=2020-06-05&a
mp;rft_id=https%3A%2F%2Fspacenew
s.com%2Fblacksky-launching-two-sa
tellites-on-june-starlink-missio
n%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-spaceflight-202
00617-563"><span class="mw-cite-b

```

acklink"><b><a href="#cite\_ref-spaceflight-20200617\_563-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSorensen2020" class="citation web cs1">Sorensen, Jodi (17 June 2020). <a rel="nofollow" class="external text" href="https://spaceflight.com/spaceflight-to-launch-its-first-rideshare-payloads-on-a-spacex-starlink-mission/">"Spaceflight to Launch Its First Rideshare Payloads on a Space X Starlink Mission"</a>. Spaceflight Industries<span class="reference-accessdate">. Retrieved <span class="nowrap">17 June</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Spaceflight+to+Launch+Its+First+Rideshare+Payloads+on+a+SpaceX+Starlink+Mission&amp;rft.pub=Spaceflight+Industries&amp;rft.date=2020-06-17&amp;rft.aulast=Sorensen&amp;rft.aufirst=Jodi&amp;rft\_id=https%3A%2F%2Fspaceflight.com%

```

2Fspaceflight-to-launch-its-first
-rideshare-payloads-on-a-spacex-s
tarlink-mission%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-564"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.cnet.com/news/next-spacex-lau
nch-includes-57-starlink-satellit
es-all-wearing-visors/">"SpaceX s
crubs Starlink satellite launch W
ednesday due to weather". 8 J
uly 2020.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&rft.genre=unknown&rft.b
title=SpaceX+scrubs+Starlink+sate
llite+launch+Wednesday+due+to+wea
ther&rft.date=2020-07-08&
rft_id=https%3A%2F%2Fwww.cnet.co

```

```

m%2Fnews%2Fnext-spacex-launch-inc
ludes-57-starlink-satellites-all-
wearing-visors%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-565"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.space.com/spacex-starlink-11-
planet-skysats-launch-august-202
0.html">"SpaceX launches 58 Starl
ink satellites and 3 SkySats, sti
cks rocket landing". 18 Augus
t 2020.</cite><span title="ctx_ve
r=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&rft.bti
tle=SpaceX+launches+58+Starlink+s
atellites+and+3+SkySats%2C+sticks
+rocket+landing&rft.date=2020
-08-18&rft_id=https%3A%2F%2Fw

```



```

ww.space.com%2Fspacex-starlink-11
-planet-skysats-launch-august-202
0.html&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-566"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBu
rghardt2020" class="citation web
cs1">Burghardt, Thomas (17 Augus
t 2020). <a rel="nofollow" class
="external text" href="https://ww
w.nasaspaceflight.com/2020/08/spa
cex-break-record-sixth-fligh
t/">"SpaceX to Break Record with
Booster's Sixth Flight". NAS
ASpaceFlight.com.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Abook&rft.genre=unknown&a
mp;rft.btitle=SpaceX+to+Break+Rec
ord+with+Booster%27s+Sixth+Flight
&rft.pub=NASASpaceFlight.com&
amp;rft.date=2020-08-17&rft.a

```

```

ulast=Burghardt&rft.aufirst=Thomas&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2020%2F08%2Fspacex-break-record-sixth-flight%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-567">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX Conducts First Polar Launch from Cape in over 50 Years". 30 August 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+Conducts+First+Polar+Launch+from+Cape+in+over+50+Years&rft.date=2020-08-30&rft_id=https%3A%2F%2Fwww.nasaspac

```

```

eflight.com%2F2020%2F08%2Fspace-
polar-cape-50-years%2F&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-skyrocket-saoco
m1b-568"><span class="mw-cite-bac
klink">^ <a href="#cite_ref-skyro
cket-saocom1b_568-0"><sup><i>a
</i></sup> <a href="#cite
_ref-skyrocket-saocom1b_568-1"><s
up><i>b</i></sup></spa
n> <
link rel="mw-deduplicated-inline-
style" href="mw-data:TemplateStyl
es:r1067248974"/><cite class="cit
ation web cs1"><a rel="nofollow"
class="external text" href="http
s://space.skyrocket.de/doc_sdat/s
aocom-1.htm">"SAOCOM 1A, 1B".
Gunters Space Page<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">8 July
2020.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
book&rft.genre=unknown&rft
t.btitle=SAOCOM+1A%2C+1B&rft.

```

```

pub=Gunters+Space+Page&rft_id
=https%3A%2F%2Fspace.skyrocket.d
e%2Fdoc_sdat%2Fsaocom-1.htm&r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-SAOCOM_1B_Missi
on-569"><span class="mw-cite-back
link"><a href="#cite_ref-SAOCO
M_1B_Mission_569-0">^</sp
an>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1067248974"/><cite class="ci
tation web cs1"><a rel="nofollow"
class="external text" href="http
s://www.youtube.com/watch?v=P-gLO
sDjE3E&feature=youtu.be">"SAO
COM 1B Mission"<span class="r
eference-accessdate">. Retrieved
29 August</
span> 2020.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Abook&rft.genre=unknown&
&rft.btitle=SAOCOM+1B+Mission&
&rft_id=https%3A%2F%2Fwww.yout
ube.com%2Fwatch%3Fv%3DP-gLOsDjE3

```

```

E%26feature%3Dyoutu.be&rft_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-570"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
directory.eoportal.org/web/eoport
al/satellite-missions/s/saoco
m">"SAOCOM (SAR Observation and C
ommunications Satellite) Constell
ation". eoPortal<span class
="reference-accessdate">. Retriev
ed 23 Septem
ber 2020.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=SAOCOM+%28SA
R+Observation+and+Communications+
Satellite%29+Constellation&rft
.pub=eoPortal&rft_id=https%3

```

A%2F%2Fdirectory.eoportal.org%2Fweb%2Feoportal%2Fsatellite-missions%2Fs%2Fsaocom&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-571"><span class="mw-cite-backlink"><b><a href="#cite\_ref-571">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc\_sdat/saocom-1.htm">"SAOCOM 1A, 1B"</a>. <i>space.skyrocket.de</i>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=space.skyrocket.de&rft.atitle=SAOCOM+1A%2C+1B&rft\_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc\_sdat%2Fsaocom-1.htm&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

```


<li id="cite_note-572"><span clas
s="mw-cite-backlink">^

<link rel="mw-deduplicate
d-inline-style" href="mw-data:Tem
plateStyles:r1067248974"/><cite i
d="CITEREFMichael_Baylor_[@ne
xtspaceflight]2019" class="ci
tation web cs1">Michael Baylor [@
nextspaceflight] (9 October 201
9). <a rel="nofollow" class="exte
rnal text" href="https://twitter.
com/nextspaceflight/status/118202
5275573510146">"I can confirm tha
t SpaceX currently plans to launc
h SAOCOM 1B from Cape Canaveral i
nstead of Vandenberg. This will b
e the first use of the southern p
olar corridor to reach orbit from
the Cape since 1960" (Tweet)
– via <a href="/wiki/Twitt
er" title="Twitter">Twitter.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&rft.
genre=unknown&rft.btitle=I+
can+confirm+that+SpaceX+currently
+plans+to+launch+SAOCOM+1B+from+C

```

ape+Canaveral+instead+of+Vandenbe  
rg.+This+will+be+the+first+use+of  
+the+southern+polar+corridor+to+r  
each+orbit+from+the+Cape+since+19  
60.&rft.date=2019-10-09&r  
ft.au=Michael+Baylor+%5B%40nextsp  
aceflight%5D&rft\_id=https%3A%  
2F%2Ftwitter.com%2Fnextspacefligh  
t%2Fstatus%2F1182025275573510146&  
amp;rfr\_id=info%3Asid%2Fen.wikipe  
dia.org%3AList+of+Falcon+9+and+Fa  
lcon+Heavy+launches" class="Z398  
8"></span></li>  
<li><link rel="mw-deduplicated-in  
line-style" href="mw-data:Templat  
eStyles:r1067248974"/><cite id="C  
ITEREFMichael\_Baylor\_&#91;@nextsp  
aceflight&#93;2019" class="citati  
on web cs1">Michael Baylor [@next  
spaceflight] (10 October 2019). <  
a rel="nofollow" class="external  
text" href="https://twitter.com/  
nextspaceflight/status/1182425981  
392437250">"Minor correction with  
regards to the 1960 date. Looks l  
ike there was a one from the Cape  
in 1969 (so it's only been 50 yea  
rs rolling on the floor laughin  
g). nssdc.gsfc.nasa.gov/nmc/space  
craft/displayTrajectory.action?id



```

=1969-016A" (Tweet) – v
ia <a href="/wiki/Twitter" title
="Twitter">Twitter.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Minor+correc
tion+with+regards+to+the+1960+dat
e.+Looks+like+there+was+a+one+fro
m+the+Cape+in+1969+%28so+it%27s+o
nly+been+50+years+rolling+on+the+
floor+laughing%29.+nssdc.gsfc.nas
a.gov%2Fnmcc%2Fspacecraft%2Fdispla
yTrajectory.action%3Fid%3D1969-01
6A&rft.date=2019-10-10&rft
.au=Michael+Baylor+%5B%40nextspa
ceflight%5D&rft_id=https%3A%2
F%2Ftwitter.com%2Fnextspacefligh
t%2Fstatus%2F1182425981392437250&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8"> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i><li id="cite_note-573">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBurghardt2020" class="citation web cs1">Burghardt, Thomas (30 August 2020). "SpaceX Conducts First Polar Launch from Cape in over 50 Years". NASA Spaceflight.</cite>

```

t.btitle=SpaceX+Conducts+First+Po
lar+Launch+from+Cape+in+over+50+Y
ears&rft.pub=NASASpaceflight&
&rft.date=2020-08-30&rft.a
ulast=Burghardt&rft.aufirst=T
homas&rft_id=https%3A%2F%2Fww
w.nasaspaceflight.com%2F2020%2F0
8%2Fspacex-polar-cape-50-years%2F
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-sfn-20200903-57
4"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-sfn-20200
903_574-0"><sup><i><b>a</b></i></
sup></a> <a href="#cite_ref-sfn-2
0200903_574-1"><sup><i><b>b</b></
i></sup></a></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFClark2020" c
lass="citation web cs1">Clark, St
ephen (3 September 2020). <a rel
="nofollow" class="external text"
href="https://spaceflightnow.com/
2020/09/03/spacex-launches-more-s
tarlink-satellites-beta-testing-w

```

```

ell-underway/">"SpaceX launches m
ore Starlink satellites, beta tes
ting well underway"</a>. Spacefli
ght Now<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">23 September</span> 202
0</span>.</cite><span title="ctx_
ver=Z39.88-2004&amp;rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&amp;rft.genre=unknown&amp;rft.b
title=SpaceX+launches+more+Starli
nk+satellites%2C+beta+testing+wel
l+underway&amp;rft.pub=Spacefligh
t+Now&amp;rft.date=2020-09-03&am
p;rft.aulast=Clark&amp;rft.aufirs
t=Stephen&amp;rft_id=https%3A%2F%
2Fspaceflightnow.com%2F2020%2F09%
2F03%2Fspacex-launches-more-starl
ink-satellites-beta-testing-well-
underway%2F&amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span></span>
</li>
<li id="cite_note-nsf290820-575">
<span class="mw-cite-backlink"><b
><a href="#cite_ref-nsf290820_575
-0">^</a></b></span> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m

```

```
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://www.nasas
paceflight.com/2020/08/spacex-sup
er-sunday-100th-falcon-launc
h/">"SpaceX postpones first Super
Sunday flight due to weather"</a
>. 29 August 2020.</cite><span ti
tle="ctx_ver=Z39.88-2004&amp;rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Abook&amp;rft.genre=unknown&
amp;rft.btitle=SpaceX+postpones+f
irst+Super+Sunday+flight+due+to+w
eather&amp;rft.date=2020-08-29&am
p;rft_id=https%3A%2F%2Fwww.nasasp
aceflight.com%2F2020%2F08%2Fspace
x-super-sunday-100th-falcon-launc
h%2F&amp;rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-576"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-576">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
```

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
earthsky.org/space/spacex-starlin
k-falcon-9-launch-oct-6-2020/">"S
paceX Launched 60 More Starlink S
atellites This Week"</a>. 8 Octob
er 2020.</cite><span title="ctx_v
er=Z39.88-2004&amp;rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&amp;rft.genre=unknown&amp;rft.bt
itle=SpaceX+Launched+60+More+Star
link+Satellites+This+Week&amp;rft
t.date=2020-10-08&amp;rft_id=http
s%3A%2F%2Fearthsky.org%2Fspace%2F
spacex-starlink-falcon-9-launch-o
ct-6-2020%2F&amp;rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988"></span></span>
</li>
<li id="cite_note-577"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-577">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://n
extspaceflight.com/launches/detai

```

```
ls/2577">"Falcon 9 Block 5 | Starlink V1 L12"</a>. <i>nextspaceflight.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">5 September</span> 2020</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=nextspaceflight.com&amp;rft.atitle=Falcon+9+Block+5+%7C+Starlink+V1+L12&amp;rft_id=http%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F2577&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-578"><span class="mw-cite-backlink"><b><a href="#cite_ref-578">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBerger2020" class="citation web cs1">Berger, Eric (18 September 2020). <a rel="nofollow" class="external text" href="https://arstechn
```

ica.com/science/2020/09/rocket-report-chinese-rocket-fails-starship-may-make-a-leap-in-october/">"Rocket Report: Chinese rocket fails, Starship may make a leap in October". Ars Technica. Retrieved 23 September 2020.</cite>

<li id="cite_note-579">^


```

<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2020/10/s
pacex-falcon-9-launch-next-starli
nk/">"SpaceX Falcon 9 launches la
test Starlink mission"</a>. NasaS
paceflight.com. 17 October 2019.
</cite><span title="ctx_ver=Z39.8
8-2004&amp;rft_val_fmt=info%3Aof
i%2Ffmt%3Akev%3Amtx%3Abook&amp;rft
t.genre=unknown&amp;rft.btitle=Sp
aceX+Falcon+9+launches+latest+Sta
rlink+mission&amp;rft.pub=NasaSpa
ceflight.com&amp;rft.date=2019-10
-17&amp;rft_id=https%3A%2F%2Fwww.
nasaspaceflight.com%2F2020%2F10%2
Fspacex-falcon-9-launch-next-star
link%2F&amp;rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"></span></span>
</li>
<li id="cite_note-580"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-580">^</a></b></span>
<span class="reference-text"><lin

```

```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://nextspaceflight.com/launches/details/2578">"Falcon 9 Block 5 | Starlink V1 L13"</a>. <i>nextspaceflight.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">5 September</span> 2020</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=nextspaceflight.com&amp;rft.atitle=Falcon+9+Block+5+%7C+Starlink+V1+L13&amp;rft_id=http%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F2578&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-581"><span class="mw-cite-backlink"><b><a href="#cite_ref-581">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style
```

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGr
aham2020" class="citation web cs
1">Graham, William (17 October 20
20). <a rel="nofollow" class="ext
ernal text" href="https://www.nas
aspaceflight.com/2020/10/spacex-f
alcon-9-launch-next-starlink/">"S
paceX Falcon 9 launches latest St
arlink mission"</a>. <i>nasaspace
flight.com</i><span class="refere
nce-accessdate">. Retrieved <span
class="nowrap">19 October</span>
2020</span>.</cite><span title
="ctx_ver=Z39.88-2004&amp;rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&amp;rft.genre=unknown
&amp;rft.jtitle=nasaspaceflight.c
om&amp;rft.atitle=SpaceX+Falcon+9
+launches+latest+Starlink+mission
&amp;rft.date=2020-10-17&amp;rft.
aulast=Graham&amp;rft.aufirst=Wil
liam&amp;rft_id=https%3A%2F%2Fww
w.nasaspaceflight.com%2F2020%2F1
0%2Fspacex-falcon-9-launch-next-s
tarlink%2F&amp;rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988"></span></span>
</li>

```

```
<li id="cite_note-582"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-582">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2020/10/s
pacex-second-starlink-mission-in-
week/">"SpaceX launches second St
arlink mission of the week"</a>.
NasaSpaceflight.com. 24 October
2021.</cite><span title="ctx_ver
=Z39.88-2004&amp;rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&amp;rft.bti
tle=SpaceX+launches+second+Starli
nk+mission+of+the+week&amp;rft.pu
b=NasaSpaceflight.com&amp;rft.dat
e=2021-10-24&amp;rft_id=https%3A%
2F%2Fwww.nasaspaceflight.com%2F20
20%2F10%2Fspacex-second-starlink-
mission-in-week%2F&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
```

```
<li id="cite_note-583"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-583">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFLe
ntz2020" class="citation web cs
1">Lentz, Danny (24 October 202
0). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2020/10/spacex-se
cond-starlink-mission-in-wee
k/">"SpaceX launches second Starl
ink mission of the week"</a>. NAS
ASpaceFlight<span class="referenc
e-accessdate">. Retrieved <span c
lass="nowrap">24 October</span> 2
020</span>.</cite><span title="ct
x_ver=Z39.88-2004&amp;rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ab
ook&amp;rft.genre=unknown&amp;rft
.btitle=SpaceX+launches+second+S
tarlink+mission+of+the+week&amp;r
ft.pub=NASASpaceFlight&amp;rft.da
te=2020-10-24&amp;rft.aulast=Lent
z&amp;rft.aufirst=Danny&amp;rft_i
d=https%3A%2F%2Fwww.nasaspaceflig
ht.com%2F2020%2F10%2Fspacex-secon
d-starlink-mission-in-week%2F&am
```

```
p;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">
</span></span>
</li>
<li id="cite_note-584"><span class="mw-cite-backlink"><b><a href="#cite_ref-584">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2020/11/spacex-line-launch-fourth-gps/">"https://www.nasaspaceflight.com/2020/11/spacex-line-launch-fourth-gps/"</a>. NasaSpaceflight.com. 5 November 2020.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=https%3A%2F%2Fwww.nasaspaceflight.com%2F2020%2F11%2Fspacex-line-launch-fourth-gps%2F&amp;rft.pub=NasaSpaceflight.com&amp;rft.date=2020-11-05&amp;rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2020%2F11%2Fspacex-line-l
```

```

aunch-fourth-gps%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span> <span class="cs1-visible-error citation-comment"><code class="cs1-code">{{<a href="/wiki/Template:Cite_web" title="Template:Cite web">cite web</a>}}</code>: </span><span class="cs1-visible-error citation-comment">External link in <code class="cs1-code"><code class="cs1-code">&#124;title=</code></code> (<a href="/wiki/Help:CS1_errors#param_has_ext_link" title="Help:CS1 errors">help</a>)</span></span>
</li>
<li id="cite_note-cr-048-15-585">
<span class="mw-cite-backlink"><b><a href="#cite_ref-cr-048-15_585-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation pressrelease cs1"><a rel="nofollow" class="external text" href="https://www.defense.gov/News/Contracts/Contract-View/Article/1466539//">"Co

```

contracts" (Press release). United States Department of Defense. 14 March 2018https://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true

a.org/wikipedia/en/thumb/6/62/PD-icon.svg/18px-PD-icon.svg.png 1.5x, //upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/24px-PD-icon.svg.png 2x" data-file-width="196" data-file-height="196" /> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-gps_advisory_board_2018_20181205-586">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFWhitney2018" class="citation web cs1">Whitney, Steve (5 December 2018). "GPS Enterprise Status and Modernization" (PDF). U.S. Air Force Space and

Missile Systems Center Public Affairs Officehttps://labs.cognitiveclass.ai/tools/jupyterlab/lab/tree/labs/module_1_L2/jupyter-labs-webscraping.ipynb?lti=true

n.svg/24px-PD-icon.svg.png 2x" data-file-width="196" data-file-height="196" /> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-587">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1">"Contracts for March 14, 2018". U.S. Department of Defense. Retrieved 15 March 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Contracts+for+March+14%2C+2018&

```
rft_id=https%3A%2F%2Fwww.defense.
gov%2FNews%2FContracts%2FContract
-View%2FArticle%2F1466539%2F%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8"></span>  <i>This article inco
rporates text from this source, w
hich is in the <a href="/wiki/Pub
lic_domain" title="Public domai
n">public domain</a></i><i>.</i>
</span>
</li>
<li id="cite_note-588"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-588">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
```

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation web cs1">Cla
rk, Stephen. <a rel="nofollow" cl
ass="external text" href="http
s://spaceflightnow.com/2020/10/0
3/spacex-aborts-liftoff-of-gps-sa
tellite-continuing-streak-of-laun
ch-scrubs/">"SpaceX aborts liftof
f of GPS satellite, continuing st
reak of launch scrubs"</a>. Space
flight Now<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">26 October</span> 202
0</span>.</cite><span title="ctx_
ver=Z39.88-2004&amp;rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&amp;rft.genre=unknown&amp;rft.b
title=SpaceX+aborts+liftoff+of+GP
S+satellite%2C+continuing+streak+
of+launch+scrubs&amp;rft.pub=Spac
eflight+Now&amp;rft.aulast=Clark&
amp;rft.aufirst=Stephen&amp;rft_i
d=https%3A%2F%2Fspaceflightnow.co
m%2F2020%2F10%2F03%2Fspacex-abort
s-liftoff-of-gps-satellite-conti
ning-streak-of-launch-scrubs%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398

```

```

8"></span></span>
</li>
<li id="cite_note-589"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-589">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBe
rger2020" class="citation news cs
1">Berger, Eric (28 October 202
0). <a rel="nofollow" class="exte
rnal text" href="https://arstechn
ica.com/science/2020/10/nasa-and-
spacex-set-new-date-for-crew-laun
ch-explain-merlin-engine-issu
e/">"How a tiny bit of lacquer gr
ounded new Falcon 9 rockets for a
month"</a>. Ars Technica<span cla
ss="reference-accessdate">. Retri
eved <span class="nowrap">29 Octo
ber</span> 2020</span>.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Ajournal&amp;rft.genre
=article&amp;rft.atitle=How+a+tin
y+bit+of+lacquer+grounded+new+Fal
con+9+rockets+for+a+month&amp;rft
.date=2020-10-28&amp;rft.aulast=
Berger&amp;rft.aufirst=Eric&amp;r

```

```

ft_id=https%3A%2F%2Farstechnica.c
om%2Fscience%2F2020%2F10%2Fnasa-a
nd-spacex-set-new-date-for-crew-l
aunch-explain-merlin-engine-issu
e%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988"></span></span>
</li>
<li id="cite_note-590"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-590">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFLe
ntz2020" class="citation web cs
1">Lentz, Danny (24 October 202
0). <a rel="nofollow" class="exte
rnal text" href="https://www.nasa
spaceflight.com/2020/10/spacex-se
cond-starlink-mission-in-wee
k/">"SpaceX launches second Starl
ink mission of the week"</a>. <i>
nasaspaceflight.com</i><span clas
s="reference-accessdate">. Retriev
ed <span class="nowrap">26 Octob
er</span> 2020</span>.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake

```

```

v%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=nasaspaceflight.com&rft.atitle=SpaceX+launches+second+Starlink+mission+of+the+week&rft.date=2020-10-24&rft.aulast=Lentz&rft.aufirst=Danny&rft_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2020%2F10%2Fspacex-second-starlink-mission-in-week%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-591"><span class="mw-cite-backlink"><b><a href="#cite_ref-591">^</a></b></span>
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFLewis" class="citation web cs1">Lewis, Marie. <a rel="nofollow" class="external text" href="https://blogs.nasa.gov/commercialcrew/2020/10/10/nasa-spacex-crew-1-launch-update/">"NASA, SpaceX Crew-1 Launch Update – Commercial Crew Program"</a>. <i>blogs.nasa.gov</i><

```



```
span class="reference-accessdate">. Retrieved <span class="nowrap">26 October</span> 2020</span>.</cite><span title="ctx_ver=Z39.8-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=blogs.nasa.gov&rft.atitle=NASA%2C+SpaceX+Crew-1+Launch+Update+%E2%80%93+Commercial+Crew+Program&rft.aulast=Lewis&rft.aufirst=Marie&rft_id=https%3A%2F%2Fblogs.nasa.gov%2Fcommercialcrew%2F2020%2F10%2F10%2Fnasa-space-x-crew-1-launch-update%2F&rft_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span> 
```

```

/> <i>This article incorporates
text from this source, which is
in the <a href="/wiki/Public_dom
ain" title="Public domain">public
domain</a></i><i>.</i></span>
</li>
<li id="cite_note-592"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-592">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKa
thy_Lueders_&#91;@KathyLueders&#9
3;2020" class="citation web cs1">
Kathy Lueders [@KathyLueders] (21
October 2020). <a rel="nofollow"
class="external text" href="http
s://twitter.com/KathyLueders/stat
us/1318915120051802112">"Based on
our current analysis, @SpaceX is
replacing one Merlin engine on t
he Sentinel 6-Michael Freilich la
unch vehicle and one engine for C
rew-1 rocket that displayed simil
ar early-start behavior during te
sting. (3/5)"</a> (Tweet) &#8211;
via <a href="/wiki/Twitter" title
="Twitter">Twitter</a>.</cite><sp
an title="ctx_ver=Z39.88-2004&am

```

p;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Based+on+our+current+analysis%2C+%40SpaceX+is+replacing+one+Merlin+engine+on+the+Sentinel+6-Michael+Freilich+launch+vehicle+and+one+engine+for+Crew-1+rocket+that+displayed+similar+early-start+behavior+during+testing.+%283%2F5%29&rft.date=2020-10-21&rft.au=Kathy+Lueders+%5B%40KathyLueders%5D&rft_id=https%3A%2F%2Ftwitter.com%2FKathyLueders%2Fstatus%2F1318915120051802112&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"> <i>This artic

```

le incorporates text from this so
urce, which is in the <a href="/w
iki/Public_domain" title="Public
domain">public domain</a></i><i
>.</i></span>
</li>
<li id="cite_note-593"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-593">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBr
idenstine,_Jim_&#91;@JimBridensti
ne&#93;2020" class="citation web
cs1"><a href="/wiki/Jim_Bridenst
ine" title="Jim Bridenstine">Brid
enstine, Jim [@JimBridenstine]</a
> (13 November 2020). <a rel="nof
ollow" class="external text" href
="https://twitter.com/JimBridenst
ine/status/132735751002243481
6">"Update: Due to onshore winds
and recovery operations, @NASA a
nd @SpaceX are targeting launch o
f the Crew-1 mission with astrona
uts to the @Space_Station at 7:27
p.m. EST Sunday, Nov. 15. The fir
st stage booster is planned to be
reused to fly astronauts on Crew-

```

2. #LaunchAmerica" (Tweet). Archived from the original on 20 January 2021. Retrieved 3 March 2021 – via Twitter.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Update%3A+Due+to+onshore+winds+and+recovery+operations%2C+%40NASA+and+%40SpaceX+are+targeting+launch+of+the+Crew-1+mission+with+astronauts+to+the+%40Space_Station+at+7%3A27+p.m.+EST+Sunday%2C+Nov.+15.+The+first+stage+booster+is+planned+to+be+reused+to+fly+astronauts+on+Crew-2.+%23LaunchAmerica&rft.date=2020-11-13&rft.au=Bridenstine%2C+Jim+%5B%40JimBridenstine%5D&rft_id=https%3A%2F%2Ftwitter.com%2FJimBridenstine%2Fstatus%2F1327357510022434816&rfr_

id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"><li id="cite_note-594">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBaylor,_Michael_[@nextspaceflight]2020" class="citation web cs1">Baylor, Michael [@nextspaceflight] (24 April 2020). "The core number for this booster is B1061. t.co/YcWgnhYspM" (Tweet). Archived from the original on 21 October 2020. Retrieved 3 March 2

```

021</span> &#8211; via <a href="/
wiki/Twitter" title="Twitter">Tw
tter</a>.</cite><span title="ctx_
ver=Z39.88-2004&amp;rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&amp;rft.genre=unknown&amp;rft.b
title=The+core+number+for+this+bo
oster+is+B1061.+t.co%2FYcWgnhYspM
&amp;rft.date=2020-04-24&amp;rft.
au=Baylor%2C+Michael+%5B%40nextsp
aceflight%5D&amp;rft_id=https%3A%
2F%2Ftwitter.com%2Fnextspacefligh
t%2Fstatus%2F1253831248444747777&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8"></span></span>
</li>
<li id="cite_note-595"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-595">^</a></b></span>
<span class="reference-text"><lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFBa
ylor,_Michael_&#91;@nextspaceflig
ht&#93;2020" class="citation web
cs1">Baylor, Michael [@nextspace
flight] (6 April 2020). <a rel="n
ofollow" class="external text" hr

```

```

ef="https://twitter.com/nextspace
flight/status/124728447834865254
4">"If all goes well, an uncrewed
Orbital Flight Test in the fall o
f 2020 will see a Crew Dragon and
Starliner spacecrafts docked to t
he Space Station at the same tim
e. Dragon will be at the Station
  for Crew-1 – SpaceX's first oper
ational crewed mission"</a> (Twee
t). <a rel="nofollow" class="exte
rnal text" href="https://web.arch
ive.org/web/20200616153404/http
s://twitter.com/nextspaceflight/s
tatus/1247284478348652544">Archiv
ed</a> from the original on 16 Ju
ne 2020<span class="reference-acc
essdate">. Retrieved <span class
="nowrap">3 March</span> 2021</sp
an> &#8211; via <a href="/wiki/Tw
itter" title="Twitter">Twitter</a
>.</cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&amp;
rft.genre=unknown&amp;rft.btitle=
If+all+goes+well%2C+an+uncrewed+O
rbital+Flight+Test+in+the+fall+of
+2020+will+see+a+Crew+Dragon+and+
Starliner+spacecrafts+docked+to+t
he+Space+Station+at+the+same+tim

```


e.+Dragon+will+be+at+the+Station+for+Crew-1+%E2%80%93+SpaceX%27s+first+operational+crewed+mission.& rft.date=2020-04-06&rft.au=Baylor%2C+Michael+%5B%40nextspaceflight%5D&rft_id=https%3A%2F%2Ftwitter.com%2Fnextspaceflight%2Fstatus%2F1247284478348652544&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-596">^

<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"USCV-1: NASA planners slip first ISS commercial crew mission to late 2017". NASASpaceflight. 5 April 2013. Retrieved 8 July</s

```

pan> 2020</span>.</cite><span tit
le="ctx_ver=Z39.88-2004&amp;rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Abook&amp;rft.genre=unknown&a
mp;rft.btitle=USCV-1%3A+NASA+plan
ners+slip+first+ISS+commercial+cr
ew+mission+to+late+2017&amp;rft.p
ub=NASASpaceflight&amp;rft.date=2
013-04-05&amp;rft_id=https%3A%2F%
2Fwww.nasaspaceflight.com%2F2013%
2F04%2Fuscv-1-nasa-slip-iss-comme
rcial-late-2017%2F&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-scientificameri
can-2-597"><span class="mw-cite-b
acklink"><b><a href="#cite_ref-sc
ientificamerican-2_597-0">^</a></
b></span> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFWall2014" class="citatio
n web cs1">Wall, Mike (17 Septemb
er 2014). <a rel="nofollow" class
="external text" href="https://ww
w.scientificamerican.com/article/

```

nasa-picks-spacex-and-boeing-to-fly-u-s-astronauts-on-private-spaceships/?redirect=1">"NASA Picks SpaceX and Boeing to Fly U.S. Astronauts on Private Spaceships". Scientific American. Archived from the original on 21 May 2019. Retrieved 8 July 2020. <q>SpaceX and Boeing are splitting NASA's US \$6.8 billion Commercial Crew Transportation Capability award, or CcCap [...] SpaceX will get US\$2.6 billion and Boeing will receive US\$4.2 billion, officials said</q></cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+Picks+SpaceX+and+Boeing+to+Fly+U.S.+Astronauts+on+Private+Spaceships&rft.pub=Scientific+Amer

```

ican&rft.date=2014-09-17&
rft.aulast=Wall&rft.aufirst=Mike&rft_id=https%3A%2F%2Fwww.
scientificamerican.com%2Farticle%
2Fnasa-picks-spacex-and-boeing-to
-fly-u-s-astronauts-on-private-sp
aceships%2F%3Fredirect%3D1&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an></span>
</li>
<li id="cite_note-598"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-598">^</a></b></span>
<span class="reference-text"><a r
el="nofollow" class="external fre
e" href="https://www.nasa.gov/fea
ture/nasa-and-spacex-complete-cer
tification-of-first-human-rated-c
ommercial-space-system">https://w
ww.nasa.gov/feature/nasa-and-spac
ex-complete-certification-of-firs
t-human-rated-commercial-space-sy
stem</a></span>
</li>
<li id="cite_note-599"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-599">^</a></b></span>
<span class="reference-text"><lin

```

```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://
spaceflightnow.com/2020/11/21/international-satellite-launches-to-extend-measurements-of-sea-level-rise/">"International satellite launches to extend measurements of sea level rise"</a>. 21 November 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=International+satellite+launches+to+extend+measurements+of+sea+level+rise&rft.date=2020-11-21&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F11%2F21%2Finternational-satellite-launches-to-extend-measurements-of-sea-level-rise%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-600"><span class="mw-cite-backlink"><b><a href="#cite_ref-600">^</a></b></span>

```

```
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc_sdat/jason-cs.htm">"Jason-CS A, B (Sentinel 6A, 6B)"</a>. <i>space.skyrocket.de</i>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=space.skyrocket.de&rft.atitle=Jason-CS+A%2C+B+%28Sentinel+6A%2C+6B%29&rft_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc_sdat%2Fjason-cs.htm&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
</li>
<li id="cite_note-SFN20201122-601"><span class="mw-cite-backlink"><b><a href="#cite_ref-SFN20201122_601-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067
```

```

248974"/><cite class="citation we
b cs1"><a rel="nofollow" class="e
xternal text" href="https://space
flightnow.com/2020/11/20/falcon-9
-starlink-v10-l15-mission-status-
center/">"Live coverage: SpaceX s
crubs Starlink launch attempt"</a
>. Spaceflight Now. 24 November 2
020<span class="reference-accessd
ate">. Retrieved <span class="now
rap">24 November</span> 2020</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&amp;
rft.genre=unknown&amp;rft.btitle=
Live+coverage%3A+SpaceX+scrubs+St
arlink+launch+attempt&amp;rft.pub
=Spaceflight+Now&amp;rft.date=202
0-11-24&amp;rft_id=https%3A%2F%2F
spaceflightnow.com%2F2020%2F11%2F
20%2Ffalcon-9-starlink-v10-l15-mi
ssion-status-center%2F&amp;rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988"></span>
</span>
</li>
<li id="cite_note-602"><span clas
s="mw-cite-backlink"><b><a href
="#cite_ref-602">^</a></b></span>

```

```
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://nextspaceflight.com/launches/details/2670">"Falcon 9 Block 5 | Starlink V1 L15"</a>. <i>nextspaceflight.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">17 November</span> 2020</span>.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=nextspaceflight.com&rft.atitle=Falcon+9+Block+5+%7C+Starlink+V1+L15&rft_id=http%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F2670&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-603"><span class="mw-cite-backlink"><b><a href="#cite_ref-603">^</a></b></span><span class="reference-text"><link
```



```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2020/12/03/falcon-9-crs-21-mission-status-center/">"Live coverage: Falcon 9 rocket counting down to Cargo Dragon launch"</a>. Spaceflight Now. 5 December 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Live+coverage%3A+Falcon+9+rocket+counting+down+to+Cargo+Dragon+launch&rft.date=2020-12-05&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F12%2F03%2Ffalcon-9-crs-21-mission-status-center%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite_note-nextspaceflight-20201013-604"><span class="mw-cite-backlink"><b><a href="#cite_ref-nextspaceflight-20201013_604-0">^</a></b></span> <span class
```

```
= "reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs 1"><a rel="nofollow" class="external text" href="http://nextspaceflight.com/launches/details/108">"Falcon 9 Block 5 | CRS-21"</a> . <i>nextspaceflight.com</i><span class="reference-accessdate"> .
```

```
Retrieved <span class="nowrap">13 October</span> 2020</span>.</cite><span title="ctx_ver=Z39.88-2004&amp;rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=nextspaceflight.com&amp;rft.atitle=Falcon+9+Block+5+%7C+CRS-21&amp;rft_id=http%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F108&amp;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>
```

```
</li>
```

```
<li id="cite_note-605"><span class="mw-cite-backlink"><b><a href="#cite_ref-605">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-sty
```

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
oig.nasa.gov/docs/IG-18-016.pd
f">"Audit of Commercial Resupply
Services to the International Sp
ace Station"</a> <span class="cs1
-format">(PDF)</span>. p.&#160;1
6.</cite><span title="ctx_ver=Z3
9.88-2004&amp;rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&amp;
rft.genre=unknown&amp;rft.btitle=
Audit+of+Commercial+Resupply+Serv
ices+to+the+International+Space+S
tation&amp;rft.pages=16&amp;rft_i
d=https%3A%2F%2Foig.nasa.gov%2Fdo
cs%2FIG-18-016.pdf&amp;rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></span></spa
n>
</li>
<li id="cite_note-Bishop2020-60
6"><span class="mw-cite-backlin
k"><b><a href="#cite_ref-Bishop20
20_606-0">^</a></b></span> <span
class="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067

```

248974"/><cite class="citation web cs1">"Nanoracks' Bishop Airlock". Nanoracks. Retrieved 11 February 2020.</cite>

<li id="cite_note-grc-schedule-607">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://ww

w1.grc.nasa.gov/space/iss-research/microgravity-research-flights/">"Microgravity Research Flights". <i>Glenn Research Center</i>. NASA. 18 August 2020. Retrieved 27 March 2021.</cite> <i>This
article incorporates text from th
is source, which is in the <a href
="/wiki/Public_domain" title="Pu
blic domain">public domain</i
><i>.</i>

<li id="cite_note-608"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.space.com/spacex-sirius-xm-sx
m-7-launch-rocket-landing-succes
s">"SpaceX just launched a powerf
ul Sirius XM satellite into orbit
and nailed a rocket landing".
Space.com. 13 December 2020.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=SpaceX+j
ust+launched+a+powerful+Sirius+XM
+satellite+into+orbit+and+nailed+

```

```
a+rocket+landing&rft.pub=Space.com&rft.date=2020-12-13&rft_id=https%3A%2F%2Fwww.space.com%2Fspacex-sirius-xm-sxm-7-launch-rocket-landing-success&rft_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-609">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Falcon 9 Block 5 | SXM-7". <i>nextspaceflight.com</i>. Retrieved 5 October 2020.
</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=nextspaceflight.com&rft.ati
```

tle=Falcon+9+Block+5+%7C+SXM-7&am  
p;rft\_id=http%3A%2F%2Fnextspacefl  
ight.com%2Flaunches%2Fdetails%2F9  
3& rfr\_id=info%3Asid%2Fen.wiki  
pedia.org%3AList+of+Falcon+9+and+  
Falcon+Heavy+launches" class="Z39  
88"></span></span>  
</li>  
<li id="cite\_note-610"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-610">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFBu  
sinesswire" class="citation web c  
s1">Businesswire. <a rel="nofollo  
w" class="external text" href="ht  
tps://www.businesswire.com/news/h  
ome/20201213005033/en/SiriusXM%E  
2%80%99s-New-SXM-7-Satellite-Buil  
t-by-Maxar-and-Launched-Aboard-a-  
SpaceX-Falcon-9-Performing-Proper  
ly-After-Launch">"SiriusXM's New  
SXM-7 Satellite, Built by Maxar  
and Launched Aboard a SpaceX Fal  
con 9, Performing Properly After  
Launch"</a><span class="referenc  
e-accessdate">. Retrieved <span c  
lass="nowrap">15 December</span>



2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SiriusXM%27s+New+SXM-7+Satellite%2C+Built+by+Maxar+and+Launched+Aboard+a+SpaceX+Falcon+9%2C+Performing+Properly+After+Launch&amp;rft.au=Businesswire&amp;rft\_id=https%3A%2F%2Fwww.businesswire.com%2Fnews%2Fhome%2F20201213005033%2Fen%2FSiriusXM%25E2%2580%2599s-New-SXM-7-Satellite-Built-by-Maxar-and-Launched-Aboard-a-SpaceX-Falcon-9-Performing-Properly-After-Launch&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-611"><span class="mw-cite-backlink"><b><a href="#cite\_ref-611">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2020/12/13/sir

```

iusxm-satellite-rides-spacex-rock
et-into-orbit/">"SiriusXM satell
ite rides SpaceX rocket into orbi
t"<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">14 December 2020
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=SiriusXM+satellite+rides+Spa
ceX+rocket+into+orbit&rft_id=
https%3A%2F%2Fspaceflightnow.com%
2F2020%2F12%2F13%2Fsiriusxm-satel
lite-rides-spacex-rocket-into-orb
it%2F&rft_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-auto3-612"><spa
n class="mw-cite-backlink">^ <a h
ref="#cite_ref-auto3_612-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFKrebs2

```

```

020" class="citation web cs1">Kre
bs, Gunter (30 July 2020). <a rel
="nofollow" class="external text"
href="https://space.skyrocket.de/
doc_sdat/sxm-7.htm">"SXM 7, 8". Gunter's Space Page<span class
="reference-accessdate">. Retriev
ed 23 Septem
ber 2020.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=SXM+7%2C+8&a
mp;rft.pub=Gunter%27s+Space+Page&
amp;rft.date=2020-07-30&rft.a
ulast=Krebs&rft.aufirst=Gunte
r&rft_id=https%3A%2F%2Fspace.
skyrocket.de%2Fdoc_sdat%2Fsxm-7.h
tm&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-613"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKa

```

```
nayamaSesnic2020" class="citation
web cs1">Kanayama, Lee; Sesnic, T
revor (13 December 2020). <a rel
="nofollow" class="external text"
href="https://www.nasaspacefligh
t.com/2020/12/spacex-ready-for-25
th-falcon9-of-year/">"SXM-7: Spac
eX launches 25th Falcon 9 launch
of the year". NASASpaceFligh
t.com<span class="reference-acces
sdate">. Retrieved <span class="n
owrap">28 December 2020</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitl
e=SXM-7%3A+SpaceX+launches+25th+F
alcon+9+launch+of+the+year&rft
.pub=NASASpaceFlight.com&rft
.date=2020-12-13&rft.aulast=
Kanayama&rft.aufirst=Lee&
rft.au=Sesnic%2C+Trevor&rft_i
d=https%3A%2F%2Fwww.nasaspaceflig
ht.com%2F2020%2F12%2Fspacex-ready
-for-25th-falcon9-of-year%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

```

```
<li id="cite_note-SFN20201217-614">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Live coverage: SpaceX launch for NRO delayed to Saturday". Spaceflight Now. 17 December 2020. Retrieved 18 December 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Live+coverage%3A+SpaceX+launch+for+NRO+delayed+to+Saturday&rft.pub=Spaceflight+Now&rft.date=2020-12-17&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F12%2F17%2Ffalcon-9-nrol-108-mission-status-center%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList
```

t+of+Falcon+9+and+Falcon+Heavy+la  
unches" class="Z3988"></span></sp  
an>  
</li>  
<li id="cite\_note-615"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-615">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFCl  
ark2020" class="citation web cs  
1">Clark, Stephen (5 October 202  
0). <a rel="nofollow" class="exte  
rnal text" href="https://spacefli  
ghtnow.com/2020/10/05/nro-reveals  
-plans-for-previously-undisclosed  
-launch-with-spacex-this-mont  
h/">"NRO reveals plans for previo  
usly-undisclosed SpaceX launch th  
is month"</a>. Spaceflight Now<sp  
an class="reference-accessdate">.  
Retrieved <span class="nowrap">6  
October</span> 2020</span>.</cit  
e><span title="ctx\_ver=Z39.88-200  
4&amp;rft\_val\_fmt=info%3Aofi%2Ffm  
t%3Akev%3Amtx%3Abook&amp;rft.genr  
e=unknown&amp;rft.btitle=NRO+reve  
als+plans+for+previously-undisclo  
sed+SpaceX+launch+this+month&amp;

```

rft.pub=Spaceflight+Now&rft.d
ate=2020-10-05&rft.aulast=Cl
ark&rft.aufirst=Stephen&rft
t_id=https%3A%2F%2Fspaceflightno
w.com%2F2020%2F10%2F05%2Fnro-reve
als-plans-for-previously-undisclo
sed-launch-with-spacex-this-mont
h%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-616"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/spacex-launches-tur
ksat-5a/">"SpaceX launches Turksa
t 5A". <i>Spacenews.com</i>.
8 January 2021.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=Spacenews.com&am
p;rft.atitle=SpaceX+launches+Turk

```

