SpaceX Falcon 9 first stage Landing Prediction

Lab 1: Collecting the data

Estimated time needed: **45** minutes

In this capstone, we will predict if the Falcon 9 first stage will land successfully. SpaceX advertises Falcon 9 rocket launches on its website with a cost of 62 million dollars; other providers cost upward of 165 million dollars each, much of the savings is because SpaceX can reuse the first stage. Therefore if we can determine if the first stage will land, we can determine the cost of a launch. This information can be used if an alternate company wants to bid against SpaceX for a rocket launch. In this lab, you will collect and make sure the data is in the correct format from an API. The following is an example of a successful and launch.

Several examples of an unsuccessful landing are shown here:

Most unsuccessful landings are planned. Space X performs a controlled landing in the oceans.

Objectives

In this lab, you will make a get request to the SpaceX API. You will also do some basic data wrangling and formating.

- Request to the SpaceX API
- Clean the requested data

Import Libraries and Define Auxiliary Functions

We will import the following libraries into the lab

In [ ]:
```
# Requests allows us to make HTTP requests which we will use to get data fro
import requests
# Pandas is a software library written for the Python programming language f
import pandas as pd
# NumPy is a library for the Python programming language, adding support for
import numpy as np
# Datetime is a library that allows us to represent dates
import datetime

# Setting this option will print all collumns of a dataframe
pd.set_option('display.max_columns', None)
# Setting this option will print all of the data in a feature
pd.set_option('display.max_colwidth', None)
```

Below we will define a series of helper functions that will help us use the API to extract information using identification numbers in the launch data.

From the `rocket` column we would like to learn the booster name.

In [ ]:
```
# Takes the dataset and uses the rocket column to call the API and append th

def getBoosterVersion(data):
    for x in data['rocket']:
        if x:
            response = requests.get("https://api.spacexdata.com/v4/rockets/"
            BoosterVersion.append(response['name'])
```

From the `launchpad` we would like to know the name of the launch site being used, the logitude, and the latitude.

In [ ]:
```
# Takes the dataset and uses the launchpad column to call the API and append
def getLaunchSite(data):
    for x in data['launchpad']:
       if x:
            response = requests.get("https://api.spacexdata.com/v4/launchpad
            Longitude.append(response['longitude'])
            Latitude.append(response['latitude'])
            LaunchSite.append(response['name'])
```

In [ ]:
```
# Takes the dataset and uses the payloads column to call the API and append
def getPayloadData(data):
    for load in data['payloads']:
       if load:
           response = requests.get("https://api.spacexdata.com/v4/payloads/"
           PayloadMass.append(response['mass_kg'])
           Orbit.append(response['orbit'])
```

From `cores` we would like to learn the outcome of the landing, the type of the landing, number of flights with that core, whether gridfins were used, wheter the core is reused, wheter legs were used, the landing pad used, the block of the core which is a number used to seperate version of cores, the number of times this specific core has been reused, and the serial of the core.

In [ ]:
```
# Takes the dataset and uses the cores column to call the API and append the
def getCoreData(data):
    for core in data['cores']:
            if core['core'] != None:
                response = requests.get("https://api.spacexdata.com/v4/cores
                Block.append(response['block'])
                ReusedCount.append(response['reuse_count'])
                Serial.append(response['serial'])
            else:
                Block.append(None)
                ReusedCount.append(None)
                Serial.append(None)
            Outcome.append(str(core['landing_success'])+' '+str(core['landir
            Flights.append(core['flight'])
            GridFins.append(core['gridfins'])
            Reused.append(core['reused'])
            Legs.append(core['legs'])
            LandingPad.append(core['landpad'])
```

Now let's start requesting rocket launch data from SpaceX API with the following URL:

In [ ]:
```
spacex_url="https://api.spacexdata.com/v4/launches/past"
```

In [ ]:
```
response = requests.get(spacex_url)
```

Check the content of the response

In [ ]:
```
print(response.content)
```

b'[{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/94/f2/NN6Ph45r_o.png","large":"https://images2.imgbox.com/5b/02/QcxHUb5V_o.png"},"reddit":{"campaign":null,"launch":null,"media":null,"recovery":null},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://www.youtube.com/watch?v=0a_00nJ_Y88","youtube_id":"0a_00nJ_Y88","article":"https://www.space.com/2196-spacex-inaugural-falcon-1-rocket-lost-launch.html","wikipedia":"https://en.wikipedia.org/wiki/DemoSat"},"static_fire_date_utc":"2006-03-17T00:00:00.000Z","static_fire_date_unix":1142553600,"net":false,"window":0,"rocket":"5e9d0d95eda69955f709d1eb","success":false,"failures":[{"time":33,"altitude":null,"reason":"merlin engine failure"}],"details":"Engine failure at 33 seconds and loss of vehicle","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4b5b6c3bb0006eeb1e1"],"launchpad":"5e9e4502f5090995de566f86","flight_number":1,"name":"FalconSat","date_utc":"2006-03-24T22:30:00.000Z","date_unix":1143239400,"date_local":"2006-03-25T10:30:00+12:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e289df35918033d3b2623","flight":1,"gridfins":false,"legs":false,"reused":false,"landing_attempt":false,"landing_success":null,"landing_type":null,"landpad":null}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cd9ffd86e000604b32a"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/f9/4a/ZboXReNb_o.png","large":"https://images2.imgbox.com/80/a2/bkWotCIS_o.png"},"reddit":{"campaign":null,"launch":null,"media":null,"recovery":null},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://www.youtube.com/watch?v=Lk4zQ2wP-Nc","youtube_id":"Lk4zQ2wP-Nc","article":"https://www.space.com/3590-spacex-falcon-1-rocket-fails-reach-orbit.html","wikipedia":"https://en.wikipedia.org/wiki/DemoSat"},"static_fire_date_utc":null,"static_fire_date_unix":null,"net":false,"window":0,"rocket":"5e9d0d95eda69955f709d1eb","success":false,"failures":[{"time":301,"altitude":289,"reason":"harmonic oscillation leading to premature engine shutdown"}],"details":"Successful first stage burn and transition to second stage, maximum altitude 289 km, Premature engine shutdown at T+7 min 30 s, Failed to reach orbit, Failed to recover first stage","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4b6b6c3bb0006eeb1e2"],"launchpad":"5e9e4502f5090995de566f86","flight_number":2,"name":"DemoSat","date_utc":"2007-03-21T01:10:00.000Z","date_unix":1174439400,"date_local":"2007-03-21T13:10:00+12:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e289ef35918416a3b2624","flight":1,"gridfins":false,"legs":false,"reused":false,"landing_attempt":false,"landing_success":null,"landing_type":null,"landpad":null}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cdaffd86e000604b32b"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/6c/cb/na1tzhHs_o.png","large":"https://images2.imgbox.com/4a/80/k1oAkY0k_o.png"},"reddit":{"campaign":null,"launch":null,"media":null,"recovery":null},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://www.youtube.com/watch?v=v0w9p3U8860","youtube_id":"v0w9p3U8860","article":"http://www.spacex.com/news/2013/02/11/falcon-1-flight-3-mission-summary","wikipedia":"https://en.wikipedia.org/wiki/Trailblazer_(satellite)"},"static_fire_date_utc":null,"static_fire_date_unix":null,"net":false,"window":0,"rocket":"5e9d0d95eda69955f709d1eb","success":false,"failures":[{"time":140,"altitude":35,"reason":"residual stage-1 thrust led to collision between stage 1 and stage 2"}],"details":"Residual stage 1 thrust led to collision between stage 1 and stage 2","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4b6b6c3bb0006eeb1e3","5eb0e4b6b6c3bb0006eeb1e4"],"launchpad":"5e9e4502f5090995de566f86","flight_number":3,"name":"Trailblazer","date_utc":"2008-08-03T03:34:00.000Z","date_unix":1217734440,"date_local":"2008-08-03T15:34:00+12:00","date_precision":"hour","upcoming":false,"cores":[{"co