```

sat+5A&rft.date=2021-01-08&
p;rft_id=https%3A%2F%2Fspacenews.
com%2Fspacex-launches-turksat-5a%
2F&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-turk5a-617"><sp
an class="mw-cite-backlink">^ <s
up><i>a</i></sup> <a h
ref="#cite_ref-turk5a_617-1"><sup
><i>b</i></sup>
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKr
ebs" class="citation web cs1">Kre
bs, Gunter. <a rel="nofollow" cla
ss="external text" href="http://s
pace.skyrocket.de/doc_sdat/turksa
t-5a.htm">"Türksat 5A". Gunte
r's Space Page<span class="refere
nce-accessdate">. Retrieved 9 November
2017.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am

```



p;rft.btitle=T%C3%BCrksat+5A&amp;  
rft.pub=Gunter%27s+Space+Page&am  
p;rft.aulast=Krebs&amp;rft.aufirs  
t=Gunter&amp;rft\_id=http%3A%2F%2F  
space.skyrocket.de%2Fdoc\_sdat%2Ft  
urksat-5a.htm&amp;rfr\_id=info%3As  
id%2Fen.wikipedia.org%3AList+of+F  
alcon+9+and+Falcon+Heavy+launche  
s" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-618"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-618">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFSe  
snic" class="citation web cs1">Se  
snic, Trevor. <a rel="nofollow" c  
lass="external text" href="http  
s://everydayastronaut.com/turksat  
-5a/">"Türksat 5A | Falcon 9 Bloc  
k 5"</a>. <i>Everyday Astronaut</  
i><span class="reference-accessda  
te">. Retrieved <span class="nowr  
ap">8 January</span> 2021</span>.  
</cite><span title="ctx\_ver=Z39.8  
8-2004&amp;rft\_val\_fmt=info%3Aof  
i%2Ffmt%3Akev%3Amtx%3Ajournal&am  
p;rft.genre=unknown&amp;rft.jtitl

```

e=Everyday+Astronaut&rft.atitle=T%C3%BCrksat+5A+%7C+Falcon+9+Block+5&rft.aulast=Sesnic&rft.aufirst=Trevor&rft_id=https%3A%2F%2Feverydayastronaut.com%2Fturksat-5a%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-619">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"First launch of 2021 sees SpaceX Falcon 9 place Turksat 5A into supersync GTO". 8 January 2021.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=First+launch+of+2021+sees+Spa

```

```

ceX+Falcon+9+place+Turksat+5A+int
o+supersync+GT0&rft.date=2021
-01-08&rft_id=https%3A%2F%2Fw
ww.seradata.com%2Ffirst-launch-of
-2021-sees-spacex-falcon-9-place-
turksat-5a-into-gto-for-turkey%2F
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">

<li id="cite_note-620"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2021/01/s
pacex-launch-first-starlink-missi
on-2021/">"SpaceX launches first
Starlink mission of 2021". <
i>NasaSpaceflight.com</i>. 20 Jan
uary 2021.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajo
urnal&rft.genre=unknown&rft.jt
itle=NasaSpaceflight.com&am

```

```

p;rft.atitle=SpaceX+launches+first+Starlink+mission+of+2021&rft.date=2021-01-20&rft_id=http%3A%2F%2Fwww.nasaspaceflight.com%2F2021%2F01%2Fspacex-launch-first-starlink-mission-2021%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-621">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Falcon 9 Block 5 | Starlink V1 L16". <i>nextspaceflight.com</i>. Retrieved 15 January 2021.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&r

```

```
ft.jtitle=nextspaceflight.com&am
p;rft.atitle=Falcon+9+Block+5+%7C
+Starlink+V1+L16&rft_id=http%
3A%2F%2Fnextspaceflight.com%2Flau
nches%2Fdetails%2F2671&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-622"><span clas
s="mw-cite-backlink">^
<a r
el="nofollow" class="external fre
e" href="https://arstechnica.com/
science/2021/01/with-latest-starl
ink-launch-spacex-to-set-record-f
or-rapid-reuse/">https://arstechn
ica.com/science/2021/01/with-late
st-starlink-launch-spacex-to-set-
record-for-rapid-reuse/

<li id="cite_note-623"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
```

```

r1067248974"/><cite id="CITEREFIemole2021" class="citation web cs
1">Iemole, Anthony (20 January 20
21). <a rel="nofollow" class="ext
ernal text" href="https://www.nas
aspaceflight.com/2021/01/spacex-l
aunch-first-starlink-mission-202
1/">"SpaceX launches first Starli
nk mission of 2021". NASASpac
eFlight.com!access-date=21 Januar
y 2021.</cite><span title="ctx_ve
r=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&rft.bti
tle=SpaceX+launches+first+Starlin
k+mission+of+2021&rft.pub=NAS
ASpaceFlight.com%21access-date%3D
21+January+2021&rft.date=2021
-01-20&rft.aulast=Iemole&
rft.aufirst=Anthony&rft_id=ht
tps%3A%2F%2Fwww.nasaspaceflight.c
om%2F2021%2F01%2Fspacex-launch-fi
rst-starlink-mission-2021%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-624"><span clas
s="mw-cite-backlink"><a href

```

```

="#cite_ref-624">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.space.com/spacex-launches-143
-satellites-transporter-1-rocket-
landing">"SpaceX launches a recor
d 143 satellites on one rocket, a
ces landing". <i>Space.com</i
>. 24 January 2021<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">25 January</s
pan> 2021.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Ajournal&rft.genre=unknow
n&rft.jtitle=Space.com&rft
.title=SpaceX+launches+a+record
+143+satellites+on+one+rocket%2C+
aces+landing&rft.date=2021-01
-24&rft_id=https%3A%2F%2Fwww.
space.com%2Fspacex-launches-143-s
atellites-transporter-1-rocket-la
nding&rft_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988">

```

```

<li id="cite_note-625"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://n
extspaceflight.com/launches/detai
ls/2403">"Falcon 9 Block 5 | Tran
sporter 1". <i>nextspacefligh
t.com</i><span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">17 January 2021
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=unknown&rft
.jtitle=nextspaceflight.com&
rft.atitle=Falcon+9+Block+5+%7C+T
ransporter+1&rft_id=http%3A%2
F%2Fnextspaceflight.com%2Flaunche
s%2Fdetails%2F2403&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

```



```
<li id="cite_note-RsA-626">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Rideshare program". 14 July 2020.</cite><li id="cite_note-627"><a href
```

= "#cite\_ref-627">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFMcDowell,\_Jonathan\_&#91;@planet4589&#93;2021" class="citation web cs1"><a href="/wiki/Jonathan\_McDowell" title="Jonathan McDowell">McDowell, Jonathan [@planet4589]</a> (23 January 2021). <a rel="nofollow" class="external text" href="https://twitter.com/planet4589/status/1353008600931840000">"@Launch Photo @Nanoracks @SpireGlobal Middle ring port 3 is EXOLAUNCH EXPORT-2 with the dummy sat at left, the third ICEYE at right, and two black cubesat deployers with 24 SpaceBEES, AI Charlie, PIXL 1 and SOMP2b (photo @LaunchPhoto) t.co/7yyS9Czgv1"</a> (Tweet). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20210123155846/https://twitter.com/planet4589/status/1353008600931840000">Archived</a> from the original on 23 January 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">3 Mar

ch</span> 2021</span> &#8211; via  
 <a href="/wiki/Twitter" title="Tw  
 itter">Twitter</a>.</cite><span t  
 itle="ctx\_ver=Z39.88-2004&amp;rft  
 \_val\_fmt=info%3Aofi%2Ffmt%3Akev%3  
 Amtx%3Abook&amp;rft.genre=unknown  
 &amp;rft.btitle=%40LaunchPhoto+%4  
 0Nanoracks+%40SpireGlobal+Middle+  
 ring+port+3+is+EXOLAUNCH+EXOPORT-  
 2+with+the+dummy+sat+at+left%2C+t  
 he+third+ICEYE+at+right%2C+and+tw  
 o+black+cubesat+deployers+with+24  
 +SpaceBEEs%2C+AI+Charlie%2C+PIXL+  
 1+and+SOMP2b+%28photo+%40LaunchPh  
 oto%29+t.co%2F7yyS9Czgvl&amp;rft.  
 date=2021-01-23&amp;rft.au=McDowe  
 ll%2C+Jonathan+%5B%40planet4589%5  
 D&amp;rft\_id=https%3A%2F%2Ftwitte  
 r.com%2Fplanet4589%2Fstatus%2F135  
 3008600931840000&amp;rfr\_id=info%  
 3Asid%2Fen.wikipedia.org%3AList+o  
 f+Falcon+9+and+Falcon+Heavy+launc  
 hes" class="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-628"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-628">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:

r1067248974"/><cite id="CITEREFSp  
 aceX\_&#91;@SpaceX&#93;2021" class  
 ="citation web cs1"><a href="/wik  
 i/SpaceX" title="SpaceX">SpaceX  
 [@SpaceX]</a> (22 January 2021).  
 <a rel="nofollow" class="external  
 text" href="https://twitter.com/S  
 paceX/status/135267204016409395  
 5">"Falcon 9 and 143 spacecraft a  
 re vertical on pad 40 ahead of to  
 morrow's launch of the Transporte  
 r-1 mission, the first dedicated  
 SmallSat Rideshare Program missi  
 on; SpaceX's 42-minute launch win  
 dow opens at 9:40 a.m. and weathe  
 r is 60% favorable → t.co/bJFjLCz  
 WdK t.co/BFEnf8uru9"</a> (Tweet).  
 <a rel="nofollow" class="external  
 text" href="https://web.archive.o  
 rg/web/20210203043549/https://twi  
 tter.com/SpaceX/status/1352672040  
 164093955">Archived</a> from the  
 original on 3 February 2021<span  
 class="reference-accessdate">. Re  
 trieved <span class="nowrap">3 Ma  
 rch</span> 2021</span> &#8211; vi  
 a <a href="/wiki/Twitter" title  
 ="Twitter">Twitter</a>.</cite><sp  
 an title="ctx\_ver=Z39.88-2004&am  
 p;rft\_val\_fmt=info%3Aofi%2Ffmt%3A

```

kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Falcon+9+and
+143+spacecraft+are+vertical+on+p
ad+40+ahead+of+tomorrow%E2%80%99s
+launch+of+the+Transporter-1+miss
ion%2C+the+first+dedicated+SmallS
at+Rideshare+Program+mission%3B+S
paceX%27s+42-minute+launch+window
+opens+at+9%3A40+a.m.+and+weather
+is+60%25+favorable+%E2%86%92+t.c
o%2FbJFjLCzWdK+t.co%2FBFEnf8uru9&
amp;rft.date=2021-01-22&rft.a
u=SpaceX+%5B%40SpaceX%5D&rft_
id=https%3A%2F%2Ftwitter.com%2FSp
aceX%2Fstatus%2F13526720401640939
55&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-629"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.mdpi.com/2072-4292/12/1/9

```

```

2">"UVSQ-SAT, a pathfinder satell
ite dedicated to climate physics"
.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=UVSQ-SAT%2C+a+pathfinder+satell
ite+dedicated+to+climate+physics&
amp;rft_id=https%3A%2F%2Fwww.mdp
i.com%2F2072-4292%2F12%2F1%2F92&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-630"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceq.ca/spacex-transporter-1-ri
deshare-mission-with-canadian-sat
ellites-onboard-slips-to-mid-janu
ary/">"SpaceX Transporter-1 rides
hare mission with Canadian satell
ites onboard slips to mid-January

```

```

(Updated)".</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=SpaceX+Transporter-1
+rideshare+mission+with+Canadian+
satellites+onboard+slips+to+mid-J
anuary+%28Updated%29&rft_id=h
ttps%3A%2F%2Fspaceq.ca%2Fspacex-t
ransporter-1-rideshare-mission-wi
th-canadian-satellites-onboard-sl
ips-to-mid-january%2F&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"><s
pan class="cs1-maint citation-com
ment"><code class="cs1-code">{{<a
href="/wiki/Template:Cite_web" ti
tle="Template:Cite web">cite web
}}</code>: CS1 maint: url-st
atus (<a href="/wiki/Category:CS1
_maint:_url-status" title="Catego
ry:CS1 maint: url-status">link)

<li id="cite_note-631"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty

```

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
kepler.space/newsroom/press-relea
ses/post/kepler-communications-se
lects-spacex-to-launch-two-batche
s-of-its-nanosatellite-constellat
ion">"Kepler Communications".
<i>kepler.space</i>.</cite><span
 title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=kepler.spac
e&rft.atitle=Kepler+Communica
tions&rft_id=https%3A%2F%2Fke
pler.space%2Fnewsroom%2Fpress-rel
eases%2Fpost%2Fkepler-communicati
ons-selects-spacex-to-launch-two-
batches-of-its-nanosatellite-cons
tellation&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-632"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty

```



```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://advanced-television.com/2021/
01/07/spacex-plans-ride-share-sta
rlink-launch/">"SpaceX launches s
tarlink with smallsat rideshare m
ission 1". 8 January 2021.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&rft
t.genre=article&rft.atitle=Sp
aceX+launches+starlink+with+small
sat+rideshare+mission+1&rft.d
ate=2021-01-08&rft_id=https%3
A%2F%2Fadvanced-television.com%2F
2021%2F01%2F07%2Fspacex-plans-rid
e-share-starlink-launch%2F&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-633"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:

```

```

r1067248974"/><cite class="citation
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceflight.com/spaceflight-inc-u
nveils-next-gen-orbital-transfer-
vehicle-to-fly-aboard-latest-spac
ex-rideshare-mission/">"Spaceflig
ht inc. unveiled next-gen orbital
transfer vehicle to fly aboard la
test SpaceX rideshare mission". Spaceflight.com.</cite><span t
itle="ctx_ver=Z39.88-2004&rft
_val_fmt=info%3Aofi%2Ffmt%3Akev%3
Amtx%3Abook&rft.genre=unknown
&rft.btitle=Spaceflight+inc.+
unveiled+next-gen+orbital+transfe
r+vehicle+to+fly+aboard+latest+Sp
aceX+rideshare+mission&rft.pu
b=Spaceflight.com&rft_id=http
s%3A%2F%2Fspaceflight.com%2Fspace
flight-inc-unveils-next-gen-orbit
al-transfer-vehicle-to-fly-aboard
-latest-spacex-rideshare-mission%
2F&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-634"><span clas
s="mw-cite-backlink"><a href

```

```
= "#cite_ref-634">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
everydayastronaut.com/transporter
-1/">"Transporter-1 | Falcon 9 Bl
ock 5". <q>"For the first tim
e Falcon 9 flew with a third stag
e on the Transporter-1 mission".
</q></cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Transporter-1+%7C+Falcon+9+Bloc
k+5&rft_id=https%3A%2F%2Fever
ydayastronaut.com%2Ftransporter-
1%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988"><span class="cs1-
maint citation-comment"><code cla
ss="cs1-code">{{<a href="/wiki/Te
mplate:Cite_web" title="Template:
Cite web">cite web}}</code>:
CS1 maint: url-status (<a href="/
wiki/Category:CS1_maint:_url-stat
us" title="Category:CS1 maint: ur
```

```
l-status">link)

<li id="cite_note-635"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://n
extspaceflight.com/launches/detai
ls/2673">"Falcon 9 Block 5 | Star
link V1 L18". <i>nextspacefli
ght.com</i><span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">26 January 20
21.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajo
urnal&rft.genre=unknown&r
ft.jtitle=nextspaceflight.com&am
p;rft.atitle=Falcon+9+Block+5+%7C
+Starlink+V1+L18&rft_id=http%
3A%2F%2Fnextspaceflight.com%2Flau
nches%2Fdetails%2F2673&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

```

```

<li id="cite_note-636"><span clas
s="mw-cite-backlink">^
<a r
el="nofollow" class="external fre
e" href="https://nextspaceflight.
com/launches/details/2673">http
s://nextspaceflight.com/launches/
details/2673

<li id="cite_note-637"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGe
bhardt2021" class="citation web c
s1">Gebhardt, Chris (3 February 2
021). <a rel="nofollow" class="ex
ternal text" href="https://www.na
saspacesflight.com/2021/02/spacex-
twin-starlink-45th-busy-year/">"S
paceX launches first of twin Star
link missions, 45th Space Wing's
 busy year continues". <i>NAS
ASpaceFlight.com</i><span class
="reference-accessdate">. Retriev
ed 4 Februar
```

```

y 2021.</cite>

<li id="cite_note-638">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2021/02/16/spacex-successfully-deploys-60-more-

```

starlink-satellites-but-loses-boost-er-on-descent/">"SpaceX successfully deploys 60 Starlink satellites, but loses booster on descent"</a>. 16 February 2021.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+successfully+deploys+60+Starlink+satellites%2C+but+loses+booster+on+descent&amp;rft.date=2021-02-16&amp;rft\_id=https%3A%2F%2Fspaceflightnow.com%2F2021%2F02%2F16%2Fspace-x-successfully-deploys-60-more-starlink-satellites-but-loses-boost-er-on-descent%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-nextSL19-639"><span class="mw-cite-backlink"><b><a href="#cite\_ref-nextSL19\_639-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBaylor" class="citation web cs1">Baylor, Mich

```
ael. "Starlink V1 L19". <i>nextspaceflight</i>. Retrieved 12 February 2021.</cite><li id="cite_note-640">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFCao2021" class="citation web cs1">C
```



ao, Sissi (16 February 2021). <a rel="nofollow" class="external text" href="https://observer.com/2021/02/spacex-fail-landing-starlink-mission-falcon9/">"SpaceX Fails Falcon 9 Rocket Landing in Rare Miss During Latest Starlink Mission"</a>. <i>Observer</i><span class="reference-accessdate">. Retrieved <span class="nowrap">26 February</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Observer&amp;rft.atitle=SpaceX+Fails+Falcon+9+Rocket+Landing+in+Rare+Miss+During+Latest+Starlink+Mission&amp;rft.date=2021-02-16&amp;rft.aulast=Cao&amp;rft.aufirst=Sissi&amp;rft\_id=https%3A%2F%2Fobserver.com%2F2021%2F02%2Fspacex-fail-landing-starlink-mission-falcon9%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-641"><span class="mw-cite-backlink"><b><a href

```
= "#cite_ref-641">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCla
rk" class="citation web cs1">Cla
rk, Stephen. <a rel="nofollow" cl
ass="external text" href="http
s://spaceflightnow.com/2021/03/0
1/component-fatigue-caused-early-
shutdown-of-merlin-engine-on-last
-spacex-launch/">"Component fatig
ue caused early shutdown of Merli
n engine on last SpaceX launch"</
a>. <i>Spaceflight Now</i><span c
lass="reference-accessdate">. Ret
rieved 2 Mar
ch 2021.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=Spaceflight
+Now&rft.atitle=Component+fat
igue+caused+early+shutdown+of+Mer
lin+engine+on+last+SpaceX+launch&
amp;rft.aulast=Clark&rft.aufi
rst=Stephen&rft_id=https%3A%2
F%2Fspaceflightnow.com%2F2021%2F0
3%2F01%2Fcomponent-fatigue-caused
-early-shutdown-of-merlin-engine-
```

```

on-last-spacex-launch%2F&rfr_
id=info%3Asid%2Fen.wikipedia.org%
3AList+of+Falcon+9+and+Falcon+Hea
vy+launches" class="Z3988">

<li id="cite_note-642"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2021/03/s
pacex-fairing-recovery-octagrabbe
r/">"SpaceX evolving fairing reco
very plans, taking advantage of O
ctagrabber in pursuit of rapid re
usability". 9 March 2021.</ci
te><span title="ctx_ver=Z39.88-20
04&rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Abook&rft.gen
re=unknown&rft.btitle=SpaceX+
evolving+fairing+recovery+plans%2
C+taking+advantage+of+Octagrabber
+in+pursuit+of+rapid+reusability&
amp;rft.date=2021-03-09&rft_i
d=https%3A%2F%2Fwww.nasaspaceflig

```

```

ht.com%2F2021%2F03%2Fspacex-fairi
ng-recovery-octagrabber%2F&rf
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-643"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacexfleet.com/fairing-data/">"F
airing Recovery List"<span cl
ass="reference-accessdate">. Retr
ieved 8 Apri
l 2021.</cite><span
title="ctx_ver=Z39.88-2004&rf
t_val_fmt=info%3Aofi%2Ffmt%3Akev%
3Amtx%3Abook&rf_t.genre=unknow
n&rf_t.btitle=Fairing+Recovery
+List&rf_t_id=https%3A%2F%2Fsp
acexfleet.com%2Ffairing-data%2F&a
mp;rf_r_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398

```

```
8">

<li id="cite_note-644"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@e
lonmusk2021" class="citation web
cs1">@elonmusk (7 April 2021). <
a rel="nofollow" class="external
text" href="https://twitter.com/
elonmusk/status/13797449474530549
81">"They will be recovered from
the water & reused" (Twe
et) – via <a href="/wiki/Tw
itter" title="Twitter">Twitter.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
They+will+be+recovered+from+the+w
ater+%26+reused&rft.date=2021
-04-07&rft.au=%40elonmusk&am
p;rft_id=https%3A%2F%2Ftwitter.co
m%2Felonmusk%2Fstatus%2F137974494
7453054981&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
```

```
lass="Z3988">

<li id="cite_note-645"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFl
etcher2021" class="citation news
cs1">Fletcher, Colin (3 March 20
21). <a rel="nofollow" class="ext
ernal text" href="https://www.nas
aspaceflight.com/2021/03/spacex-l
aunch-delayed-starlink/">"SpaceX
successfully launches long-delay
ed Starlink L-17 mission". <i
><a href="/w/index.php?title=Nasa
SpaceFlight.com&action=edit&a
mp;redlink=1" class="new" title
="NasaSpaceFlight.com (page does
not exist)">NasaSpaceFlight.com
</i><span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">23 May 2021</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=article&rft.jtit
le=NasaSpaceFlight.com&rft.at
```

```

itle=SpaceX+successfully+launches
+long-delayed+Starlink+L-17+missi
on&rft.date=2021-03-03&rft
.t.aulast=Fletcher&rft.aufirst
=Colin&rft_id=https%3A%2F%2Fw
ww.nasaspaceflight.com%2F2021%2F0
3%2Fspacex-launch-delayed-starlin
k%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-nextSL17-646"><
span class="mw-cite-backlink">
<a href="#cite_ref-nextSL17_646-
0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="http://nextspacef
light.com/launches/details/267
2">"Falcon 9 Block 5 | Starlink V
1 L17". <i>nextspaceflight.co
m</i><span class="reference-acces
sdate">. Retrieved <span class="n
owrap">22 February 2021</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%

```

```

3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=unknown&rft.jt
itle=nextspaceflight.com&rft.
atitle=Falcon+9+Block+5+%7C+Starl
ink+V1+L17&rft_id=http%3A%2F%
2Fnextspaceflight.com%2Flaunches%
2Fdetails%2F2672&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988">

<li id="cite_note-647"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFl
etcher2021" class="citation news
cs1">Fletcher, Colin (3 March 20
21). <a rel="nofollow" class="ext
ernal text" href="https://www.nas
aspaceflight.com/2021/03/spacex-l
aunch-delayed-starlink/">"SpaceX
successfully launches long-delay
ed Starlink L-17 mission". <i
>nasaspaceflight.com</i><span cla
ss="reference-accessdate">. Retri
eved 4 March
 2021.</cite><span

```



```

title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=ar
ticle&rft.jtitle=nasaspacefl
ight.com&rft.atitle=SpaceX+su
ccessfully+launches+long-delayed+
Starlink+L-17+mission&rft.dat
e=2021-03-03&rft.aulast=Fletc
her&rft.aufirst=Colin&rft
_id=https%3A%2F%2Fwww.nasaspacefl
ight.com%2F2021%2F03%2Fspacex-lau
nch-delayed-starlink%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-648"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFMc
Dowell,_Jonathan_[@planet4589
]2021" class="citation web cs
1"><a href="/wiki/Jonathan_McDowe
ll" title="Jonathan McDowell">McD
owell, Jonathan [@planet4589]
(26 March 2021). <a rel="nofollo

```

w" class="external text" href="https://twitter.com/planet4589/status/1375301028514500615">"The Falcon 9 second stage from the Mar 4 Starlink launch failed to make a deorbit burn and is now reentering after 22 days in orbit. Its reentry was observed from the Seattle area at about 0400 UTC Mar 26"

</a> (Tweet)<span class="reference-accessdate">. Retrieved <span class="nowrap">26 March</span> 2021</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=The+Falcon+9+second+stage+from+the+Mar+4+Starlink+launch+failed+to+make+a+deorbit+burn+and+is+now+reentering+after+22+days+in+orbit.+Its+reentry+was+observed+from+the+Seattle+area+at+about+0400+UTC+Mar+26.&amp;rft.date=2021-03-26&amp;rft.au=McDowell%2C+Jonathan+%5B%40planet4589%5D&amp;rft\_id=https%3A%2F%2Ftwitter.com%2Fplanet4589%2Fstatus%2F1375301028514500615&amp;rfr\_id=info%3Asid%2Fen.wi

kikipedia.org%3Alist+of+Falcon+9+an  
 d+Falcon+Heavy+launches" class="Z  
 3988"></span></span>  
 </li>  
 <li id="cite\_note-649"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-649">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:  
 r1067248974"/><cite id="CITEREFCl  
 ark2021" class="citation news cs  
 1">Clark, Stephen (11 March 202  
 1). <a rel="nofollow" class="exte  
 rnal text" href="https://spacefli  
 ghtnow.com/2021/03/11/spacex-adds  
 -more-satellites-to-starlink-inte  
 rnet-fleet/">"SpaceX adds more sa  
 tellites to Starlink internet fle  
 et"</a>. <i>Spaceflight Now</i><s  
 pan class="reference-accessdat  
 e">. Retrieved <span class="nowra  
 p">23 May</span> 2021</span>.</ci  
 te><span title="ctx\_ver=Z39.88-20  
 04&amp;rft\_val\_fmt=info%3Aofi%2Ff  
 mt%3Akev%3Amtx%3Ajournal&amp;rft.  
 genre=article&amp;rft.jtitle=Spac  
 eflight+Now&amp;rft.atitle=SpaceX  
 +adds+more+satellites+to+Starlink  
 +internet+fleet&amp;rft.date=2021

```

-03-11&rft.au=last=Clark&rft.au=first=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2021%2F03%2F11%2Fspacex-adds-more-satellites-to-starlink-internet-fleet%2F&rft_id=info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-NextL20-650">^ <link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Falcon 9 Block 5 | Starlink V1 L20". Next Spaceflight. 11 March 2021. Retrieved 11 March 2021.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Falco

```

```

n+9+Block+5+%7C+Starlink+V1+L20&a
mp;rft.pub=Next+Spaceflight&r
ft.date=2021-03-11&rft_id=htt
ps%3A%2F%2Fnextspaceflight.com%2F
launches%2Fdetails%2F2675&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-651"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2021" class="citation news cs
1">Clark, Stephen (11 March 202
1). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2021/03/11/spacex-adds
-more-satellites-to-starlink-inte
rnet-fleet/">"SpaceX adds more sa
tellites to Starlink internet fle
et". <i>spaceflightnow.com</i
><span class="reference-accessdat
e">. Retrieved <span class="nowra
p">11 March 2021.</
cite><span title="ctx_ver=Z39.88-

```

```

2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=spaceflightnow.com&rft.atitle=SpaceX+adds+more+satellites+to+Starlink+internet+fleet&rft.date=2021-03-11&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2021%2F03%2F11%2Fspacex-adds-more-satellites-to-starlink-internet-fleet%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-652">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX's Falcon 9 booster flies for 9th time as Starlink constellation grows". NasaSpace

```

```

flight.com. 13 March 2021.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Abook&rft.genre=
unknown&rft.btitle=SpaceX%E2%
80%99s+Falcon+9+booster+flies+for
+9th+time+as+Starlink+constellati
on+grows&rft.pub=NasaSpacefli
ght.com&rft.date=2021-03-13&a
mp;rft_id=https%3A%2F%2Fwww.nasas
paceflight.com%2F2021%2F03%2Fspac
ex-starlink-first-booster-fly-nin
e%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-653"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
everydayastronaut.com/starlink-2
1/">"Starlink 21 | Falcon 9 Block
5". <i>Everyday Astronaut</i
>. 13 March 2021.</cite><span tit

```

```

le="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=Everyday+Astronaut&rft.atitle=Starlink+21+%7C+Falcon+9+Block+5&rft.date=2021-03-13&rft_id=https%3A%2F%2Feverydayastronaut.com%2Fstarlink-21%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-654">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX launches 60 new Starlink internet satellites, nails latest rocket landing at sea"
. <i>Space.com</i>. 24 March 2021.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=inf

```



o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=Space.com&rft.atitle=SpaceX+launches+60+new+Starlink+internet+satellites%2C+nails+latest+rocket+landing+at+sea&rft.date=2021-03-24&rft\_id=https%3A%2F%2Fwww.space.com%2Fspacex-starlink-22-satellites-launch-rocket-landing-success&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-655"><span class="mw-cite-backlink"><b><a href="#cite\_ref-655">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://nextspaceflight.com/launches/details/2677">"Starlink V1 L22"</a>. <i>Next Spaceflight</i><span class="reference-accessdate">. Retrieved <span class="nowrap">13 March</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft

```

t_val_fmt=info%3Aofi%2Ffmt%3Akev%
3Amtx%3Ajournal&rft.genre=unk
nown&rft.jtitle=Next+Spacefli
ght&rft.atitle=Starlink+V1+L2
2&rft_id=https%3A%2F%2Fnextsp
aceflight.com%2Flaunches%2Fdetail
s%2F2677&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-656"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREF@K
yle_M_Photo2021" class="citation
web cs1">@Kyle_M_Photo (26 March
2021). <a rel="nofollow" class="e
xternal text" href="https://twitt
er.com/Kyle_M_Photo/status/137537
5412163973120">"Shelia Bordelon h
as returned to Port Canaveral wit
h two fairing halves that she lif
ted out of the water with her cra
ne. They look intact, but are not
tarped" (Tweet) – via <
a href="/wiki/Twitter" title="Twi

```

```

tter">Twitter.</cite><span ti
tle="ctx_ver=Z39.88-2004&rft_
val_fmt=info%3Aofi%2Ffmt%3Akev%3A
mtx%3Abook&rft.genre=unknown&
&rft.btitle=Shelia+Bordelon+ha
s+returned+to+Port+Canaveral+with
+two+fairing+halves+that+she+lift
ed+out+of+the+water+with+her+cran
e.+They+look+intact%2C+but+are+no
t+tarped.&rft.date=2021-03-26
&rft.au=%40Kyle_M_Photo&r
ft_id=https%3A%2F%2Ftwitter.com%2
FKyle_M_Photo%2Fstatus%2F13753754
12163973120&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-657"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKa
nayama" class="citation web cs1">
Kamayama, Lee. <a rel="nofollow"
class="external text" href="http
s://www.nasaspaceflight.com/2021/
04/spacex-launch-starlink-12

```

```

3/">"SpaceX launches Starlink v1.
0 L23 mission". <i>NASASpacfl
ight</i><span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">7 April 2021</sp
an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=unknown&rft.jti
tle=NASASpacflight&rft.atitle
=SpaceX+launches+Starlink+v1.0+L2
3+mission&rft.aulast=Kanayama
&rft.aufirst=Lee&rft_id=h
ttps%3A%2F%2Fwww.nasaspaceflight.
com%2F2021%2F04%2Fspacex-launch-s
tarlink-123%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-658"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.cnbc.com/2021/04/23/spacexs-c

```

```

rew-2-mission-for-nasa-launches-s
uccessfully-reaches-orbit.htm
l">"SpaceX Crew-2 reaches orbit,
 with Elon Musk's company launchi
ng 10 astronauts in under a year"
. 23 April 2021.</cite><span
 title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=SpaceX+Crew-2+
reaches+orbit%2C+with+Elon+Musk%E
2%80%99s+company+launching+10+ast
ronauts+in+under+a+year&rft.d
ate=2021-04-23&rft_id=https%3
A%2F%2Fwww.cnn.com%2F2021%2F04%2
F23%2Fspacexs-crew-2-mission-for-
nasa-launches-successfully-reache
s-orbit.html&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-:6-659"><span c
lass="mw-cite-backlink"><a hre
f="#cite_ref-:6_659-0">^
 <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFFoust,_Jeff_[@jeff_fous

```

```

t#93;2020" class="citation web c
s1">Foust, Jeff [@jeff_foust] (23
July 2020). <a rel="nofollow" cla
ss="external text" href="https://
twitter.com/jeff_foust/status/128
6312153193029633">"McErlean: NAS
A's plans call for reusing the Fa
lcon 9 booster from the Crew-1 mi
ssion on the Crew-2 mission, and
to reuse the Demo-2 capsule for
Crew-2 as well" (Tweet). Re
trieved 23 J
uly 2020 – vi
a <a href="/wiki/Twitter" title
="Twitter">Twitter.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=McErlean%3A+
NASA%27s+plans+call+for+reusing+t
he+Falcon+9+booster+from+the+Crew
-1+mission+on+the+Crew-2+mission%
2C+and+to+reuse+the+Demo-2+capsul
e+for+Crew-2+as+well.&rft.dat
e=2020-07-23&rft.au=Foust%2C+
Jeff+%5B%40jeff_foust%5D&rft_
id=https%3A%2F%2Ftwitter.com%2Fje
ff_foust%2Fstatus%2F1286312153193
029633&rfr_id=info%3Asid%2Fe

```

```

n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-660"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
everydayastronaut.com/crew-2/">"C
rew-2 (USCV-2) | Falcon 9 Block
5". <i>Everyday Astronaut</i>
>. 22 April 2021<span class="refe
rence-accessdate">. Retrieved <sp
an class="nowrap">23 April
2021.</cite><span title="c
tx_ver=Z39.88-2004&rft_val_fm
t=info%3Aofi%2Ffmt%3Akev%3Amtx%3A
journal&rft.genre=unknown&am
p;rft.jtitle=Everyday+Astronaut&a
mp;rft.atitle=Crew-2+%28USCV-2%29
+%7C+Falcon+9+Block+5&rft.dat
e=2021-04-22&rft_id=https%3A%
2F%2Feverydayastronaut.com%2Fcrew
-2%2F&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+

```

```

and+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-661"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFPo
tter2020" class="citation web cs
1">Potter, Sean (28 July 2020). <
a rel="nofollow" class="external
text" href="http://www.nasa.gov/
press-release/nasa-announces-astr
onauts-to-fly-on-spacex-crew-2-mi
ssion-to-space-station">"NASA Ann
ounces Astronauts to Fly on Space
X Crew-2 Mission". NASA. R
etrieved 29
July 2020.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Abook&rft.genre=u
nknown&rft.btitle=NASA+Announ
ces+Astronauts+to+Fly+on+SpaceX+C
rew-2+Mission&rft.pub=NASA&am
p;rft.date=2020-07-28&rft.aul
ast=Potter&rft.aufirst=Sean&a

```



```

mp;rft_id=http%3A%2F%2Fwww.nasa.gov%2Fpress-release%2Fnasa-announces-astronauts-to-fly-on-spacex-crew-2-mission-to-space-station&am
p;rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">
 <i>This article incorpo
rates text from this source, whic
h is in the <a href="/wiki/Public
_domain" title="Public domain">pu
blic domain</i><i>.</i>

<li id="cite_note-662"><span clas
s="mw-cite-backlink">^
<lin

```

k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF@nextspaceflight2020" class="citation web cs1">@nextspaceflight (3 June 2020). <a rel="nofollow" class="external text" href="https://twitter.com/nextspaceflight/status/1268316718750814209">"SpaceX has been given NASA approval to fly flight-proven Falcon 9 and Crew Dragon vehicles during Commercial Crew flights starting with Post-Certification Mission 2, per a modification to SpaceX's contract with NASA. beta.sam.gov/awards/9012160"</a> (Tweet) &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+has+been+given+NASA+approval+to+fly+flight-proven+Falcon+9+and+Crew+Dragon+vehicles+during+Commercial+Crew+flights+starting+with+Post-Certification+Mission+2%2C+per+a+modification+to+SpaceX%27s+contract+with+NASA.+beta.sam.gov%2Fawards%2F90121

```

60&rft.date=2020-06-03&rft.au=%40nextspaceflight&rft_id=https%3A%2F%2Ftwitter.com%2Fnextspaceflight%2Fstatus%2F1268316718750814209&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">
<li id="cite_note-663">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX rocket launches another 60 Starlink satellites, nails its 7th landing at sea".
 Space.com. 29 April 2021.</cite>
<span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+rocket+launches+another+60+Starlink+satellites%2C+nails+its+7th+landi

```

```

ng+at+sea&rft.pub=Space.com&a
mp;rft.date=2021-04-29&rft_id
=https%3A%2F%2Fwww.space.com%2Fsp
acex-starlink-24-satellite-missio
n-launch-rocket-landing&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-664"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nextspaceflight.com/launches/deta
ils/2679">"Starlink V1 L24"<s
pan class="reference-accessdat
e">. Retrieved <span class="nowrap"
>17 April 2021.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=Starl
ink+V1+L24&rft_id=https%3A%2
F%2Fnextspaceflight.com%2Flaunche

```

```
s%2Fdetails%2F2679&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3Alist
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-665"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/spacex-launches-sta
rlink-satellites/">"SpaceX launch
es Starlink satellites". <i>S
paceNews</i>. 29 April 2021. R
etrieved 29
April 2021.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Ffmt%
3Akev%3Amtx%3Ajournal&rft.gen
re=unknown&rft.jtitle=SpaceNe
ws&rft.atitle=SpaceX+launches
+Starlink+satellites&rft.date
=2021-04-29&rft_id=https%3A%2
F%2Fspacenews.com%2Fspacex-launch
```

```

es-starlink-satellites%2F&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-666"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.space.com/spacex-starlink-25-
satellite-mission-launch-rocket-l
anding">"paceX's Star Wars Day la
unch puts 60 Starlink satellites
in orbit, lands rocket". Spa
ce.com. 4 May 2021.</cite><span t
itle="ctx_ver=Z39.88-2004&rft
_val_fmt=info%3Aofi%2Ffmt%3Akev%3
Amtx%3Abook&rft.genre=unknown
&rft.btitle=paceX%27s+Star+Wa
rs+Day+launch+puts+60+Starlink+sa
tellites+in+orbit%2C+lands+rocket
&rft.pub=Space.com&rft.da
te=2021-05-04&rft_id=https%3
A%2F%2Fwww.space.com%2Fspacex-sta

```

```

rlink-25-satellite-mission-launch
-rocket-landing&#amp;rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-667"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://n
extspaceflight.com/launches/detai
ls/2680">"Falcon 9 Block 5 | Star
link V1 L25". <i>nextspacefli
ght.com</i><span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">29 April 2021
.</cite><span title="ctx_v
er=Z39.88-2004&#amp;rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&#amp;rft.genre=unknown&#amp;rft
.jtitle=nextspaceflight.com&#amp;
rft.atitle=Falcon+9+Block+5+%7C+S
tarlink+V1+L25&#amp;rft_id=http%3
A%2F%2Fnextspaceflight.com%2Flaun
ches%2Fdetails%2F2680&#amp;rfr_id=

```

```
info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-668">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SpaceX launches 60 Starlink satellites in record 10th liftoff (and landing) of reused rocket". 9 May 2021.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+launches+60+Starlink+satellites+in+record+10th+liftoff+%28and+landing%29+of+reused+rocket&rft.date=2021-05-09&rft_id=https%3A%2F%2Fwww.space.com%2Fspacex-starlink-27-10th-falcon-9-rocket-launch-1
```



anding-success&#amp;rfr\_id=info%3A  
 sid%2Fen.wikipedia.org%3AList+of+  
 Falcon+9+and+Falcon+Heavy+launche  
 s" class="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-669"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-669">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:  
 r1067248974"/><cite class="citati  
 on web cs1"><a rel="nofollow" cla  
 ss="external text" href="https://  
 nextspaceflight.com/launches/deta  
 ils/5331">"Starlink V1 L27"</a>.  
 <i>NextSpaceflight.com</i><span  
 class="reference-accessdate">. R  
 etrieved <span class="nowrap">5 M  
 ay</span> 2021</span>.</cite><spa  
 n title="ctx\_ver=Z39.88-2004&#amp;  
 rft\_val\_fmt=info%3Aofi%2Ffmt%3Ake  
 v%3Amtx%3Ajournal&#amp;rft.genre=u  
 nknown&#amp;rft.jtitle=NextSpacefl  
 ight.com&#amp;rft.atitle=Starlink+  
 V1+L27&#amp;rft\_id=https%3A%2F%2Fn  
 extspaceflight.com%2Flaunches%2Fd  
 etails%2F5331&#amp;rfr\_id=info%3As  
 id%2Fen.wikipedia.org%3AList+of+F  
 alcon+9+and+Falcon+Heavy+launche

```
s" class="Z3988">

<li id="cite_note-NSF8521-670"><
a href="#cite_ref-NSF8521_670-0">
^ <link rel="mw-dedupl
icated-inline-style" href="mw-dat
a:TemplateStyles:r1067248974"/><c
ite class="citation web cs1"><a r
el="nofollow" class="external tex
t" href="https://www.nasaspacefli
ght.com/2021/05/historic-10th-fal
con9-reflight/">"SpaceX flies his
toric 10th mission of a Falcon 9
as Starlink constellation expand
s". 8 May 2021.</cite><span t
itle="ctx_ver=Z39.88-2004&rft
_val_fmt=info%3Aofi%2Ffmt%3Akev%3
Amtx%3Abook&rft.genre=unknown
&rft.btitle=SpaceX+flies+hist
oric+10th+mission+of+a+Falcon+9+a
s+Starlink+constellation+expands&
amp;rft.date=2021-05-08&rft_i
d=https%3A%2F%2Fwww.nasaspaceflig
ht.com%2F2021%2F05%2Fhistoric-10t
h-falcon9-reflight%2F&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></
```

```
span>

<li id="cite_note-671"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.space.com/17933-nasa-televisi
on-webcasts-live-space-tv.htm
l">"Replay! SpaceX launches 52 St
arlink satellites and 2 rideshare
payloads". 16 May 2021.</cite
><span title="ctx_ver=Z39.88-2004
&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=Replay%2
1+SpaceX+launches+52+Starlink+sat
ellites+and+2+rideshare+payloads&
amp;rft.date=2021-05-16&rft_i
d=https%3A%2F%2Fwww.space.com%2F1
7933-nasa-television-webcasts-liv
e-space-tv.html&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

```

```
<li id="cite_note-672"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nextspaceflight.com/launches/deta
ils/2681">"Starlink V1 L26"<s
pan class="reference-accessdat
e">. Retrieved <span class="nowrap"
>6 May 2021.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=Starlink
+V1+L26&rft_id=https%3A%2F%2F
nextspaceflight.com%2Flaunches%2F
details%2F2681&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-673"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
```

le" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://nextspaceflight.com/launches/details/2681">"Starlink V1 L26"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">4 May</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Starlink+V1+L26&amp;rft\_id=https%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F2681&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-674"><span class="mw-cite-backlink"><b><a href="#cite\_ref-674">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://nextspaceflight.com/launches/deta

ils/2681">"Starlink V1 L26 & Rideshares"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">15 May</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Starlink+V1+L26+%26+Rideshares&rft\_id=https%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F2681&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>  
<li id="cite\_note-SL28-675"><span class="mw-cite-backlink">^ <a href="#cite\_ref-SL28\_675-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-SL28\_675-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-SL28\_675-2"><sup><i><b>c</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs 1"><a rel="nofollow" class="external text" href="https://www.nasas

paceflight.com/2021/05/spacex-starlink-rideshare-milestone-nears/">"SpaceX launches Starlink rideshare mission as constellation deployment milestone nears"</a>. NasaSpaceFlight.com. 15 May 2021.

</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+launches+Starlink+rideshare+mission+as+constellation+deployment+milestone+nears&amp;rft.pub=NasaSpaceFlight.com&amp;rft.date=2021-05-15&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceflight.com%2F2021%2F05%2Fspacex-starlink-rideshare-milestone-nears%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-676"><span class="mw-cite-backlink"><b><a href="#cite\_ref-676">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citati

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2021/05/s
tarlink-complete-first-shell/">"S
tarlink v1.0 L28 mission complete
s first "shell" of satellites for
worldwide coverage". 26 May 2
021.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Starlink+v1.0+L28+mission+compl
etes+first+%22shell%22+of+satelli
tes+for+worldwide+coverage&rft
.date=2021-05-26&rft_id=http
s%3A%2F%2Fwww.nasaspaceflight.co
m%2F2021%2F05%2Fstarlink-complete
-first-shell%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-NSFS128-677"><s
pan class="mw-cite-backlink">^ <s
up><i>a</i></sup> <a h
ref="#cite_ref-NSFS128_677-1"><su
p><i>b</i></sup> <a hr
ef="#cite_ref-NSFS128_677-2"><sup
><i>c</i></sup>

```



```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Starlink V1 L28". Retrieved 14 May 2021.</cite>

<li id="cite_note-sn20210526-678">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFFoust20
```

```

21" class="citation news cs1">Foust, Jeff (26 May 2021). "SpaceX sets Falcon 9 fairing reuse mark with Starlink launch". <i>SpaceNews</i>. Retrieved 27 May 2021.</cite>

<li id="cite_note-679"><span clas

```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2021/06/c
rs22-new-solar-arrays/">"SpaceX l
aunches CRS-22, new solar arrays
to International Space Station"
. NasaSpaceflight.com. 3 June
2021.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=SpaceX+launches+CRS-22%2C+new+s
olar+arrays+to+International+Spac
e+Station&rft.pub=NasaSpacefl
ight.com&rft.date=2021-06-03&
amp;rft_id=https%3A%2F%2Fwww.nasa
spaceflight.com%2F2021%2F06%2Fcrs
22-new-solar-arrays%2F&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-680"><span clas
```

```

s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nextspaceflight.com/launches/deta
ils/109">"CRS-22"<span class
="reference-accessdate">. Retriev
ed 17 April
 2021.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=CRS-22&rft
_id=https%3A%2F%2Fnextspacefligh
t.com%2Flaunches%2Fdetails%2F109&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-nasa-20160114-6
81"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-nasa-2016
0114_681-0"><sup><i>a</i>
</sup> <a href="#cite_ref-nas
a-20160114_681-1"><sup><i>b

```

```

></i></sup> <sup><i>
>c</i></sup> <sup>
<i>d</i></sup>
^{<i>e</i>} ^{<i>f</i>}
> ^{<i>g</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation pressrelease cs 1">"NASA Awards International Space Station Cargo Transport Contracts" (Press release). NASA. 14 January 2016. Retrieved 24 August 2017.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genr

```

```
e=unknown&rft.btitle=NASA+Awards+International+Space+Station+Cargo+Transport+Contracts&rft.pub=NASA&rft.date=2016-01-14&rft_id=http%3A%2F%2Fwww.nasa.gov%2Fpress-release%2Fnasa-awards-international-space-station-cargo-transport-contracts&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i>

<li id="cite_note-682"><span clas
```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSe
mpsrott2021" class="citation web
cs1">Sempsrott, Danielle (2 June
2021). <a rel="nofollow" class="e
xternal text" href="https://blog
s.nasa.gov/spacexcrs22/2021/06/0
2/hometown-heroes-students-create
-satellite-inspired-by-gatlinburg
-wildfires/">"Hometown Heroes: St
udents Create Satellite Inspired
by Gatlinburg Wildfires". NA
SA<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">3 June 2021</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Hometown+Heroes%3A+Students+Creat
e+Satellite+Inspired+by+Gatlinbur
g+Wildfires&rft.pub=NASA&
rft.date=2021-06-02&rft.aulas
t=Sempsrott&rft.aufirst=Danie
lle&rft_id=https%3A%2F%2Fblog
```

s.nasa.gov%2Fspacexcrs22%2F2021%2F06%2F02%2Fhometown-heroes-students-create-satellite-inspired-by-gatlinburg-wildfires%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-683"><span class="mw-cite-backlink"><b><a href="#cite\_ref-683">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.manchester.ac.uk/discover/news/manchester-scientists-to-launch-low-orbiting-satellite-on-spacex-mission/">"Manchester scientists to launch low-orbiting satellite on SpaceX mission"</a>. <a href="/wiki/University\_of\_Manchester" title="University of Manchester">University of Manchester</a>. 25 May 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">3 June</span> 2021</sp



```

an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Manchester+scientists+to+launch
+low-orbiting+satellite+on+SpaceX
+mission&rft.pub=University+o
f+Manchester&rft.date=2021-05
-25&rft_id=https%3A%2F%2Fwww.
manchester.ac.uk%2Fdiscover%2Fnew
s%2Fmanchester-scientists-to-laun
ch-low-orbiting-satellite-on-spac
ex-mission%2F&rfr_id=info%3As
id%2Fen.wikipedia.org%3AList+of+F
alcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-684"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://w
ww.mric.mu/English/Events/Pages/F
irst-Mauritian-Satellite,-MIR-SAT
1-on-its-way-to-the-ISS.aspx">"Fi
rst Mauritian Satellite, MIR-SAT1

```

on its way to the ISS". MRIC. 3 June 2021> . Retrieved <span class="nowrap">5 June</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=First+Mauritian+Satellite%2C+MIR-SAT1+on+its+way+to+the+ISS&rft.pub=MRIC&rft.date=2021-06-03&rft\_id=http%3A%2F%2Fwww.mric.mu%2FEnglish%2FEvents%2FPages%2FFirst-Mauritian-Satellite%2C-MIR-SAT1-on-its-way-to-the-ISS.aspx&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-685"><span class="mw-cite-backlink"><b><a href="#cite\_ref-685">^</a></b></span>

<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.nasaspaceflight.com/2021/06/s

xm8-launch/">"SpaceX launches 2nd mission in three days with Sirius XM-8"</a>. NasaSpaceflight.com. 6 June 2021.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SpaceX+launches+2nd+mission+in+three+days+with+SiriusXM-8&amp;rft.pub=NasaSpaceflight.com&amp;rft.date=2021-06-06&amp;rft\_id=https%3A%2F%2Fwww.nasaspaceligh t.com%2F2021%2F06%2Fsxm8-launch%2 F&amp;rfr\_id=info%3Asid%2Fen.wiki pedia.org%3AList+of+Falcon+9+and+ Falcon+Heavy+launches" class="Z39 88"></span></span>

</li>

<li id="cite\_note-spacex\_manifest-686"><span class="mw-cite-backlink">^ <a href="#cite\_ref-spacex\_manifest\_686-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-spacex\_manifest\_686-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="e

```

external text" href="http://www.sp
acex.com/missions#future-missions
-header">"SpaceX launch manifest"
. SpaceX<span class="referenc
e-accessdate">. Retrieved <span c
lass="nowrap">17 August 20
17.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Abo
ok&rft.genre=unknown&rft.
btitle=SpaceX+launch+manifest&am
p;rft.pub=SpaceX&rft_id=http%
3A%2F%2Fwww.spacex.com%2Fmission
s%23future-missions-header&rft
_rft_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-687"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on pressrelease cs1"><a rel="nofo
llow" class="external text" href
="http://sslmda.com/html/pressrel
eases/pr20160728.php">"SSL Select

```

ed to Provide Two Powerful Satellites to SiriusXM". *sslmda.com* (Press release). 28 July 2016 class="reference-accessdate">. Retrieved class="nowrap">14 June 2020</span></span></cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SSL+Selected+to+Provide+Two+Powerful+Satellites+to+SiriusXM&rft.date=2016-07-28&rft\_id=http%3A%2F%2Fsslmda.com%2Fhtml%2Fpressreleases%2Fpr20160728.php&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-sfn\_ls-688"><span class="mw-cite-backlink">^ <a href="#cite\_ref-sfn\_ls\_688-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-sfn\_ls\_688-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-sfn\_ls\_688-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-sfn\_ls\_688-3"><sup><i><b>d</b></i></sup></a> <a href

```

="#cite_ref-sfn_ls_688-4"><sup><i>
e</i></sup> <sup><i>
f</i></sup> <sup><i>
g</i></sup> <sup><i>
h</i></sup> <s
pan class="reference-text"><link
rel="mw-deduplicated-inline-styl
e" href="mw-data:TemplateStyles:r
1067248974"/><cite id="CITEREFCl
ark2021" class="citation web cs1">
Clark, Stephen (7 June 2021). <a
rel="nofollow" class="external t
ext" href="http://spaceflightnow.
com/launch-schedule/">"Launch sch
edule". SpaceFlight Now. R
etrieved 7 J
une 2021.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Launch+sched
ule&rft.pub=SpaceFlight+Now&a
mp;rft.date=2021-06-07&rft.au
last=Clark&rft.aufirst=Stephe
n&rft_id=http%3A%2F%2Fspacefl
ightnow.com%2Flaunch-schedule%2F&

```

`&rfr_id=info%3Asid%2Fen.wikipe  
dia.org%3AList+of+Falcon+9+and+Fa  
lcon+Heavy+launches" class="Z398  
8"></span></span>  
</li>  
<li id="cite_note-cooper-689"><sp  
an class="mw-cite-backlink"><b><a  
href="#cite_ref-cooper_689-0">^</  
a></b></span> <span class="refere  
nce-text"><link rel="mw-deduplica  
ted-inline-style" href="mw-data:T  
emplateStyles:r1067248974"/><cite  
id="CITEREFCooper2021" class="cit  
ation web cs1">Cooper, Ben (31 Ma  
y 2021). <a rel="nofollow" class  
="external text" href="http://ww  
w.launchphotography.com/Launch_Vi  
ewing_Guide.html">"Rocket Launch  
Viewing Guide for Cape Canavera  
l"</a>. <i>launchphotography.com  
</i><span class="reference-access  
date">. Retrieved <span class="no  
wrap">2 June</span> 2021</span>.  
</cite><span title="ctx_ver=Z39.8  
8-2004&amp;rft_val_fmt=info%3Aof  
i%2Ffmt%3Akev%3Amtx%3Ajournal&am  
p;rft.genre=unknown&amp;rft.jtitl  
e=launchphotography.com&amp;rft.a  
title=Rocket+Launch+Viewing+Guide  
+for+Cape+Canaveral&amp;rft.date=`

2021-05-31&amp;rft.aulast=Cooper&  
 amp;rft.aufirst=Ben&amp;rft\_id=ht  
 tp%3A%2F%2Fwww.launchphotography.  
 com%2FLaunch\_Viewing\_Guide.html&a  
 mp;rfr\_id=info%3Asid%2Fen.wikiped  
 ia.org%3AList+of+Falcon+9+and+Fal  
 con+Heavy+launches" class="Z398  
 8"></span></span>  
 </li>  
 <li id="cite\_note-nextSFupcoming-  
 690"><span class="mw-cite-backlin  
 k">^ <a href="#cite\_ref-nextSFupc  
 oming\_690-0"><sup><i><b>a</b></i>  
 </sup></a> <a href="#cite\_ref-nex  
 tSFupcoming\_690-1"><sup><i><b>b</  
 b></i></sup></a> <a href="#cite\_r  
 ef-nextSFupcoming\_690-2"><sup><i>  
 <b>c</b></i></sup></a></span> <sp  
 an class="reference-text"><link r  
 el="mw-deduplicated-inline-style"  
 href="mw-data:TemplateStyles:r106  
 7248974"/><cite id="CITEREFBaylo  
 r" class="citation web cs1">Baylo  
 r, Michael. <a rel="nofollow" cla  
 ss="external text" href="https://  
 nextspaceflight.com/launches/?sea  
 rch=SpaceX">"Upcoming Launches: S  
 paceX"</a>. <i>NextSpaceflight</i>  
 ><span class="reference-accessdat  
 e">. Retrieved <span class="nowra



```

p">3 June 2021.</cite>

<li id="cite_note-faa_EA_508-691">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.faa.gov/space/environmental/nepa_docs/media/SpaceX_Falcon_Program_Draft_EA_50

```

8.pdf">"Draft Environmental Assessment for SpaceX Falcon Launches at Kennedy Space Center and Cape Canaveral Air Force Station"</a>  
 <span class="cs1-format">(PDF)</span>. FAA. February 2020<span class="reference-accessdate">. Retrieved <span class="nowrap">10 May</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Draft+Environmental+Assessment+for+SpaceX+Falcon+Launches+at+Kennedy+Space+Center+and+Cape+Canaveral+Air+Force+Station&amp;rft.pub=FAA&amp;rft.date=2020-02&amp;rft\_id=https%3A%2F%2Fwww.faa.gov%2Fspace%2Fenvironmental%2Fnepa\_docs%2Fmedia%2FSpaceX\_Falcon\_Program\_Draft\_EA\_508.pdf&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span></li>

<li id="cite\_note-692"><span class="mw-cite-backlink"><b><a href="#cite\_ref-692">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://arstechnica.com/science/2020/10/after-two-scrubs-elon-musk-says-he-will-visit-spacex-launch-sites-in-florida/">"After two scrubs, Elon Musk says he will visit SpaceX launch sites in Florida"</a>. Ars Technica. 3 October 2020<span class="reference-accessdate">. Retri

```

eved 4 Octob
er 2020.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Abook&rft.genre=unkn
own&rft.btitle=After+two+scru
bs%2C+Elon+Musk+says+he+will+visi
t+SpaceX+launch+sites+in+Florida&
amp;rft.pub=Ars+Technica&rft.
date=2020-10-03&rft_id=https%
3A%2F%2Farstechnica.com%2Fscienc
e%2F2020%2F10%2Fafter-two-scrubs-
elon-musk-says-he-will-visit-spac
ex-launch-sites-in-florida%2F&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-GPS_boosterreus
e-693"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-GPS_boo
sterreuse_693-0"><sup><i>a
</i></sup> <a href="#cite_ref
-GPS_boosterreuse_693-1"><sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation n

```

```

ews cs1"><a rel="nofollow" class
="external text" href="https://sp
acenews.com/spacexs-contract-to-l
aunch-gps-satellites-modified-to-
allow-reuse-of-falcon-9-boosters
/">"SpaceX's GPS contract modifi
ed to allow reuse of Falcon 9 boo
sters". 25 September 2020.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&rft
t.genre=article&rft.atitle=Sp
aceX%27s+GPS+contract+modified+to
+allow+reuse+of+Falcon+9+boosters
&rft.date=2020-09-25&rft_
id=https%3A%2F%2Fspacenews.com%2F
spacexs-contract-to-launch-gps-sa
tellites-modified-to-allow-reuse-
of-falcon-9-boosters%2F&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-GPS_III_5678-69
4"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-GPS_III_5
678_694-0"><sup><i>a</i></
sup> <a href="#cite_ref-GPS_I
II_5678_694-1"><sup><i>b</i></

```

<sup></sup></a></span> <span class="reference-text"><link rel="mw-eduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs 1"><a rel="nofollow" class="external text" href="http://gpsworld.com/air-force-awards-lockheed-martin-contracts-for-next-set-of-gps-iii-satellites/">"Air Force Awards Lockheed Martin Contracts for Next Set of GPS III Satellites"</a>. <i>GPS World</i>. 26 February 2013<span class="reference-accessdate">. Retrieved <span class="nowrap">2 December</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=GPS+World&rft.atitle=Air+Force+Awards+Lockheed+Martin+Contracts+for+Next+Set+of+GPS+III+Satellites&rft.date=2013-02-26&rft\_id=http%3A%2F%2Fgpsworld.com%2Fair-force-awards-lockheed-martin-contracts-for-next-set-of-gps-iii-satellites%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+la</sup>

unches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-airforce\_20170629-695"><span class="mw-cite-backlink"><b><a href="#cite\_ref-airforce\_20170629\_695-0">^</a></b></span> <span class="reference-text">  
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://web.archive.org/web/20171202052927/http://www.losangeles.af.mil/News/Article-Display/Article/1234153/final-rfp-released-for-launch-services-contract/">"Final RFP Released for Launch Services Contract"</a>. U.S. Air Force Space and Missile Systems Center Public Affairs Office. 29 June 2017<span class="reference-accessdate">.  
Retrieved <span class="nowrap">2 December</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Final+RFP+Released+for+Launch+Services+Co

ntract&rft.pub=U.S.+Air+Force  
 +Space+and+Missile+Systems+Center  
 +Public+Affairs+Office&rft.da  
 te=2017-06-29&rft\_id=https%3  
 A%2F%2Fweb.archive.org%2Fweb%2F20  
 171202052927%2Fhttp%3A%2F%2Fwww.l  
 osangeles.af.mil%2FNews%2FArticle  
 -Display%2FArticle%2F1234153%2Ffi  
 nal-rfp-released-for-launch-servi  
 ces-contract%2F&rfr\_id=info%3  
 Asid%2Fen.wikipedia.org%3AList+of  
 +Falcon+9+and+Falcon+Heavy+launch  
 es" class="Z3988"></span>  <i>This  
 article incorporates text from th  
 is source, which is in the <a hre  
 f="/wiki/Public\_domain" title="Pu  
 blic domain">public domain</a></i  
 ><i>.</i></span>



```

<li id="cite_note-696"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.businesswire.com/news/home/20
210119005117/en/Satellogic-and-Sp
aceX-Announce-Multiple-Launch-Agr
eement">"Satellogic and SpaceX An
nounce Multiple Launch Agreement"
. businesswire. 19 January 20
21<span class="reference-accessda
te">. Retrieved <span class="nowr
ap">21 January 2021.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Satellogic+and+SpaceX+Announce+Mu
ltiple+Launch+Agreement&rft.p
ub=businesswire&rft.date=2021
-01-19&rft_id=https%3A%2F%2Fw
ww.businesswire.com%2Fnews%2Fhom
e%2F20210119005117%2Fen%2FSatello
gic-and-SpaceX-Announce-Multiple-
```

Launch-Agreement&#amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-697"><span class="mw-cite-backlink"><b><a href="#cite\_ref-697">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://fcc.report/IBFS/SAT-MOD-20210512-00067/7521191">"FCC Mod Supplement"</a>. 13 May 2021.</cite><span title="ctx\_ver=Z39.88-2004&#amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&#amp;rft.genre=unknown&#amp;rft.btitle=FCC+Mod+Supplement&#amp;rft.date=2021-05-13&#amp;rft\_id=https%3A%2F%2Ffcc.report%2FIBFS%2FSAT-MOD-20210512-00067%2F7521191&#amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-698"><span clas

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.elonx.net/spacex-smallsat-rid
eshare-missions/">"Smallsat Rides
hare Missions"<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">3 February</s
pan> 2021.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Abook&rft.genre=unknown&a
mp;rft.btitle=Smallsat+Rideshare+
Missions&rft_id=https%3A%2F%2
Fwww.elonx.net%2Fspacex-smallsat-
rideshare-missions%2F&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></
span>

<li id="cite_note-699"><span clas
s="mw-cite-backlink">^
<lin
```

```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citation web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nextspaceflight.com/launches/deta
ils/6795">"Polar Starlink"<sp
an class="reference-accessdate">.
Retrieved 28
May 2021.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Polar+Starli
nk&rft_id=https%3A%2F%2Fnexts
paceflight.com%2Flaunches%2Fdetai
ls%2F6795&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-sfn28521-700"><
span class="mw-cite-backlink">
<a href="#cite_ref-sfn28521_700-
0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFClark2021" c
lass="citation web cs1">Clark, St
```

```

ephen (28 May 2021). <a rel="nofo
llow" class="external text" href
="https://spaceflightnow.com/202
1/05/28/five-launches-planned-fro
m-floridas-space-coast-in-jun
e/">"Five launches planned from F
lorida's Space Coast in June". <i>Spaceflight Now</i><span cl
ass="reference-accessdate">. Retr
ieved 28 May
 2021.</cite><span
 title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=Spaceflight
+Now&rft.atitle=Five+launches
+planned+from+Florida%27s+Space+C
oast+in+June&rft.date=2021-05
-28&rft.aulast=Clark&rft.
aufirst=Stephen&rft_id=https%
3A%2F%2Fspaceflightnow.com%2F202
1%2F05%2F28%2Ffive-launches-plann
ed-from-floridas-space-coast-in-j
une%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-701"><span clas
s="mw-cite-backlink"><a href

```

```

="#cite_ref-701">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.spacex.com/updates/inspiratio
n-4-mission/index.html">"Inspirat
ion4"<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">1 February 2021
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Inspiration4&rft_id=http
s%3A%2F%2Fwww.spacex.com%2Fupdate
s%2Finspiration-4-mission%2Finde
x.html&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-Isaacman_Youtub
e-702"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-Isaacma
n_Youtube_702-0"><sup><i>a
</i></sup> <a href="#cite_ref
-Isaacman_Youtube_702-1"><sup><i>

```

```

b</i></sup> <sp
an class="reference-text"><a rel
="nofollow" class="external text"
href="https://www.youtube.com/wat
ch?v=GHjnunTi5XE">Meet The First
 All-Civilian Space Crew | Inspir
ation4 Livestream

<li id="cite_note-703"><span clas
s="mw-cite-backlink">^
<a r
el="nofollow" class="external fre
e" href="https://inspiration4.co
m/crew">https://inspiration4.com/
crew

<li id="cite_note-BW20210201-70
4"><span class="mw-cite-backlin
k"><a href="#cite_ref-BW202102
01_704-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation we
b cs1"><a rel="nofollow" class="e
xternal text" href="https://www.b
usinesswire.com/news/home/2021020
1005905/en/World%E2%80%99s">"Firs
t-All-Civilian-Mission-to-Space-W

```

ill-Usher-in-New-Era-of-Commercial-Space-Exploration"</a>. Business Wire. 1 February 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">11 March </span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=First-All-Civilian-Mission-to-Space-Will-Usher-in-New-Era-of-Commercial-Space-Exploration&amp;rft.pub=Business+Wire&amp;rft.date=2021-02-01&amp;rft\_id=https%3A%2F%2Fwww.businesswire.com%2Fnews%2Fhome%2F20210201005905%2Fen%2FWorld%25E2%2580%2599s&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-705"><span class="mw-cite-backlink"><b><a href="#cite\_ref-705">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF@elonmusk2021" class="citation web



```

cs1">@elonmusk (30 March 2021).
"Probably most "in space" you could possibly feel by being in a glass dome" (Tweet) – via Twitter.</cite>
<span title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Probably+most+%E2%80%9Cin+space%E2%80%9D+you+could+possibly+feel+by+being+in+a+glass+dome&rft.date=2021-03-30&rft.au=%40elonmusk&rft_id=https%3A%2F%2Ftwitter.com%2Felonmusk%2Fstatus%2F1376904492478791689&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-gunter-sarah1-706">^ ^{<i>a</i>} ^{<i>b</i>}

```

```

></i></sup> <a href="#cite_re
f-gunter-sarah1_706-2"><sup><i>c</i></sup> <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFKrebs"
class="citation web cs1">Krebs,
Gunter. <a rel="nofollow" class
="external text" href="http://spa
ce.skyrocket.de/doc_sdat/sarah-a.
htm">"SARah 1". Gunter's Spac
e Page<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">18 February 2021
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=SARah+1&rft.pub=Gunter%2
7s+Space+Page&rft.aulast=Kreb
s&rft.aufirst=Gunter&rft_
id=http%3A%2F%2Fspace.skyrocket.d
e%2Fdoc_sdat%2Fsarah-a.htm&rf
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-spx-20130808-70

```

7"><span class="mw-cite-backlin  
k"><b><a href="#cite\_ref-spx-2013  
0808\_707-0">^</a></b></span> <spa  
n class="reference-text"><link re  
l="mw-deduplicated-inline-style"  
href="mw-data:TemplateStyles:r10  
67248974"/><cite id="CITEREFPost2  
013" class="citation pressrelease  
cs1">Post, Hannah (8 August 201  
3). <a rel="nofollow" class="exte  
rnal text" href="https://web.arch  
ive.org/web/20180220060058/htt  
p://www.spacex.com/press/2013/08/  
08/spacex-awarded-launch-german-r  
adar-reconnaissance-satellite-sys  
tem">"SpaceX is awarded launch of  
german radar reconnaissance satel  
lite system"</a> (Press release).  
SpaceX. Archived from <a rel="nof  
ollow" class="external text" href  
="http://www.spacex.com/press/201  
3/08/08/spacex-awarded-launch-ger  
man-radar-reconnaissance-satellit  
e-system">the original</a> on 20  
February 2018<span class="refere  
nce-accessdate">. Retrieved <span  
class="nowrap">25 September</span  
> 2017</span>.</cite><span title  
="ctx\_ver=Z39.88-2004&amp;rft\_val  
\_fmt=info%3Aofi%2Ffmt%3Akev%3Amt

```

x%3Abook&rft.genre=unknown&
p;rft.btitle=SpaceX+is+awarded+la
unch+of+german+radar+reconnaisan
ce+satellite+system&rft.pub=SpaceX&rft.date=2013-08-08&
p;rft.aulast=Post&rft.aufirst=Hannah&rft_id=http%3A%2F%2Fww.spacex.com%2Fpress%2F2013%2F08%2F08%2Fspacex-awarded-launch-german-radar-reconnaissance-satellite-system&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-Deutscher_Bundestag-708">^ ^{<i>>a</i>} ^{<i>b</i>}
 <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1 cs1-prop-foreign-lang-source"><a rel="nofollow" class="external text" href="https://dipbt.bundestag.de/dip21/btd/

```

19/072/1907253.pdf">"German load transports into space"</a> <span class="cs1-format">(PDF)</span> (in German). 21 January 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">10 February</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=German+load+transports+into+space&amp;rft.date=2019-01-21&amp;rft\_id=https%3A%2F%2Fdipbt.bundestag.de%2Fdiip21%2Fbtd%2F19%2F072%2F1907253.pdf&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-gunter-sarah2-709"><span class="mw-cite-backlink">^ <a href="#cite\_ref-gunter-sarah2\_709-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-gunter-sarah2\_709-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248

```

974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. "SARah 2/3". Gunter's Space Page. Retrieved 17 October 2017.</cite>

<li id="cite_note-Ridesharefl-710">^ ^{<i>a</i>} ^{<i>b</i>} <a href="#cite_ref-Rid

```

```

esharefl_710-2"><sup><i>c
</i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://rideshar
e.spacex.com/search?orbitClassifi
cation=1&launchDate=2020-05-1
0&payloadMass=1">"Rideshare P
rogram listing". SpaceX. R
etrieved 3 A
pril 2021.</cite><s
pan title="ctx_ver=Z39.88-2004&
;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Rideshare+Pr
ogram+listing&rft.pub=SpaceX&
;rft_id=https%3A%2F%2Frideshar
e.spacex.com%2Fsearch%3ForbitClas
sification%3D1%26launchDate%3D202
0-05-10%26payloadMass%3D1&rfr
_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-711"><span clas

```

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFSE
S_S.A.2021" class="citation web c
s1">SES S.A. (25 February 2021).
 <a rel="nofollow" class="externa
l text" href="https://www.ses.co
m/sites/default/files/2021-03/210
305_SES-AR2020.pdf">"Annual Repor
t 2020" <span class="cs1-form
at">(PDF). p. 25. Re
trieved 26 M
arch 2021.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Annual+Repor
t+2020&rft.pages=25&rft.d
ate=2021-02-25&rft.au=SES+S.
A.&rft_id=https%3A%2F%2Fwww.s
es.com%2Fsites%2Fdefault%2Ffiles%
2F2021-03%2F210305_SES-AR2020.pdf
&rft_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">
```



```


<li id="cite_note-auto7-712">^ ^{<i>a</i>} ^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"SES Selects SpaceX to Launch Groundbreaking O3b mPOWER MEO Communications System". Business Wire News. 9 September 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SES+Selects+SpaceX+to+Launch+Groundbreaking+O3b+mPOWER+MEO+Communications+System&rft.pub=Business+Wire+News&rft.date=2019-09-09&rft_

```

```

id=https%3A%2F%2Fbusiness.financi
alpost.com%2Fpmn%2Fpress-releases
-pmn%2Fbusiness-wire-news-release
s-pmn%2Fses-selects-spacex-to-lau
nch-groundbreaking-o3b-mpower-meo
-communications-system&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-auto6-713"><spa
n class="mw-cite-backlink">^ <a h
ref="#cite_ref-auto6_713-0"><sup>
<i>a</i></sup> <sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite class="citation w
eb cs1"><a rel="nofollow" class
="external text" href="https://sp
acenews.com/spacex-to-launch-sess
-o3b-mpower-constellation-on-two-
falcon-9-rockets/">"SpaceX to lau
nch SES's O3b mPower constellatio
n on two Falcon 9 rockets". S
paceNews. 9 September 2019.</cite
><span title="ctx_ver=Z39.88-2004

```

```

&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=SpaceX+to+launch+SES%27s+O3b+mPower+constellation+on+two+Falcon+9+rockets&rft.pub=SpaceNews&rft.date=2019-09-09&rft_id=https%3A%2F%2Fspacenews.com%2Fspacex-to-launch-sess-o3b-mpower-constellation-on-two-falcon-9-rockets%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-714">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"CRS-22 Mission Overview" (PDF). Retrieved <s

```

```
pan class="nowrap">27 May
 2021.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=CRS-22+Mission+Overv
iew&rft_id=https%3A%2F%2Fwww.
nasa.gov%2Fsites%2Fdefault%2Ffile
s%2Fatoms%2Ffiles%2Fspacex_crs-22
_mision_overview_0.pdf&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-SFN20201229-71
5"><span class="mw-cite-backlin
k"><a href="#cite_ref-SFN20201
229_715-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFClark20
20" class="citation web cs1">Clar
k, Stephen (29 December 2020). <a
rel="nofollow" class="external te
xt" href="https://spaceflightnow.
com/2020/12/29/three-astronauts-a
ssigned-to-crew-dragon-mission-in
-late-2021/">"Three astronauts as
```

signed to Crew Dragon mission in late 2021". Spaceflight Now

</li>

<li id="cite\_note-sfn-20210523-716"><span class="mw-cite-backlink">^ <a href="#cite\_ref-sfn-20210523\_716-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-sfn-20210523\_716-1"><sup><i><b>b</b></i></sup></a></span> <span class

```
= "reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFClark2021" c
lass="citation web cs1">Clark, St
ephen (23 May 2021). <a rel="nofo
llow" class="external text" href
="https://spaceflightnow.com/202
1/05/23/falcon-heavy-s-first-natio
nal-security-launch-slips-to-octo
ber/">"Falcon Heavy's first natio
nal security launch slips to Octo
ber". <i>Spaceflight Now</i><
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">23 May 2021.</ci
te><span title="ctx_ver=Z39.88-20
04&rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Ajournal&rft.
genre=unknown&rft.jtitle=Spac
eflight+Now&rft.atitle=Falcon
+Heavy%27s+first+national+securit
y+launch+slips+to+October&rft.
date=2021-05-23&rft.aulast=
Clark&rft.aufirst=Stephen&am
p;rft_id=https%3A%2F%2Fspacefligh
tnow.com%2F2021%2F05%2F23%2Ffalco
n-heavy-s-first-national-security-
launch-slips-to-october%2F&rft
r_id=info%3Asid%2Fen.wikipedia.or
```

g%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-USDD190219-717"><span class="mw-cite-backlink">^ <a href="#cite\_ref-USDD190219\_717-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-USDD190219\_717-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://dod.defense.gov/News/Contracts/Contract-View/Article/1760766/">"U.S. Department of Defense Contracts for February 19, 2019"</a>. 19 February 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">20 February</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=U.S.+Department+of+Defense+Contracts+for+February+19%2C+2019&amp;rft.date=

2019-02-19&#amp;rft\_id=https%3A%2F%2Fdod.defense.gov%2FNews%2FContracts%2FContract-View%2FArticle%2F1760766%2F&#amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i> <i>.</i></span> </li> <li id="cite\_note-718"><span class="mw-cite-backlink"><b><a href="#cite\_ref-718">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-sty



```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/millennium-space-de
livers-cubesat-for-upcoming-u-s-s
pace-force-rideshare-mission/">"M
illennium Space delivers smallsat
for upcoming U.S. Space Force rid
eshare mission". 21 April 202
0.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Millennium+Space+delivers+smallsa
t+for+upcoming+U.S.+Space+Force+r
ideshare+mission&rft.date=202
0-04-21&rft_id=https%3A%2F%2F
spacenews.com%2Fmillennium-space-
delivers-cubesat-for-upcoming-u-s-
-space-force-rideshare-mission%2F
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">

<li id="cite_note-719"><span clas
s="mw-cite-backlink">^
<lin

```

```
k rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2020" class="citation web cs1">Clark, Stephen (27 April 2020). "Falcon Heavy set for design validation milestone before late 2020 launch". Spaceflight Now. Retrieved 23 September 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Falcon+Heavy+set+for+design+validation+milestone+before+late+2020+launch&rft.pub=Spaceflight+Now&rft.date=2020-04-27&rft.au=Clark&rft.aufirst=Stephen&rft_id=https%3A%2F%2Fspaceflightnow.com%2F2020%2F04%2F27%2Ffalcon-heavy-on-track-for-design-validation-milestone-before-late-2020-launch%2F&rfr_id=inf
```

```
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-720"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nextspaceflight.com/launches/deta
ils/1151">"USSF-44 will use a new
Droneship according to launch sch
edule". Next Spaceflight. 2 J
une 2021<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">3 June 2021</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
USSF-44+will+use+a+new+Droneship+
according+to+launch+schedule&
rft.pub=Next+Spaceflight&rft.
date=2021-06-02&rft_id=https%
3A%2F%2Fnextspaceflight.com%2Flau
```

```
nches%2Fdetails%2F1151&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-721"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spaceexplored.com/2021/06/05/excl
usive-new-photos-of-a-shortfall-o
f-gravitas-show-spacexs-new-drone
ship-is-getting-close-to-don
e/">"Exclusive: New photos of A S
hortfall Of Gravitas show Space
X's new droneship is getting clos
e to done". 5 June 2021.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Abook&rft.genr
e=unknown&rft.btitle=Exclusiv
e%3A+New+photos+of+A+Shortfall+Of
+Gravitas+show+SpaceX%E2%80%99s+n
ew+droneship+is+getting+close+to+
```

```

done&rft.date=2021-06-05&
rft_id=https%3A%2F%2Fspaceexplo
d.com%2F2021%2F06%2F05%2Fexclusiv
e-new-photos-of-a-shortfall-of-gr
avitas-show-spacexs-new-droneship
-is-getting-close-to-done%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-722"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="http://n
extspaceflight.com/launches/agenc
y/upcoming/1/">"SpaceX Launch Man
ifest". <i>nextspaceflight.co
m</i><span class="reference-acces
sdate">. Retrieved <span class="n
owrap">25 May 2021.
</cite><span title="ctx_ver=Z39.8
8-2004&rft_val_fmt=info%3Aof
i%2Fmt%3Akev%3Amtx%3Ajournal&am
p;rft.genre=unknown&rft.jtitl

```

```

e=nextspaceflight.com&rft.ati
tle=SpaceX+Launch+Manifest&rft
t_id=http%3A%2F%2Fnextspacefligh
t.com%2Flaunches%2Fagency%2Fupcom
ing%2F1%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988">

<li id="cite_note-723"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/air-force-awards-73
9-million-in-launch-contracts-to-
ula-and-spacex/">"Air Force award
s US$739 million in launch contra
cts to ULA and SpaceX". Space
News. 19 February 2019.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=Air+Force+aw
ards+US%24739+million+in+launch+c
ontracts+to+ULA+and+SpaceX&rft

```

```

t.pub=SpaceNews&rft.date=2019
-02-19&rft_id=https%3A%2F%2Fs
pacenews.com%2Fair-force-awards-7
39-million-in-launch-contracts-to
-ula-and-spacex%2F&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-NASA_ixpe-724">
^
 <a href="#cite_ref-NASA_ixpe_724
-0">^{<i>a</i>} <a href="#cite_ref-NASA_ixpe_72
4-1">^{<i>b</i>}</
a> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFBrown2019" class="citati
on web cs1">Brown, Katherine (8 J
uly 2019). <a rel="nofollow" clas
s="external text" href="http://ww
w.nasa.gov/press-release/nasa-awa
rds-launch-services-contract-for-
groundbreaking-astronautics-missi
on">"NASA Awards Launch Services
Contract for Astrophysics Missio
n". NASA<span class="referenc

```

e-accessdate">. Retrieved <span class="nowrap">8 July</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+Awards+Launch+Services+Contract+for+Astrophysics+Mission&rft.pub=NASA&rft.date=2019-07-08&rft.aulast=Brown&rft.aufirst=Katherine&rft\_id=http%3A%2F%2Fwww.nasa.gov%2Fpress-release%2Fnasa-awards-launch-services-contract-for-groundbreaking-astrophysics-mission&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span><img alt="Public Domain" src="//upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/12px-PD-icon.svg.png" decoding="async" width="12" height="12" class="noviewer" srcset="//upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/18px-PD-icon.svg.png 1.5x, //upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/24px-PD-icon.svg.png 2x" data-file-width="196" data-file-height="196" /



```

> <i>This article incorporates te
xt from this source, which is in
 the <a href="/wiki/Public_domai
n" title="Public domain">public d
omain</i><i>.</i>

<li id="cite_note-725"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasa.gov/feature/dart-launch-
moves-to-secondary-window">"DART
 Launch Moves to Secondary Windo
w"<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">17 February 2021
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=DART+Launch+Moves+to+Seconda
ry+Window&rft_id=https%3A%2F%
2Fwww.nasa.gov%2Ffeature%2Fdart-l
aunch-moves-to-secondary-window&a
mp;rfr_id=info%3Asid%2Fen.wikiped

```

```

ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-NASA_DART-726">
^
 <a href="#cite_ref-NASA_DART_726
-0">^{<i>a</i>} <a href="#cite_ref-NASA_DART_72
6-1">^{<i>b</i>}</
a> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFNorthon2019" class="cita
tion web cs1">Northon, Karen (11
 April 2019). <a rel="nofollow" c
lass="external text" href="htt
p://www.nasa.gov/press-release/na
sa-awards-launch-services-contrac
t-for-asteroid-redirect-test-miss
ion">"NASA Awards Launch Services
Contract for Asteroid Redirect Te
st". NASA<span class="referen
ce-accessdate">. Retrieved 12 April 2
019.</cite><span title="ct
x_ver=Z39.88-2004&rft_val_fmt
=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ab
ook&rft.genre=unknown&rft

```

```

t.btitle=NASA+Awards+Launch+Servi
ces+Contract+for+Asteroid+Redirec
t+Test&#rft.pub=NASA&#rft.d
ate=2019-04-11&#rft.aulast=Nor
thon&#rft.aufirst=Karen&#rft
t_id=http%3A%2F%2Fwww.nasa.gov%2F
press-release%2Fnasa-awards-launc
h-services-contract-for-asteroid-
redirect-test-mission&#rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"> <
img alt="Public Domain" src="//up
load.wikimedia.org/wikipedia/en/t
humb/6/62/PD-icon.svg/12px-PD-ico
n.svg.png" decoding="async" width
="12" height="12" class="noviewe
r" srcset="//upload.wikimedia.or
g/wikipedia/en/thumb/6/62/PD-ico
n.svg/18px-PD-icon.svg.png 1.5x,
//upload.wikimedia.org/wikipedi
a/en/thumb/6/62/PD-icon.svg/24px-
PD-icon.svg.png 2x" data-file-wid
th="196" data-file-height="196" /
> <i>This article incorporates te
xt from this source, which is in
the <a href="/wiki/Public_domai
n" title="Public domain">public d
omain</i><i>.</i>


```

```
<li id="cite_note-727"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nssdc.gsfc.nasa.gov/nmc/spacecraf
t/display.action?id=DART">"Double
Asteroid Redirection Test (DART)"
<span class="reference-access
date">. Retrieved <span class="no
wrap">11 September 2019</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Abook&am
p;rft.genre=unknown&rft.btitl
e=Double+Asteroid+Redirection+Tes
t+%28DART%29&rft_id=https%3A%
2F%2Fnssdc.gsfc.nasa.gov%2Fnmc%2F
spacecraft%2Fdisplay.action%3Fid%
3DDART&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988"> <i>This artic
le incorporates text from this so
urce, which is in the <a href="/w
iki/Public_domain" title="Public
 domain">public domain</i><i
>.</i>

<li id="cite_note-728"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFo
ust,_Jeff_[@jeff_foust]20
21" class="citation web cs1"><a h
ref="/wiki/Jeff_Foust" title="Jef
f Foust">Foust, Jeff [@jeff_fous
t] (9 February 2021). <a rel
="nofollow" class="external text"
href="https://twitter.com/jeff_fo
ust/status/135919046911322522
```

4">"In a SmallSat Symposium session, Jarrod McLachlan of SpaceX says they have two more dedicated rideshare launches, Transporter-2 and -3, scheduled for later this year. No estimate on # of satellites on each, but he said demand is "strong and growing."<span class="cs1-kern-right"></span>"</a>

(Tweet). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20210209172545/https://twitter.com/jeff\_foust/status/1359190469113225224">Archive</a> from the original on 9 February 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">3 March</span> 2021</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=In+a+SmallSat+Symposium+session%2C+Jarrod+McLachlan+of+SpaceX+says+they+have+two+more+dedicated+rideshare+launches%2C+Transporter-2+and+-3%2C+scheduled+for+later+this+year.+No+estimate+on+%23+of+sat

ellites+on+each%2C+but+he+said+demand+is+%E2%80%9Cstrong+and+growing.%E2%80%9D&#x26;rft.date=2021-02-09&#x26;rft.au=Foust%2C+Jeff+%5B%40jeff\_foust%5D&#x26;rft\_id=https%3A%2F%2Ftwitter.com%2Fjeff\_foust%2Fstatus%2F1359190469113225224&#x26;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-729"><span class="mw-cite-backlink"><b><a href="#cite\_ref-729">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs2019" class="citation web cs1">Krebs, Gunter (6 September 2019). <a rel="nofollow" class="external text" href="http://space.skyrocket.de/doc\_sdat/turksat-5b.htm">"Türksat 5B"</a>. Gunter's Space Page<span class="reference-accessdate">. Retrieved <span class="nowrap">23 September</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&#x26;rft\_val\_fmt=i

```

nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&rf.genre=unknown&rf.b
title=T%C3%BCrksat+5B&rf.pub
=Gunter%27s+Space+Page&rf.da
te=2019-09-06&rf.aulast=Kreb
s&rf.aufirst=Gunter&rf_
id=http%3A%2F%2Fspace.skyrocket.d
e%2Fdoc_sdat%2Fturksat-5b.htm&
p;rf_r_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-via-20210504-73
0"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-via-20210
504_730-0"><sup><i>a</i></
sup> <a href="#cite_ref-via-2
0210504_730-1"><sup><i>b</
i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFJewett2021"
class="citation web cs1">Jewett,
Rachel (4 May 2021). <a rel="nofo
llow" class="external text" href
="https://www.satellitetoday.com/
business/2021/05/04/maxar-takes-h
it-from-sirius-xm-satellite-loss-

```



pushes-legion-launch-to-q4/">"Maxar Takes Hit from SiriusXM Satellite Loss, Pushes Legion Launch to Q4"</a>. <i>Via Satellite</i><span class="reference-accessdate">.

Retrieved <span class="nowrap">6 May</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Via+Satellite&amp;rft.atitle=Maxar+Takes+Hit+from+SiriusXM+Satellite+Loss%2C+Pushes+Legion+Launch+to+Q4&amp;rft.date=2021-05-04&amp;rft.aulas=t+Jewett&amp;rft.aufirst=Rachel&amp;rft\_id=https%3A%2F%2Fwww.satellitetoday.com%2Fbusiness%2F2021%2F05%2F04%2Fmaxar-takes-hit-from-sirius-xm-satellite-loss-pushes-legion-launch-to-q4%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-worldviewlegion-731"><span class="mw-cite-backlink">^ <a href="#cite\_ref-worldviewlegion\_731-0"><sup><i><b>a</b></i></sup>

<sup>1</sup>[b](#cite_ref-worldviewlegion_731-1)  
<sup>2</sup>[c](#cite_ref-worldviewlegion_731-2)  
<sup>3</sup>[d](#cite_ref-worldviewlegion_731-3)  
<sup>4</sup>[e](#cite_ref-worldviewlegion_731-4)  
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://www.businesswire.com/news/home/20180314005049/en/Maxar-Technologies%E2%80%99-DigitalGlobe-Selects-SpaceX-Launch-Next-generation">"Maxar Technologies' DigitalGlobe Selects SpaceX to Launch its Next-generation WorldView Legion Satellites"</a>. 14 March 2018<span class="reference-accessdate">. Retrieved <span class="nowrap">14 March</span> 2018</span>.<q>Maxar Technologies' DigitalGlobe Selects SpaceX to Launch its Next-generation WorldView Legion Satellites</q></cite><span titl

```

e="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Maxar+Technologies%27+DigitalGlobe+Selects+SpaceX+to+Launch+its+Next-generation+WorldView+Legion+Satellites&rft.date=2018-03-14&rft_id=https%3A%2F%2Fwww.businesswire.com%2Fnews%2Fhome%2F20180314005049%2Fen%2FMaxar-Technologies%25E2%2580%2599-DigitalGlobe-Selects-SpaceX-Launch-Next-generation&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-spaceflightnow_2020-02-18-732">^ ^{<i>a</i>}
^{<i>b</i>} <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFClark2020"

```

```

class="citation web cs1">Clark, S
tephen (18 February 2020). <a rel
="nofollow" class="external text"
href="https://spaceflightnow.com/
2020/02/18/space-adventures-annou
nces-plans-to-launch-private-citi
zens-on-spacex-crew-capsule/">"Sp
ace Adventures announces plans to
fly private citizens on SpaceX cr
ew capsule". Spaceflight Now<
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">23 September 2020.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Space+Adventures+announces+plans+
to+fly+private+citizens+on+SpaceX
+crew+capsule&rft.pub=Spacefl
ight+Now&rft.date=2020-02-18&
amp;rft.aulast=Clark&rft.aufi
rst=Stephen&rft_id=https%3A%2
F%2Fspaceflightnow.com%2F2020%2F0
2%2F18%2Fspace-adventures-announc
es-plans-to-launch-private-citize
ns-on-spacex-crew-capsule%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></

```

```
span>

<li id="cite_note-733"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFHa
rwood2020" class="citation web cs
1">Harwood, William (18 February
 2020). <a rel="nofollow" class
="external text" href="https://ww
w.cbsnews.com/news/spacex-space-a
dventures-tourism-orbit-crew-drag
on-2022/">"SpaceX and Space Adven
tures to launch space tourism fli
ght in 2022". <i>CBS News</i>
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">23 September 2020.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=unknown&rft.jtit
le=CBS+News&rft.atitle=SpaceX
+and+Space+Adventures+to+launch+s
pace+tourism+flight+in+2022&r
ft.date=2020-02-18&rft.aulast
=Harwood&rft.aufirst=William&
```

```

&rft_id=https%3A%2F%2Fwww.cbsn
ews.com%2Fnews%2Fspacex-space-adv
entures-tourism-orbit-crew-dragon
-2022%2F&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-734"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http://
www.collectspace.com/news/news-01
2621a-axiom-space-ax1-crew-announ
ce.html">"Axiom Space names first
private crew to launch to space s
tation". collect SPACE. 26 Ja
nuary 2021<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">1 February 202
1.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&rft.genre=article&rft
t.atitle=Axiom+Space+names+first+

```

```

private+crew+to+launch+to+space+sta
tion&rf=2021-01-26&rf_id=http%3A%2F%2Fwww.collect
space.com%2Fnews%2Fnews-012621a-axiom-space-ax1-crew-announce.html
&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z398
8">

<li id="cite_note-735">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREF0'Kane2020" class="citation web cs1">O'Kane, Sean (5 March 2020). "Space X will send three tourists to the International Space Station next year". The Verge. Retrieved 23 September 2020.</cite><sp

```


```

an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=SpaceX+will+
send+three+tourists+to+the+Intern
ational+Space+Station+next+year&a
mp;rft.pub=The+Verge&rft.date
=2020-03-05&rft.aulast=0%27Ka
ne&rft.aufirst=Sean&rft_i
d=https%3A%2F%2Fwww.theverge.com%
2F2020%2F3%2F5%2F21166657%2Fspace
x-tourists-iss-international-spac
e-station-orbit-falcon-9-dragon&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

<li id="cite_note-736"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFNA
SA_Commercial_Crew_[@Commerci
al_Crew]2021" class="citation
web cs1">NASA Commercial Crew [@C
ommercial_Crew] (12 February 202
1). <a rel="nofollow" class="exte

```



rnal text" href="https://twitter.com/Commercial\_Crew/status/1360307237709840394">"NASA astronauts @astro\_kjell and Bob Hines have been assigned to launch on the agency's @SpaceX Crew-4 mission to the @Space\_Station. The mission is expected to launch in 2022 from @NASAKennedy.  Get to know more about the Crew-4 @NASA\_Astronauts: t.co/p83i4IwpfQ t.co/a2Es9a8e3c"</a> (Tweet). <a rel="nofollow" class="external text" href="https://web.archive.org/web/20210227135803/https://twitter.com/Commercial\_Crew/status/1360307237709840394">Archived</a> from the original on 27 February 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">3 March</span> 2021</span> &#8211; via <a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=NASA+astronauts+%40astro\_kjell+and+Bob+Hines+have+been+assigned+to+launch+on+the+agency%E2%80%99s+%40SpaceX+Crew-4+mi

ssion+to+the+%40Space\_Station.+Th  
e+mission+is+expected+to+launch+i  
n+2022+from+%40NASAKennedy.+%F0%9  
F%9A%80+Get+to+know+more+about+th  
e+Crew-4+%40NASA\_Astronauts%3A+t.  
co%2Fp83i4IwpfQ+t.co%2Fa2Es9a8e3c  
&rft.date=2021-02-12&rft.  
au=NASA+Commercial+Crew+%5B%40Com  
mercial\_Crew%5D&rft\_id=https%  
3A%2F%2Ftwitter.com%2FCommercial\_  
Crew%2Fstatus%2F13603072377098403  
94&rfr\_id=info%3Asid%2Fen.wik  
ipedia.org%3AList+of+Falcon+9+and  
+Falcon+Heavy+launches" class="Z3  
988"></span></span>  
</li>  
<li id="cite\_note-sn-20200820-73  
7"><span class="mw-cite-backlin  
k">^ <a href="#cite\_ref-sn-202008  
20\_737-0"><sup><i><b>a</b></i></s  
up></a> <a href="#cite\_ref-sn-202  
00820\_737-1"><sup><i><b>b</b></i>  
</sup></a> <a href="#cite\_ref-sn-  
20200820\_737-2"><sup><i><b>c</b>  
</i></sup></a></span> <span class  
="reference-text"><link rel="mw-d  
eduplicated-inline-style" href="m  
w-data:TemplateStyles:r106724897  
4"/><cite id="CITEREFHenry2020" c  
lass="citation web cs1">Henry, Ca

leb (20 August 2020). <a rel="nofollow" class="external text" href="https://spacenews.com/ses-taps-spacex-for-two-additional-falcon-9-launches/">"SES taps SpaceX for two additional Falcon 9 launches"</a>. SpaceNews<span class="reference-accessdate">. Retrieved <span class="nowrap">23 September</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=SES+taps+SpaceX+for+two+additional+Falcon+9+launches&amp;rft.pub=SpaceNews&amp;rft.date=2020-08-20&amp;rft.aulast=Henry&amp;rft.aufirst=Caleb&amp;rft\_id=https%3A%2F%2Fspacenews.com%2Fses-taps-spacex-for-two-additional-falcon-9-launches%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-spacex-smallsat-738"><span class="mw-cite-backlink">^ <a href="#cite\_ref-spacex-smallsat\_738-0"><sup><i><b>a</b></i></sup>

<sup>[b](#cite_ref-spacex-smalllsat_738-1)</sup>  
<sup>[c](#cite_ref-spacex-smalllsat_738-2)</sup>  
<sup>[d](#cite_ref-spacex-smalllsat_738-3)</sup>  
<sup>[e](#cite_ref-spacex-smalllsat_738-4)</sup>  
<sup>[f](#cite_ref-spacex-smalllsat_738-5)</sup>

[eduplicated-inline-style href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs 1"><a rel="nofollow" class="external text" href="https://i.imgur.com/m7s8JF8.png">"SpaceX Satellite Rideshare Program Available Flights"</a>. <i><a href="/wiki/Space X" title="SpaceX">SpaceX</a></i>. Archived from <a rel="nofollow" class="external text" href="https://rideshare.spacex.com/search">the original</a> on 5 June 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">5 June</span> 2021</span>.</cite><span title="ctx\\_ver=Z39.88-20](#)

```

04&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=SpaceX&rft.atitle=SpaceX+Satellite+Rideshare+Program+Available+Flights&rft_id=https%3A%2F%2Frideshare.spacex.com%2Fsearch&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"> Archived via Imgur.

<li id="cite_note-739">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Intuitive Machines-1 Orbital Debris Assessment Report (ODAR) Revision 1.1" (PDF).<i><a href="/wiki/Intuitive_Machines" title="Intuitive Machin

```

es">Intuitive Machines</a></i>. <a href="/wiki/Federal\_Communications\_Commission" title="Federal Communications Commission">FCC</a>. 22 April 2021<span class="reference-accessdate">. Retrieved <span class="nowrap">24 April</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Intuitive+Machines&amp;rft.atitle=Intuitive+Machines-1+Orbital+Debris+Assessment+Report+%28ODAR%29+Revision+1.1&amp;rft.date=2021-04-22&amp;rft\_id=https%3A%2F%2Ffcc.report%2FIBFS%2FSAT-LOA-20210423-00055%2F6378695.pdf&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-740"><span class="mw-cite-backlink"><b><a href="#cite\_ref-740">^</a></b></span>  
<span class="reference-text"><a rel="nofollow" class="external free" href="https://www.nasa.gov/feature/first-commercial-moon-delive

ry-assignments-to-advance-artemis"><https://www.nasa.gov/feature/first-commercial-moon-delivery-assignments-to-advance-artemis>  <i>This article incorporates text from this source, which is in the <a href="/wiki/Public\_domain" title="Public domain">public domain</a></i><i>.</i></span></li>

<li id="cite\_note-741"><span class="mw-cite-backlink"><b><a href="#cite\_ref-741">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFMathews2019" class="citation web cs

```
1">Mathews, Chris (5 June 2019).
 "Houston co. receives US$77 million NASA contract for lunar mission". <i>bizjournals.com</i>. Retrieved 1 September 2019.</cite>

```



```
<li id="cite_note-arst-20190601-742">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"NASA picks three companies to attempt Moon landings in 2020 and 2021". Ars Technica. 31 May 2019. Retrieved 31 August 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+picks+three+companies+to+attempt+Moon+landings+in+2020+and+2021&rft.pub=Ars+Technica&rft.date=2019-05-31&rft_id=https%3A%2F%2Farstechnica.com%2Fscience%2F2019%2F05%2Fnasa-picks-three-companies-to-attempt-moon-l
```

andings-in-2020-and-2021%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>  
<li id="cite\_note-743"><span class="mw-cite-backlink"><b><a href="#cite\_ref-743">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://nextspaceflight.com/launches/details/1915">"IM-1 Nova-C & DOGE-1"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">9 May</span> 2021</span>>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=IM-1+Nova-C+%26+DOGE-1&rft\_id=https%3A%2F%2Fnextspaceflight.com%2Flaunches%2Fdetails%2F1915&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

```


<li id="cite_note-744"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFGe
ometric_Energy_press_release" cla
ss="citation web cs1">Geometric E
nergy press release. <a rel="nofo
llow" class="external text" href
="https://www.newswire.ca/news-re
leases/spacex-to-launch-doge-1-to
-the-moon--875845973.html">"Space
X to Launch DOGE-1 to the Moon!"
. <i>www.newswire.ca</i>. Re
trieved 10 M
ay 2021.</cite><spa
n title="ctx_ver=Z39.88-2004&
rft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=www.newswir
e.ca&rft.atitle=SpaceX+to+Lau
nch+DOGE-1+to+the+Moon%21&rft
.au=Geometric+Energy+press+relea
se&rft_id=https%3A%2F%2Fwww.n
ewswire.ca%2Fnews-releases%2Fpac

```

```

ex-to-launch-doge-1-to-the-moon--
875845973.html&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-745"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFWe
rner2021" class="citation web cs
1">Werner, Debra (25 February 202
1). <a rel="nofollow" class="exte
rnal text" href="https://spacenew
s.com/maxar-q4-2020/">"Maxar rema
ins focused on multiyear diversif
ication strategy". <i><a href
="/wiki/SpaceNews" title="SpaceNe
ws">SpaceNews</i><span class
="reference-accessdate">. Retriev
ed 6 May</sp
an> 2021.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=SpaceNews&rft
.title=Maxar+remains+focused+on

```

```

+multiyear+diversification+strate
gy&rft.date=2021-02-25&rft.aulast=Werner&rft.aufirst=Debra&rft_id=https%3A%2F%2Fspace
news.com%2Fmaxar-q4-2020%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-NASA-SMSR-746">
^
 ^{<i>a</i>}
 ^{<i>b</i>}
 ^{<i>c</i>}
 ^{<i>d</i>}
 ^{<i>e</i>}
 ^{<i>f</i>}
 ^{<i>g</i>}
 ^{<i>h</i>}
 <sup><i>i</i>

```

```

></sup> <a href="#cite_ref-NA
SA-SMSR_746-9">^{<i>j</i>} <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://sma.nasa.
gov/docs/default-source/sma-disci
plines-and-programs/smsr/smsr-int
egrated-master-schedule_24feb202
0.pdf">"SMSR Integrated Master Sc
hedule" <span class="cs1-form
at">(PDF). <i>Office of Sa
fety and Mission Assurance</i>. <
a href="/wiki/NASA" title="NASA">
NASA. 28 April 2021<span clas
s="reference-accessdate">. Retriev
ed 3 May</s
pan> 2021.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Ajournal&rft.genre=unknown&rft.jtitle=Office+of+Safety
+and+Mission+Assurance&rft.at
itle=SMSR+Integrated+Master+Sched
ule&rft.date=2021-04-28&rft_id=https%3A%2F%2Fsma.nasa.gov%
2Fdocs%2Fdefault-source%2Fsma-dis

```

ciplines-and-programs%2Fsmr%2Fsmr-intergrated-master-schedule\_24feb2020.pdf&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-747"><span class="mw-cite-backlink"><b><a href="#cite\_ref-747">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFErwin2018" class="citation news cs1">Erwin, Sandra (21 June 2018). <a rel="nofollow" class="external text" href="http://spacenews.com/spacex-wins-130-million-military-launch-contract-for-falcon-heavy/">"SpaceX wins \$130 million military launch contract for Falcon Heavy"</a>. SpaceNews<span class="reference-accessdate">. Retrieved <span class="nowrap">12 September</span> 2018</span></cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+wi

```

ns+%24130+million+military+launch
+contract+for+Falcon+Heavy&rft
.date=2018-06-21&rft.aulast=
Erwin&rft.aufirst=Sandra&
rft_id=http%3A%2F%2Fspacenews.co
m%2Fspacex-wins-130-million-milit
ary-launch-contract-for-falcon-he
avy%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-748"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2018" class="citation news cs
1">Clark, Stephen (26 June 2018).
<a rel="nofollow" class="external
text" href="https://spaceflightno
w.com/2018/06/26/u-s-air-force-ce
rtifies-falcon-heavy-rocket-award
s-launch-contract/">"U.S. Air For
ce certifies Falcon Heavy rocket,
awards launch contract". Spac
eNews<span class="reference-acces
sdate">. Retrieved <span class="n

```



owrap">28 April</span> 2020</span>  
 >.</cite><span title="ctx\_ver=Z3  
 9.88-2004&amp;rft\_val\_fmt=info%3A  
 ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a  
 mp;rft.genre=article&amp;rft.atit  
 le=U.S.+Air+Force+certifies+Falco  
 n+Heavy+rocket%2C+awards+launch+c  
 ontract&amp;rft.date=2018-06-26&a  
 mp;rft.aulast=Clark&amp;rft.aufir  
 st=Stephen&amp;rft\_id=https%3A%2  
 F%2Fspaceflightnow.com%2F2018%2F0  
 6%2F26%2Fu-s-air-force-certifies-  
 falcon-heavy-rocket-awards-launch  
 -contract%2F&amp;rfr\_id=info%3Asi  
 d%2Fen.wikipedia.org%3AList+of+Fa  
 lcon+9+and+Falcon+Heavy+launches"  
 class="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-749"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-749">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:  
 r1067248974"/><cite class="citati  
 on web cs1"><a rel="nofollow" cla  
 ss="external text" href="https://  
 spacenews.com/viasat-q3-202  
 1//">"Viasat"</a>. SpaceNews. 5 F  
 ebruary 2021<span class="referenc

```
e-accessdate">. Retrieved <span c
lass="nowrap">17 February
2021.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Viasat&rft.pub=SpaceNews&rft.date=2021-02-05&
amp;rft_id=https%3A%2F%2Fspacenew
s.com%2Fviasat-q3-2021%2F%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-750"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on pressrelease cs1"><a rel="nofo
llow" class="external text" href
="http://investors.viasat.com/new
s-releases/news-release-details/v
iasat-spacex-enter-contract-futur
e-viasat-3-satellite-launch">"Via
sat, SpaceX Enter Contract for a
Future ViaSat-3 Satellite Launc
```

h"</a> (Press release). ViaSat. 25 October 2018<span class="reference-accessdate">. Retrieved <span class="nowrap">25 October</span> 2018</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Viasat%2C+SpaceX+Enter+Contract+for+a+Future+ViaSat-3+Satellite+Launch&amp;rft.pub=ViaSat&amp;rft.date=2018-10-25&amp;rft\_id=http%3A%2F%2Finvestors.viasat.com%2Fnews-releases%2Fnews-release-details%2Fviasat-spacex-enter-contract-future-viasat-3-satellite-launch&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-SN20181025-751"><span class="mw-cite-backlink">^ <a href="#cite\_ref-SN20181025\_751-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-SN20181025\_751-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-dat

```

a:TemplateStyles:r1067248974"/><cite id="CITEREFHenry2018" class="citation news cs1">Henry, Caleb (25 October 2018). "Viasat books Falcon Heavy for ViaSat-3 launch". SpaceNews . Retrieved 25 October 2018. </cite><li id="cite_note-752">^

```

```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFLee2020" class="citation web cs1 cs1-prop-foreign-lang-source">Lee, Jonghwa (27 September 2020). "한국형 달 궤도선, 2022년 8월 1일 발사된다" [Korean lunar orbiter to launch on August 1, 2022] (in Korean). Maeil Business Newspaper. Retrieved 27 September 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=%ED%95%9C%EA%B5%AD%ED%98%95+%EB%8B%AC+%EA%B6%A4%EB%8F%84%EC%84%A0%2C+2022%EB%85%84+8%EC%9B%94+1%EC%9D%BC+%EB%B0%9C%EC%82%AC%EB%90%9C%EB%8B%A4&rft.pub=Maeil+Business+Newspaper&rft.date=2020-09-27&rft.aulast=Lee&rft.aufirst=Jonghwa&rft_id=https%3A%2F%2Fwww.mk.co.kr%2Fnews%2F
```

```
it%2Fview%2F2020%2F09%2F997251%2F
&rfr_id=info%3Asid%2Fen.wikip
edia.org%3AList+of+Falcon+9+and+F
alcon+Heavy+launches" class="Z398
8">

<li id="cite_note-753"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
nssdc.gsfc.nasa.gov/nmc/spacecraf
t/display.action?id=KPLO">"KPLO"
. <i>nssdc.gsfc.nasa.gov</i>.
NASA.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=unknown&rft.jt
itle=nssdc.gsfc.nasa.gov&rft.
atitle=KPLO&rft_id=https%3A%2
F%2Fnssdc.gsfc.nasa.gov%2Fnm%2Fs
pacecraft%2Fdisplay.action%3Fid%3
DKPLO&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988"> <i>This article in
corporates text from this source,
which is in the <a href="/wiki/Pu
blic_domain" title="Public domai
n">public domain</i><i>.</i>

<li id="cite_note-kplo-754">^ <a hre
f="#cite_ref-kplo_754-0"><sup><i>
a</i></sup> <a href="#
cite_ref-kplo_754-1"><sup><i>b
</i></sup> <span c
lass="reference-text"><link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFKrebs"
class="citation web cs1">Krebs,
Gunter. <a rel="nofollow" class

```

```

="external text" href="http://space.skyrocket.de/doc_sdat/kplo.htm">"KPLO". Gunter's Space Page. Retrieved 19 December 2017
>.</cite>

<li id="cite_note-755">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.miragenews.com/nasa-awards-launch-services-contract-for-psyche

```



-mission/">"NASA Awards Launch Services Contract for Psyche Mission"</a>. <i>miragenews.com</i>. Mirage News<span class="reference-accessdate">. Retrieved <span class="nowrap">28 February</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=miragenews.com&rft.title=NASA+Awards+Launch+Services+Contract+for+Psyche+Mission&rft\_id=https%3A%2F%2Fwww.miragenews.com%2Fnasa-awards-launch-services-contract-for-psyche-mission%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z39.88"></span></span>

</li>

<li id="cite\_note-756"><span class="mw-cite-backlink"><b><a href="#cite\_ref-756">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://

```

www.nasa.gov/mission_pages/psych
e/overview/index.html">"Psyche Ov
erview". <i>nasa.gov</i>. NAS
A<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">28 February 2020.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=unknown&rft.jtit
le=nasa.gov&rft.atitle=Psyche
+Overview&rft_id=https%3A%2F%
2Fwww.nasa.gov%2Fmission_pages%2F
psyche%2Foverview%2Findex.html&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">
 <i>This article incorpo

```

```

rates text from this source, which is in the public domain</i><i>.</i>
>

<li id="cite_note-cnbc.com-757">^ ^{<i>a</i>}
^{<i>b</i>}
^{<i>c</i>}
 https://www.cnbc.com/2020/09/17/spacex-and-arianespace-win-390-million-worth-of-intelsat-launches.html

<li id="cite_note-arstechnica.com-758">^ ^{<i>a</i>} <a href="#cite_ref-a

```

rstecnica.com\_758-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-arstecnica.com\_758-2"><sup><i><b>c</b></i></sup></a> <a href="#cite\_ref-arstecnica.com\_758-3"><sup><i><b>d</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://arstecnica.com/science/2020/08/the-air-force-selects-ula-and-spacex-for-mid-2020s-launches/">"In a consequential decision, Air Force picks its rockets for mid-2020s launches"</a>. 7 August 2020.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=In+a+consequential+decision%2C+Air+Force+picks+its+rockets+for+mid-2020s+launches&amp;rft.date=2020-08-07&amp;rft\_id=https%3A%2F%2Farstecnica.com%2Fscience%2F2020%2F08%2Fthe-air-force-selects-ula-and-spacex-for-mid-2020s-launches%2F&amp;rfr\_id=info%3Asid%2Fe

```

n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-759"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFer
win" class="citation web cs1">Erw
in, Sandra. <a rel="nofollow" cla
ss="external text" href="https://
spacenews.com/spacex-explains-why
-the-u-s-space-force-is-paying-31
6-million-for-a-single-launc
h/">"SpaceX explains why the U.S.
Space Force is paying US$316 mill
ion for a single launch". <i>
spacenews.com</i><span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">10 November</s
pan> 2020.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Ajournal&rft.genre=unknow
n&rft.jtitle=spacenews.com&am
p;rft.atitle=SpaceX+explains+why+
the+U.S.+Space+Force+is+paying+U

```

S\$24316+million+for+a+single+launch&rft.au\$last=Erwin&rft.au\$first=Sandra&rft\_id=https%3A%2F%2Fspacenews.com%2Fspacex-explains-why-the-u-s-space-force-is-paying-316-million-for-a-single-launch%2F&rft\_id=info%3A\$id%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-760"><span class="mw-cite-backlink"><b><a href="#cite\_ref-760">^</a></b></span>

<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="http://www.spaceref.com/news/viewpr.html?pid=56804">"MethaneSAT Picks SpaceX as Launch Provider for Mission to Protect Earth's Climate"</a>.

<i>Spaceref</i><span class="reference-accessdate">. Retrieved <span class="nowrap">13 January</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amt

```

x%3Ajournal&#rft.genre=unknown
&#rft.jtitle=Spacer&#rft.
atitle=MethaneSAT+Picks+SpaceX+as
+Launch+Provider+for+Mission+to+P
rotect+Earth%27s+Climate&#rft_
id=http%3A%2F%2Fwww.spacer&#rft.
2Fnews%2Fviewpr.html%3Fpid%3D5680
4&#rfr_id=info%3Asid%2Fen.wiki
pedia.org%3AList+of+Falcon+9+and+
Falcon+Heavy+launches" class="Z39
88">

<li id="cite_note-swot-contract-7
61"><span class="mw-cite-backlin
k"><a href="#cite_ref-swot-con
tract_761-0">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFCheryl
_WarnerSteve_ColeGeorge_H._Diller
2016" class="citation news cs1">C
heryl Warner; Steve Cole; George
H. Diller (22 November 2016). <a
rel="nofollow" class="external te
xt" href="https://www.nasa.gov/pr
ess-release/nasa-selects-launch-s
ervices-for-global-surface-water-
survey-mission">"NASA Selects Lau
nch Services for Global Surface W

```

ater Survey Mission". NASA



```
alt="Public Domain" src="//upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/12px-PD-icon.svg.png" decoding="async" width="12" height="12" class="noviewer" srcset="//upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/18px-PD-icon.svg.png 1.5x, //upload.wikimedia.org/wikipedia/en/thumb/6/62/PD-icon.svg/24px-PD-icon.svg.png 2x" data-file-width="196" data-file-height="196" /> <i>This article incorporates text from this source, which is in the public domain</i><i>.</i><li id="cite_note-762">^<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFBiancamariaLettenmaierPavelsky2016" class="citation journal cs1">Biancamaria, Sylvain; Lettenmaier, Dennis P.; Pavelsky, Tamlin M. (2016). <a rel="nofollow" class="exte
```

rnal text" href="https://hal.archives-ouvertes.fr/hal-02136974/file/Biancamaria\_etal2016\_SurvGeophysics.pdf">"The SWOT Mission and Its Capabilities for Land Hydrology"</a> <span class="cs1-format">(PDF)</span>. <i>Surveys in Geophysics</i>. <b>37</b> (2): 307–337. <a href="/wiki/Bibcode\_(identifier)" class="mw-redirect" title="Bibcode (identifier)">Bibcode</a>:<a rel="nofollow" class="external text" href="https://ui.adsabs.harvard.edu/abs/2016SGeo...37..307B">2016SGeo...37..307B</a>. <a href="/wiki/Doi\_(identifier)" class="mw-redirect" title="Doi (identifier)">doi</a>:<a rel="nofollow" class="external text" href="https://doi.org/10.1007%2Fs10712-015-9346-y">10.1007/s10712-015-9346-y</a>. <a href="/wiki/S2CID\_(identifier)" class="mw-redirect" title="S2CID (identifier)">S2CID</a>&#160;<a rel="nofollow" class="external text" href="https://api.semanticscholar.org/CorpusID:130786322">130786322</a>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Am

tx%3Ajournal&rft.genre=article&rft.jtitle=Surveys+in+Geophysics&rft.atitle=The+SWOT+Mission+and+Its+Capabilities+for+Land+Hydrology&rft.volume=37&rft.issue=2&rft.pages=307-337&rft.date=2016&rft\_id=https%3A%2F%2Fapi.semanticscholar.org%2FCorpusID%3A130786322%23id-name%3DS2CID&rft\_id=info%3Adoi%2F10.1007%2Fs10712-015-9346-y&rft\_id=info%3Abibcode%2F2016SGeo...37..307B&rft.aulast=Biancamaria&rft.aufirst=Sylvain&rft.au=Lettenmaier%2C+Dennis+P.&rft.au=Pavelsky%2C+Tamlin+M.&rft\_id=https%3A%2F%2Fhal.archives-ouvertes.fr%2Fhal-02136974%2Ffile%2FBiancamaria\_etal2016\_SurvGeophys.pdf&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-763"><span class="mw-cite-backlink"><b><a href="#cite\_ref-763">^</a></b></span><span class="reference-text"><a rel="nofollow" class="external free" href="https://spacenews.com/ma

sten-wins-nasa-lunar-lander-award/">https://spacenews.com/masten-wins-nasa-lunar-lander-award/</a>  
</span>  
</li>  
<li id="cite\_note-764"><span class="mw-cite-backlink"><b><a href="#cite\_ref-764">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSheetz,\_Michael\_&#91;@thesheetztweetz&#93;2020" class="citation web cs1"><a href="/wiki/Michael\_Sheetz" title="Michael Sheetz">Sheetz, Michael [@thesheetztweetz]</a> (26 August 2020). <a rel="nofollow" class="external text" href="https://twitter.com/thesheetztweetz/status/1298682689491329024">"Masten Space Systems signed a contract with SpaceX to launch the Masten Mission One (MM1) to the Moon in 2022, with the XL-1 lander set to deliver 9 payloads to the lunar south pole under NASA's CLPS program. t.co/IhwOApBtVq"</a> (Tweet). <a rel="nofollow" class="external text" href="https://web.arch

```

ive.org/web/20200826180508/http
s://twitter.com/thesheetztweetz/s
tatus/1298682689491329024">Archiv
ed from the original on 26 Au
gust 2020<span class="reference-a
ccessdate">. Retrieved <span clas
s="nowrap">3 March 2021</s
pan> – via <a href="/wiki/T
witter" title="Twitter">Twitter</
a>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Masten+Space+Systems+signed+a+con
tract+with+SpaceX+to+launch+the+M
asten+Mission+One+%28MM1%29+to+th
e+Moon+in+2022%2C+with+the+XL-1+l
ander+set+to+deliver+9+payloads+t
o+the+lunar+south+pole+under+NAS
A%27s+CLPS+program.+t.co%2FIhw0Ap
BtVq&rft.date=2020-08-26&
rft.au=Sheetz%2C+Michael+%5B%40th
esheetztweetz%5D&rft_id=http
s%3A%2F%2Ftwitter.com%2Fthesheetz
tweetz%2Fstatus%2F129868268949132
9024&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">


```

```

<li id="cite_note-765"><span clas
s="mw-cite-backlink">^
<a r
el="nofollow" class="external fre
e" href="https://www.masten.aero/
blog/spacex/">https://www.masten.
aero/blog/spacex/

<li id="cite_note-HenrySpaceNorwa
y-766"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-HenrySp
aceNorway_766-0"><sup><i>a
</i></sup> <a href="#cite_ref
-HenrySpaceNorway_766-1"><sup><i>
b</i></sup> <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFHenry"
class="citation web cs1">Henry, C
aleb. <a rel="nofollow" class="ex
ternal text" href="https://spacen
ews.com/northrop-grumman-to-build
-two-triple-payload-satellites-fo
r-space-norway-spacex-to-launc
h/">"Northrop Grumman to build tw
o triple-payload satellites for S
pace Norway, SpaceX to launch". SpaceNews<span class="referenc

```

e-accessdate">. Retrieved <span class="nowrap">4 July</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Northrop+Grumman+to+build+two+triple-payload+satellites+for+Space+Norway%2C+SpaceX+to+launch&amp;rft.pub=SpaceNews&amp;rft.auiat=Henry&amp;rft.aufirst=Caleb&amp;rft\_id=https%3A%2F%2Fspacenews.com%2Fnorthrop-grumman-to-build-two-triple-payload-satellites-for-space-norway-spacex-to-launch%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-767"><span class="mw-cite-backlink"><b><a href="#cite\_ref-767">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://www.teslarati.com/spacex-doub

```

le-satellite-falcon-9-launch-cont
ract-win/">"SpaceX awarded double
-satellite Falcon 9 launch contra
ct, sixth win of 2019". Tesla
rati. 4 July 2019<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">7 July
2019.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=SpaceX+awarded+do
uble-satellite+Falcon+9+launch+co
ntract%2C+sixth+win+of+2019&r
ft.date=2019-07-04&rft_id=htt
ps%3A%2F%2Fwww.teslarati.com%2Fsp
acex-double-satellite-falcon-9-la
unch-contract-win%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s
pan>

<li id="cite_note-768"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati

```



```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
finance.yahoo.com/news/intuitive-
machines-taps-spacex-second-15312
8364.html">"Intuitive Machines ta
ps SpaceX for second lunar lander
mission". <i>Yahoo!</i>. R
etrieved 13
January 2021.</cit
e><span title="ctx_ver=Z39.88-200
4&rft_val_fmt=info%3Aofi%2Ffm
t%3Akev%3Amtx%3Ajournal&rft.g
enre=unknown&rft.jtitle=Yaho
o%21&rft.atitle=Intuitive+Mac
hines+taps+SpaceX+for+second+luna
r+lander+mission&rft_id=http
s%3A%2F%2Ffinance.yahoo.com%2Fnew
s%2Fintuitive-machines-taps-space
x-second-153128364.html&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-769"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty

```

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on news cs1"><a rel="nofollow" cl
ass="external text" href="http
s://ispace-inc.com/news/?p=187
4">"MBRSC Teams Up with Japan's i
space on Emirates Lunar Mission"
. <i><a href="/wiki/Ispace_(J
apanese_company)" title="Ispace
(Japanese company)">ispace</
i>. 14 April 2021<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">24 April 2021.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.jtitle=ispace&rft.at
itle=MBRSC+Teams+Up+with+Japan%27
s+ispace+on+Emirates+Lunar+Missio
n&rft.date=2021-04-14&rft
_id=https%3A%2F%2Fispace-inc.com%
2Fnews%2F%3Fp%3D1874&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s
pan>

<li id="cite_note-spacenews-20180
926-770"><span class="mw-cite-bac

```

```

klink">^ <a href="#cite_ref-space
news-20180926_770-0"><sup><i>a
</i></sup> <a href="#cite
_ref-spacenews-20180926_770-1"><s
up><i>b</i></sup> <a h
ref="#cite_ref-spacenews-20180926
_770-2"><sup><i>c</i></sup
> <span class="referen
ce-text"><link rel="mw-deduplicat
ed-inline-style" href="mw-data:Te
mplateStyles:r1067248974"/><cite
class="citation web cs1"><a rel
="nofollow" class="external text"
href="https://spacenews.com/japan
ese-company-inspace-selects-spacex
-for-lunar-missions/">"Japanese c
ompany ispace selects SpaceX for
lunar missions". SpaceNews.
26 September 2018<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">31 August</sp
an> 2019.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Japanese+company+isp
ace+selects+SpaceX+for+lunar+miss
ions&rft.pub=SpaceNews&rft
.date=2018-09-26&rft_id=http
s%3A%2F%2Fspacenews.com%2Fjapanes

```

e-company-inspace-selects-spacex-for-lunar-missions%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-inspace20190822-771"><span class="mw-cite-backlink">^ <a href="#cite\_ref-inspace20190822\_771-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-inspace20190822\_771-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-inspace20190822\_771-2"><sup><i><b>c</b></i></sup></a></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://inspace-inc.com/news/?p=1376">"Mission Timeline Adjustment for the HA KUTO-R Program"</a>. <i>inspace-inc.com</i>. 22 August 2019<span class="reference-accessdate">. Retrieved <span class="nowrap">24 August</span> 2019</span></cite><span title="ctx\_ver=Z39.88-2004&am

p;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=inspace-inc.com&rft.atitle=Mission+Timeline+Adjustment+for+the+HAKUTO-R+Program&rft.date=2019-08-22&rft\_id=https%3A%2F%2Finspace-inc.com%2Fnews%2F%3Fp%3D1376&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-772"><span class="mw-cite-backlink"><b><a href="#cite\_ref-772">^</a></b></span>

<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://spaceflightnow.com/2021/02/15/spacex-planning-launch-of-two-falcon-heavy-missions-in-summer-and-fall/">"SpaceX planning launch of two Falcon Heavy missions in summer and fall"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">18 February</span

```
> 2021.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=SpaceX+planning+laun
ch+of+two+Falcon+Heavy+missions+i
n+summer+and+fall&rft_id=http
s%3A%2F%2Fspaceflightnow.com%2F20
21%2F02%2F15%2Fspacex-planning-la
unch-of-two-falcon-heavy-missions
-in-summer-and-fall%2F&rfr_id
=info%3Asid%2Fen.wikipedia.org%3A
List+of+Falcon+9+and+Falcon+Heavy
+launches" class="Z3988">

<li id="cite_note-773"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.inmarsat.com/en/news/latest-n
ews/corporate/2021/inmarsat-marks
-five-years-of-global-xpress-worl
dwide-service-and.html">"Inmarsat
marks five years of Global Xpress
```

worldwide service and confirms plans for major extension of world-leading network". *[Inmarsat](/wiki/Inmarsat "Inmarsat")*. 4 January 2021. Retrieved 20 May 2021.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=unknown&rft.jtitle=Inmarsat&rft.atitle=Inmarsat+marks+five+years+of+Global+Xpress+worldwide+service+and+confirms+plans+for+major+extension+of+world-leading+network&rft.date=2021-01-04&rft\_id=https%3A%2F%2Fwww.inmarsat.com%2Fen%2Fnews%2Flatest-news%2Fcorporate%2F2021%2Finmarsat-marks-five-years-of-global-xpress-worldwide-service-and.html&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-spacenews-20180601-774"><span class="mw-cite-backlink"><b><a href="#cite\_ref-spac

```
enews-20180601_774-0">^ <link rel="mw-deduplicated-inline-style" href="mw-data:Template Styles:r1067248974"/><cite id="CITEREFHenry2018" class="citation news cs1">Henry, Caleb (1 June 2018). "Arabsat Falcon Heavy mission slated for December-January timeframe". SpaceNews. Retrieved 2 June 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=Arabsat+Falcon+Heavy+mission+slated+for+December%E2%80%93January+timeframe&rft.date=2018-06-01&rft.auiast=Henry&rft.aufirst=Caleb&rft_id=http%3A%2F%2Fspacenews.com%2Farabsat-falcon-heavy-mission-slated-for-december-january-timeframe%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falco
```



```
n+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-gxflex-775">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Inmarsat to place GX Flex next-gen satellite system order this year". SpaceNews. 7 March 2019.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Inmarsat+to+place+GX+Flex+next-gen+satellite+system+order+this+year&rft.pub=SpaceNews&rft.date=2019-03-07&rft_id=https%3A%2F%2Fspacenews.com%2Finmarsat-to-place-gx-flex-next-gen-satellite-system-order-this-year%2F&rfr_id=info%3Asid%2Fen.wikipedia
```

```
a.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-launchmanifest20200406-776">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Launch Manifest". SpaceX. Archived from the original on 6 April 2020. Retrieved 6 April 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Launch+Manifest&rft.pub=SpaceX&rft_id=https%3A%2F%2Fww
```

```
w.spacex.com%2Fmissions&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-777">^
https://space.skyrocket.de/doc_sdat/ses-18.htm

<li id="cite_note-778">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1">"SES Selects SpaceX for Launch of New C-Band Satellites". 5
```

August 2020.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SES+Selects+SpaceX+for+Launch+of+New+C-Band+Satellites&amp;rft.date=2020-08-05&amp;rft\_id=https%3A%2F%2Fwww.businesswire.com%2Fnews%2Fhome%2F20200805005594%2Fen%2FSES-Selects-SpaceX-Launch-New-C-Band-Satellites&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-779"><span class="mw-cite-backlink"><b><a href="#cite\_ref-779">^</a></b></span>

<span class="reference-text"><a rel="nofollow" class="external free" href="https://spaceflightnow.com/2020/08/05/ula-spacex-win-contracts-to-launch-satellites-for-ses-in-2022/">https://spaceflightnow.com/2020/08/05/ula-spacex-win-contracts-to-launch-satellites-for-ses-in-2022/</a></span>

</li>

<li id="cite\_note-780"><span clas

```
s="mw-cite-backlink">^
<a r
el="nofollow" class="external fre
e" href="https://spaceflightnow.c
om/2020/08/20/ses-orders-two-more
-falcon-9-launches-from-spacex/">
https://spaceflightnow.com/2020/0
8/20/ses-orders-two-more-falcon-9
-launches-from-spacex/

<li id="cite_note-businesswire.co
m-781"><span class="mw-cite-backl
ink">^ <a href="#cite_ref-busines
swire.com_781-0"><sup><i>a
</i></sup> <a href="#cite_ref
-businesswire.com_781-1"><sup><i>
b</i></sup> <sp
an class="reference-text"><a rel
="nofollow" class="external free"
href="https://www.businesswire.co
m/news/home/20200819005803/en/SES
-Picks-SpaceX-Launch-Additional-0
3b-mPOWER">https://www.businesswi
re.com/news/home/20200819005803/e
n/SES-Picks-SpaceX-Launch-Additio
nal-03b-mPOWER

<li id="cite_note-broadcastpro202
00122-782"><span class="mw-cite-b
```

```
acklink">^ <a href="#cite_ref-bro
adcastpro20200122_782-0"><sup><i>
a</i></sup> <a href="#
cite_ref-broadcastpro20200122_782
-1">^{<i>b</i>}
> <a href="#cite_ref-broadcastpro
20200122_782-2"><sup><i>c
</i></sup> <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite class="citation web cs
1"><a rel="nofollow" class="exter
nal text" href="https://www.broad
castprome.com/news/satellite/nile
sat-partners-with-spacex-to-launc
h-nilesat-301-satellite-in-202
2/">"Nilesat partners with SpaceX
to launch Nilesat-301 satellite i
n 2022". Broadcastprome. 22 J
anuary 2020<span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">23 January 20
20.</cite><span title="ctx
_ver=Z39.88-2004&rft_val_fmt=
info%3Aofi%2Ffmt%3Akev%3Amtx%3Abo
ok&rft.genre=unknown&rft.
btitle=Nilesat+partners+with+Spac
eX+to+launch+Nilesat-301+satellit
e+in+2022&rft.pub=Broadcastpr
```

```

ome&rft.date=2020-01-22&r
ft_id=https%3A%2F%2Fwww.broadcast
prome.com%2Fnews%2Fsatellite%2Fni
lesat-partners-with-spacex-to-lau
nch-nilesat-301-satellite-in-202
2%2F&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-783"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on pressrelease cs1"><a rel="nofo
llow" class="external text" href
="https://investors.intelsat.com/
news-releases/news-release-detail
s/intelsat-selects-spacex-launch-
intelsat-40e-satellite">"Intelsat
Selects SpaceX to Launch Intelsat
40e Satellite". <i><a href="/
wiki/Intelsat" title="Intelsat">I
ntelsat</i> (Press release).
17 March 2020<span class="refere
nce-accessdate">. Retrieved 20 May 2021

```

```

.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Intelsat+Selects+SpaceX+to+L
aunch+Intelsat+40e+Satellite&
rft.date=2020-03-17&rft_id=ht
tps%3A%2F%2Finvestors.intelsat.co
m%2Fnews-releases%2Fnews-release-
details%2Fintelsat-selects-spacex
-launch-intelsat-40e-satellite&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-784"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
space.skyrocket.de/doc_lau_det/fa
lcon-9_v1-2_b5.htm">"Falcon-9 v1.
2 (Block 5) (Falcon-9FT (Block
5))"<span class="reference-a
ccessdate">. Retrieved <span clas

```



```
s="nowrap">25 May 2021.</cite>

<li id="cite_note-gunter-NRO-785">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs" class="citation web cs1">Krebs, Gunter. "NROL launches". Gunter's Space Page. Retrieved 20 February 2
```

019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=NR0L+launches&amp;rft.pub=Gunter%27s+Space+Page&amp;rft.auctlast=Krebs&amp;rft.aufirst=Gunter&amp;rft\_id=http%3A%2F%2Fspace.skyrocket.de%2Fdoc\_sat%2Fnrol.htm&amp;rft\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-786"><span class="mw-cite-backlink"><b><a href="#cite\_ref-786">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc\_sdat/aurora-4a.htm">"Aurora 4A"</a><span class="reference-accessdate">. Retrieved <span class="nowrap">2 June</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=NR0L+launches&amp;rft.pub=Gunter%27s+Space+Page&amp;rft.auctlast=Krebs&amp;rft.aufirst=Gunter&amp;rft\_id=http%3A%2F%2Fspace.skyrocket.de%2Fdoc\_sat%2Fnrol.htm&amp;rft\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

```

v%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Aurora+4A&rft_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc_sdat%2Faurora-4a.htm&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-787">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFHenry2020" class="citation web cs1">Henry, Caleb (13 February 2020). "Astranis raises US$90 million in debt and equity ahead of first launch". SpaceNews. Retrieved 23 September 2020.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3A

```

```

ofi%2Ffmt%3Akev%3Amtx%3Abook&
rft.genre=unknown&rft.btitle=
Astranis+raises+US%2490+million+i
n+debt+and+equity+ahead+of+first+
launch&rft.pub=SpaceNews&
rft.date=2020-02-13&rft.aulas
t=Henry&rft.aufirst=Caleb&
p;rft_id=https%3A%2F%2Fspacenews.
com%2Fastranis-raises-90-million-
in-debt-and-equity-ahead-of-first
-launch%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988">

<li id="cite_note-788"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKn
app" class="citation web cs1">Kna
pp, Alex. <a rel="nofollow" class
="external text" href="https://ww
w.forbes.com/sites/alexknapp/201
9/08/26/internet-startup-astranis
-selects-spacex-to-launch-its-fir
st-commercial-satellite/">"Intern
et Startup Astranis Selects Space

```

X To Launch Its First Commercial Satellite". *Forbes* Retrieved 1 September 2019.

</span></span>

</li>

<li id="cite\_note-gunter-v2c-789"><span class="mw-cite-backlink">^ <a href="#cite\_ref-gunter-v2c\_789-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-gunter-v2c\_789-1"><sup><i><b>b</b></i></sup></a> <a href="#cite\_ref-gunte

r-v2c\_789-2"><sup><i><b>c</b></i>  
</sup></a></span> <span class="reference-text"><link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKrebs2021" class="citation web cs1">Krebs, Gunter (19 April 2021). <a rel="nofollow" class="external text" href="https://space.skyrocket.de/doc\_sdat/dragon-v2c.htm">"Dragon CRS-2 1,... CRS-29 (SpX 21,... 29)"</a>. <i>Gunter's Space Page</i><span class="reference-accessdate">.

Retrieved <span class="nowrap">3 May</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=Gunter%27s+Space+Page&amp;rft.atitle=Dragon+CRS-21%2C...+CRS-29+%28SpX+21%2C...+29%29&amp;rft.date=2021-04-19&amp;rft.aulast=Krebs&amp;rft.aufirst=Gunter&amp;rft\_id=https%3A%2F%2Fspace.skyrocket.de%2Fdoc\_sdat%2Fdragon-v2c.htm&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></spa

```
n>

<li id="cite_note-790"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFPa
tel2020" class="citation news cs
1">Patel, Neel V. (27 February 20
20). <a rel="nofollow" class="ext
ernal text" href="https://www.tec
hnologyreview.com/2020/02/27/9056
41/lunar-missions-before-nasa-202
4-artemis-moon-landing-space-x-mi
ning/">"The 17 biggest lunar miss
ions leading up to NASA's 2024 mo
on landing". Technology Revie
w<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">22 June 2020.</c
ite><span title="ctx_ver=Z39.88-2
004&rft_val_fmt=info%3Aofi%2F
fmt%3Akev%3Amtx%3Ajournal&rft
.genre=article&rft.atitle=Th
e+17+biggest+lunar+missions+leadi
ng+up+to+NASA%27s+2024+moon+landi
ng&rft.date=2020-02-27&rft
.t.aulast=Patel&rft.aufirst=Ne
```

el+V.&rft\_id=https%3A%2F%2Fwww.technologyreview.com%2F2020%2F02%2F27%2F905641%2Flunar-missions-before-nasa-2024-artemis-moon-landing-space-x-mining%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-791"><span class="mw-cite-backlink"><b><a href="#cite\_ref-791">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://ispace-inc.com/wp-content/uploads/2020/05/ispace\_PayloadUserGuide\_v2\_202001.pdf">"ispace Payload User's Guide"</a> <span class="cs1-format">(PDF)</span>. <i>ispace-inc.com</i>. January 2020.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=ispace-inc.com&amp;rft.atitle=ispace+Payl



oad+User%27s+Guide&rft.date=2020-01&rft\_id=https%3A%2F%2Finspace-inc.com%2Fwp-content%2Fuploads%2F2020%2F05%2Finspace\_PayloadUserGuide\_v2\_202001.pdf&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-792"><span class="mw-cite-backlink"><b><a href="#cite\_ref-792">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFGordon2020" class="citation web cs1">Gordon, Elon (October 2020). <a rel="nofollow" class="external text" href="https://madeinspace.us/wp-content/uploads/2020/10/ASCEND-2020-Archinaut-One-Status-Update.pdf">"Archinaut One Technology Demonstration Mission Status Update"</a> <span class="cs1-format">(PDF)</span>. <i><a href="/wiki/Made\_In\_Space,\_Inc." title="Made In Space, Inc.">Made In Space, Inc.</a></i><span class="referen

```

ce-accessdate"> Retrieved <span c
lass="nowrap">6 May 2021</
span>.</cite><span title="ctx_ver
=Z39.88-2004&rft_val_fmt=inf
o%3Aofi%2Ffmt%3Akev%3Amtx%3Ajourn
al&rft.genre=unknown&rft.
jtitle=Made+In+Space%2C+Inc.&
rft.atitle=Archinaut+One+Technolo
gy+Demonstration+Mission+Status+U
pdate&rft.date=2020-10&rft
t.aulast=Gordon&rft.aufirst=E
lon&rft_id=https%3A%2F%2Fmade
inspace.us%2Fwp-content%2Fupload
s%2F2020%2F10%2FASCEND-2020-Archi
naut-One-Status-Update.pdf&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-793"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2021" class="citation web cs
1">Clark, Stephen (2 June 2021).
<a rel="nofollow" class="externa

```

```

l text" href="https://spaceflight
now.com/2021/06/02/new-solar-arra
ys-ready-to-upgrade-international
-space-stations-power-grid/">"New
solar arrays ready to upgrade Int
ernational Space Station's power
grid". <i>Spaceflight Now</i>
><span class="reference-accessdat
e">. Retrieved <span class="nowra
p">5 June 2021.</ci
te><span title="ctx_ver=Z39.88-20
04&rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Ajournal&rft.
genre=unknown&rft.jtitle=Spac
eflight+Now&rft.atitle=New+so
lar+arrays+ready+to+upgrade+Inter
national+Space+Station%27s+power+
grid&rft.date=2021-06-02&
rft.aulast=Clark&rft.aufirst=
Stephen&rft_id=https%3A%2F%2F
spaceflightnow.com%2F2021%2F06%2F
02%2Fnew-solar-arrays-ready-to-up
grade-international-space-station
s-power-grid%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-794"><span clas
s="mw-cite-backlink"><a href

```

```

="#cite_ref-794">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
firefly.com/lunar-lander/">"Lunar
Lander". <i><a href="/wiki/Fi
refly_Aerospace" title="Firefly A
erospace">Firefly Aerospace</
i>. 1 February 2021<span class="r
eference-accessdate">. Retrieved
20 May</spa
n> 2021.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=Firefly+Aerospace
&rft.atitle=Lunar+Lander&
rft.date=2021-02-01&rft_id=ht
tps%3A%2F%2Ffirefly.com%2Flunar-l
ander%2F&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-795"><span clas
s="mw-cite-backlink">^

```

```

<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFo
ust2021" class="citation web cs
1">Foust, Jeff (20 May 2021). <a
rel="nofollow" class="external t
ext" href="https://spacenews.com/
firefly-selects-spacex-to-launch-
its-lunar-lander/">"Firefly selec
ts SpaceX to launch its lunar lan
der". <i><a href="/wiki/Space
News" title="SpaceNews">SpaceNews
</i><span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">20 May 2021</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&a
mp;rft.genre=unknown&rft.jtit
le=SpaceNews&rft.atitle=Firef
ly+selects+SpaceX+to+launch+its+l
unar+lander&rft.date=2021-05-
20&rft.aulast=Foust&rft.a
ufirst=Jeff&rft_id=https%3A%2
F%2Fspacenews.com%2Ffirefly-selec
ts-spacex-to-launch-its-lunar-lan
der%2F&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas

```

```

s="Z3988">

<li id="cite_note-796"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.businesswire.com/news/home/20
210520005731/en/Firefly-Aerospace
-Awards-Contract-to-SpaceX-to-Lau
nch-Blue-Ghost-Mission-to-Moon-in
-2023">"Firefly Aerospace Awards
Contract to SpaceX to Launch Blu
e Ghost Mission to Moon in 2023"
. <i><a href="/wiki/Business_
Wire" title="Business Wire">Busin
ess Wire</i>. 20 May 2021<spa
n class="reference-accessdate">.
Retrieved 2
0 May 2021.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Ajournal&rft.genr
e=unknown&rft.jtitle=Business
+Wire&rft.atitle=Firefly+Aero
space+Awards+Contract+to+SpaceX+t

```

```

o+Launch+Blue+Ghost+Mission+to+Mo
on+in+2023&rfc.date=2021-05-2
0&rfc_id=https%3A%2F%2Fwww.bu
sinesswire.com%2Fnews%2Fhome%2F20
210520005731%2Fen%2FFirefly-Aeros
pace-Awards-Contract-to-SpaceX-to
-Launch-Blue-Ghost-Mission-to-Moo
n-in-2023&rfr_id=info%3Asid%2
Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-797"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark2020" class="citation web cs
1">Clark, Stephen (5 February 202
0). <a rel="nofollow" class="exte
rnal text" href="https://spacefli
ghtnow.com/2020/02/05/spacex-wins
-contract-to-launch-nasas-pace-ea
rth-science-mission/">"SpaceX win
s contract to launch NASA's PACE
Earth science mission". <i>S
paceflight Now</i><span class="re
ference-accessdate">. Retrieved <

```

```
span class="nowrap">3 May
 2021.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=Spaceflight+Now&
rft.atitle=SpaceX+wins+contrac
t+to+launch+NASA%27s+PACE+Earth+s
cience+mission&rft.date=2020-
02-05&rft.aulast=Clark&rft
.aufirst=Stephen&rft_id=http
s%3A%2F%2Fspaceflightnow.com%2F20
20%2F02%2F05%2Fspacex-wins-contrac
t-to-launch-nasas-pace-earth-sci
ence-mission%2F&rfr_id=info%3
Asid%2Fen.wikipedia.org%3AList+of
+Falcon+9+and+Falcon+Heavy+launch
es" class="Z3988">

<li id="cite_note-798"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCo
laprete2020" class="citation web
cs1">Colaprete, Anthony (17 Augu
st 2020). <a rel="nofollow" class
="external text" href="https://sc
```



[ience.nasa.gov/science-pink/s3fs-public/atoms/files/09-Colaprete-VIPER%20Overview%20for%20PAC%2008172020.pdf](https://science.nasa.gov/science-pink/s3fs-public/atoms/files/09-Colaprete-VIPER%20Overview%20for%20PAC%2008172020.pdf)">"VIPER: A lunar water reconnaissance mission"</a> <span class="cs1-format">(PDF)</span>. <a href="/wiki/NASA" title="NASA">NASA</a>. p.&#160;2<span class="reference-accessdate">. Retrieved <span class="nowrap">13 April</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=VIPER%3A+A+lunar+water+reconnaissance+mission&amp;rft.pages=2&amp;rft.pub=NASA&amp;rft.date=2020-08-17&amp;rft.au last=Colaprete&amp;rft.aufirst=Anthony&amp;rft\_id=https%3A%2F%2Fscience.nasa.gov%2Fscience-pink%2Fs3fs-public%2Fatoms%2Ffiles%2F09-Colaprete-VIPER%2520Overview%2520for%2520PAC%252008172020.pdf&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-799"><span clas

```
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFo
ust2021" class="citation web cs
1">Foust, Jeff (13 April 2021). <
a rel="nofollow" class="external
text" href="https://spacenews.co
m/astrobotic-selects-falcon-heavy
-to-launch-nasas-viper-lunar-rove
r/">"Astrobotic selects Falcon He
avy to launch NASA's VIPER lunar
rover". <i><a href="/wiki/Sp
aceNews" title="SpaceNews">SpaceN
ews</i><span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">13 April 2021
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=unknown&rft
.jtitle=SpaceNews&rft.atitle
=Astrobotic+selects+Falcon+Heavy+
to+launch+NASA%27s+VIPER+lunar+ro
ver&rft.date=2021-04-13&r
ft.aulast=Foust&rft.aufirst=J
eff&rft_id=https%3A%2F%2Fspac
enews.com%2Fastrobotic-selects-fa
```

```

lcon-heavy-to-launch-nasas-viper-
lunar-rover%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-800"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFEl
oksari2020" class="citation web c
s1">Eloksari, Eisy A. (25 Novemb
er 2020). <a rel="nofollow" class
="external text" href="https://ww
w.thejakartapost.com/news/2020/1
1/25/indonesia-to-delay-satria-sa
tellite-launch-cites-covid-19-dis
ruption.html">"Indonesia to delay
Satria satellite launch, cites CO
VID-19 disruption". <i><a hre
f="/wiki/The_Jakarta_Post" title
="The Jakarta Post">The Jakarta P
ost</i><span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">13 April 2021
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in

```

```
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajour
nal&rft.genre=unknown&rft
.t.jtitle=The+Jakarta+Post&rft
.t.atitle=Indonesia+to+delay+Satri
a+satellite+launch%2C+cites+COVID
-19+disruption&rft.date=2020-
11-25&rft.aulast=Eloksari&am
p;rft.aufirst=Eisya+A.&rft_id
=https%3A%2F%2Fwww.thejakartapos
t.com%2Fnews%2F2020%2F11%2F25%2Fi
ndonesia-to-delay-satria-satellit
e-launch-cites-covid-19-disruptio
n.html&rfr_id=info%3Asid%2Fe
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-ussf36config-80
1"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-ussf36con
fig_801-0"><sup><i>a</i></
sup> <a href="#cite_ref-ussf3
6config_801-1"><sup><i>b</
i></sup> <a href="#cite_ref-u
ssf36config_801-2"><sup><i>c</
b></i></sup> <a href="#cite_r
ef-ussf36config_801-3"><sup><i>d</i></sup> <a href="#ci
te_ref-ussf36config_801-4"><sup><
i>e</i></sup> <
```

```

span class="reference-text"><link
rel="mw-deduplicated-inline-styl
e" href="mw-data:TemplateStyles:r
1067248974"/><cite id="CITEREF@th
esheetztweetz2021" class="citatio
n web cs1">@thesheetztweetz (9 Ma
rch 2021). <a rel="nofollow" clas
s="external text" href="https://t
witter.com/thesheetztweetz/statu
s/1369437277567541248">".@USSF_SMC
says both SpaceX launches will
be with Falcon 9 rockets and bot
h ULA launches will be with Vulca
n rockets" (Tweet) – vi
a <a href="/wiki/Twitter" title
="Twitter">Twitter.</cite><sp
an title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un
known&rft.btitle=.%40USSF_SMC
+says+both+SpaceX+launches+will+b
e+with+Falcon+9+rockets+and+both+
ULA+launches+will+be+with+Vulcan+
rockets.&rft.date=2021-03-09&
amp;rft.au=%40thesheetztweetz&am
p;rft_id=https%3A%2F%2Ftwitter.co
m%2Fthesheetztweetz%2Fstatus%2F13
69437277567541248&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau

```

```

nches" class="Z3988"></spa
n>

<li id="cite_note-ussf36location-
802"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-ussf36loc
ation_802-0"><sup><i>a</i>
</sup> <a href="#cite_ref-uss
f36location_802-1"><sup><i>b</
b></i></sup> <span cla
ss="reference-text"><link rel="mw
-deduplicated-inline-style" href
="mw-data:TemplateStyles:r1067248
974"/><cite id="CITEREF@StephenCl
ark12021" class="citation web cs
1">@StephenClark1 (13 March 202
1). <a rel="nofollow" class="exte
rnal text" href="https://twitter.
com/StephenClark1/status/13707328
25159290888">"In response to my q
uestions to SMC: "Each of the FY2
1 awarded missions is planned to
launch in FY23 from the Eastern
Range."<span class="cs1-kern-rig
ht">" (Tweet) –
via <a href="/wiki/Twitter" titl
e="Twitter">Twitter.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A
kev%3Amtx%3Abook&rft.genre=un

```

known&rft.btitle=In+response+to+my+questions+to+SMC%3A+%22Each+of+the+FY21+awarded+missions+is+planned+to+launch+in+FY23+from+the+Eastern+Range.%22&rft.date=2021-03-13&rft.au=%40StephenClark1&rft\_id=https%3A%2F%2Ftwitter.com%2FStephenClark1%2Fstatus%2F1370732825159290888&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-defense.gov-803"><span class="mw-cite-backlink">^ <a href="#cite\_ref-defense.gov\_803-0"><sup><i><b>a</b></i></sup></a> <a href="#cite\_ref-defense.gov\_803-1"><sup><i><b>b</b></i></sup></a></span> <span class="reference-text"><link rel="mw-duplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.defense.gov/Newsroom/Contracts/Contract/Article/2530911/">"Contracts For March 9, 2021"</a>. U.S. Department

of Defence. 9 March 2021.</cite>  
 <span title="ctx\_ver=Z39.88-2004&  
 amp;rft\_val\_fmt=info%3Aofi%2Ffmt%  
 3Akev%3Amtx%3Abook&amp;rft.genre=  
 unknown&amp;rft.btitle=Contracts+  
 For+March+9%2C+2021&amp;rft.pub=  
 U.S.+Department+of+Defence&amp;rft.  
 date=2021-03-09&amp;rft\_id=http  
 s%3A%2F%2Fwww.defense.gov%2FNewsr  
 oom%2FContracts%2FContract%2FArti  
 cle%2F2530911%2F&amp;rfr\_id=info%  
 3Asid%2Fen.wikipedia.org%3AList+o  
 f+Falcon+9+and+Falcon+Heavy+launc  
 hes" class="Z3988"></span></span>  
 </li>  
 <li id="cite\_note-axiom-804"><spa  
 n class="mw-cite-backlink">^ <a h  
 ref="#cite\_ref-axiom\_804-0"><sup>  
 <i><b>a</b></i></sup></a> <a href  
 ="#cite\_ref-axiom\_804-1"><sup><i>  
 <b>b</b></i></sup></a> <a href="#"  
 cite\_ref-axiom\_804-2"><sup><i><b>  
 c</b></i></sup></a></span> <span  
 class="reference-text"><link rel  
 ="mw-deduplicated-inline-style" h  
 ref="mw-data:TemplateStyles:r1067  
 248974"/><cite class="citation we  
 b cs1"><a rel="nofollow" class="e  
 xternal text" href="https://www.a  
 xiomspace.com/press-release/axiom



```

-spacex-deal">"Axiom and SpaceX sign blockbuster deal". 2 June 2021.</cite>

<li id="cite_note-805">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Former NASA astronaut plans private trip back to space: 'It's a little bit like an addiction'<span class="cs1-kern-right

```

t"></span>"</a>. CNN. 25 May 2021.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Former+NASA+astronaut+plans+private+trip+back+to+space%3A+%27It%27s+a+little+bit+like+an+addiction%27&amp;rft.pub=CNN&amp;rft.date=2021-05-25&amp;rft\_id=https%3A%2F%2Fwww.cnn.com%2F2021%2F05%2F25%2Ftech%2Fspacex-axiom-ax2-peggy-whitson-scn%2Findex.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-806"><span class="mw-cite-backlink"><b><a href="#cite\_ref-806">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://www.cnbc.com/2021/06/02/axiom-space-expands-spacex-deal-for-private-crew-launches-to-iss-.html">"Ax

iom Space expands SpaceX private crew launch deal, with four total missions to the space station" </a>. CNBC. 2 June 2021.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Axiom+Space+expands+SpaceX+private+crew+launch+deal%2C+with+four+total+missions+to+the+space+station&amp;rft.pub=CNBC&amp;rft.date=2021-06-02&amp;rft\_id=https%3A%2F%2Fwww.cnn.com%2F2021%2F06%2F02%2Faxiom-space-expands-spacex-deal-for-private-crew-launches-to-iss-.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></li>

<li id="cite\_note-807"><span class="mw-cite-backlink"><b><a href="#cite\_ref-807">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1"><a rel="nofollow" class="external text" href="https://

```

www.cnbc.com/2021/05/18/discovery
-adventure-tv-show-to-launch-winn
ing-contestant-to-space-station.h
tml">"Discovery adventure TV show
to launch winning contestant to t
he space station". CNBC. 18 M
ay 2021.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=Discovery+adventure+TV+show+
to+launch+winning+contestant+to+t
he+space+station&rft.pub=CNBC
&rft.date=2021-05-18&rft_
id=https%3A%2F%2Fwww.cnbc.com%2F2
021%2F05%2F18%2Fdiscovery-adventu
re-tv-show-to-launch-winning-cont
estant-to-space-station.html&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-808"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati

```

```

on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
arxiv.org/abs/1412.4872">"Cosmolo
gy with the SPHEREX All-Sky Spect
ral Survey". 25 March 2015.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=Cosmo
logy+with+the+SPHEREX+All-Sky+Spe
ctral+Survey&rft.date=2015-03
-25&rft_id=https%3A%2F%2Farxi
v.org%2Fabs%2F1412.4872&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-809"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasa.gov/press-release/nasa-a
wards-launch-services-contract-fo
r-spherex-astronautics-missio

```

n">"NASA Awards Launch Services Contract for SPHEREx Astrophysics Mission"</a>. NASA. 4 February 2021.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+Awards+Launch+Services+Contract+for+SPHEREx+Astrophysics+Mission&rft.pub=NASA&rft.date=2021-02-04&rft\_id=https%3A%2F%2Fwww.nasa.gov%2Fpress-release%2Fnasa-awards-launch-services-contract-for-spherex-astrophysics-mission&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-810"><span class="mw-cite-backlink"><b><a href="#cite\_ref-810">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFSmith2021" class="citation web cs1">Smith, Marcia (26 May 2021). <a rel="nofollow" class="external text" href="https://spacepolicyo

nline.com/news/nelson-watch-the-chinese/">"Nelson: "Watch the Chinese"<span class="cs1-kern-right"></span>"</a>. <i>SpacePolicyOnline.com</i><span class="reference-accessdate">. Retrieved <span class="nowrap">26 May</span> 2021</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=SpacePolicyOnline.com&amp;rft.atitle=Nelson%3A+%22Watch+the+Chinese%22&amp;rft.date=2021-05-26&amp;rft.aulast=Smith&amp;rft.aufirst=Marcia&amp;rft\_id=https%3A%2F%2Fspacepolicyonline.com%2Fnews%2Fnelson-watch-the-chinese%2F&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-811"><span class="mw-cite-backlink"><b><a href="#cite\_ref-811">^</a></b></span>  
<span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFCl

```
ark2020" class="citation web cs
1">Clark, Stephen (6 May 2020). <
a rel="nofollow" class="external
text" href="https://spaceflightn
ow.com/2020/05/06/nasa-plans-to-l
aunch-first-two-gateway-elements-
on-same-rocket/">"NASA plans to l
aunch first two Gateway elements
on same rocket". <i>Spacefli
ght Now</i><span class="reference
-accessdate">. Retrieved <span cl
ass="nowrap">30 September
2020.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=Spaceflight+Now&a
mp;rft.atitle=NASA+plans+to+launc
h+first+two+Gateway+elements+on+s
ame+rocket&rft.date=2020-05-0
6&rft.aulast=Clark&rft.au
first=Stephen&rft_id=https%3
A%2F%2Fspaceflightnow.com%2F2020%
2F05%2F06%2Fnasa-plans-to-launch-
first-two-gateway-elements-on-sam
e-rocket%2F&rfr_id=info%3Asi
d%2Fen.wikipedia.org%3AList+of+Fa
lcon+9+and+Falcon+Heavy+launches"
class="Z3988">

```



```
<li id="cite_note-ppe-812">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFPotter2021" class="citation pressrelease cs1">Potter, Sean (9 February 2021). "NASA Awards Contract to Launch Initial Elements for Lunar Outpost". <i>NASA</i> (Press release). Retrieved 9 February 2021.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+Awards+Contract+to+Launch+Initial+Elements+for+Lunar+Outpost&rft.date=2021-02-09&rft.aulast=Potter&rft.aufirst=Sean&rft_id=https%3A%2F%2F
```

```

www.nasa.gov%2Fpress-release%2Fna
sa-awards-contract-to-launch-init
ial-elements-for-lunar-outpost&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-813"><span clas
s="mw-cite-backlink">^
<a r
el="nofollow" class="external fre
e" href="https://arstechnica.com/
science/2020/03/nasa-officials-ou
tline-plans-for-building-a-lunar-
gateway-in-the-mid-2020s/">http
s://arstechnica.com/science/2020/
03/nasa-officials-outline-plans-f
or-building-a-lunar-gateway-in-th
e-mid-2020s/

<li id="cite_note-814"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFCl
ark" class="citation web cs1">Cla

```

```
rk, Stephen. "NASA picks SpaceX to deliver cargo to Gateway station in lunar orbit". Spaceflight Now. Retrieved 28 March 2020.</cite>

<li id="cite_note-815"><a href
```

```

="#cite_ref-815">^
<a r
el="nofollow" class="external fre
e" href="https://www.cnbc.com/202
0/03/27/nasa-picks-spacex-for-lun
ar-orbit-missions-with-dragon-xl-
falocn-heavy.html">https://www.cn
bc.com/2020/03/27/nasa-picks-spac
ex-for-lunar-orbit-missions-with-
dragon-xl-falocn-heavy.html</
span>

<li id="cite_note-816"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
blogs.nasa.gov/imap/2020/12/11/na
sa-adjusts-imap-schedule-to-accom
modate-covid-19-precautions/">"NA
SA Adjusts IMAP Schedule to Accom
modate COVID-19 Precautions – IMA
P Mission". <i>blogs.nasa.gov
</i><span class="reference-access
date">. Retrieved <span class="no
wrap">19 December 2020</sp

```

```

an>.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=unknown&rft.jti
tle=blogs.nasa.gov&rft.atitle
=NASA+Adjusts+IMAP+Schedule+to+Ac
commodate+COVID-19+Precautions+%E
2%80%93+IMAP+Mission&rft_id=h
ttps%3A%2F%2Fblogs.nasa.gov%2Fima
p%2F2020%2F12%2F11%2Fnasa-adjusts
-imap-schedule-to-accommodate-cov
id-19-precautions%2F&rfr_id=i
nfo%3Asid%2Fen.wikipedia.org%3Ali
st+of+Falcon+9+and+Falcon+Heavy+l
aunches" class="Z3988"></s
pan>

<li id="cite_note-817"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasa.gov/press-release/nasa-a
wards-launch-services-contract-fo
r-imap-mission">"NASA Awards Laun
ch Services Contract for IMAP Mis

```

sion"</a>. <i>nasa.gov</i><span class="reference-accessdate">. Retrieved <span class="nowrap">26 September</span> 2020</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=nasa.gov&amp;rft.atitle=NASA+Awards+Launch+Services+Contract+for+IMAP+Mission&amp;rft\_id=https%3A%2F%2Fwww.nasa.gov%2Fpress-release%2Fnasa-awards-launch-services-contract-for-imap-mission&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span>  <i>This article incorporates text from th

```

is source, which is in the <a href=
"/wiki/Public_domain" title="Pu
blic domain">public domain</i
><i>.</i>

<li id="cite_note-oig.nasa.gov-81
8"><span class="mw-cite-backlin
k">^ <a href="#cite_ref-oig.nasa.
gov_818-0"><sup><i>a</i></
sup> <a href="#cite_ref-oig.n
asa.gov_818-1"><sup><i>b</
i></sup> <span class
="reference-text"><a rel="nofollow"
class="external free" href="ht
tps://oig.nasa.gov/docs/IG-21-00
4.pdf">https://oig.nasa.gov/docs/
IG-21-004.pdf

<li id="cite_note-Bowersox_interv
iew-819"><span class="mw-cite-bac
klink"><a href="#cite_ref-Bowe
rsox_interview_819-0">^</
span> <span class="reference-tex
t"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1067248974"/><cite id="CI
TEREF0'Brien2010" class="cita
tion audio-visual cs1">O'Brien, M
iles (26 June 2010). <a rel="nofo
llow" class="external text" href

```

=<https://www.youtube.com/watch?v=90u3nPc0U2E><i>Interview with Ken Bowersox from SpaceX</i></a>.

Spaceflight Now<span class="reference-accessdate">. Retrieved <span class="nowrap">25 May</span> 2012</span> &#8211; via YouTube.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Interview+with+Ken+Bowersox+from+SpaceX&amp;rft.pub=Spaceflight+Now&amp;rft.date=2010-06-26&amp;rft.aulast=0%27Brien&amp;rft.aufirst=Miles&amp;rft\_id=https%3A%2F%2Fwww.youtube.com%2Fwatch%3Fv%3D90u3nPc0U2E&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-abc.net.au\_June\_5,-820"><span class="mw-cite-backlink"><b><a href="#cite\_ref-abc.net.au\_June\_5,\_820-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:Template Styles:r1067248974"/><cite class



```

="citation news cs1"><a rel="nofo
llow" class="external text" href
="http://www.abc.net.au/news/2010
-06-05/ufo-spotted-over-eastern-a
ustralia/855590">"UFO spotted ove
r eastern Australia". ABC. 5
June 2010<span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">2 November 201
7.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&rft.genre=article&rft
.title=UFO+spotted+over+eastern
+Australia&rft.date=2010-06-0
5&rft_id=http%3A%2F%2Fwww.ab
c.net.au%2Fnews%2F2010-06-05%2Fuf
o-spotted-over-eastern-australia%
2F855590&rfr_id=info%3Asid%2F
en.wikipedia.org%3AList+of+Falcon
+9+and+Falcon+Heavy+launches" cla
ss="Z3988">

<li id="cite_note-space.com_June_
7,-821"><span class="mw-cite-back
link"><a href="#cite_ref-spac
e.com_June_7,_821-0">^</s
pan> <span class="reference-tex
t"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template

```

Styles:r1067248974"/><cite class="citation news cs1"><a rel="nofollow" class="external text" href="https://www.space.com/8546-ufo-spotted-australia-private-rocket.html">"<span class="cs1-kern-left"></span>"UFO" Spotted Over Australia Likely a Private Rocket"</a>. Space.com. 7 June 2010<span class="reference-accessdate">. Retrieved <span class="nowrap">2 November</span> 2017</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=%22UFO%22+Spotted+Over+Australia+Likely+a+Private+Rocket&amp;rft.date=2010-06-07&amp;rft\_id=https%3A%2F%2Fwww.space.com%2F8546-ufo-spotted-australia-private-rocket.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-BBCLaunchDec2010-822"><span class="mw-cite-backlink"><b><a href="#cite\_ref-BBCLaunchDec2010\_822-0">^</a></b></span>

```
> <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1">"Private space capsule's maiden voyage ends with a splash". BBC. 8 December 2010. Retrieved 8 December 2010.</cite>

<li id="cite_note-SFN_Status-823"><a href="#cite_ref-SFN_Stat
```

```

us_823-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite class="citation we
b cs1"><a rel="nofollow" class="e
xternal text" href="http://www.sp
aceflightnow.com/falcon9/002/stat
us.html">"COTS Demo Flight 1 stat
us". Spaceflight Now. 9 Decem
ber 2010<span class="reference-ac
cessdate">. Retrieved <span class
="nowrap">10 November 2017
.</cite><span title="ctx_v
er=Z39.88-2004&rft_val_fmt=in
fo%3Aofi%2Ffmt%3Akev%3Amtx%3Abook
&rft.genre=unknown&rft.bt
itle=COTS+Demo+Flight+1+status&am
p;rft.pub=Spaceflight+Now&rft
t.date=2010-12-09&rft_id=htt
p%3A%2F%2Fwww.spaceflightnow.com%
2Ffalcon9%2F002%2Fstatus.html&am
p;rfr_id=info%3Asid%2Fen.wikipedi
a.org%3AList+of+Falcon+9+and+Falc
on+Heavy+launches" class="Z3988">

<li id="cite_note-824"><span clas
s="mw-cite-backlink">^

```

```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFAlex_Knapp2014" class="citation news cs1">Alex Knapp (29 May 2014).
 "SpaceX Unveils Its New Dragon Spacecraft"
>. Retrieved 13 August 2017.
</cite>

```

```

<li id="cite_note-Space_News_2011-07-22-825">^ <link rel="mw-deduplicate-d-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"NASA Tentatively Approves Combining SpaceX Flights". SpaceNews. 22 July 2011. Archived from the original on 5 January 2013. Retrieved 22 July 2011.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+Tentatively+Approves+Combi
```

```

ning+SpaceX+Flights&#amp;rft.pub=SpaceNews&#amp;rft.date=2011-07-22&
&#amp;rft_id=http%3A%2F%2Fwww.space
news.com%2Fcivil%2F110722-nasa-co
mbining-spacex-flights.html&#amp;r
fr_id=info%3Asid%2Fen.wikipedia.o
rg%3AList+of+Falcon+9+and+Falcon+
Heavy+launches" class="Z3988"></s
pan>

<li id="cite_note-ars-826"><a h
ref="#cite_ref-ars_826-0">^</
b> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFKlingler2012" class="cit
ation web cs1">Klingler, Dave (31
May 2012). <a rel="nofollow" clas
s="external text" href="https://a
rstechnica.com/science/2012/05/dr
agon-spacecraft-makes-perfect-spl
ashdown/">"Dragon spacecraft make
s perfect splashdown". Ars Te
chnica<span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">19 August 2012</
span>.</cite><span title="ctx_ver
=Z39.88-2004&#amp;rft_val_fmt=inf

```

```

o%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&
amp;rft.genre=unknown&rft.bti
tle=Dragon+spacecraft+makes+perfe
ct+splashdown&rft.pub=Ars+Tec
hnica&rft.date=2012-05-31&am
p;rft.aulast=Klingler&rft.auf
irst=Dave&rft_id=https%3A%2F%
2Ffarstechnica.com%2Fscience%2F201
2%2F05%2Fdragon-spacecraft-makes-
perfect-splashdown%2F&rfr_id=
info%3Asid%2Fen.wikipedia.org%3AL
ist+of+Falcon+9+and+Falcon+Heavy+
launches" class="Z3988"></
span>

<li id="cite_note-827"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFKS
C_Visitor_Complex_[@ExploreSp
aceKSC]2016" class="citation
web cs1">KSC Visitor Complex [@E
xploreSpaceKSC] (14 December 201
6). <a rel="nofollow" class="exte
rnal text" href="https://twitter.
com/ExploreSpaceKSC/status/809061
485699887104">"Don't feed the #Dr

```



agon: Space Flown #SpaceX Dragon capsule now on display at #KennedySpaceCenter in #NASA Now exhibit. #JoinTheJourney" (Tweet) (span class="reference-accessdate">. Retrieved (span class="nowrap">15 August</span> 2018</span> &#8211; via (a href="/wiki/Twitter" title="Twitter">Twitter</a>.</cite>(span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Don%27t+feed+the+%23Dragon%3A+Space+Flown+%23SpaceX+Dragon+capsule+now+on+display+at+%23KennedySpaceCenter+in+%23NASA+Now+exhibit.+%23JoinTheJourney&amp;rft.date=2016-12-14&amp;rft.au=KSC+Visitor+Complex+%5B%40ExploreSpaceKSC%5D&amp;rft\_id=https%3A%2F%2Ftwitter.com%2FExploreSpaceKSC%2Fstatus%2F809061485699887104&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span><br /><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:1067248974"/><cite id="CITEREFKSC\_Visitor\_Complex\_&#91;@ExploreSpa

```

ceKSC]2016" class="citation w
eb cs1">KSC Visitor Complex [@Exp
loreSpaceKSC] (14 December 2016).
<a rel="nofollow" class="external
text" href="https://twitter.com/E
xploreSpaceKSC/status/80914675045
5910401">"Same Dragon as displaye
d here in February 2015 from the
C2+ or COTS Demo Flight 2 missio
n" (Tweet)<span class="refere
nce-accessdate">. Retrieved 15 August 2
018 – via <a href="/
wiki/Twitter" title="Twitter">Twi
tter.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Aboo
k&rft.genre=unknown&rft.b
title=Same+Dragon+as+displayed+he
re+in+February+2015+from+the+C2%2
B+or+COTS+Demo+Flight+2+mission&a
mp;rft.date=2016-12-14&rft.au
=KSC+Visitor+Complex+%5B%40Explor
eSpaceKSC%5D&rft_id=https%3A%
2F%2Ftwitter.com%2FExploreSpaceKS
C%2Fstatus%2F809146750455910401&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">

```

```

<li id="cite_note-certified-828">
<a href="#cite_ref-certified_828
-0">^ <span class
="reference-text"><link rel="mw-d
eduplicated-inline-style" href="m
w-data:TemplateStyles:r106724897
4"/><cite id="CITEREFClark2012" c
lass="citation web cs1">Clark, St
ephen (24 August 2012). <a rel="n
ofollow" class="external text" hr
ef="http://spaceflightnow.com/new
s/n1208/24cots/">"NASA ready for
operational cargo flights by Spac
eX". Spaceflight Now. <a rel
="nofollow" class="external text"
href="https://web.archive.org/we
b/20120827001937/http://www.space
flightnow.com/news/n1208/24cot
s/">Archived from the origina
l on 27 August 2012<span class="r
eference-accessdate">. Retrieved
29 August</
span> 2012. <q>SpaceX has
completed all milestones under a
development and demonstration par
tnership with NASA, clearing the
way for the firm to begin regula
r operational cargo deliveries to
```

the International Space Station in October, NASA Administrator Charles Bolden announced Thursday.</p></cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=NASA+ready+for+operational+cargo+flights+by+SpaceX&rft.pub=Spaceflight+Now&rft.date=2012-08-24&rft.aulast=Clark&rft.aufirst=Stephen&rft\_id=http%3A%2F%2Fspaceflightnow.com%2Fnews%2Fn1208%2F24cots%2F%2F&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-829"><span class="mw-cite-backlink"><b><a href="#cite\_ref-829">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFLindsey2012" class="citation news cs1">Lindsey, Clark (8 October 2012). <a rel="nofollow" class="external text" href="https://archive.

today/20121217163116/https://www.newspacewatch.com/articles/spacex-crs-1-post-conference-press-conference.html">"SpaceX CRS-1: Post conference press conference"</a>. NewSpace Watch. Archived from <a rel="nofollow" class="external text" href="https://www.newspacewatch.com/articles/spacex-crs-1-post-conference-press-conference.html">the original</a> on 17 December 2012.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=SpaceX+CRS-1%3A+Post+conference+press+conference&amp;rft.date=2012-10-08&amp;rft.aulast=Lindsey&amp;rft.aufirst=Clark&amp;rft\_id=https%3A%2F%2Fwww.newspacewatch.com%2Farticles%2Fspacex-crs-1-post-conference-press-conference.html&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-flight4engineanomaly-830"><span class="mw-cite-backlink"><b><a href="#cite\_ref-fl

ight4engineanomaly\_830-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFAtkinson2012" class="citation news cs1">Atkinson, Nancy (8 October 2012). <a rel="nofollow" class="external text" href="http://www.universetoday.com/97753/falcon-9-experienced-engine-anomaly-but-kept-going-to-orbit/">"Falcon 9 Experienced Engine Anomaly But Kept Going to Orbit"</a>. Universe Today<span class="reference-accessdate">. Retrieved <span class="nowrap">8 October</span> 2012</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=article&amp;rft.atitle=Falcon+9+Experienced+Engine+Anomaly+But+Kept+Going+to+Orbit&amp;rft.date=2012-10-08&amp;rft.aulast=Atkinson&amp;rft.aufirst=Nancy&amp;rft\_id=http%3A%2F%2Fwww.universetoday.com%2F97753%2Ffalcon-9-experienced-engine-anomaly-but-kept-going-to-orbit%2F&amp;rfr\_id=info%3Asid%2Fen.wikip

```
edia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-Dragon_mission_report_CRS-1-831">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"Dragon Mission Report | Return of the Dragon: Commercial craft back home". Spaceflight Now. 28 October 2012. Retrieved 10 November 2017.</cite>
<span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Dragon+Mission+Report+%26%23124%3B+Return+of+the+Dragon%3A+Commercial+craft+back+home&rft.pub=Spaceflight
```

```

+Now&rft.date=2012-10-28&
rft_id=http%3A%2F%2Fspaceflightno
w.com%2Ffalcon9%2F004%2F121028spl
ashdown%2F&rfr_id=info%3Asid%
2Fen.wikipedia.org%3AList+of+Falc
on+9+and+Falcon+Heavy+launches" c
lass="Z3988">

<li id="cite_note-block123-832"><
span class="mw-cite-backlink">^ <
a href="#cite_ref-block123_832-
0">^{<i>a</i>}
<a href="#cite_ref-block123_832-
1">^{<i>b</i>}
 <span class="reference-te
xt"><link rel="mw-deduplicated-in
line-style" href="mw-data:Templat
eStyles:r1067248974"/><cite id="C
ITEREFKyle" class="citation web c
s1">Kyle, Ed. <a rel="nofollow" c
lass="external text" href="htt
p://www.spacelaunchreport.com/fal
con9ft.html">"SpaceX Falcon 9 v1.
2 Data Sheet". <i>spacelaunch
report.com</i>.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=unknown
&rft.jtitle=spacelaunchrepor
t.com&rft.atitle=SpaceX+Falco

```



```

n+9+v1.2+Data+Sheet&rft.aulas
t=Kyle&rft.aufirst=Ed&rft
_id=http%3A%2F%2Fwww.spacelaunchr
eport.com%2Ffalcon9ft.html&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-sfn20130928-83
3"><span class="mw-cite-backlin
k"><a href="#cite_ref-sfn20130
928_833-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFClark20
13" class="citation news cs1">Cla
rk, Stephen (29 September 2013).
 <a rel="nofollow" class="externa
l text" href="http://www.spacefli
ghtnow.com/falcon9/006/130928prev
iew/#.Ukg1xxCafzk">"SpaceX to put
Falcon 9 upgrades to the test Sun
day". Spaceflight Now<span cl
ass="reference-accessdate">. Retr
ieved 28 Sep
tember 2013.</cite>
<span title="ctx_ver=Z39.88-2004&
amp;rft_val_fmt=info%3Aofi%2Fmt%

```

```

3Akev%3Amtx%3Ajournal&rft.genre=article&rft.atitle=SpaceX+to+put+Falcon+9+upgrades+to+the+test+Sunday&rft.date=2013-09-29&rft.aulast=Clark&rft.aufirst=Stephen&rft_id=http%3A%2F%2Fwww.spaceflightnow.com%2Ffalcon9%2F006%2F130928preview%2F%23.Ukg1xxCafzk&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches"
class="Z3988">

<li id="cite_note-sn20130906-834">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFKlotz2013" class="citation news cs1">Klotz, Irene (6 September 2013). "Musk Says SpaceX Being "Extremely Paranoid" as It Readies for Falcon 9's California Debu

```

```

t". SpaceNews<span class="ref
erence-accessdate">. Retrieved <s
pan class="nowrap">2 November</sp
an> 2017.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Ajournal&rft.genre=article
&rft.atitle=Musk+Says+SpaceX+
Being+%22Extremely+Paranoid%22+as
+It+Readies+for+Falcon+9%27s+Cali
fornia+Debut&rft.date=2013-09
-06&rft.aulast=Klotz&rft.
aufirst=Irene&rft_id=http%3A%
2F%2Fspacenews.com%2F37094musk-sa
ys-spacex-being-extremely-paranoi
d-as-it-readies-for-falcon-9s%2F&
amp;rfr_id=info%3Asid%2Fen.wikipe
dia.org%3AList+of+Falcon+9+and+Fa
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-sn20130929-83
5"><span class="mw-cite-backlin
k"><a href="#cite_ref-sn201309
29_835-0">^ <link rel
="mw-deduplicated-inline-style" h
ref="mw-data:TemplateStyles:r1067
248974"/><cite id="CITEREFFerster
2013" class="citation news cs1">F

```

```

erster, Warren (29 September 201
3). <a rel="nofollow" class="exte
rnal text" href="http://spacenew
s.com/37450upgraded-falcon-9-rock
et-successfully-debuts-from-vande
nberg/">"Upgraded Falcon 9 Rocket
Successfully Debuts from Vandenbe
rg". SpaceNews<span class="re
ference-accessdate">. Retrieved <
span class="nowrap">2 November</s
pan> 2017.</cite><span tit
le="ctx_ver=Z39.88-2004&rft_v
al_fmt=info%3Aofi%2Ffmt%3Akev%3Am
tx%3Ajournal&rft.genre=articl
e&rft.atitle=Upgraded+Falcon+
9+Rocket+Successfully+Debuts+from
+Vandenberg&rft.date=2013-09-
29&rft.aulast=Ferster&rft
t.aufirst=Warren&rft_id=http%
3A%2F%2Fspacenews.com%2F37450upgr
aded-falcon-9-rocket-successfully
-debuts-from-vandenberg%2F&rft
r_id=info%3Asid%2Fen.wikipedia.or
g%3AList+of+Falcon+9+and+Falcon+H
eavy+launches" class="Z3988"></sp
an>

<li id="cite_note-836"><span clas
s="mw-cite-backlink">^

```

```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFJeff_Foust2015" class="citation web cs1">Jeff Foust (28 June 2015). "Docking Adapter, Satellites, Student Experiments Lost In Dragon Failure". SpaceNews. Retrieved 19 August 2017. </cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Docking+Adapter%2C+Satellites%2C+Student+Experiments+Lost+In+Dragon+Failure&rft.pub=SpaceNews&rft.date=2015-06-28&rft.au=Jeff+Foust&rft_id=http%3A%2F%2Fspacenews.com%2Fdocking-adapter-satellites-student-experiments-lost-in-dragon-failure%2F&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Hea
```

```
vy+launches" class="Z3988">

<li id="cite_note-SpaceXJuly2015-837">^ <link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation web cs1">"CRS-7 Investigation Update". SpaceX. 20 July 2015. Archived from the original on 11 August 2015. Retrieved 7 August 2015.</cite><span title="ctx_ver=Z39.88-2004&rfc_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rfc.genre=unknown&rfc.btitle=CRS-7+Investig
```

ation+Update&rft.pub=SpaceX&rft.date=2015-07-20&rft\_id=http%3A%2F%2Fwww.spacex.com%2Fnews%2F2015%2F07%2F20%2Fcrs-7-investigation-update&rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-838"><span class="mw-cite-backlink"><b><a href="#cite\_ref-838">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation audio-visual cs1"><a rel="nofollow" class="external text" href="https://www.youtube.com/watch?v=fTom8xVzFdo"><i>Slow motion video of the Falcon 9 explosion</i></a>. <i>Astronomy Now</i>. 28 June 2015<span class="reference-access date">. Retrieved <span class="nowrap">6 March</span> 2016</span>. </cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Slow+motion+video+of+the+Falcon+9+e

xplosion&#amp;rft.date=2015-06-28&  
 amp;rft\_id=https%3A%2F%2Fwww.yout  
 ube.com%2Fwatch%3Fv%3DfTom8xVzFdo  
 &#amp;rfr\_id=info%3Asid%2Fen.wikip  
 edia.org%3AList+of+Falcon+9+and+F  
 alcon+Heavy+launches" class="Z398  
 8"></span></span>  
 </li>  
 <li id="cite\_note-839"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-839">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:  
 r1067248974"/><cite class="citati  
 on web cs1"><a rel="nofollow" cla  
 ss="external text" href="https://  
 www.nasa.gov/sites/default/files/  
 atoms/files/public\_summary\_nasa\_i  
 rt\_spacex\_crs-7\_final.pdf">"NASA  
 Independent Review Team SpaceX C  
 RS-7 Accident Investigation Repor  
 t"</a> <span class="cs1-format">  
 (PDF)</span>. NASA. 12 March 2018  
 <span class="reference-accessdat  
 e">. Retrieved <span class="nowra  
 p">12 March</span> 2018</span>.</  
 cite><span title="ctx\_ver=Z39.88-  
 2004&#amp;rft\_val\_fmt=info%3Aofi%2  
 Ffmt%3Akev%3Amtx%3Abook&#amp;rft.g



```

enre=unknown&rft.btitle=NASA+
Independent+Review+Team+SpaceX+CR
S-7+Accident+Investigation+Report
&rft.pub=NASA&rft.date=20
18-03-12&rft_id=https%3A%2F%2
Fwww.nasa.gov%2Fsites%2Fdefault%2
Ffiles%2Fatoms%2Ffiles%2Fpublic_s
ummary_nasa_irt_spacex_crs-7_fina
l.pdf&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988"> <i>This article in
corporates text from this source,
which is in the <a href="/wiki/Pu
blic_domain" title="Public domai
n">public domain</i><i>.</i>


```

```
<li id="cite_note-840"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFFo
ust2015" class="citation web cs
1">Foust, Jeff (15 September 201
5). <a rel="nofollow" class="exte
rnal text" href="http://spacenew
s.com/ses-betting-on-spacex-falco
n-9-upgrade-as-debut-approache
s/">"SES Betting on SpaceX, Falco
n 9 Upgrade as Debut Approaches"
. SpaceNews<span class="refer
ence-accessdate">. Retrieved <spa
n class="nowrap">18 October 2015.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=SES+Betting+on+Space
X%2C+Falcon+9+Upgrade+as+Debut+Ap
proaches&rft.pub=SpaceNews&am
p;rft.date=2015-09-15&rft.aul
ast=Foust&rft.aufirst=Jeff&am
p;rft_id=http%3A%2F%2Fspacenews.c
om%2Fses-betting-on-spacex-falcon
-9-upgrade-as-debut-approaches%2F
```

```

&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988">

<li id="cite_note-841">^
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFColdeweyWagstaff2015" class="citation news cs1">Coldewey, Devin; Wagstaff, Keith (22 December 2015).
 "SpaceX Makes History: Falcon 9 Launches, Lands Vertically". <i>NBC News</i>. Retrieved 5 January 2016.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=NBC+News&rft.atitle=

```

SpaceX+Makes+History%3A+Falcon+9+Launches%2C+Lands+Vertically&rft.date=2015-12-22&rft.aulas t=Coldewey&rft.aufirst=Devin& amp;rft.au=Wagstaff%2C+Keith&rft\_id=https%3A%2F%2Fwww.nbcnews.com%2Ftech%2Finnovation%2Fspacex-makes-history-successfully-launches-lands-falcon-9-rocket-n483921& rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span>

</li>

<li id="cite\_note-natgeo-842"><span class="mw-cite-backlink"><b><a href="#cite\_ref-natgeo\_842-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFDrake2016" class="citation news cs1">Drake, Nadia (8 April 2016). <a rel="nofollow" class="external text" href="http://phenomena.nationalgeographic.com/2016/04/08/spacex-rocket-makes-spectacular-landing-on-drone-ship/">"SpaceX Rocket Makes Spectacular Landing on Drone Ship"</a>. N

ational Geographic (magazine)<span class="reference-accessdate">.  
Retrieved <span class="nowrap">8  
April</span> 2016</span>.</cite><  
span title="ctx\_ver=Z39.88-2004&a  
mp;rft\_val\_fmt=info%3Aofi%2Ffmt%3  
Akev%3Amtx%3Ajournal&amp;rft.genr  
e=article&amp;rft.atitle=SpaceX+R  
ocket+Makes+Spectacular+Landing+o  
n+Drone+Ship&amp;rft.date=2016-04  
-08&amp;rft.aulast=Drake&amp;rft.  
aufirst=Nadia&amp;rft\_id=http%3A%  
2F%2Fphenomena.nationalgeographi  
c.com%2F2016%2F04%2F08%2Fspacex-r  
ocket-makes-spectacular-landing-o  
n-drone-ship%2F&amp;rfr\_id=info%3  
Asid%2Fen.wikipedia.org%3AList+of  
+Falcon+9+and+Falcon+Heavy+launch  
es" class="Z3988"></span></span>  
</li>  
<li id="cite\_note-843"><span clas  
s="mw-cite-backlink"><b><a href  
="#cite\_ref-843">^</a></b></span>  
<span class="reference-text"><lin  
k rel="mw-deduplicated-inline-sty  
le" href="mw-data:TemplateStyles:  
r1067248974"/><cite id="CITEREFJa  
son\_Rhian2015" class="citation ne  
ws cs1">Jason Rhian (8 April 201  
5). <a rel="nofollow" class="exte

```

rnal text" href="http://www.space
flightinsider.com/missions/iss/sp
acex-returns-cargo-dragon-service
-crs-8-mission/">"Triumph! SpaceX
returns Dragon to service with CR
S-8, nails landing on Drone Ship"
. Spaceflight Insider<span cl
ass="reference-accessdate">. Retr
ieved 10 Nov
ember 2017.</cite><
span title="ctx_ver=Z39.88-2004&a
mp;rft_val_fmt=info%3Aofi%2Ffmt%3
Akev%3Amtx%3Ajournal&rft.genr
e=article&rft.atitle=Triumph%
21+SpaceX+returns+Dragon+to+servi
ce+with+CRS-8%2C+nails+landing+on
+Drone+Ship&rft.date=2015-04-
08&rft.au=Jason+Rhian&rft
_id=http%3A%2F%2Fwww.spaceflighti
nsider.com%2Fmissions%2Fiss%2Fspa
cex-returns-cargo-dragon-service-
crs-8-mission%2F&rfr_id=info%
3Asid%2Fen.wikipedia.org%3AList+o
f+Falcon+9+and+Falcon+Heavy+launc
hes" class="Z3988">

<li id="cite_note-Malik-844"><spa
n class="mw-cite-backlink">^</
a> <span class="refere

```

nce-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFMalik2016" class="citation web cs1">Malik, Tariq (1 September 2016). <a rel="nofollow" class="external text" href="http://www.space.com/33929-spacex-falcon-9-rocket-explodes-on-launch-pad.html">"Launchpad Explosion Destroys SpaceX Falcon 9 Rocket, Satellite in Florida"</a>. Space.com. <a rel="nofollow" class="external text" href="https://web.archive.org/web/20160902140256/http://www.space.com/33929-spacex-falcon-9-rocket-explodes-on-launch-pad.html">Archived</a> from the original on 2 September 2016<span class="reference-accessdate">. Retrieved <span class="nowrap">1 September</span> 2016</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&amp;rft.genre=unknown&amp;rft.btitle=Launchpad+Explosion+Destroys+SpaceX+Falcon+9+Rocket%2C+Satellite+in+Florida&amp;rft.pub=Space.com&amp;rft.date=2016-09-01&amp;rft.aulast=Malik&a

```

mp;rft.aufirst=Tariq&rft_id=ht
tp%3A%2F%2Fwww.space.com%2F33929
-spacex-falcon-9-rocket-explodes-
on-launch-pad.html&rfr_id=inf
o%3Asid%2Fen.wikipedia.org%3AList
+of+Falcon+9+and+Falcon+Heavy+lau
nches" class="Z3988"></spa
n>

<li id="cite_note-SpaceflightInsi
der-2017-04-04-845"><span class
="mw-cite-backlink"><a href="#
cite_ref-SpaceflightInsider-2017-
04-04_845-0">^ <sp
an class="reference-text"><link r
el="mw-deduplicated-inline-style"
href="mw-data:TemplateStyles:r106
7248974"/><cite id="CITEREFLeahy2
017" class="citation news cs1">Le
ahy, Bart (4 April 2017). <a rel
="nofollow" class="external text"
href="http://www.spaceflightinsid
er.com/organizations/space-explor
ation-technologies/twice-launched
-falcon-9-first-stage-returned-po
rt-canaveral/">"Twice-launched Fa
lcon 9 first stage returned to Po
rt Canaveral". Spaceflight In
sider<span class="reference-acces
sdate">. Retrieved <span class="n

```



```

owrap">10 November 2017</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=article&rft.at
itle=Twice-launched+Falcon+9+firs
t+stage+returned+to+Port+Canavera
l&rft.date=2017-04-04&rft
t.au1ast=Leahy&rft.au1first=Ba
rt&rft_id=http%3A%2F%2Fwww.sp
aceflightinsider.com%2Forganizati
ons%2Fspace-exploration-technolog
ies%2Ftwice-launched-falcon-9-fir
st-stage-returned-port-canaveral%
2F&rfr_id=info%3Asid%2Fen.wik
ipedia.org%3AList+of+Falcon+9+and
+Falcon+Heavy+launches" class="Z3
988">

<li id="cite_note-markwatch-846">
^
 <a href="#cite_ref-markwatch_846
-0">^{<i>a</i>}
> <a href="#cite_ref-markwatch_84
6-1">^{<i>b</i>}</
a> <span class="reference-
text"><link rel="mw-deduplicated-
inline-style" href="mw-data:Templ
ateStyles:r1067248974"/><cite id
="CITEREFPasztor" class="citation

```

```

web cs1">Pasztor, Andy. <a rel="n
ofollow" class="external text" hr
ef="https://www.marketwatch.com/s
tory/northrop-grumman-may-be-to-b
lame-for-botched-satellite-launch
-in-january-2018-04-08">"Northrop
Grumman may be to blame for botch
ed satellite launch in January"</
a>. Wall Street Journal – v
ia Market Watch.</cite><span titl
e="ctx_ver=Z39.88-2004&rft_va
l_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Northrop+Grumman+may
+be+to+blame+for+botched+satellit
e+launch+in+January&rft.pub=W
all+Street+Journal&rft.aulast
=Pasztor&rft.aufirst=Andy&am
p;rft_id=https%3A%2F%2Fwww.market
watch.com%2Fstory%2Fnorthrop-grum
man-may-be-to-blame-for-botched-s
atellite-launch-in-january-2018-0
4-08&rfr_id=info%3Asid%2Fen.w
ikipedia.org%3AList+of+Falcon+9+a
nd+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-847"><span clas
s="mw-cite-backlink">^

```

```
<link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite class="citation news cs1">"Probes Point to Northrop Grumman Errors in January Spy-Satellite Failure". <i>Wall Street Journal</i>. 8 April 2018. Retrieved 8 April 2018.</cite><span title="ctx_ver=Z39.88-2004&rft_val_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&rft.genre=article&rft.jtitle=Wall+Street+Journal&rft.atitle=Probes+Point+to+Northrop+Grumman+Errors+in+January+Spy-Satellite+Failure&rft.date=2018-04-08&rft_id=https%3A%2F%2Fwww.wsj.com%2Farticles%2Fprobes-point-to-northrop-grumman-errors-in-january-spy-satellite-failure-1523220500&rfr_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Fa
```

```
lcon+Heavy+launches" class="Z398
8">

<li id="cite_note-848"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
money.cnn.com/2018/02/06/technolo
gy/future/biggest-rockets-falcon-
heavy-comparison/index.html">"Spa
ceX Falcon Heavy: How it stacks u
p with other massive rockets". CNN News. 6 February 2018.</ci
te><span title="ctx_ver=Z39.88-20
04&rft_val_fmt=info%3Aofi%2Ff
mt%3Akev%3Amtx%3Abook&rft.gen
re=unknown&rft.btitle=SpaceX+
Falcon+Heavy%3A+How+it+stacks+up+
with+other+massive+rockets&rft
.pub=CNN+News&rft.date=2018-
02-06&rft_id=https%3A%2F%2Fmo
ney.cnn.com%2F2018%2F02%2F06%2Fte
chnology%2Ffuture%2Fbiggest-rocke
ts-falcon-heavy-comparison%2Finde
x.html&rfr_id=info%3Asid%2Fe
```

```
n.wikipedia.org%3AList+of+Falcon+
9+and+Falcon+Heavy+launches" clas
s="Z3988">

<li id="cite_note-NatGeo-2018-02-
06-849"><span class="mw-cite-back
link"><a href="#cite_ref-NatGe
o-2018-02-06_849-0">^</sp
an>
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1067248974"/><cite class="ci
tation news cs1"><a rel="nofollo
w" class="external text" href="ht
tps://news.nationalgeographic.co
m/2018/02/falcon-heavy-launch-spa
cex-elon-musk-space-science/">"Fa
lcon Heavy Rocket Makes History W
ith Successful First Launch".
National Geographic. 6 February 2
018.</cite><span title="ctx_ver=Z
39.88-2004&rft_val_fmt=info%3
Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&
amp;rft.genre=article&rft.ati
tle=Falcon+Heavy+Rocket+Makes+His
tory+With+Successful+First+Launch
&rft.date=2018-02-06&rft_
id=https%3A%2F%2Fnews.nationalgeo
graphic.com%2F2018%2F02%2Ffalcon-
heavy-launch-spacex-elon-musk-spa
```

ce-science%2F&#amp;rfr\_id=info%3Aid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-PopMech-2018-02-05-850"><span class="mw-cite-backlink"><b><a href="#cite\_ref-PopMech-2018-02-05\_850-0">^</a></b></span> <span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:Template Styles:r1067248974"/><cite id="CITEREFJoe\_Pappalardo2018" class="citation magazine cs1">Joe Pappalardo (5 February 2018). <a rel="nofollow" class="external text" href="https://www.popularmechanics.com/space/moon-mars/a16571489/elon-musk-space-tesla-mars/">"Elon Musk's Space Tesla Isn't Going to Mars. It's Going Somewhere More Important"</a>. <i>Popular Mechanics</i>.</cite><span title="ctx\_ver=Z39.88-2004&#amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&#amp;rft.genre=article&#amp;rft.jtitle=Popular+Mechanics&#amp;rft.atitle=Elon+Musk%27s+Space+Tesla+Isn%27t+Going+to+Mars.+It%27s+Goi

ng+Somewhere+More+Important.&  
 rft.date=2018-02-05&rft.au=Jo  
 e+Pappalardo&rft\_id=https%3A%  
 2F%2Fwww.popularmechanics.com%2Fs  
 pace%2Fmoon-mars%2Fa16571489%2Fel  
 on-musk-space-tesla-mars%2F&r  
 fr\_id=info%3Asid%2Fen.wikipedia.o  
 rg%3AList+of+Falcon+9+and+Falcon+  
 Heavy+launches" class="Z3988"></s  
 pan></span>

</li>

<li id="cite\_note-851"><span clas  
 s="mw-cite-backlink"><b><a href  
 ="#cite\_ref-851">^</a></b></span>  
 <span class="reference-text"><lin  
 k rel="mw-deduplicated-inline-sty  
 le" href="mw-data:TemplateStyles:  
 r1067248974"/><cite id="CITEREFGr  
 ush" class="citation web cs1">Gru  
 sh, Loren. <a rel="nofollow" clas  
 s="external text" href="https://w  
 ww.theverge.com/2019/3/7/1825454  
 9/spacex-crew-dragon-iss-nasa-lan  
 ding-parachutes-splashdown">"Spac  
 eX's Crew Dragon has proved itsel  
 f in space - now it has to get ba  
 ck to Earth in one piece"</a>. <i  
 >The verge</i>. The Verge<span cl  
 ass="reference-accessdate">. Retr  
 ieved <span class="nowrap">8 Marc

h</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&amp;rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal&amp;rft.genre=unknown&amp;rft.jtitle=The+verge&amp;rft.atitle=SpaceX%27s+Crew+Dragon+has+proved+itself+in+space+-+now+it+has+to+get+back+to+Earth+in+one+piece&amp;rft.aulast=Grush&amp;rft.aufirst=Loren&amp;rft\_id=https%3A%2F%2Fwww.theverge.com%2F2019%2F3%2F7%2F18254549%2Fspacex-crew-dragon-iss-nasa-landing-parachutes-splashdown&amp;rfr\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li>

<li id="cite\_note-852"><span class="mw-cite-backlink"><b><a href="#cite\_ref-852">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1067248974"/><cite id="CITEREFElon\_Musk\_&#91;@elonmusk&#93;2019" class="citation web cs1">Elon Musk [@elonmusk] (1 March 2019). <a rel="nofollow" class="external text" href="https://twitter.com/elo



```
nmusk/status/110170155215321907
2">"Super high tech zero-g indica
tor" (Tweet) – via <a h
ref="/wiki/Twitter" title="Twitte
r">Twitter.</cite><span title
="ctx_ver=Z39.88-2004&rft_val
_fmt=info%3Aofi%2Ffmt%3Akev%3Amt
x%3Abook&rft.genre=unknown&am
p;rft.btitle=Super+high+tech+zero
-g+indicator&rft.date=2019-03
-01&rft.au=Elon+Musk+%5B%40el
onmusk%5D&rft_id=https%3A%2F%
2Ftwitter.com%2Felonmusk%2Fstatu
s%2F1101701552153219072&rfr_i
d=info%3Asid%2Fen.wikipedia.org%3
AList+of+Falcon+9+and+Falcon+Heav
y+launches" class="Z3988">

<li id="cite_note-853"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFWe
itering" class="citation web cs
1">Weitering, Hanneke. <a rel="no
follow" class="external text" hre
f="https://www.space.com/astronau
```

t-anne-mcclain-loves-celestial-buddy-earth.html">"Astronaut Anne McClain Is Having a Ball in Space with Her 'Celestial Buddy'<span class="cs1-kern-right"></span>"</a>. Space.com<span class="reference-accessdate">. Retrieved <span class="nowrap">8 March</span> 2019</span>.</cite><span title="ctx\_ver=Z39.88-2004&rft\_val\_fmt=info%3Aofi%2Ffmt%3Akev%3Amtx%3Abook&rft.genre=unknown&rft.btitle=Astronaut+Anne+McClain+Is+Having+a+Ball+in+Space+with+Her+%27Celestial+Buddy%27&rft.pub=Space.com&rft.aulast=Weitering&rft.aufirst=Hanneke&rft\_id=https%3A%2F%2Fwww.space.com%2Fastronaut-anne-mcclain-loves-celestial-buddy-earth.html&rft\_r\_id=info%3Asid%2Fen.wikipedia.org%3AList+of+Falcon+9+and+Falcon+Heavy+launches" class="Z3988"></span></span></li><li id="cite\_note-854"><span class="mw-cite-backlink"><b><a href="#cite\_ref-854">^</a></b></span><span class="reference-text"><link rel="mw-deduplicated-inline-sty

```

le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.abc.net.au/news/2019-03-09/el
on-musk-spacex-capsule-splashes-d
own-off-florida-coast/1088610
0">"Elon Musk's SpaceX capsule sp
lashes down off Florida coast". <i>ABC News</i>. ABC<span clas
s="reference-accessdate">. Retriev
ed 8 March
 2019.</cite><span
title="ctx_ver=Z39.88-2004&r
ft_val_fmt=info%3Aofi%2Ffmt%3Ake
v%3Amtx%3Ajournal&rft.genre=u
nknown&rft.jtitle=ABC+News&am
p;rft.atitle=Elon+Musk%27s+SpaceX
+capsule+splashes+down+off+Florid
a+coast&rft_id=https%3A%2F%2F
www.abc.net.au%2Fnews%2F2019-03-0
9%2Felon-musk-spacex-capsule-spla
shes-down-off-florida-coast%2F108
86100&rfr_id=info%3Asid%2Fen.
wikipedia.org%3AList+of+Falcon+9+
and+Falcon+Heavy+launches" class
="Z3988">

<li id="cite_note-855"><span clas
s="mw-cite-backlink"><a href

```

```

="#cite_ref-855">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.cnet.com/news/spacex-crew-dra
gon-splashdown-see-nasa-astronaut
s-return-to-earth/">"SpaceX Crew
Dragon splashdown: See NASA astr
onauts return to Earth". CNET
<span class="reference-accessdat
e">. Retrieved <span class="nowra
p">4 August 2020.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Abook&rft.g
enre=unknown&rft.btitle=Space
X+Crew+Dragon+splashdown%3A+See+N
ASA+astronauts+return+to+Earth&am
p;rft.pub=CNET&rft_id=https%3
A%2F%2Fwww.cnet.com%2Fnews%2Fspac
ex-crew-dragon-splashdown-see-nas
a-astronauts-return-to-earth%2F&a
mp;rfr_id=info%3Asid%2Fen.wikiped
ia.org%3AList+of+Falcon+9+and+Fal
con+Heavy+launches" class="Z398
8">


```

```
<li id="cite_note-856"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2021/03/s
pacex-starlink-first-booster-fly-
nine/">"SpaceX's Falcon 9 booster
flies for 9th time as Starlink co
nstellation grows". <i>NASASp
aceFlight.com</i>. 14 March 2021<
span class="reference-accessdat
e">. Retrieved <span class="nowra
p">15 March 2021.</
cite><span title="ctx_ver=Z39.88-
2004&rft_val_fmt=info%3Aofi%2
Ffmt%3Akev%3Amtx%3Ajournal&rft
.genre=unknown&rft.jtitle=NA
SASpaceFlight.com&rft.atitle=
SpaceX%27s+Falcon+9+booster+flies
+for+9th+time+as+Starlink+constel
lation+grows&rft.date=2021-03
-14&rft_id=https%3A%2F%2Fwww.
nasaspaceflight.com%2F2021%2F03%2
Fspacex-starlink-first-booster-fl
y-nine%2F&rfr_id=info%3Asid%2
```

```

Fen.wikipedia.org%3AList+of+Falco
n+9+and+Falcon+Heavy+launches" cl
ass="Z3988">

<li id="cite_note-857"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFTa
yeb" class="citation web cs1">Tay
eb, Zahra. <a rel="nofollow" clas
s="external text" href="https://w
ww.businessinsider.com/spacex-lau
nches-falcon-9-rocket-booster-for
-record-breaking-9th-time-2021-
3">"SpaceX launches Falcon 9 rock
et booster for a record-breaking
 9th time". <i>Business Insid
er</i><span class="reference-acce
ssdate">. Retrieved <span class
="nowrap">15 March 2021</s
pan>.</cite><span title="ctx_ver=
Z39.88-2004&rft_val_fmt=info%
3Aofi%2Ffmt%3Akev%3Amtx%3Ajournal
&rft.genre=unknown&rft.jt
itle=Business+Insider&rft.ati
tle=SpaceX+launches+Falcon+9+rock
et+booster+for+a+record-breaking+

```

```

9th+time&rft.aulast=Tayeb&
p;rft.aufirst=Zahra&rft_id=ht
tps%3A%2F%2Fwww.businessinsider.c
om%2Fspacex-launches-falcon-9-roc
ket-booster-for-record-breaking-9
th-time-2021-3&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-858"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite class="citati
on web cs1"><a rel="nofollow" cla
ss="external text" href="https://
www.nasaspaceflight.com/2021/05/h
istoric-10th-falcon9-refligh
t/">"SpaceX flies historic 10th m
ission of a Falcon 9 as Starlink
constellation expands". <i>N
ASASpaceFlighy</i>. 9 May 2021<sp
an class="reference-accessdate">.
Retrieved 9
May 2021.</cite><s
pan title="ctx_ver=Z39.88-2004&am
p;rft_val_fmt=info%3Aofi%2Ffmt%3A

```

```

kev%3Amtx%3Ajournal&rft.genre
=unknown&rft.jtitle=NASASpace
Flighy&rft.atitle=SpaceX+flie
s+historic+10th+mission+of+a+Falc
on+9+as+Starlink+constellation+ex
pands&rft.date=2021-05-09&am
p;rft_id=https%3A%2F%2Fwww.nasasp
aceflight.com%2F2021%2F05%2Fhisto
ric-10th-falcon9-reflight%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

<li id="cite_note-859"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2021" class="citation web cs
1">Ralph, Eric (17 January 2021).
<a rel="nofollow" class="external
text" href="https://www.teslarat
i.com/spacex-falcon-9-booster-rec
ord-rocket-turnaround-2021/">"Spa
ceX Falcon 9 booster set to beat
the rocket turnaround record by
a huge margin". <i>TESLARATI

```



```

</i><span class="reference-access
date">. Retrieved <span class="no
wrap">25 January</spa
n>.</cite><span title="ctx_ver=Z3
9.88-2004&rft_val_fmt=info%3A
ofi%2Ffmt%3Akev%3Amtx%3Ajournal&
rft.genre=unknown&rft.jtit
le=TESLARATI&rft.atitle=Space
X+Falcon+9+booster+set+to+beat+th
e+rocket+turnaround+record+by+a+h
uge+margin&rft.date=2021-01-1
7&rft.aulast=Ralph&rft.au
first=Eric&rft_id=https%3A%2
F%2Fwww.teslarati.com%2Fspacex-fa
lcon-9-booster-record-rocket-turn
around-2021%2F&rfr_id=info%3A
sid%2Fen.wikipedia.org%3AList+of+
Falcon+9+and+Falcon+Heavy+launche
s" class="Z3988">

<li id="cite_note-860"><span clas
s="mw-cite-backlink">^
<lin
k rel="mw-deduplicated-inline-sty
le" href="mw-data:TemplateStyles:
r1067248974"/><cite id="CITEREFRa
lph2021" class="citation web cs
1">Ralph, Eric (4 February 2021).
<a rel="nofollow" class="external

```

```

text" href="https://www.teslarati
i.com/spacex-falcon-9-halves-spac
e-shuttle-record/">"SpaceX Falcon
9 rocket cuts Space Shuttle turna
round record in half". <i>TES
LARATI</i><span class="reference-
accessdate">. Retrieved <span cla
ss="nowrap">4 February 202
1.</cite><span title="ctx_
ver=Z39.88-2004&rft_val_fmt=i
nfo%3Aofi%2Ffmt%3Akev%3Amtx%3Ajou
rnal&rft.genre=unknown&rft
.jtitle=TESLARATI&rft.atitle
=SpaceX+Falcon+9+rocket+cuts+Spac
e+Shuttle+turnaround+record+in+ha
lf&rft.date=2021-02-04&rft
.aulast=Ralph&rft.aufirst=Er
ic&rft_id=https%3A%2F%2Fwww.t
eslarati.com%2Fspacex-falcon-9-ha
lves-space-shuttle-record%2F&
rfr_id=info%3Asid%2Fen.wikipedia.
org%3AList+of+Falcon+9+and+Falcon
+Heavy+launches" class="Z3988"></
span>

</div>
<div class="navbox-styles nomobil
e"><style data-mw-deduplicate="Te
mplateStyles:r1061467846">.mw-par
ser-output .navbox{box-sizing:bor

```

```

der-box;border:1px solid #a2a9b1;
width:100%;clear:both;font-size:8
8%;text-align:center;padding:1px;
margin:1em auto 0}.mw-parser-outp
ut .navbox .navbox{margin-top:0}.
mw-parser-output .navbox+.navbo
x,.mw-parser-output .navbox+.navb
ox-styles+.navbox{margin-top:-1p
x}.mw-parser-output .navbox-inne
r,.mw-parser-output .navbox-subgr
oup{width:100%}.mw-parser-output
.navbox-group,.mw-parser-output
.navbox-title,.mw-parser-output
.navbox-abovebelow{padding:0.25e
m 1em;line-height:1.5em;text-alig
n:center}.mw-parser-output .navbo
x-group{white-space:nowrap;text-a
lign:right}.mw-parser-output .nav
box,.mw-parser-output .navbox-sub
group{background-color:#fdfdfd}.m
w-parser-output .navbox-list{line
-height:1.5em;border-color:#fdfdf
d}.mw-parser-output .navbox-list-
with-group{text-align:left;border
-left-width:2px;border-left-styl
e:solid}.mw-parser-output tr+tr>.
navbox-abovebelow,.mw-parser-outp
ut tr+tr>.navbox-group,.mw-parser
-output tr+tr>.navbox-image,.mw-p
arser-output tr+tr>.navbox-list{b

```

```

order-top:2px solid #fdfdfd}.mw-p
arser-output .navbox-title{backgr
ound-color:#ccf}.mw-parser-output
.navbox-abovebelow,.mw-parser-out
put .navbox-group,.mw-parser-outp
ut .navbox-subgroup .navbox-title
{background-color:#ddf}.mw-parser
-output .navbox-subgroup .navbox-
group,.mw-parser-output .navbox-s
ubgroup .navbox-abovebelow{backgr
ound-color:#e6e6ff}.mw-parser-out
put .navbox-even{background-colo
r:#f7f7f7}.mw-parser-output .navb
ox-odd{background-color:transpare
nt}.mw-parser-output .navbox .hli
st td dl,.mw-parser-output .navbo
x .hlist td ol,.mw-parser-output
.navbox .hlist td ul,.mw-parser-
output .navbox td.hlist dl,.mw-pa
rser-output .navbox td.hlist ol,.
mw-parser-output .navbox td.hlist
ul{padding:0.125em 0}.mw-parser-o
utput .navbox .navbar{display:blo
ck;font-size:100%}.mw-parser-outp
ut .navbox-title .navbar{float:le
ft;text-align:left;margin-right:
0.5em}</style></div><div role="na
vigation" class="navbox" aria-lab
elledby="SpaceX_missions_and_payl
oads" style="padding:3px"><table

```

```

class="nowraplinks hlist mw-collapsible autocollapse navbox-inner" style="border-spacing:0;background:transparent;color:inherit"><tbody><tr><th scope="col" class="navbox-title" colspan="3"><style data-mw-deduplicate="TemplateStyles:r1063604349">.mw-parser-output .navbox{display:inline;font-size:88%;font-weight:normal}.mw-parser-output .navbox-collapse{float:left;text-align:left}.mw-parser-output .navbox-boxtext{word-spacing:0}.mw-parser-output .navbox ul{display:inline-block;white-space:nowrap;line-height:inherit}.mw-parser-output .navbox-brackets::before{margin-right:-0.125em;content:"["}.mw-parser-output .navbox-brackets::after{margin-left:-0.125em;content:"]"}.mw-parser-output .navbox li{word-spacing:-0.125em}.mw-parser-output .navbox a>span,.mw-parser-output .navbox a>abbr{text-decoration:inherit}.mw-parser-output .navbox-mini abbr{font-variant:small-caps;border-bottom:none;text-decoration:none;cursor:inherit}.mw-parser-output .navbox-ar-ct-full{font-size:114%;margin:

```

```
0 7em}.mw-parser-output .navbar-c
t-mini{font-size:114%;margin:0 4e
m}</style><div class="navbar plai
nlinks hlist navbar-mini"><li
class="nv-view"><a href="/wiki/Te
mplate:SpaceX_missions_and_payloa
ds" title="Template:SpaceX missio
ns and payloads"><abbr title="Vie
w this template" style=";;backgro
und:none transparent;border:none;
box-shadow:none;padding:0;">v</ab
br><li class="nv-talk"><
a href="/wiki/Template_talk:Space
X_missions_and_payloads" title="T
emplate talk:SpaceX missions and
payloads"><abbr title="Discuss t
his template" style=";;backgroun
d:none transparent;border:none;bo
x-shadow:none;padding:0;">t</abbr
><li class="nv-edit"><a
class="external text" href="http
s://en.wikipedia.org/w/index.php?
title=Template:SpaceX_missions_an
d_payloads&action=edit"><abbr
title="Edit this template" style
=";;background:none transparent;b
order:none;box-shadow:none;paddin
g:0;">e</abbr></div
><div id="SpaceX_missions_and_pay
loads" style="font-size:114%;marg
```

```

in:0 4em">SpaceX missions and pay
loads</div></th></tr><tr><th scop
e="row" class="navbox-group" styl
e="width:1%"><a href="/wiki/Space
X_launch_vehicles" title="SpaceX
launch vehicles">SpaceX launch v
ehicles</th><td class="navbox
-list-with-group navbox-list navb
ox-odd" style="width:100%;padding
:0"><div style="padding:0 0.25e
m">
<a href="/wiki/Falcon_1"
title="Falcon 1">Falcon 1</l
i>
<a href="/wiki/Falcon_9" titl
e="Falcon 9">Falcon 9
<a href="/wiki/Falcon_9_v
1.0" title="Falcon 9 v1.0">v1.0</
a>
<a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">v1.1</l
i>
<a href="/wiki/Falcon_9_Full_
Thrust" title="Falcon 9 Full Thru
st">Full Thrust
<a href="/wiki/Falcon_9_Block
_5" title="Falcon 9 Block 5">Bloc
k 5
<a href="/wiki/Falcon_Heavy"
title="Falcon Heavy">Falcon Heav

```

```

y
<i><a href="/wiki/SpaceX_Star
ship" title="SpaceX Starship">Sta
rship</i>
</div></td><td class="noviewer na
vbox-image" rowspan="5" style="wi
dth:1px;padding:0 0 0 2px"><div><
a href="/wiki/SpaceX" title="Spac
eX"></div></td></tr><tr><
th scope="row" class="navbox-grou
p" style="width:1%"><a href="/wik
i/Falcon_1#Launch_history" title
="Falcon 1">Falcon 1 missions
</th><td class="navbox-list-with-
group navbox-list navbox-even" st
yle="width:100%;padding:0"><div s

```



```

tyle="padding:0 0.25em">
Demo 1† (FalconSAT-2
Demo 2†
Flight 3†
Trailblazer
PRESat
NanoSail-D
Explorers
Ratsat
RazakSAT
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Falcon 9 missions</th>
<td class="navbox-list-with-group navbox-list navbox-odd" style="width:100%;padding:0"><div style="padding:0 0.25em"></div><table cla

```

```
ss="nowraplinks navbox-subgroup"
 style="border-spacing:0"><tbody>
<tr><th scope="row" class="navbox
-group" style="width:1%">Demo fli
ghts</th><td class="navbox-list-w
ith-group navbox-list navbox-odd"
style="width:100%;padding:0"><div
style="padding:0 0.25em">
<a href="/wiki/Dragon_Spa
cecraft_Qualification_Unit" title
="Dragon Spacecraft Qualification
Unit">Dragon test flight
<a href="/wiki/SpaceX_COTS_De
mo_Flight_1" title="SpaceX COTS D
emo Flight 1">COTS-1
<a href="/wiki/SpaceX_COTS_De
mo_Flight_2" title="SpaceX COTS D
emo Flight 2">COTS-2
<a href="/wiki/Crew_Dragon_Pa
d_Abort_Test" title="Crew Dragon
Pad Abort Test">Crew Dragon Pad
Abort Test
<a href="/wiki/Falcon_Heavy_t
est_flight" title="Falcon Heavy t
est flight">Falcon Heavy test fli
ght
<a href="/wiki/Elon_Musk%
27s_Tesla_Roadster" title="Elon M
usk's Tesla Roadster">Elon Mu
sk's Tesla Roadster
```

```


<a href="/wiki/Crew_Dragon_De
mo-1" title="Crew Dragon Demo-1">
Crew Dragon Demo-1
<a href="/wiki/Crew_Dragon_In
-Flight_Abort_Test" title="Crew D
ragon In-Flight Abort Test">Crew
Dragon In-Flight Abort Test

<a href="/wiki/Crew_Dragon_De
mo-2" title="Crew Dragon Demo-2">
Demo-2
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/ISS" class
="mw-redirect" title="ISS">ISS logistics</th><td class="navbox
-list-with-group navbox-list navb
ox-even" style="width:100%;paddin
g:0"><div style="padding:0 0.25e
m">
<a href="/wiki/SpaceX_CRS
-1" title="SpaceX CRS-1">CRS-1
<a href="/wiki/SpaceX_CRS-2"
title="SpaceX CRS-2">CRS-2</
li>
<a href="/wiki/SpaceX_CRS-3"
title="SpaceX CRS-3">CRS-3</
li>

```

```
<a href="/wiki/SpaceX_CRS-4"
 title="SpaceX CRS-4">CRS-4
<a href="/wiki/SpaceX_CRS-5"
 title="SpaceX CRS-5">CRS-5
<a href="/wiki/SpaceX_CRS-6"
 title="SpaceX CRS-6">CRS-6
<a href="/wiki/SpaceX_CRS-7"
 title="SpaceX CRS-7">CRS-7†

<a href="/wiki/SpaceX_CRS-8"
 title="SpaceX CRS-8">CRS-8
<a href="/wiki/SpaceX_CRS-9"
 title="SpaceX CRS-9">CRS-9
<a href="/wiki/SpaceX_CRS-10"
 title="SpaceX CRS-10">CRS-10

<a href="/wiki/SpaceX_CRS-11"
 title="SpaceX CRS-11">CRS-11

<a href="/wiki/SpaceX_CRS-12"
 title="SpaceX CRS-12">CRS-12

<a href="/wiki/SpaceX_CRS-13"
 title="SpaceX CRS-13">CRS-13

```

```
<a href="/wiki/SpaceX_CRS-14"
title="SpaceX CRS-14">CRS-14

<a href="/wiki/SpaceX_CRS-15"
title="SpaceX CRS-15">CRS-15

<a href="/wiki/SpaceX_CRS-16"
title="SpaceX CRS-16">CRS-16

<a href="/wiki/SpaceX_CRS-17"
title="SpaceX CRS-17">CRS-17

<a href="/wiki/SpaceX_CRS-18"
title="SpaceX CRS-18">CRS-18

<a href="/wiki/SpaceX_CRS-19"
title="SpaceX CRS-19">CRS-19

<a href="/wiki/SpaceX_CRS-20"
title="SpaceX CRS-20">CRS-20

<a href="/wiki/SpaceX_CRS-21"
title="SpaceX CRS-21">CRS-21

<a href="/wiki/SpaceX_CRS-22"
title="SpaceX CRS-22">CRS-22

<a href="/wiki/SpaceX_CRS-23"
title="SpaceX CRS-23">CRS-23

```

```
<a href="/wiki/SpaceX_CRS-24"
title="SpaceX CRS-24">CRS-24

<i><a href="/wiki/SpaceX_CRS-
25" title="SpaceX CRS-25">CRS-25
</i>
<i><a href="/wiki/SpaceX_CRS-
26" title="SpaceX CRS-26">CRS-26
</i>
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Crewed missions</th><td c
lass="navbox-list-with-group navb
ox-list navbox-odd" style="width:
100%;padding:0"><div style="paddi
ng:0 0.25em">
<a href="/wiki/Crew_Drago
n_Demo-2" title="Crew Dragon Demo
-2">Demo-2
<a href="/wiki/SpaceX_Crew-1"
title="SpaceX Crew-1">Crew-1

<a href="/wiki/SpaceX_Crew-2"
title="SpaceX Crew-2">Crew-2

<a href="/wiki/Inspiration4"
title="Inspiration4">Inspiration
4
<a href="/wiki/SpaceX_Crew-3"
title="SpaceX Crew-3">Crew-3
```

```

Axiom-1
<u>Crew-4</u>
<i>Crew-5</i>
<i>Axiom-2</i>
<i>Polaris Dawn</i>
<i>Crew-6</i>
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Commercial satellites</th>
<td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
SES-8
Thaicom 6
```

```
Orbcomm OG2 × 6
AsiaSat 8
AsiaSat 6
ABS-3A / Eutelsat 115 West B
TürkmenÄlem 52°E
Orbcomm OG2 × 11
SES-9
JCSAT-14
Thaicom 8
ABS-2A / <a href="/wiki/Eutelsat_117_West_B" class="mw-redirect"
```



```
title="Eutelsat 117 West B">Eute
lsat 117 West B
<a href="/wiki/JCSAT-16" titl
e="JCSAT-16">JCSAT-16
<a href="/wiki/Amos-6" class
="mw-redirect" title="Amos-6">Amo
s-6†
<a href="/wiki/Iridium_NEXT"
class="mw-redirect" title="Iridi
um NEXT">Iridium NEXT 1-10</l
i>
<a href="/wiki/EchoStar_23" c
lass="mw-redirect" title="EchoSta
r 23">EchoStar 23
<a href="/wiki/SES-10" title
="SES-10">SES-10
<a href="/wiki/Inmarsat-5_F4"
class="mw-redirect" title="Inmars
at-5 F4">Inmarsat-5 F4
<a href="/wiki/BulgariaSat-1"
title="BulgariaSat-1">BulgariaSat
-1
<a href="/wiki/Iridium_NEXT"
class="mw-redirect" title="Iridi
um NEXT">Iridium NEXT 11-20</l
i>
<a href="/wiki/Intelsat_35e"
title="Intelsat 35e">Intelsat 35
e
Iridium NEXT 21-30
```

```
<a href="/wiki/SES-11" title
="SES-11">SES-11
<a href="/wiki/Koreasat_5A" t
itle="Koreasat 5A">Koreasat 5A
Iridium NEXT 31-40
<a href="/wiki/Hispasat_30W-
6" title="Hispasat 30W-6">Hispasa
t 30W-6
Iridium NEXT 41-50
<a href="/wiki/Bangabandhu-1"
title="Bangabandhu-1">Bangabandhu
-1
Iridium NEXT 51-55
<a href="/wiki/SES-12" title
="SES-12">SES-12
<a href="/wiki/Telstar_19V" t
itle="Telstar 19V">Telstar 19V
Iridium NEXT 56-65
<a href="/wiki/Telkom_4" clas
s="mw-redirect" title="Telkom 4">
Telkom 4 (Merah Putih)
<a href="/wiki/Telstar_18V" t
itle="Telstar 18V">Telstar 18V
<a href="/wiki/Es%27hail_2" t
itle="Es'hail 2">Es'hail 2
<a href="/wiki/SSO-A" class
```

```

="mw-redirect" title="SSO-A">SSO-
A
Iridium NEXT 66-75
<a href="/wiki/Nusantara_Sat
u" title="Nusantara Satu">Nusanta
ra Satu / <a href="/wiki/Bere
sheet" title="Beresheet">Bereshee
t
<a href="/wiki/Amos_17" class
="mw-redirect" title="Amos 17">Am
os 17
<a href="/wiki/JCSAT" class
="mw-redirect" title="JCSAT">JCSA
T-18
<a href="/wiki/Sirius_XM_Hold
ings#Satellites" class="mw-redire
ct" title="Sirius XM Holdings">SX
M 7
<a href="/wiki/T%C3%BCrksat_5
A" title="Türksat 5A">Türksat 5A

SXM 8
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Scientific satellites</th
><td class="navbox-list-with-grou
p navbox-list navbox-odd" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em">
<a href="/wiki/CASSIOPE"

```

```
title="CASSIOPE">CASSIOPE
DSCOVR
Jason-3
Formosat-5
TESS
GRACE-FO
SAOCOM 1A
RADARSAT Constellation
SAOCOM 1B
DART
```

```

<i>Hakuto-R</i>
<i>Jason-CS</i>
<i>KPLOR</i>
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Military satellites</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
NROL-76
X-37B OTV-5
Zuma
SES-16 / GovSat-1
Paz</

```

```

a>
<a href="/wiki/GPS_IIIA" clas
s="mw-redirect" title="GPS IIIA">
GPS IIIA-01
<a href="/wiki/ANASIS-II" tit
le="ANASIS-II">ANASIS-II
GPS IIIA-03
NROL-108
<i>GPS IIIA-04</i>
<i>GPS IIIA-05</i>
<i><a href="/wiki/SARah" clas
s="mw-redirect" title="SARah">SAR
ah 1</i>
<i>GPS IIIA-06</i>
<i>SARah 2/3</i>
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Starlink"
title="Starlink">Starlink</t
h><td class="navbox-list-with-gro
up navbox-list navbox-odd" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em">
2019
Starlink 0
L1
2020
Starlink L2
L3
...

```

```

L15
2021
Starlink L16
...
L28
Group 2-1
4-1
4-3
4-4
2022
Starlink Group 4-5
4-6
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Rideshares</th><td class
="navbox-list-with-group navbox-l
ist navbox-even" style="width:10
0%;padding:0"><div style="paddin
g:0 0.25em">
2021
<a href="/w/index.php?tit
le=Transporter-1&action=edit&
amp;redlink=1" class="new" title
="Transporter-1 (page does not ex
ist)">Transporter-1
Transporter-2
2022
Transporter-3</
li>
</div></td></tr></tbody></table><

```

```

div></div></td></tr><tr><th scope
="row" class="navbox-group" style
="width:1%"><a href="/wiki/Falcon
_Heavy#Scheduled_launches_and_pot
ential_payloads" title="Falcon Hea
vy">Falcon Heavy missions</t
h><td class="navbox-list-with-gro
up navbox-list navbox-odd" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em">
<a href="/wiki/Falcon_Hea
vy_test_flight" title="Falcon Hea
vy test flight">Test flight
<a href="/wiki/Elon_Musk%
27s_Tesla_Roadster" title="Elon M
usk's Tesla Roadster">Tesla R
oadster
<a href="/wiki/Arabsat-6A" ti
tle="Arabsat-6A">Arabsat-6A</
li>
<a href="/wiki/Space_Test_Pro
gram" title="Space Test Program">
USAF STP-2
<a href="/wiki/Demonstrat
ion_and_Science_Experiments" titl
e="Demonstration and Science Expe
riments">DSX
<a href="/wiki/COSMIC-2" titl
e="COSMIC-2">FormoSat-7
<a href="/wiki/LightSail_2" c

```



```

lass="mw-redirect" title="LightSail 2">LightSail 2
GPIM
DSAC
ISAT
<i>USSF-44</i>
<i>USSF-52</i>
<i>ViaSat-3 Americas</i>
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%"><a href="/wiki/List_of_SpaceX_Starship_flight_tests" title="List of SpaceX Starship flight

```

```

tests"><i>Starship</i> missions
</th><td class="navbox-list-w
ith-group navbox-list navbox-eve
n" style="width:100%;padding:0"><
div style="padding:0 0.25em"><i><
a href="/wiki/Polaris_Program" cl
ass="mw-redirect" title="Polaris
Program">Polaris Program thi
rd flight</i>, <i><a href="/wiki/
DearMoon_project" title="DearMoon
project">dearMoon</i>, <i>two
<a href="/wiki/Starship_HLS" titl
e="Starship HLS">Starship HLS
flights</i></div></td></tr><tr><t
d class="navbox-abovebelow" colsp
an="3"><div>
Ongoing spaceflight(s) in
<u>underline</u>
<i>Italics</i> indicates futu
re missions and vehicles under de
velopment.
Symbol † indicates failed mis
sions and destroyed vehicles.

</div></td></tr></tbody></table>
</div>
<div class="navbox-styles nomobil
e"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1061467846"/></div><div r

```

```
ole="navigation" class="navbox" aria-labelledby="SpaceX" style="padding:3px"><table class="nowraplinks mw-collapsible mw-collapsed navbox-inner" style="border-spacing:0;background:transparent;color:inherit"><tbody><tr><th scope="col" class="navbox-title" colspan="3"><link rel="mw-deduplicated-inline-style" href="mw-data:TemplateStyles:r1063604349"/><div class="navbar plainlinks hlist navbar-mini"><li class="nv-view"><abbr title="View this template" style=";;background:none transparent;border:none;box-shadow:none;padding:0;">v</abbr><li class="nv-talk"><abbr title="Discuss this template" style=";;background:none transparent;border:none;box-shadow:none;padding:0;">t</abbr><li class="nv-edit"><abbr title="Edit this templat
```

```

e" style=";;background:none trans
parent;border:none;box-shadow:non
e;padding:0;">e</abbr></
ul></div><div id="SpaceX" style
="font-size:114%;margin:0 4em"><a
href="/wiki/SpaceX" title="Space
X">SpaceX</div></th></tr><tr>
<td class="navbox-abovebelow" col
span="3"><div id="History"><a hre
f="/wiki/History_of_SpaceX" title
="History of SpaceX">History
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/SpaceX_lau
nch_vehicles" title="SpaceX launc
h vehicles">Launch vehicles</
th><td class="navbox-list-with-gr
oup navbox-list navbox-odd hlist"
style="width:100%;padding:0"><div
style="padding:0 0.25em"></div><t
able class="nowraplinks navbox-su
bgroup" style="border-spacing:0">
<tbody><tr><th scope="row" class
="navbox-group" style="width:1%">
Current</th><td class="navbox-lis
t-with-group navbox-list navbox-o
dd" style="width:100%;padding:0">
<div style="padding:0 0.25em">
<a href="/wiki/Falcon_9"
title="Falcon 9">Falcon 9

```

```


Block 5
<a href="/wiki/Falcon_Heavy"
title="Falcon Heavy">Falcon Heav
y
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">In development</th><td cl
ass="navbox-list-with-group navbo
x-list navbox-even" style="width:
100%;padding:0"><div style="paddi
ng:0 0.25em">
<a href="/wiki/SpaceX_Sta
rship" title="SpaceX Starship">St
arship*
<a href="/wiki/SpaceX_Sta
rship_development_history" class
="mw-redirect" title="SpaceX Star
ship development history">develop
ment history</
ul>
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Retired</th><td class="na
vbox-list-with-group navbox-list
navbox-odd" style="width:100%;pa
dding:0"><div style="padding:0 0.
25em">
<a href="/wiki/Falcon_1"

```

```

 title="Falcon 1">Falcon 1

Falcon 9
v1.0
v1.1
"Full Thrust" v1.2
Block 4
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Cancelled</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
Falcon 1e*
Falcon 5*
Falcon 9 Air*
<a href="/wiki/SpaceX_launch_

```

```

vehicles#BFR_and_ITS" title="SpaceX launch vehicles">BFR and ITS*
</div></td></tr></tbody></table><div></div></td><td class="noviewer navbar-image" rowspan="13" style="width:1px;padding:0 0 0 2px"><div></div></td></tr><tr><th scope="row" class="navbar-group" style="width:1%">Spacecraft</th><td class="navbar-list-with-group navbar-list navbar-odd hlist" style="width:100%;padding:0"><div style="padding:0 0.25em"></div><table class="nowraplinks n

```

```

avbox-subgroup" style="border-spacing:0"><tbody><tr><th scope="row" class="navbox-group" style="width:1%">Cargo</th><td class="navbox-list-with-group navbox-list navbox-odd" style="width:100%;padding:0"><div style="padding:0 0.25em">
Dragon
1 Cargo
Dragon
2 Cargo
Dragon
XL*
Starship
*
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Crewed</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
Dragon
2 Crew

```



```

C206 <i>Endeavour</i>
C207 <i>Resilience</i>
C210 <i>Endurance</i>
C211 <i>Freedom</i>
Starship*
</div></td></tr></tbody></table><div></div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Test vehicles</th><td class="navbox-list-with-group navbox-list navbox-odd hlist" style="width:100%;padding:0"><div style="padding:0 0.25em"></div><table class="nowraplinks navbox-subgroup" style="border-spacing:0"><tbody><tr><th scope="row" class="navb

```

```

ox-group" style="width:1%">Current
</th><td class="navbox-list-with-
group navbox-list navbox-odd" st
yle="width:100%;padding:0"><div s
tyle="padding:0 0.25em">
<a href="/wiki/SpaceX_Sta
rship_development_history#Starshi
p_prototypes" class="mw-redirect"
title="SpaceX Starship developmen
t history">Starship prototypes
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Retired</th><td class="na
vbox-list-with-group navbox-list
navbox-even" style="width:100%;p
adding:0"><div style="padding:0
0.25em">
<i><a href="/wiki/SpaceX_
Grasshopper" class="mw-redirect"
title="SpaceX Grasshopper">Grass
hopper</i>
<a href="/wiki/F9R_Dev1" clas
s="mw-redirect" title="F9R Dev1">
F9R Dev1
<i><a href="/wiki/Dragon_2_Dr
agonFly" title="Dragon 2 DragonFl
y">DragonFly</i>
<i><a href="/wiki/Starhopper"
class="mw-redirect" title="Starho

```

```

pper">Starhopper</i>
>
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Unflown</th><td class="na
vbox-list-with-group navbox-list
navbox-odd" style="width:100%;pa
dding:0"><div style="padding:0 0.
25em">
<a href="/wiki/F9R_Dev2"
class="mw-redirect" title="F9R D
ev2">F9R Dev2*
</div></td></tr></tbody></table><
div></div></td></tr><tr><th scope
="row" class="navbox-group" style
="width:1%"><a href="/wiki/SpaceX
_rocket_engines" title="SpaceX ro
cket engines">Rocket engines
</th><td class="navbox-list-with-
group navbox-list navbox-even hli
st" style="width:100%;padding:0">
<div style="padding:0 0.25em">
<a href="/wiki/SpaceX_Mer
lin" title="SpaceX Merlin">Merlin

1A
1B*
1C
1D
Vacuum

```

```

<a href="/wiki/SpaceX_Kestre
l" title="SpaceX Kestrel">Kestrel

<a href="/wiki/SpaceX_Draco"
title="SpaceX Draco">Draco</
li>
<a href="/wiki/SuperDraco" ti
tle="SuperDraco">SuperDraco</
li>
<a href="/wiki/SpaceX_Raptor"
title="SpaceX Raptor">Raptor
1
2
Vacuum
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Template:S
paceX_missions_and_payloads" titl
e="Template:SpaceX missions and p
ayloads">Lists of missions</t
h><td class="navbox-list-with-gro
up navbox-list navbox-odd hlist"
style="width:100%;padding:0"><di
v style="padding:0 0.25em">
<a href="/wiki/Falcon_1#L
aunch_history" title="Falcon 1">F
alcon 1
<a class="mw-selflink selflin
k">Falcon 9 and Falcon Heavy


```

```

<a href="/wiki/Starlink" titl
e="Starlink">Starlink
<a href="/wiki/List_of_SpaceX
_Starship_launches" class="mw-red
irect" title="List of SpaceX Star
ship launches">Starship

</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/SpaceX_lau
nch_facilities" class="mw-redirec
t" title="SpaceX launch facilitie
s">Launch facilities</th><td
class="navbox-list-with-group na
vbox-list navbox-odd hlist" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em"></div><table
class="nowraplinks navbox-subgrou
p" style="border-spacing:0"><tbod
y><tr><th scope="row" class="navb
ox-group" style="width:1%">Orbita
l</th><td class="navbox-list-with
-group navbox-list navbox-even" s
tyle="width:100%;padding:0"><div
style="padding:0 0.25em">
<a href="/wiki/Cape_Canav
eral_Space_Force_Station" title
="Cape Canaveral Space Force Stat
ion">CCSFS <a href="/wiki/Cap
e_Canaveral_Space_Launch_Complex_

```

```

40" title="Cape Canaveral Space L
aunch Complex 40">SLC-40
<a href="/wiki/Kennedy_Space_
Center" title="Kennedy Space Cent
er">KSC <a href="/wiki/Kenned
y_Space_Center_Launch_Complex_39
A" title="Kennedy Space Center La
unch Complex 39A">LC-39A
<a href="/wiki/Vandenberg_Spa
ce_Force_Base" title="Vandenberg
Space Force Base">VSFB <a hr
ef="/wiki/Vandenberg_Space_Launch
_Complex_4#SLC-4E" title="Vandenb
erg Space Launch Complex 4">SLC-4
E
<a href="/wiki/SpaceX_Starshi
p_offshore_platform" class="mw-re
direct" title="SpaceX Starship of
fshore platform">Floating launch
platforms*
<a href="/wiki/Ronald_Reagan_
Ballistic_Missile_Defense_Test_Si
te" title="Ronald Reagan Ballisti
c Missile Defense Test Site">Omel
ek Island†
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Atmospheric</th><td class
="navbox-list-with-group navbox-l
ist navbox-odd" style="width:10

```

```

0%;padding:0"><div style="padding:0 0.25em">
McGregor
New Mexico
Starbase
Boca Chica

</div></td></tr></tbody></table><div></div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Landing sites</th><td class="navbox-list-with-group navbox-list navbox-even hlist" style="width:100%;padding:0"><div style="padding:0 0.25em">

```

```

<a href="/wiki/Autonomous
_spaceport_drone_ship" title="Aut
onomous spaceport drone ship">Aut
onomous spaceport drone ships

Landing Zones
<a href="/wiki/Landing_Zo
nes_1_and_2" title="Landing Zones
1 and 2">LZ-1 and LZ-2
<a href="/wiki/Vandenberg_Air
_Force_Base_Space_Launch_Complex_
4#LZ-4" class="mw-redirect" title
="Vandenberg Air Force Base Space
Launch Complex 4">LZ-4</
ul>
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Other facilities</th><td
class="navbox-list-with-group na
vbox-list navbox-odd hlist" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em">
<a href="/wiki/SpaceX#Hea
dquarters_and_rocket_manufacturin
g_plant" title="SpaceX">Headquart
ers and factory
<a href="/wiki/Hawthorne,
_California" title="Hawthorne, Ca
lifornia">Hawthorne, California</
a>

```



```

Rocket development and test facility
McGregor, Texas
Satellite development facility
Redmond, Washington
Regional offices
Chantilly, Houston, Seattle, Washington DC
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Support</th><td class="navbox-list-with-group navbox-list navbox-even hlist" style="width:

```

```
100%;padding:0"><div style="padding:0 0.25em">
<i>Megan</i> (recovery ship)
<i>Shannon</i> (recovery ship)
SpaceX fairing recovery program

</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Contracts</th><td class="navbox-list-with-group navbox-list navbox-odd hlist" style="width:100%;padding:0"><div style="padding:0 0.25em">
Commercial Orbital Transportation Services
Commercial Resupply Services
```

```

Commercial Crew Program

Commercial Lunar Payload Services

Gateway Logistics Services
Starship HLS
Polaris
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">R&D programs</th><td class="navbox-list-with-group navbox-list navbox-even hlist" style="width:100%;padding:0"><div style="padding:0 0.25em">


```

```

Reusability
Falcon 9 landing tests
Red Dragon (canceled)
Mars transport
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Key people</th><td class="navbox-list-with-group navbox-list navbox-odd hlist" style="width:100%;padding:0"><div style="padding:0 0.25em">
Elon Musk
 (CEO, CTO)
Gwynne Shotwell (President and COO)

Tom Mueller
 (former VP of Propulsion Development)
</div></td></tr><tr><th scope="ro

```

```

w" class="navbox-group" style="width:1%">Related</th><td class="navbox-list-with-group navbox-list navbox-even hlist" style="width:100%;padding:0"><div style="padding:0 0.25em">
<i>Countdown: Inspiration4 Mission to Space</i> (2021 docuseries)
<i>Return to Space</i> (2022)

</div></td></tr><tr><td class="navbox-abovebelow" colspan="3"><div>
<p>* denotes unflown vehicles or engines, and future missions or sites. † denotes failed missions, destroyed vehicles, and abandoned sites.
<div class="hlist hlist-separated"> <a href="h
ttps://commons.wikimedia.org/wik
i/Category:SpaceX" class="extiw"
title="commons:Category:SpaceX">
Commons</div></
div></td></tr></tbody></table></d
iv>
<div class="navbox-styles nomobil
e"><link rel="mw-deduplicated-inl
ine-style" href="mw-data:Template
Styles:r1061467846"/></div><div r
ole="navigation" class="navbox" a
ria-labelledby="Spaceflight_lists
_and_timelines" style="padding:3p
x"><table class="nowraplinks hlis
t mw-collapsible autocollapse nav
box-inner" style="border-spacing:
0;background:transparent;color:in
herit"><tbody><tr><th scope="col"
class="navbox-title" colspan="3">
<link rel="mw-deduplicated-inline
-style" href="mw-data:TemplateSty
les:r1063604349"/><div class="nav

```

```

bar plainlinks hlist navbar-min
i"><li class="nv-view"><abbr title="View this template" style=";;background:none transparent;border:none;box-shadow:none;padding:0;">v</abbr><li class="nv-talk"><abbr title="Discuss this template" style=";;background:none transparent;border:none;box-shadow:none;padding:0;">t</abbr><li class="nv-edit"><abbr title="Edit this template" style=";;background:none transparent;border:none;box-shadow:none;padding:0;">e</abbr></div><div id="Spaceflight_lists_and_timelines" style="font-size:114%;margin:0 4em">Spaceflig

```

```

ht lists and timelines</div>
</th></tr><tr><td class="navbox-abovebelow" colspan="3"><div id="*_Timeline_of_spaceflight">
Timeline of spaceflight
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">General</th><td class="navbox-list-with-group navbox-list navbox-odd" style="width:100%;padding:0"><div style="padding:0 0.25em">
Space exploration
outline
timeline
Spacecraft
<a href="/wiki/List_of_spacef

```



```

light_records" title="List of spaceflight records">Spaceflight records
Space Race
Asian Space Race
Rocket and missile technology
</div></td><td class="noviewer novbox-image" rowspan="9" style="width:1px;padding:0 0 0 2px"><div></div></td>
</tr><tr><th scope="row" class="navbox-group" style="width:1%">
Human spaceflight</th><td class="navbox-list-with-group navbox-list navbox-odd" style="width:100%;padding:0"><div style="padding:0 0.25em"></div><table class="nowraplinks navbox-subgroup" style="border-spacing:0"><tbody><tr><th scope="row" class="navbox-group" style="width:1%">General</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:

```

```
g:0 0.25em">
Crewed spacecraft
timeline
by program

Spaceflights
1961–1970
1971–1980
1981–1990
<a href="/wiki/List_of_human_
```

```
spaceflights,_1991%E2%80%932000"
 title="List of human spaceflight
s, 1991–2000">1991–2000
<a href="/wiki/List_of_human_
spaceflights,_2001%E2%80%932010"
 title="List of human spaceflight
s, 2001–2010">2001–2010
<a href="/wiki/List_of_human_
spaceflights,_2011%E2%80%932020"
 title="List of human spaceflight
s, 2011–2020">2011–2020
<a href="/wiki/List_of_human_
spaceflights,_2021%E2%80%93present"
 title="List of human spaceflig
hts, 2021–present">2021–present</
a>
<a href="/wiki/List_of_Soviet_
human_spaceflight_missions" titl
e="List of Soviet human spaceflig
ht missions">Soviet
<a href="/wiki/List_of_Russia
n_human_spaceflight_missions" tit
le="List of Russian human spacefl
ight missions">Russian
<a href="/wiki/List_of_Vostok_
_and_Voskhod_missions" title="Lis
t of Vostok and Voskhod mission
s">Vostok and Voskhod
<a href="/wiki/List_of_Soyuz_
missions" title="List of Soyuz mi
```

```
ssions">Soyuz
Mercury
Gemini
Apollo
Skylab
Shenzhou
Gaganyaan
Spacelab
Artemis
Civilian spaceflight
Orbital
```

```

<a href="/wiki/List_of_fully_
civilian_crewed_suborbital_spacef
lights" title="List of fully civi
lian crewed suborbital spacefligh
ts">Suborbital

</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Salyut_pro
gramme" title="Salyut programme">
Salyut</th><td class="navbox-
list-with-group navbox-list navbo
x-odd" style="width:100%;padding:
0"><div style="padding:0 0.25em">
<a href="/wiki/List_of_Sa
lyut_expeditions" title="List of
Salyut expeditions">Expeditions

Spaceflights
<a href="/wiki/List_of_hu
man_spaceflights_to_Salyut_space_
stations" title="List of human sp
aceflights to Salyut space statio
ns">crewed
<a href="/wiki/List_of_uncrew
ed_spaceflights_to_Salyut_space_s
tations" title="List of uncrewed
spaceflights to Salyut space sta
tions">uncrewed
>

```

```

<a href="/wiki/List_of_Salyut
_spacewalks" title="List of Salyu
t spacewalks">Spacewalks
<a href="/wiki/List_of_Salyut
_visitors" title="List of Salyut
visitors">Visitors
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><i><a href="/wiki/Mir" ti
tle="Mir">Mir</i></th><td cla
ss="navbox-list-with-group navbox
-list navbox-even" style="width:1
00%;padding:0"><div style="paddin
g:0 0.25em">
<a href="/wiki/List_of_Mi
r_expeditions" title="List of Mir
expeditions">Expeditions
Spaceflights
<a href="/wiki/List_of_hu
man_spaceflights_to_Mir" title="L
ist of human spaceflights to Mi
r">crewed
<a href="/wiki/List_of_uncrew
ed_spaceflights_to_Mir" title="Li
st of uncrewed spaceflights to Mi
r">uncrewed
<a href="/wiki/List_of_Mir_sp
acewalks" title="List of Mir spac
ewalks">Spacewalks
<a href="/wiki/List_of_Mir_vi

```

```
sitors" title="List of Mir visito
rs">Visitors
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Internatio
nal_Space_Station" title="Interna
tional Space Station">ISS</th>
<td class="navbox-list-with-grou
p navbox-list navbox-odd" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em">
<a href="/wiki/List_of_In
ternational_Space_Station_expedit
ions" title="List of Internationa
l Space Station expeditions">Expe
ditions
<a href="/wiki/List_of_spacef
lights_to_the_International_Space
_Station" title="List of spacefli
ghts to the International Space S
tation">Spaceflights
<a href="/wiki/List_of_hu
man_spaceflights_to_the_Internati
onal_Space_Station" title="List o
f human spaceflights to the Inter
national Space Station">crewed
<a href="/wiki/Uncrewed_space
flights_to_the_International_Spac
e_Station" title="Uncrewed spacef
```



```
lights to the International Space
Station">uncrewed</
li>
<a href="/wiki/List_of_Intern
ational_Space_Station_spacewalks"
title="List of International Spac
e Station spacewalks">Spacewalks

<a href="/wiki/List_of_visito
rs_to_the_International_Space_Sta
tion" title="List of visitors to
the International Space Statio
n">Visitors
<a href="/wiki/List_of_spacec
raft_deployed_from_the_Internatio
nal_Space_Station" title="List of
spacecraft deployed from the Inte
rnational Space Station">Deployed

</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Tiangong_s
pace_station" title="Tiangong spa
ce station">Tiangong</th><td
class="navbox-list-with-group na
vbox-list navbox-even" style="wid
th:100%;padding:0"><div style="pa
dding:0 0.25em">
<a href="/wiki/List_of_Ti
angong_Space_Station_expeditions"
```

```

title="List of Tiangong Space Sta
tion expeditions">Expeditions

<a href="/wiki/List_of_human_
spaceflights_to_the_Tiangong_spa
ce_station" title="List of human s
paceflights to the Tiangong space
station">Crewed Spaceflights

</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Space_Shut
tle" title="Space Shuttle">Shuttl
e</th><td class="navbox-list-
with-group navbox-list navbox-od
d" style="width:100%;padding:0"><
div style="padding:0 0.25em">
<a href="/wiki/List_of_Sp
ace_Shuttle_crews" title="List of
Space Shuttle crews">Crews</l
i>
<a href="/wiki/List_of_Space_
Shuttle_missions" title="List of
Space Shuttle missions">Missions

<a href="/wiki/List_of_Space_
Shuttle_rollbacks" title="List of
Space Shuttle rollbacks">Rollback
s
</div></td></tr><tr><th scope="ro

```

```
w" class="navbox-group" style="width:1%">People</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
Astronauts
by name

by year of selection
>
Apollo
Gemini
Chinese
European
```

```
i>

Cosmonauts
female
Jewish
Muslim
Arab
African American
Ibero-America
Space scientists
Space travelers
<a href="/wiki/List_of_sp
```

```

ace_travelers_by_name" title="List
of space travelers by name">by
name
<a href="/wiki/List_of_space_
travellers_by_first_flight" title
="List of space travellers by fir
st flight">by first flight</l
i>
<a href="/wiki/List_of_space_
travelers_by_nationality" title
="List of space travelers by nati
onality">by nationality
<a href="/wiki/List_of_billio
naire_spacetravellers" title="Lis
t of billionaire spacetraveller
s">billionaires
<a href="/wiki/Timeline_of_sp
ace_travel_by_nationality" title
="Timeline of space travel by nat
ionality">timeline by nationality

<a href="/wiki/List_of_spacef
light-related_accidents_and_incid
ents" title="List of spaceflight-
related accidents and incidents">
Spaceflight-related human fatalit
ies
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%"><a href="/wiki/Extravehic

```

```
ular_activity" title="Extravehic
lar activity">EVA</th><td cla
ss="navbox-list-with-group navbox
-list navbox-odd" style="width:10
0%;padding:0"><div style="paddin
g:0 0.25em">
<a href="/wiki/List_of_sp
acewalks_and_moonwalks_1965%E2%8
0%931999" title="List of spacewal
ks and moonwalks 1965–1999">1965–
1999
<a href="/wiki/List_of_spacew
alks_2000%E2%80%932014" title="Li
st of spacewalks 2000–2014">2000–
2014
<a href="/wiki/List_of_spacew
alks_since_2015" title="List of s
pacewalks since 2015">2015–presen
t
<a href="/wiki/List_of_cumula
tive_spacewalk_records" title="Li
st of cumulative spacewalk record
s">Cumulative spacewalk records</
a>
<a href="/wiki/List_of_longes
t_spacewalks" title="List of long
est spacewalks">Longest spacewalk
s
<a href="/wiki/List_of_spacew
alkers" title="List of spacewalke
```

```

rs">Spacewalkers
</div></td></tr></tbody></table><
div></div></td></tr><tr><th scope
="row" class="navbox-group" style
="width:1%"><a href="/wiki/Discover
ery_and_exploration_of_the_Solar_
System" title="Discovery and expl
oration of the Solar System">Sola
r System
exploration</th
><td class="navbox-list-with-grou
p navbox-list navbox-even" style
="width:100%;padding:0"><div styl
e="padding:0 0.25em">
<a href="/wiki/Timeline_o
f_Solar_System_exploration" title
="Timeline of Solar System explor
ation">Timeline
<a href="/wiki/List_of_interp
lanetary_voyages" title="List of
interplanetary voyages">Interpla
netary voyages
<a href="/wiki/List_of_landin
gs_on_extraterrestrial_bodies" ti
tle="List of landings on extrater
restrial bodies">Landings on othe
r planets
<a href="/wiki/List_of_ro
vers_on_extraterrestrial_bodies"
title="List of rovers on extrate
rrestrial bodies">rovers

```

```
<a href="/wiki/List_of_artifi
cial_objects_on_extraterrestrial_
surfaces" title="List of artifici
al objects on extraterrestrial su
rfaces">artificial objects</l
i>
<a href="/wiki/List_of_object
s_at_Lagrange_points" title="List
of objects at Lagrange points">Ob
jects at Lagrange points
<a href="/wiki/List_of_Solar_
System_probes" title="List of Sol
ar System probes">Probes
<a href="/wiki/List_of_ac
tive_Solar_System_probes" title
="List of active Solar System pro
bes">active
<a href="/wiki/List_of_extrat
errestrial_orbiters" title="List
of extraterrestrial orbiters">or
biters
<a href="/wiki/List_of_artifi
cial_objects_leaving_the_Solar_Sy
stem" title="List of artificial o
bjects leaving the Solar System">
leaving the Solar System
<a href="/wiki/List_of_lunar_
probes" title="List of lunar prob
es">lunar probes</l
i>
```



```

Missions to the Moon
Timeline of satellites
Sample-return mission
Mars

</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Earth-orbiting
satellites</th><td class="navbox-list-with-group navbox-list navbox-odd" style="width:100%;padding:0"><div style="padding:0 0.25em">
Communications satellite firsts

```

```
<a href="/wiki/CubeSat" title
="CubeSat">CubeSats
<a href="/wiki/PocketQube" ti
tle="PocketQube">PocketQube</
li>
<a href="/wiki/List_of_Earth_
observation_satellites" title="Li
st of Earth observation satellite
s">Earth observation satellites</
a>
<a href="/wiki/Timeline_o
f_first_Earth_observation_satelli
tes" title="Timeline of first Ear
th observation satellites">Timeli
ne of first Earth observation sat
ellites
<a href="/wiki/List_of_satell
ites_in_geosynchronous_orbit" tit
le="List of satellites in geosync
hronous orbit">Geosynchronous orb
it
<a href="/wiki/List_of_GOES_s
atellites" title="List of GOES sa
tellites">GOES
<a href="/wiki/List_of_GPS_sa
tellites" title="List of GPS sate
llites">GPS
<a href="/wiki/List_of_Kosmos
_satellites" title="List of Kosmo
s satellites">Kosmos
```

```

Magnetospheric
NRO
TDRS
USA
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%">Vehicles</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
Orbital launch systems
Comparison

```

```
li>
<a href="/wiki/List_of_soundi
ng_rockets" title="List of soundi
ng rockets">Sounding rocket list

<a href="/wiki/Lists_of_space
craft" title="Lists of spacecraf
t">Spacecraft
<a href="/wiki/List_of_un
crewed_spacecraft_by_program" tit
le="List of uncrewed spacecraft b
y program">uncrewed
<a href="/wiki/List_of_crewed
_spacecraft" title="List of crewe
d spacecraft">crewed
<a href="/wiki/List_of_heavie
st_spacecraft" title="List of hea
viest spacecraft">heaviest</l
i>
<a href="/wiki/List_of_rocket
_stages" title="List of rocket st
ages">Upper stages
<a href="/wiki/Sounding_rocke
t" title="Sounding rocket">Soundi
ng rocket
<a href="/wiki/Small-lift_lau
nch_vehicle" title="Small-lift la
unch vehicle">Small-lift launch v
ehicle
<a href="/wiki/Medium-lift_la
```

```

unch_vehicle" title="Medium-lift
 launch vehicle">Medium-lift laun
ch vehicle
<a href="/wiki/Heavy-lift_lau
nch_vehicle" title="Heavy-lift la
unch vehicle">Heavy-lift launch v
ehicle
<a href="/wiki/Super_heavy-li
ft_launch_vehicle" title="Super h
eavy-lift launch vehicle">Super h
eavy-lift launch vehicle

</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Launches
by rocket t
ype</th><td class="navbox-list-wi
th-group navbox-list navbox-odd"
 style="width:100%;padding:0"><di
v style="padding:0 0.25em">
<a href="/wiki/List_of_Ar
iane_launches" title="List of Ari
ane launches">Ariane
<a href="/wiki/List_of_Atlas_
launches" title="List of Atlas la
unches">Atlas
<a href="/wiki/List_of_Black_
Brant_launches" title="List of Bl
ack Brant launches">Black Brant</
a>
<a href="/wiki/List_of_Electr

```

```
on_launches" title="List of Elect
ron launches">Electron
<a class="mw-selflink selflin
k">Falcon 9 and Heavy
<a href="/wiki/List_of_H-II_s
eries_and_H3_launches" title="Lis
t of H-II series and H3 launch
es">H-II and H3
<a href="/wiki/List_of_Kosmos
_launches" title="List of Kosmos
launches">Kosmos
<a href="/wiki/List_of_Long_M
arch_launches" title="List of Lon
g March launches">Long March

<a href="/wiki/List_of_Proton
_launches" title="List of Proton
launches">Proton
<a href="/wiki/List_of_PSLV_l
aunches" title="List of PSLV laun
ches">PSLV
<a href="/wiki/List_of_R-7_la
unches" title="List of R-7 launch
es">R-7 (including Semyorka, Moln
iya, Vostok, Voskhod and Soyuz)</
a>
<a href="/wiki/List_of_Scout_
launches" title="List of Scout la
unches">Scout
<a href="/wiki/List_of_Space_
```

```

Launch_System_launches" title="Li
st of Space Launch System launch
s">SLS
<a href="/wiki/List_of_SpaceX
_Starship_flight_tests" title="Li
st of SpaceX Starship flight test
s">Starship
<a href="/wiki/List_of_Thor_a
nd_Delta_launches" title="List of
Thor and Delta launches">Thor and
Delta
<a href="/wiki/List_of_Titan_
launches" title="List of Titan la
unches">Titan
<a href="/wiki/List_of_Tsyklo
n_launches" title="List of Tsyklo
n launches">Tsyklon
<a href="/wiki/List_of_V-2_te
st_launches" title="List of V-2 t
est launches">V-2 tests
<a href="/wiki/List_of_Zenit_
launches" title="List of Zenit la
unches">Zenit
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%;line-height:1.15em;">Launc
hes by spaceport</th><td class="n
avbox-list-with-group navbox-list
navbox-even" style="width:100%;pa
dding:0"><div style="padding:0 0.

```

```

25em">
<a href="/wiki/List_of_Sa
tish_Dhawan_Space_Centre_launche
s" title="List of Satish Dhawan S
pace Centre launches">Satish Dhaw
an
</div></td></tr><tr><th scope="ro
w" class="navbox-group" style="wi
dth:1%">Agencies, companies

and facilities</th><td class="nav
box-list-with-group navbox-list n
avbox-odd" style="width:100%;padd
ing:0"><div style="padding:0 0.25
em">
<a href="/wiki/List_of_co
mmunication_satellite_companies"
title="List of communication sat
ellite companies">Communications
satellite companies
<a href="/wiki/Comparison
_of_communication_satellite_opera
tors" title="Comparison of commun
ication satellite operators">comp
arison
<a href="/wiki/List_of_privat
e_spaceflight_companies" title="L
ist of private spaceflight compan
ies">Private spaceflight companie
s
<a href="/wiki/List_of_rocket

```



```

_launch_sites" title="List of rocket launch sites">Rocket launch sites
Space agencies
Spacecraft manufacturers
</div></td></tr><tr><th scope="row" class="navbox-group" style="width:1%;line-height:1.15em;">Other mission lists
and timelines
</th><td class="navbox-list-with-group navbox-list navbox-even" style="width:100%;padding:0"><div style="padding:0 0.25em">
First orbital launches by country
First artificial satellites by coun

```

```
try
NASA missions
Constellation missions
Timeline of private spaceflight
Timeline of longest spaceflights
</div></td></tr></tbody></table>
</div>
<p class="mw-empty-elt">
</p>
<!--
NewPP limit report
Parsed by mw1419
Cached time: 20220524231957
Cache expiry: 1814400
Reduced expiry: false
Complications: [vary-revision-sha1]
```

```
CPU time usage: 7.176 seconds
Real time usage: 7.919 seconds
Preprocessor visited node count:
 43602/1000000
Post-expand include size: 162233
6/2097152 bytes
Template argument size: 13768/209
7152 bytes
Highest expansion depth: 21/100
Expensive parser function count:
 25/500
Unstrip recursion depth: 1/20
Unstrip post-expand size: 258162
1/5000000 bytes
Lua time usage: 4.001/10.000 seconds
Lua memory usage: 12885371/524288
00 bytes
Lua Profile:
 dataWrapper <mw.lua:668>
400 ms 10.0%
 ?
400 ms 10.0%
 Scribunto_LuaSandboxCallback::callParserFunction
360 ms 9.0%
 recursiveClone <mwInit.lua:41
>
340 ms 8.5%
 Scribunto_LuaSandboxCallback
```

```

k::match
320 ms 8.0%
 Scribunto_LuaSandboxCallbac
k::gsub
300 ms 7.5%
 <mw.lua:690>
220 ms 5.5%
 Scribunto_LuaSandboxCallbac
k::find
120 ms 3.0%
 Scribunto_LuaSandboxCallbac
k::anchorEncode
120 ms 3.0%
 <mw.language.lua:62>
80 ms 2.0%
 [others]
1360 ms 33.8%
Number of Wikibase entities loaded: 0/400
-->
<!--
Transclusion expansion time report
(%,ms,calls,template)
100.00% 6615.055 1 -total
 31.72% 2098.356 510 Template:
Cite_web
 18.87% 1248.408 218 Template:
Cite_news
 4.96% 327.777 66 Template:
Cite_tweet

```

```

4.04% 267.164 187 Template:
Cvt
2.52% 166.670 9 Template:
Navbox
1.75% 115.726 1 Template:
Short_description
1.39% 92.200 1 Template:
SpaceX_missions_and_payloads
1.21% 80.329 2 Template:
Fix
1.20% 79.160 1 Template:
Failed_verification
-->

```

```

<!-- Saved in RevisionOutputCache
with key enwiki:rcache:102768692
2:dateformat=default and timestam
p 20220524231949 and revision id
1027686922.
-->

```

```

-->
</div><noscript></noscript>
<div class="printfooter">Retrieve
d from "<a dir="ltr" href="http
s://en.wikipedia.org/w/index.php?
title=List_of_Falcon_9_and_Falcon

```

```
_Heavy_launches&oldid=1027686922">https://en.wikipedia.org/w/index.php?title=List_of_Falcon_9_and_Falcon_Heavy_launches&oldid=1027686922"</div></div>
```

```
<div id="catlinks" class="catlinks" data-mw="interface"><div id="mw-normal-catlinks" class="mw-normal-catlinks">Categories:
Falcon 9 and Falcon Heavy launchesSpaceX launch vehiclesLists of rocket launches</div><div id="mw-hidden-catlinks" class="mw-hidden-catlinks mw-hidden-cats-hidden">Hidden categories: <a href="/wiki/Cat
```

```

egory:Source_attribution" title
="Category:Source attribution">So
urce attribution<a h
ref="/wiki/Category:All_articles_
with_dead_external_links" title
="Category:All articles with dead
external links">All articles with
dead external links<
a href="/wiki/Category:Articles_w
ith_dead_external_links_from_Febr
uary_2021" title="Category:Articl
es with dead external links from
February 2021">Articles with dea
d external links from February 20
21<a href="/wiki/Cat
egory:Articles_with_permanently_d
ead_external_links" title="Catego
ry:Articles with permanently dead
external links">Articles with per
manently dead external links
<a href="/wiki/Category:
CS1_Spanish-language_sources_(e
s)" title="Category:CS1 Spanish-l
anguage sources (es)">CS1 Spanish
-language sources (es)<l
i><a href="/wiki/Category:CS1_Ind
onesian-language_sources_(id)" ti
tle="Category:CS1 Indonesian-lang
uage sources (id)">CS1 Indonesian
-language sources (id)<l

```

```
i><a href="/wiki/Category:CS1_err
ors:_external_links" title="Categ
ory:CS1 errors: external links">C
S1 errors: external links<a href="/wiki/Category:CS1_
maint:_url-status" title="Categor
y:CS1 maint: url-status">CS1 main
t: url-status<a href
="/wiki/Category:CS1_German-langu
age_sources_(de)" title="Categor
y:CS1 German-language sources (d
e)">CS1 German-language sources
 (de)<a href="/wiki/
Category:CS1_Korean-language_sour
ces_(ko)" title="Category:CS1 Kor
ean-language sources (ko)">CS1 Ko
rean-language sources (ko)</l
i><a href="/wiki/Category:Art
icles_with_short_description" tit
le="Category:Articles with short
 description">Articles with short
description<a href
="/wiki/Category:Short_descriptio
n_is_different_from_Wikidata" tit
le="Category:Short description is
different from Wikidata">Short de
scription is different from Wikid
ata<a href="/wiki/Ca
tegory:Use_American_English_from_
January_2021" title="Category:Use
```



```
American English from January 2021">Use American English from January 2021All Wikipedia articles written in American EnglishUse dmy dates from January 2021Articles containing potentially dated statements from March 2018All articles containing potentially dated statements<a href="/wiki/Category:All_articles_with_failed_verification" title="Category:All ar
```

```
ticles with failed verification">
All articles with failed verifica
tion<a href="/wiki/C
ategory:Articles_with_failed_veri
fication_from_May_2021" title="Ca
tegory:Articles with failed verif
ication from May 2021">Articles w
ith failed verification from May
 2021<a href="/wiki/
Category:Articles_containing_pote
ntially_dated_statements_from_Apr
il_2020" title="Category:Articles
containing potentially dated stat
ements from April 2020">Articles
 containing potentially dated sta
tements from April 2020<
li><a href="/wiki/Category:Pages_
using_multiple_image_with_auto_sc
aled_images" title="Category:Page
s using multiple image with auto
 scaled images">Pages using multi
ple image with auto scaled images
<a href="/wiki/Categ
ory:Featured_lists" title="Catego
ry:Featured lists">Featured lists
<a href="/wiki/Categ
ory:Articles_containing_video_cli
ps" title="Category:Articles cont
aining video clips">Articles cont
aining video clips
```

```

</div></div>
 </div>
</div>

```

```

<div id="mw-navigation">
 <h2>Navigation menu</h2>
 <div id="mw-head">

```

```

<nav id="p-personal" class="mw-po
rtlet mw-portlet-personal vector-
user-menu-legacy vector-menu" ari
a-labelledby="p-personal-label" r
ole="navigation" >

```

```

 <label
 id="p-personal-la
bel"

```

```

 class="vector-men
u-heading "
 >

```

```

 <span class="vect
or-menu-heading-label">Personal t
ools

```

```

 </label>
 <div class="vector-menu-c
ontent">

```

```

 <ul class="vector
-menu-content-list"><li id="pt-an

```

```

onuserpage" class="mw-list-item">
<span title="The user page for th
e IP address you are editing as">
Not logged in<li id
="pt-anontalk" class="mw-list-ite
m"><a href="/wiki/Special:MyTalk"
title="Discussion about edits fro
m this IP address [n]" accesskey
="n">Talk<l
i id="pt-anoncontribs" class="mw-
list-item"><a href="/wiki/Specia
l:MyContributions" title="A list
of edits made from this IP addre
ss [y]" accesskey="y">Contr
ibutions<li id="p
t-createaccount" class="mw-list-i
tem"><a href="/w/index.php?title=
Special:CreateAccount&returnt
o=List+of+Falcon+9+and+Falcon+Hea
vy+launches&returntoquery=old
id%3D1027686922" title="You are e
ncouraged to create an account an
d log in; however, it is not mand
atory">Create account<li id="pt-login" class
="mw-list-item"><a href="/w/inde
x.php?title=Special:UserLogin&am
p;returnto=List+of+Falcon+9+and+F
alcon+Heavy+launches&returnto
query=oldid%3D1027686922" title

```

```
= "You're encouraged to log in; however, it's not mandatory. [o]" accesskey="o">Log in
```

```
</div>
```

```
</nav>
```

```
<div id="left-navigation">
```

```
<nav id="p-namespaces" class="mw-portlet mw-portlet-namespaces vector-menu vector-menu-tabs" aria-labelledby="p-namespaces-label" role="navigation" >
```

```
<label
```

```
id="p-namespaces-label"
```

```
class="vector-menu-heading" >
```

```
Namespaces
```

```
</label>
```

```
<div class="vector-menu-content">
```

```

 <ul class="vector
-menu-content-list"><li id="ca-ns
tab-main" class="selected mw-list
-item"><a href="/wiki/List_of_Fal
con_9_and_Falcon_Heavy_launches"
title="View the content page
[c]" accesskey="c">Article
<li id="ca-talk"
class="mw-list-item"><a href="/w
iki/Talk:List_of_Falcon_9_and_Fal
con_Heavy_launches" rel="discussi
on" title="Discuss improvements t
o the content page [t]" accesskey
="t">Talk</
ul>

```

```

 </div>

```

```

</nav>

```

```

<nav id="p-variants" class="mw-po
rtlet mw-portlet-variants emptyPo
rtlet vector-menu-dropdown-noicon
vector-menu vector-menu-dropdown"
aria-labelledby="p-variants-labe
l" role="navigation" >
 <input type="checkbox"
 id="p-variants-ch

```

```

eckbox"
 role="button"
 aria-haspopup="true"
 data-event-name="ui.dropdown-p-variants"
 class="vector-menu-checkbox"
 aria-labelledby="p-variants-label"
 />
 <label
 id="p-variants-label"
 aria-label="Change language variant"
 class="vector-menu-heading"
 >
 English
 </label>
 <div class="vector-menu-content">
 <ul class="vector-menu-content-list">
 </div>

```

```
</nav>
```

```
</div>
```

```
<div id="right-na
vigation">
```

```
<nav id="p-views" class="mw-portl
et mw-portlet-views vector-menu v
ector-menu-tabs" aria-labelledby
="p-views-label" role="navigatio
n" >
```

```
<label
```

```
id="p-views-labe
```

```
l"
```

```
class="vector-men
```

```
u-heading "
```

```
>
```

```
<span class="vect
or-menu-heading-label">Views</spa
n>
```

```
</label>
```

```
<div class="vector-menu-c
ontent">
```

```
<ul class="vector
-menu-content-list"><li id="ca-vi
ew" class="selected mw-list-ite
m"><a href="/wiki/List_of_Falcon_
```



```

9_and_Falcon_Heavy_launches">Read<li id="ca-
edit" class="mw-list-item"><a href="/w/index.php?title=List_of_Fal
con_9_and_Falcon_Heavy_launches&
mp;action=edit&oldid=10276869
22" title="Edit this page [e]" ac
cesskey="e">Edit
<li id="ca-history" class="m
w-list-item"><a href="/w/index.ph
p?title=List_of_Falcon_9_and_Falc
on_Heavy_launches&action=hist
ory" title="Past revisions of thi
s page [h]" accesskey="h">V
iew history

</div>

</nav>

```

```

<nav id="p-cactions" class="mw-po
rtlet mw-portlet-cactions emptyPo
rtlet vector-menu-dropdown-noicon
vector-menu vector-menu-dropdown"
aria-labelledby="p-cactions-labe
l" role="navigation" title="More
options" >
 <input type="checkbox"
 id="p-cactions-ch

```

```

checkbox"
 role="button"
 aria-haspopup="true"
 data-event-name="ui.dropdown-p-cactions"
 class="vector-menu-checkbox"
 aria-labelledby="p-cactions-label"
 />
 <label
 id="p-cactions-label"
 class="vector-menu-heading"
 >
 More
 </label>
 <div class="vector-menu-content">
 <ul class="vector-menu-content-list">
 </div>
</nav>

```

```

<div id="p-search" role="search"
 class="vector-search-box-vue vector-search-box-show-thumbnail vector-search-box-auto-expand-width vector-search-box">
 <div>
 <h3 >
 <
label for="searchInput">Search</label>
 </h3>
 <form action="/w/index.php" id="searchform"
 class="vector-search-box-form">
 <div id
 ="simpleSearch"
 class="vector-search-box-inner"
 data-search-loc="header-navigation">
 <
input class="vector-search-box-input"
 type="search" name="search" placeholder="Search Wikipedia" aria-la

```

```

bel="Search Wikipedia" autocapitalize="sentences" title="Search Wikipedia [f]" accesskey="f" id="searchInput"

<
input type="hidden" name="title" value="Special:Search"/>
<
input id="mw-searchButton"

class="searchButton mw-fallbackSearchButton" type="submit" name="fulltext" title="Search Wikipedia for this text" value="Search" />
<
input id="searchButton"

class="searchButton" type="submit" name="go" title="Go to a page with this exact name if it exists" value="Go" />
</div>
</form>
</div>
</div>
</div>
</div>

```

```

<div id="mw-panel">
 <div id="p-logo" role="ba
nner">
 <a class="mw-wiki
-logo" href="/wiki/Main_Page"
 title="Vi
sit the main page">
 </div>

```

```

<nav id="p-navigation" class="mw-
portlet mw-portlet-navigation vec
tor-menu vector-menu-portal porta
l" aria-labelledby="p-navigation-
label" role="navigation" >
 <label
 id="p-navigation-
label"
 class="vector-men
u-heading "
 >
 <span class="vect
or-menu-heading-label">Navigation

 </label>
 <div class="vector-menu-c
ontent">

```

```
<ul class="vector
-menu-content-list"><li id="n-mai
npage-description" class="mw-list
-item"><a href="/wiki/Main_Page"
icon="home" title="Visit the mai
n page [z]" accesskey="z">M
ain page<li id="n
-contents" class="mw-list-item"><
a href="/wiki/Wikipedia:Contents"
title="Guides to browsing Wikiped
ia">Contents<li id="n-currentevents" class
="mw-list-item"><a href="/wiki/Po
rtal:Current_events" title="Artic
les related to current events"><s
pan>Current events<li id="n-randompage" class="mw-
list-item"><a href="/wiki/Specia
l:Random" icon="die" title="Visit
a randomly selected article [x]"
accesskey="x">Random artic
le<li id="n-about
site" class="mw-list-item"><a hre
f="/wiki/Wikipedia:About" title
="Learn about Wikipedia and how i
t works">About Wikipedia</s
pan><li id="n-contactpag
e" class="mw-list-item"><a href
="//en.wikipedia.org/wiki/Wikiped
```

```

ia:Contact_us" title="How to cont
act Wikipedia">Contact us</
span><li id="n-sitesuppo
rt" class="mw-list-item"><a href
="https://donate.wikimedia.org/wi
ki/Special:FundraiserRedirector?u
tm_source=donate&utm_medium=s
idebar&utm_campaign=C13_en.wi
kipedia.org&uselang=en" title
="Support us by donating to the W
ikimedia Foundation">Donate


```

```

</div>

```

```

</nav>

```

```

<nav id="p-interaction" class="mw
-portlet mw-portlet-interaction v
ector-menu vector-menu-portal por
tal" aria-labelledby="p-interacti
on-label" role="navigation" >

```

```

<label

```

```

id="p-interaction

```

```

-label"

```

```

class="vector-men

```

```

u-heading "

```

```

>

```

```
 <span class="vector-
or-menu-heading-label">Contribute

 </label>
 <div class="vector-menu-c
ontent">
```

```
 <ul class="vector-
-menu-content-list"><li id="n-hel
p" class="mw-list-item"><a href
="/wiki/Help:Contents" icon="hel
p" title="Guidance on how to use
and edit Wikipedia">Help</
span><li id="n-introduct
ion" class="mw-list-item"><a href
="/wiki/Help:Introduction" title
="Learn how to edit Wikipedia"><s
pan>Learn to edit
<li id="n-portal" class="mw-list-
item"><a href="/wiki/Wikipedia:Co
mmunity_portal" title="The hub fo
r editors">Community portal
<li id="n-recentc
hanges" class="mw-list-item"><a h
ref="/wiki/Special:RecentChanges"
icon="recentChanges" title="A lis
t of recent changes to Wikipedia
[r]" accesskey="r">Recent
changes<li id="n
-upload" class="mw-list-item"><a
```



```

 href="/wiki/Wikipedia:File_Upload_Wizard" title="Add images or other media for use on Wikipedia">Upload file


```

```

 </div>
</nav>

```

```

<nav id="p-tb" class="mw-portlet
mw-portlet-tb vector-menu vector-
-menu-portal portal" aria-labelle
dby="p-tb-label" role="navigatio
n" >

```

```

 <label
 id="p-tb-label"
 class="vector-men
u-heading "
 >

```

```

 <span class="vect
or-menu-heading-label">Tools</spa
n>

```

```

 </label>
 <div class="vector-menu-c
ontent">

```

```

 <ul class="vector-
-menu-content-list"><li id="t-wha

```

```
tlinkshere" class="mw-list-item">
<a href="/wiki/Special:WhatLinksH
ere/List_of_Falcon_9_and_Falcon_H
eavy_launches" title="List of all
English Wikipedia pages containin
g links to this page [j]" accessk
ey="j">What links here</spa
n><li id="t-recentchange
slinked" class="mw-list-item"><a
 href="/wiki/Special:RecentChange
sLinked/List_of_Falcon_9_and_Falc
on_Heavy_launches" rel="nofollow"
title="Recent changes in pages li
nked from this page [k]" accesske
y="k">Related changes<li id="t-upload" class
="mw-list-item"><a href="/wiki/Wi
kipedia:File_Upload_Wizard" title
="Upload files [u]" accesskey
="u">Upload file
<li id="t-specialpages" clas
s="mw-list-item"><a href="/wiki/S
pecial:SpecialPages" title="A lis
t of all special pages [q]" acces
skey="q">Special pages</spa
n><li id="t-permalink" c
lass="mw-list-item"><a href="/w/i
ndex.php?title=List_of_Falcon_9_a
nd_Falcon_Heavy_launches&oldi
d=1027686922" title="Permanent li
```

nk to this revision of this page"><span>Permanent link</span></a></li><li id="t-info" class="mw-list-item"><a href="/w/index.php?title=List\_of\_Falcon\_9\_and\_Falcon\_Heavy\_launches&action=info" title="More information about this page"><span>Page information</span></a></li><li id="t-cite" class="mw-list-item"><a href="/w/index.php?title=Special:CiteThisPage&page=List\_of\_Falcon\_9\_and\_Falcon\_Heavy\_launches&id=1027686922&wpFormIdentifier=titleform" title="Information on how to cite this page"><span>Cite this page</span></a></li><li id="t-wikibase" class="mw-list-item"><a href="https://www.wikidata.org/wiki/Special:EntityPage/Q6570672" title="Structured data on this page hosted by Wikidata [g]" accesskey="g"><span>Wikidata item</span></a></li></ul>

</div>

</nav>

<nav id="p-coll-print\_export" cla

```

ss="mw-portlet mw-portlet-coll-print_export vector-menu vector-menu-portal portal" aria-labelledby="p-coll-print_export-label" role="navigation" >
 <label
 id="p-coll-print_export-label"
 class="vector-menu-heading "
 >
 Print/export
 </label>
 <div class="vector-menu-content">
 <ul class="vector-menu-content-list"><li id="coll-download-as-rl" class="mw-list-item"><sp

```

```

an>Download as PDF
<li id="t-print" class="mw-list-item">Printable version

```

```

</div>

```

```

</nav>

```

```

<nav id="p-electronpdfservice-sidebar-portlet-heading" class="mw-portlet mw-portlet-electronpdfservice-sidebar-portlet-heading emptyPortlet vector-menu vector-menu-portal portal" aria-labelledby="p-electronpdfservice-sidebar-portlet-heading-label" role="navigation" >

```

```

<label

```

```

id="p-electronpdfservice-sidebar-portlet-heading-label"

```

```

class="vector-menu-heading "
>

```

```

 Print/export
 </label>
 <div class="vector-menu-content">

 <ul class="vector-menu-content-list">

 </div>
</nav>

```

```

<nav id="p-lang" class="mw-portlet mw-portlet-lang vector-menu vector-menu-portal portal" aria-labelledby="p-lang-label" role="navigation" >
 <label
 id="p-lang-label"
 class="vector-menu-heading "
 >
 Languages

 </label>

```

```
<div class="vector-menu-content">

 <ul class="vector-menu-content-list"><li class="interlanguage-link interwiki-cs mw-list-item">Čeština<li class="interlanguage-link interwiki-de mw-list-item">Deutsch<li class="interlanguage-link interwiki-es mw-list-item"><a href="https://es.wikipedia.org/wiki/Anexo:Lanzamientos_de_cohetes_Falcon_9_y_Falcon_Heavy" title="Anexo:Lanzamientos de cohetes Falcon 9 y Falcon Heavy - Spanish" lang="es" hreflang="es" class
```

```
= "interlanguage-link-target">Español<li class="interlanguage-link interwiki-fr mw-list-item">Français<li class="interlanguage-link interwiki-ko mw-list-item">한국어<li class="interlanguage-link interwiki-it mw-list-item">Italiano<li class="interlanguage-link interwiki-ja mw-list-item"><a href="http
```



```
s://ja.wikipedia.org/wiki/%E3%83%
95%E3%82%A1%E3%83%AB%E3%82%B3%E3%
83%B39%E3%81%AE%E6%89%93%E3%81%A
1%E4%B8%8A%E3%81%92%E4%B8%80%E8%A
6%A7" title="ファルコン9の打ち上げ
一覧 - Japanese" lang="ja" hreflan
g="ja" class="interlanguage-link-
target">日本語</l
i><li class="interlanguage-link i
nterwiki-pl mw-list-item"><a href
="https://pl.wikipedia.org/wiki/L
ista_start%C3%B3w_rakiet_Falcon_9
_oraz_Falcon_Heavy" title="Lista
startów rakiet Falcon 9 oraz Fal
con Heavy - Polish" lang="pl" hre
flang="pl" class="interlanguage-l
ink-target">Polski</
a><li class="interlanguage-l
ink interwiki-pt mw-list-item"><a
href="https://pt.wikipedia.org/wi
ki/Lista_de_lan%C3%A7amentos_do_F
alcon_9_e_Falcon_Heavy" title="Li
sta de lançamentos do Falcon 9 e
Falcon Heavy - Portuguese" lang
="pt" hreflang="pt" class="interl
anguage-link-target">Portug
uês<li class="int
erlanguage-link interwiki-ru mw-l
ist-item"><a href="https://ru.wik
ipedia.org/wiki/%D0%A1%D0%BF%D0%B
```

```

8%D1%81%D0%BE%D0%BA_%D0%B7%D0%B0%
D0%BF%D1%83%D1%81%D0%BA%D0%BE%D0%
B2_%D1%80%D0%B0%D0%BA%D0%B5%D1%8
2%D1%8B-%D0%BD%D0%BE%D1%81%D0%B8%
D1%82%D0%B5%D0%BB%D1%8F_Falcon_9"
title="Список запусков ракеты-нос
ителя Falcon 9 – Russian" lang="r
u" hreflang="ru" class="interlang
uage-link-target">Русский</
span><li class="interlan
guage-link interwiki-sk mw-list-i
tem"><a href="https://sk.wikipedi
a.org/wiki/Zoznam_letov_Falconu_9
_a_Falconu_Heavy" title="Zoznam l
etov Falconu 9 a Falconu Heavy –
Slovak" lang="sk" hreflang="sk"
class="interlanguage-link-targe
t">Slovenčina</l
i><li class="interlanguage-link i
nterwiki-fi mw-list-item"><a href
="https://fi.wikipedia.org/wiki/L
uettelo_Falcon-rakettiperheen_lau
kaisuista" title="Luettelo Falcon
-rakettiperheen laukaisuista – Fi
nnish" lang="fi" hreflang="fi" cl
ass="interlanguage-link-target"><
span>Suomi<li cla
ss="interlanguage-link interwiki-
sv mw-list-item"><a href="http
s://sv.wikipedia.org/wiki/List_a_%

```

C3%B6ver\_SpaceX\_raketuppskjutning  
ar" title="Lista över SpaceX rake  
tuppskjutningar - Swedish" lang  
="sv" hreflang="sv" class="interl  
anguage-link-target"><span>Svensk  
a</span></a></li><li class="inter  
language-link interwiki-th mw-lis  
t-item"><a href="https://th.wikip  
edia.org/wiki/%E0%B8%A3%E0%B8%B2%  
E0%B8%A2%E0%B8%8A%E0%B8%B7%E0%B9%  
88%E0%B8%AD%E0%B8%81%E0%B8%B2%E0%  
B8%A3%E0%B8%9B%E0%B8%A5%E0%B9%88%  
E0%B8%AD%E0%B8%A2%E0%B8%95%E0%B8%  
B1%E0%B8%A7%E0%B8%82%E0%B8%AD%E0%  
B8%87%E0%B8%9F%E0%B8%B1%E0%B8%A5%  
E0%B8%84%E0%B8%AD%E0%B8%99\_9\_%E0%  
B9%81%E0%B8%A5%E0%B8%B0%E0%B8%9F%  
E0%B8%B1%E0%B8%A5%E0%B8%84%E0%B8%  
AD%E0%B8%99\_%E0%B9%80%E0%B8%AE%E  
0%B8%9F%E0%B8%A7%E0%B8%B5" title  
="รายชื่อการปล่อยตัวของฟัลคอน 9 และฟัล  
คอน เฮฟวี - Thai" lang="th" hrefla  
ng="th" class="interlanguage-link  
-target"><span>ไทย</span></a></li>  
><li class="interlanguage-link in  
terwiki-uk mw-list-item"><a href  
="https://uk.wikipedia.org/wiki/%  
D0%A1%D0%BF%D0%B8%D1%81%D0%BE%D0%  
BA\_%D0%B7%D0%B0%D0%BF%D1%83%D1%8  
1%D0%BA%D1%96%D0%B2\_Falcon\_9\_%D1%

```

82%D0%B0_Falcon_Heavy" title="Спи
сок запусків Falcon 9 та Falcon H
eavy – Ukrainian" lang="uk" hrefl
ang="uk" class="interlanguage-lin
k-target">Українська
<li class="interlanguage
-link interwiki-zh mw-list-item">
<a href="https://zh.wikipedia.or
g/wiki/%E7%8D%B5%E9%B7%B9%E8%99%
9F%E4%B8%8E%E7%8D%B5%E9%B7%B9%E9%
87%8D%E5%9E%8B%E9%81%8B%E8%BC%89%
E7%81%AB%E7%AE%AD%E7%99%BC%E5%B0%
84%E4%BB%BB%E5%8B%99%E5%88%97%E8%
A1%A8" title="獵鷹9號与獵鷹重型運載
火箭發射任務列表 – Chinese" lang="z
h" hreflang="zh" class="interlang
uage-link-target">中文
>

```

```

<div class="after
-portlet after-portlet-lang"><spa
n class="wb-langlinks-edit wb-lan
glinks-link"><a href="https://ww
w.wikidata.org/wiki/Special:Entit
yPage/Q6570672#sitelinks-wikipedi
a" title="Edit interlanguage link
s" class="wbc-editpage">Edit link
s</div>

```

```

</div>

```

```

</nav>

```

```
</div>
```

```
</div>
```

```
<footer id="footer" class="mw-footer" role="contentinfo" >
```

```
 <ul id="footer-info">
```

```
 <li id="footer-info-lastmod"> This page was last edited on 9 June 2021, at 11:39 (UTC).
```

```
 <li id="footer-info-copyright">This version of the page has been
 revised. Besides normal editing,
 the reason for revision may have been that this version contains f
actual inaccuracies, vandalism, o
r material not compatible with th
e <a href="https://en.wikipedia.org/wiki/Wikipedia:Text_of_Creative
_Commons_Attribution-ShareAlike_3.0_Unported_License">Creative Co
mmons Attribution-ShareAlike Lice
nse.

```

```
<ul id="footer-places">
 <li id="footer-places-privacy">Privacy policy
 <li id="footer-places-about">About Wikipedia
 <li id="footer-places-disclaimer">Disclaimers
 <li id="footer-places-contact">Contact Wikipedia
 <li id="footer-places-mobileview">Mobile view
 <li id="footer-places-dev
```

```

elopers">Developers

```

```

<li id="footer-places-statistics">Statistics

```

```

<li id="footer-places-cookiestatement">Cookie statement


```

```

<ul id="footer-icons" class="noprint">

```

```

<li id="footer-copyrightico">

```

```

<li id="footer-poweredbyico"></
a>


```

```

</footer>

```

```

<script>(RLQ=window.RLQ||[]).push
(function(){mw.config.set({"wgPag
eParseReport":{"limitreport":{"cp
utime":"7.176","walltime":"7.91
9","ppvisitednodes":{"value":4360
2,"limit":1000000},"postexpandinc
ludesize":{"value":1622336,"limi
t":2097152},"templateargumentsiz
e":{"value":13768,"limit":209715
2},"expansiondepth":{"value":2
1,"limit":100},"expensivefunction
count":{"value":25,"limit":50
0},"unstrip-depth":{"value":1,"li
mit":20},"unstrip-size":{"value":
2581621,"limit":5000000},"entitya
ccesscount":{"value":0,"limit":40
0},"timingprofile":["100.00% 661
5.055 1 -total"," 31.72% 209

```



```

8.356 510 Template:Cite_web", "
18.87% 1248.408 218 Template:C
ite_news", " 4.96% 327.777 6
6 Template:Cite_tweet", " 4.04%
267.164 187 Template:Cvt", "
2.52% 166.670 9 Template:N
avbox", " 1.75% 115.726 1 T
emplate:Short_description", " 1.3
9% 92.200 1 Template:Space
X_missions_and_payloads", " 1.21%
80.329 2 Template:Fix", " 1.
20% 79.160 1 Template:Fail
ed_verification"]}, "scribunto":
{"limitreport-timeusage":{"valu
e":"4.001", "limit":"10.000"}, "lim
itreport-memusage":{"value":12885
371, "limit":52428800}, "limitrepor
t-profile":[["dataWrapper \u003Cmw
.lua:668\u003E", "400", "10.0"],
["?", "400", "10.0"], ["Scribunto_Lu
aSandboxCallback::callParserFunct
ion", "360", "9.0"], ["recursiveClon
e \u003CmwInit.lua:41\u003E", "34
0", "8.5"], ["Scribunto_LuaSandboxC
allback::match", "320", "8.0"], ["Sc
ribunto_LuaSandboxCallback::gsu
b", "300", "7.5"], ["\u003Cmw.lua:69
0\u003E", "220", "5.5"], ["Scribunto
_LuaSandboxCallback::find", "12
0", "3.0"], ["Scribunto_LuaSandboxC

```

```
allback::anchorEncode", "120", "3.0"], [{"\u003Cmw.language.lua:62\u003E", "80", "2.0"}, [{"others}], "1360", "33.8"]]}, "cachereport": {"origin": "mw1419", "timestamp": "20220524231957", "ttl": 1814400, "transientcontent": false}}});});</script>
<script type="application/ld+json">{"@context": "https://\schema.org", "@type": "Article", "name": "List of Falcon 9 and Falcon Heavy launches", "url": "https://\en.wikipedia.org/wiki/List_of_Falcon_9_and_Falcon_Heavy_launches", "sameAs": "http://\www.wikidata.org/entity/Q6570672", "mainEntity": "http://\www.wikidata.org/entity/Q6570672", "author": {"@type": "Organization", "name": "Contributors to Wikimedia projects"}, "publisher": {"@type": "Organization", "name": "Wikimedia Foundation, Inc.", "logo": {"@type": "ImageObject", "url": "https://\www.wikimedia.org/static/images/wmf-hor-googpub.png"}}, "datePublished": "2012-11-08T00:32:00Z", "dateModified": "2021-06-09T11:39:49Z", "image": "https://upload.wikimedia.org/wikipedia/commons/0/0e/Falcon9_roc
```

```

ket_family.svg", "headline": "List
 of Falcon rocket launches"}</scr
ipt><script type="application/ld+
json">{"@context": "https://\sche
ma.org", "@type": "Article", "nam
e": "List of Falcon 9 and Falcon H
eavy launches", "url": "https://\e
n.wikipedia.org/wiki/List_of_Fa
lcon_9_and_Falcon_Heavy_launche
s", "sameAs": "http://\www.wikidat
a.org/entity/Q6570672", "mainEnt
ity": "http://\www.wikidata.org/
entity/Q6570672", "author": {"@typ
e": "Organization", "name": "Contrib
utors to Wikimedia projects"}, "pu
blisher": {"@type": "Organizatio
n", "name": "Wikimedia Foundation,
 Inc.", "logo": {"@type": "ImageObje
ct", "url": "https://\www.wikimedi
a.org/static/images/wmf-hor-go
ogpub.png"}}, "datePublished": "201
2-11-08T00:32:00Z", "dateModifie
d": "2021-06-09T11:39:49Z", "imag
e": "https://\upload.wikimedia.or
g/wikipedia/commons/\0/\0e\Fal
con9_rocket_family.svg", "headlin
e": "List of Falcon rocket launche
s"}</script>
<script>(RLQ=window.RLQ||[]).push
(function(){mw.config.set({"wgBac

```

```
kendResponseTime":200,"wgHostnam
e":"mw1399"}));});</script>
</body>
</html>
```

Create a `BeautifulSoup` object  
from the HTML response

```
In [25]: # Use BeautifulSoup() to create a
soup = BeautifulSoup(data)
```

Print the page title to verify if the  
`BeautifulSoup` object was  
created properly

```
In [26]: # Use soup.title attribute
print(soup.title)
```

```
<title>List of Falcon 9 and Falco
n Heavy launches - Wikipedia</tit
le>
```

## TASK 2: Extract all column/variable names from the HTML table header

Next, we want to collect all relevant column names from the HTML table header

Let's try to find all tables on the wiki page first. If you need to refresh your memory about

`BeautifulSoup`, please check the external reference link towards the end of this lab

```
In [28]: # Use the find_all function in the
Assign the result to a list call
html_tables = soup.find_all('table')
```

Starting from the third table is our target table contains the actual launch records.

```
In [29]: # Let's print the third table and
first_launch_table = html_tables[2]
print(first_launch_table)
```

```
<table class="wikitable plainrowh
eaders collapsible" style="width:
100%;">
<tbody><tr>
<th scope="col">Flight No.
</th>
<th scope="col">Date and
time
(<a href="/wiki/Coordinated_Unive
rsal_Time" title="Coordinated Uni
versal Time">UTC)
</th>
<th scope="col"><a href="/wiki/Li
st_of_Falcon_9_first-stage_booste
rs" title="List of Falcon 9 first
-stage boosters">Version,
Boo
ster <sup class="reference" i
d="cite_ref-booster_11-0">[b]
</sup>
</th>
<th scope="col">Launch site
</th>
<th scope="col">Payload<sup class
="reference" id="cite_ref-Dragon_
12-0"><a href="#cite_note-Dragon-
12">[c]</sup>
</th>
<th scope="col">Payload mass
</th>
<th scope="col">Orbit
```

```

</th>
<th scope="col">Customer
</th>
<th scope="col">Launch
outcom
e
</th>
<th scope="col"><a href="/wiki/Fa
lcon_9_first-stage_landing_tests"
title="Falcon 9 first-stage landi
ng tests">Booster
landing
</th></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">1
</th>
<td>4 June 2010,
18:45
</td>
<td><a href="/wiki/Falcon_9_v1.0"
title="Falcon 9 v1.0">F9 v1.0
<sup class="reference" id="cite_r
ef-MuskMay2012_13-0"><a href="#ci
te_note-MuskMay2012-13">[7]</
sup>
B0003.1<sup class="refer
ence" id="cite_ref-block_numbers_
14-0"><a href="#cite_note-block_n
umbers-14">[8]</sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC

```

```
AFS,
<a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40
</td>
<td><a href="/wiki/Dragon_Spacecr
aft_Qualification_Unit" title="Dr
agon Spacecraft Qualification Uni
t">Dragon Spacecraft Qualificatio
n Unit
</td>
<td>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO
</td>
<td><a href="/wiki/SpaceX" title
="SpaceX">SpaceX
</td>
<td class="table-success" style
="background: #9EFF9E; vertical-a
lign: middle; text-align: cente
r;">Success
</td>
<td class="table-failure" style
="background: #FFC7C7; vertical-a
lign: middle; text-align: cente
r;">Failure<sup class="reference"
id="cite_ref-ns20110930_15-0"><a
```



```

href="#cite_note-ns20110930-15">
[9]</sup><sup class="referenc
e" id="cite_ref-16"><a href="#cit
e_note-16">[10]</sup>
<sm
all>(parachute)</small>
</td></tr>
<tr>
<td colspan="9">First flight of F
alcon 9 v1.0.<sup class="referenc
e" id="cite_ref-sfn20100604_17-
0"><a href="#cite_note-sfn2010060
4-17">[11]</sup> Used a boile
rplate version of Dragon capsule
which was not designed to separat
e from the second stage.<small>(<
a href="#First_flight_of_Falcon_
9">more details below)</small
> Attempted to recover the first
stage by parachuting it into the
ocean, but it burned up on reentr
y, before the parachutes even dep
loyed.<sup class="reference" id
="cite_ref-parachute_18-0"><a hre
f="#cite_note-parachute-18">[12]
</sup>
</td></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">2
</th>

```

```
<td>8 December 2010,
15:43^{[13]}
</td>
<td>F9 v1.0
^{[7]}
B0004.1^{[8]}
</td>
<td>CC AFS,
SLC-40
</td>
<td>Dragon
demo flight C1
```

```

(Dragon C101)
</td>
<td>
</td>
<td>LEO
 (ISS)
</td>
<td><div class="plainlist">
NASA (COTS)
NRO

</div>
</td>
<td class="table-success" style="background: #9EFF9E; vertical-align: middle; text-align: center;">Success^{[9]}
```

```
</td>
<td class="table-failure" style
="background: #FFC7C7; vertical-a
lign: middle; text-align: cente
r;">Failure<sup class="reference"
id="cite_ref-ns20110930_15-2">
[9]</sup><sup class="referenc
e" id="cite_ref-20"><a href="#cit
e_note-20">[14]</sup>
<sm
all>(parachute)</small>
</td></tr>
<tr>
<td colspan="9">Maiden flight of
<a class="mw-redirect" href="/wik
i/Dragon_capsule" title="Dragon c
apsule">Dragon capsule, consi
sting of over 3 hours of testing
thruster maneuvering and reentry.
<sup class="reference" id="cite_r
ef-spaceflightnow_Clark_unleashin
g_Dragon_21-0"><a href="#cite_not
e-spaceflightnow_Clark_unleashing
_Dragon-21">[15]</sup> Attemp
ted to recover the first stage by
parachuting it into the ocean, bu
t it disintegrated upon reentry,
before the parachutes were deploy
ed.<sup class="reference" id="cit
e_ref-parachute_18-1"><a href="#c
```

```

ite_note-parachute-18">[12]</sup> <small>(more details below)</small> It also included two CubeSats,^{[16]} and a wheel of Brouère cheese.</td></tr>
<tr>
<th rowspan="2" scope="row" style="text-align:center;">3
</th>
<td>22 May 2012,
07:44^{[17]}
</td>
<td>F9 v1.0
^{[7]}
B0005.1<sup class="reference" id="cite_ref-block_numbers_

```

```

14-2"><a href="#cite_note-block_n
umbers-14">[8]</sup>
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS,
<a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40
</td>
<td><a href="/wiki/SpaceX_Dragon"
title="SpaceX Dragon">Dragon
<a class="mw-redirect" href="/wik
i/Dragon_C2%2B" title="Dragon C2
+">demo flight C2+<sup class
="reference" id="cite_ref-C2_24-
0">[1
8]</sup>
(Dragon C102)
</td>
<td>525 kg (1,157 lb)<sup class
="reference" id="cite_ref-25">[19]</su
p>
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO (<a href="/wiki/International_S
pace_Station" title="Internationa
l Space Station">ISS)

```

```

</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA (<a href="/wiki/Com
mercial_Orbital_Transportation_Se
rvices" title="Commercial Orbital
Transportation Services">COTS)
</td>
<td class="table-success" style
="background: #9EFF9E; vertical-a
lign: middle; text-align: cente
r;">Success<sup class="reference"
id="cite_ref-26"><a href="#cite_n
ote-26">[20]</sup>
</td>
<td class="table-noAttempt" style
="background: #EEE; vertical-alig
n: middle; white-space: nowrap; t
ext-align: center;">No attempt
</td></tr>
<tr>
<td colspan="9">Dragon spacecraft
demonstrated a series of tests be
fore it was allowed to approach t
he <a href="/wiki/International_S
pace_Station" title="Internationa
l Space Station">International Sp
ace Station. Two days later,
it became the first commercial sp
acecraft to board the ISS.<sup cl

```

```

ass="reference" id="cite_ref-BBC_
new_era_23-1"><a href="#cite_note
-BBC_new_era-23">[17]</sup> <
small>(<a href="#COTS_demo_missio
ns">more details below</smal
l>
</td></tr>
<tr>
<th rowspan="3" scope="row" style
="text-align:center;">4
</th>
<td rowspan="2">8 October 2012,
00:35<sup class="reference" id
="cite_ref-SFN_LLog_27-0">[21]</sup>
</td>
<td rowspan="2"><a href="/wiki/Fa
lcon_9_v1.0" title="Falcon 9 v1.
0">F9 v1.0<sup class="referen
ce" id="cite_ref-MuskMay2012_13-
3"><a href="#cite_note-MuskMay201
2-13">[7]</sup>
B0006.1<s
up class="reference" id="cite_ref
-block_numbers_14-3"><a href="#ci
te_note-block_numbers-14">[8]
</sup>
</td>
<td rowspan="2"><a href="/wiki/Ca
pe_Canaveral_Space_Force_Station"

```



```

title="Cape Canaveral Space Force
Station">CCAFS,
<a href
="/wiki/Cape_Canaveral_Space_Laun
ch_Complex_40" title="Cape Canave
ral Space Launch Complex 40">SLC-
40
</td>
<td><a href="/wiki/SpaceX_CRS-1"
title="SpaceX CRS-1">SpaceX CRS-1
<sup class="reference" id="ci
te_ref-sxManifest20120925_28-0"><
a href="#cite_note-sxManifest2012
0925-28">[22]</sup>
(Drag
on C103)
</td>
<td>4,700 kg (10,400 lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO (<a href="/wiki/International_S
pace_Station" title="Internationa
l Space Station">ISS)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS)
</td>
<td class="table-success" style

```

```
= "background: #9EFF9E; vertical-align: middle; text-align: center;">Success
</td>
<td rowspan="2" style="background-color: #ecec9c; text-align: center;">No attempt
</td></tr>
<tr>
<td>Orbcomm-OG2^{[23]}
</td>
<td>172 kg (379 lb)^{[24]}
</td>
<td>LEO
</td>
<td>Orbcomm
</td>
<td class="table-partial" style
```

```
= "background: #FE9; vertical-align: middle; text-align: center;">Partial failureclass="reference" id="cite_ref-nyt-20121030_31-0">[25]</sup></td></tr><tr><td colspan="9">CRS-1 was successful, but the secondary payload was inserted into an abnormally low orbit and subsequently lost. This was due to one of the nine Merlin engines shutting down during the launch, and NASA declining a second reignition, as per ISS visiting vehicle safety rules, the primary payload owner is contractually allowed to decline a second reignition. NASA stated that this was because SpaceX could not guarantee a high enough likelihood of the second stage completing the second burn successfully whic
```

h was required to avoid any risk of secondary payload's collision with the ISS.<sup class="reference" id="cite\_ref-OrbcommTotalLoss\_32-0"><a href="#cite\_note-OrbcommTotalLoss-32">[26]</a></sup><sup class="reference" id="cite\_ref-sn20121011\_33-0"><a href="#cite\_note-sn20121011-33">[27]</a></sup><sup class="reference" id="cite\_ref-34"><a href="#cite\_note-34">[28]</a></sup></td></tr><tr><th rowspan="2" scope="row" style="text-align:center;">5</th><td>1 March 2013,<br/>15:10</td><td><a href="/wiki/Falcon\_9\_v1.0" title="Falcon 9 v1.0">F9 v1.0</a><sup class="reference" id="cite\_ref-MuskMay2012\_13-4"><a href="#cite\_note-MuskMay2012-13">[7]</a></sup><br/>B0007.1<sup class="reference" id="cite\_ref-block\_numbers\_14-4"><a href="#cite\_note-block\_numbers-14">[8]</a></sup></td><td><a href="/wiki/Cape\_Canaveral

```

_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS,
<a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La
unch Complex 40">SLC-40
</td>
<td><a href="/wiki/SpaceX_CRS-2"
title="SpaceX CRS-2">SpaceX CRS-2
<sup class="reference" id="ci
te_ref-sxManifest20120925_28-1"><
a href="#cite_note-sxManifest2012
0925-28">[22]</sup>
(Drag
on C104)
</td>
<td>4,877 kg (10,752 lb)
</td>
<td><a href="/wiki/Low_Earth_orbi
t" title="Low Earth orbit">LEO (<a class="mw-redirect" href="/
wiki/ISS" title="ISS">ISS)
</td>
<td><a href="/wiki/NASA" title="N
ASA">NASA (<a href="/wiki/Com
mercial_Resupply_Services" title
="Commercial Resupply Services">C
RS)
</td>
<td class="table-success" style
="background: #9EFF9E; vertical-a

```

```

align: middle; text-align: center;
">Success
</td>
<td class="table-noAttempt" style="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;">No attempt
</td></tr>
<tr>
<td colspan="9">Last launch of the original Falcon 9 v1.0 launch vehicle, first use of the unpressurized trunk section of Dragon.^{[29]}
</td></tr>
<tr>
<th rowspan="2" scope="row" style="text-align:center;">6
</th>
<td>29 September 2013,
16:00^{[30]}
</td>
<td><a href="/wiki/Falcon_9_v1.1"

```

```

title="Falcon 9 v1.1">F9 v1.1
^{[7]}
B1003^{[8]}
</td>
<td>VAFB,
SLC-4E
</td>
<td>CASSIOPE^{[22]}^{[31]}
</td>
<td>500 kg (1,100 lb)
</td>
<td><a href="/wiki/Polar_orbit" t

```

```

title="Polar orbit">Polar orbit
> <a href="/wiki/Low_Earth_orbit"
title="Low Earth orbit">LEO
</td>
<td><a href="/wiki/Maxar_Technolo
gies" title="Maxar Technologies">
MDA
</td>
<td class="table-success" style
="background: #9EFF9E; vertical-a
lign: middle; text-align: cente
r;">Success<sup class="reference"
id="cite_ref-pa20130930_36-1">
[30]</sup>
</td>
<td class="table-no2" style="back
ground: #FFE3E3; color: black; ve
rtical-align: middle; text-align:
center;">Uncontrolled
<small>
(ocean)</small><sup class="refere
nce" id="cite_ref-ocean_landing_3
8-0"><a href="#cite_note-ocean_la
nding-38">[d]</sup>
</td></tr>
<tr>
<td colspan="9">First commercial
mission with a private customer,
first launch from Vandenberg, and
demonstration flight of Falcon 9

```



v1.1 with an improved 13-tonne to LEO capacity.<sup><sup class="reference" id="cite\_ref-sxf9\_20110321\_35-1"><a href="#cite\_note-sxf9\_20110321-35">[29]</a></sup></sup> After separation from the second stage carrying Canadian commercial and scientific satellites, the first stage booster performed a controlled reentry,<sup><sup class="reference" id="cite\_ref-39"><a href="#cite\_note-39">[32]</a></sup></sup> and an [<sup class="reference" id="cite\\_ref-pa20130930\\_36-2"><a href="#cite\\_note-pa20130930-36">\[30\]</a></sup> This was the first known attempt of a rocket engine being lit to perform a supersonic retro propulsion, and allowed SpaceX to enter a public-](/wiki/Falcon_9_first-stage_landing_tests "Falcon 9 first-stage landing tests")

```

private partnership with NASA</
a> and its Mars entry, descent, a
nd landing technologies research
projects.<sup class="reference" i
d="cite_ref-40"><a href="#cite_no
te-40">[33]</sup> <small>(mor
e details below)</small>
</td></tr>
<tr>
<th rowspan="2" scope="row" style
="text-align:center;">7
</th>
<td>3 December 2013,
22:41<su
p class="reference" id="cite_ref-
sfn_wwls20130624_41-0"><a href="#
cite_note-sfn_wwls20130624-41">[3
4]</sup>
</td>
<td><a href="/wiki/Falcon_9_v1.1"
title="Falcon 9 v1.1">F9 v1.1

B1004
</td>
<td><a href="/wiki/Cape_Canaveral
_Space_Force_Station" title="Cape
Canaveral Space Force Station">CC
AFS,
<a href="/wiki/Cape_
Canaveral_Space_Launch_Complex_4
0" title="Cape Canaveral Space La

```

unch Complex 40">SLC-40</a>  
 </td>  
 <td><a href="/wiki/SES-8" title="SES-8">SES-8</a><sup class="reference" id="cite\_ref-sxManifest20120925\_28-3"><a href="#cite\_note-sxManifest20120925-28">[22]</a></sup><sup class="reference" id="cite\_ref-spx-pr\_42-0"><a href="#cite\_note-spx-pr-42">[35]</a></sup><sup class="reference" id="cite\_ref-aw20110323\_43-0"><a href="#cite\_note-aw20110323-43">[36]</a></sup>  
 </td>  
 <td>3,170 kg (6,990 lb)  
 </td>  
 <td><a href="/wiki/Geostationary\_transfer\_orbit" title="Geostationary transfer orbit">GTO</a>  
 </td>  
 <td><a href="/wiki/SES\_S.A." title="SES S.A.">SES</a>  
 </td>  
 <td class="table-success" style="background: #9EFF9E; vertical-align: middle; text-align: center;">Success<sup class="reference" id="cite\_ref-SNMissionStatus7\_44-0"><a href="#cite\_note-SNMissionS

```

tatus7-44">[37]</sup>
</td>
<td class="table-noAttempt" style
="background: #EEE; vertical-align: middle; white-space: nowrap; text-align: center;">No attempt
^{[38]}
</td></tr>
<tr>
<td colspan="9">First Geostationary transfer orbit (GTO) launch for Falcon 9,^{[35]} and first successful reignition of the second stage.^{[39]} SES-8 was inserted into a Super-Synchronous Transfer Orbit of 79,341 km (49,300 mi) in apogee with an <a href="/wiki/0

```

```
rbital_inclination" title="Orbital inclination">inclination of
20.55° to the equator.
</td></tr></tbody></table>
```

You should be able to see the column names embedded in the table header elements `<th>` as follows:

```
<tr>
<th
scope="col">Flight
No.
</th>
<th scope="col">Date
and
time (<a
href="/wiki/Coordinated_Univ
title="Coordinated
Universal
Time">UTC)
</th>
<th scope="col"><a
href="/wiki/List_of_Falcon_9
stage_boosters"
```

```
title="List of Falcon
9 first-stage
boosters">Version,

Booster <sup
class="reference"
id="cite_ref-
booster_11-0"><a
href="#cite_note-
booster-11">[b]
</sup>
</th>
<th
scope="col">Launch
site
</th>
<th
scope="col">Payload<sup
class="reference"
id="cite_ref-
Dragon_12-0"><a
href="#cite_note-
Dragon-12">[c]
</sup>
</th>
<th
scope="col">Payload
```

```

mass
</th>
<th scope="col">Orbit
</th>
<th
scope="col">Customer
</th>
<th
scope="col">Launch
outco

</th>
<th scope="col"><a
href="/wiki/Falcon_9_first-
stage_landing_tests"
title="Falcon 9
first-stage landing
tests">Booster
landing</

</th></tr>

```



Next, we just need to iterate through the `<th>` elements and apply the provided

```
extract_column_from_header()
```

to extract column name one by one

```
In [30]: column_names = []

Apply find_all() function with `
Iterate each th element and appl
Append the Non-empty column name
for row in first_launch_table.find
 name = extract_column_from_he
 if (name != None and len(name)
 column_names.append(name)
```

Check the extracted column names

```
In [31]: print(column_names)

['Flight No.', 'Date and time (
)', 'Launch site', 'Payload', 'Pa
yload mass', 'Orbit', 'Customer',
'Launch outcome']
```

## TASK 3: Create a data frame by



# parsing the launch HTML tables

We will create an empty dictionary with keys from the extracted column names in the previous task. Later, this dictionary will be converted into a Pandas dataframe

```
In [32]: launch_dict= dict.fromkeys(column_

Remove an irrelevant column
del launch_dict['Date and time ()

Let's initial the launch_dict wi
launch_dict['Flight No.'] = []
launch_dict['Launch site'] = []
launch_dict['Payload'] = []
launch_dict['Payload mass'] = []
launch_dict['Orbit'] = []
launch_dict['Customer'] = []
launch_dict['Launch outcome'] = []
Added some new columns
launch_dict['Version Booster']=[]
launch_dict['Booster landing']=[]
```

```
launch_dict['Date']=[]
launch_dict['Time']=[]
```

Next, we just need to fill up the `launch_dict` with launch records extracted from table rows.

Usually, HTML tables in Wiki pages are likely to contain unexpected annotations and other types of noises, such as reference links `B0004.1[8]` , missing values `N/A` `[e]` , inconsistent formatting, etc.

To simplify the parsing process, we have provided an incomplete code snippet below to help you to fill up the `launch_dict` . Please complete the following code snippet with TODOs or you can choose to write your own logic to parse all launch tables:

```
In [33]: extracted_row = 0
#Extract each table
for table_number, table in enumerat
get table row
 for rows in table.find_all("tr
#check to see if first tab
 if rows.th:
 if rows.th.string:
 flight_number=rows
 flag=flight_number
 else:
 flag=False
#get table element
row=rows.find_all('td')
#if it is number save cell
if flag:
 extracted_row += 1
 # Flight Number value
 # TODO: Append the fli
 #print(flight_number)
 datatimelist=date_time

 # Date value
 # TODO: Append the dat
 date = datatimelist[0]
 #print(date)

 # Time value
 # TODO: Append the tin
 time = datatimelist[1]
```

```
#print(time)

Booster version
TODO: Append the bv
bv=booster_version(row
if not(bv):
 bv=row[1].a.string
print(bv)

Launch Site
TODO: Append the bv
launch_site = row[2].a
#print(launch_site)

Payload
TODO: Append the pay
payload = row[3].a.str
#print(payload)

Payload Mass
TODO: Append the pay
payload_mass = get_mas
#print(payload)

Orbit
TODO: Append the orb
orbit = row[5].a.stir
#print(orbit)

Customer
```

```
TODO: Append the cus
customer = row[6].a.st
#print(customer)

Launch outcome
TODO: Append the Lau
launch_outcome = list(
#print(Launch_outcome)

Booster Landing
TODO: Append the Lau
booster_landing = lanc
#print(booster_Landing
```

F9 v1.0B0003.1  
F9 v1.0B0004.1  
F9 v1.0B0005.1  
F9 v1.0B0006.1  
F9 v1.0B0007.1  
F9 v1.1B1003  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 v1.1  
F9 FT  
F9 v1.1  
F9 FT  
F9 FT  
F9 FT  
F9 FT  
F9 FT  
F9 FT  
F9 FT  
F9 FT  
F9 FT  
F9 FT

F9 FT  
F9 FT ↺  
F9 FT  
F9 FT  
F9 FT  
F9 FTB1029.2  
F9 FT  
F9 FT  
F9 B4  
F9 FT  
F9 B4  
F9 B4  
F9 FTB1031.2  
F9 B4  
F9 FTB1035.2  
F9 FTB1036.2  
F9 B4  
F9 FTB1032.2  
F9 FTB1038.2  
F9 B4  
F9 B4B1041.2  
F9 B4B1039.2  
F9 B4  
F9 B5B1046.1  
F9 B4B1043.2  
F9 B4B1040.2  
F9 B4B1045.2  
F9 B5  
F9 B5B1048  
F9 B5B1046.2

F9 B5



F9 B5B1049.6

F9 B5

F9 B5B1060.2

F9 B5B1058.3

F9 B5B1051.6

F9 B5

F9 B5

F9 B5

F9 B5

F9 B5 

F9 B5 

F9 B5 

F9 B5 

F9 B5

F9 B5B1051.8

F9 B5B1058.5

```


AttributeError
Traceback (most recent call last)
/tmp/ipykernel_703/354354048.py i
n <module>
 60 # Customer
 61 # TODO: Appen
d the customer into launch_dict w
ith key `Customer`
--> 62 customer = ro
w[6].a.string
 63 #print(custom
er)
 64

AttributeError: 'NoneType' object
has no attribute 'string'
```

After you have fill in the parsed  
launch record values into  
`launch_dict`, you can create a  
dataframe from it.

```
In [35]: df=pd.DataFrame(launch_dict)
df.head()
```

Out[35]:

**Flight  
No.****Launch  
site****Payload****Payload  
mass****Orl**

◀		▶
---	--	---

We can now export it to a **CSV** for the next section, but to make the answers consistent and in case you have difficulties finishing this lab.

Following labs will be using a provided dataset to make each lab independent.

```
df.to_csv('spacex_web_scraped.csv',
index=False)
```

◀		▶
---	--	---

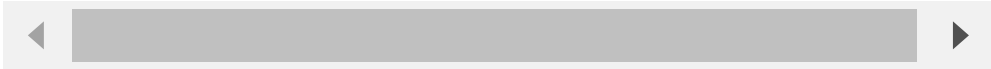
## Authors

Yan Luo

Nayef Abou Tayoun

# Change Log

Date (YYYY-MM-DD)	Version	Changed By	Change Description
2021-06-09	1.0	Yan Luo	Tasks updates
2020-11-10	1.0	Nayef	Created the initial version



Copyright © 2021 IBM Corporation.  
All rights reserved.