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t":"https://www.youtube.com/watch?v=aAj5xapImEs","youtube_id":"aAj5xapImE
s","article":"https://www.nasaspaceflight.com/2013/12/spacex-falcon-9-v1-1-m
ilestone-ses-8-launch/","wikipedia":"https://en.wikipedia.org/wiki/SES-
8"},"static_fire_date_utc":"2013-11-22T06:26:00.000Z","static_fire_date_uni
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com-6-satellite-to-orbit/","wikipedia":"https://en.wikipedia.org/wiki/Thaico
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ix":1388188800,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","s
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AF evaluated launch data from this flight as part of a separate certificatio
n program for SpaceX to qualify to fly U.S. military payloads and found that
the Thaicom 6 launch had \\"unacceptable fuel reserves at engine cutoff of t
he stage 2 second burnoff\\"","crew":[],"ships":[],"capsules":[],"payloads":
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-3_presskit_042014.pdf","webcast":"https://www.youtube.com/watch?v=Od-lON4bT
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spacex/31671/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-3"},"st
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36800,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":t
rue,"failures":[],"details":"Following second-stage separation, SpaceX condu
cted a second controlled-descent test of the discarded booster vehicle and a
chieved the first successful controlled ocean touchdown of a liquid-rocket-e
ngine orbital booster. Following touchdown the first stage tipped over as ex
pected and was destroyed. This was the first Falcon 9 booster to fly with ex
tensible landing legs and the first Dragon mission with the Falcon 9 v1.1 la
unch vehicle.","crew":[],"ships":["5ea6ed2d080df4000697c902"],"capsules":["5
e9e2c5bf3591859a63b2668"],"payloads":["5eb0e4bbb6c3bb0006eeb1f1"],"launchpa
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tes/spacex/files/spacex_orbcomm_presskit_final.pdf","webcast":"https://www.y
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s://www.orbcomm.com/en/networks/satellite/orbcomm-og2","wikipedia":"https://
en.wikipedia.org/wiki/Falcon_9_flight_10"},"static_fire_date_utc":"2015-12-1
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s":"Total payload mass was 1,316 kg (2,901 lb) : 6 satellites weighing 172 k
g each, plus two 142-kg mass simulators. This was the second Falcon 9 booste
r equipped with landing legs. Following second-stage separation, SpaceX cond
ucted a controlled-descent test of the first stage, which successfully decel
erated from\xc2\xa0hypersonic velocity in the upper atmosphere, made reentry
and landing burns, deployed its legs and touched down on the ocean surface.
As with the previous mission, the first stage then tipped over as expected a
nd was not recovered.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e
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cessfully-launched-rocket-recovery-demo-crash-lands/","wikipedia":"https://e
n.wikipedia.org/wiki/SpaceX_CRS-5"},"static_fire_date_utc":"2014-12-19T00:0
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ing second stage separation, SpaceX performed a test flight which attempted
to return the first stage of the Falcon 9 through the atmosphere and land it
on an approximately 90-by-50-meter (300 ft x 160 ft) floating platform-calle
d the autonomous spaceport drone ship. Many of the test objectives were achi
eved, including precision control of the rocket\'s descent to land on the pl
atform at a specific point in the Atlantic ocean, and a large amount of test
data was obtained from the first use of grid fin control surfaces used for m
ore precise reentry positioning. The grid fin control system ran out of hydr
aulic fluid a minute before landing and the landing itself resulted in a cra
sh.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90
b","5ea6ed2f080df4000697c90c","5ea6ed2f080df4000697c90f","5ea6ed30080df40006
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b9b54_o.jpg","https://farm9.staticflickr.com/8601/16512864369_2bb896c344_o.jp
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s://farm9.staticflickr.com/8680/16511407248_093635a243_o.jpg","https://farm9.

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tes/default/files/atoms/files/spacex_nasa_crs-7_presskit.pdf","webcast":"https://www.youtube.com/watch?v=PuNymhcTtSQ","youtube_id":"PuNymhcTtSQ","article":"https://spaceflightnow.com/2015/06/28/falcon-9-rocket-destroyed-in-launch-mishap/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-7"},"static_fire_date_utc":"2015-06-26T05:00:00.000Z","static_fire_date_unix":1435294800,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":false,"failures":[{"time":139,"altitude":40,"reason":"helium tank overpressure lead to the second stage LOX tank explosion"}],"details":"Launch performance was nominal until an overpressure incident in the second-stage LOX tank, leading to vehicle breakup at T+150 seconds. The Dragon capsule survived the explosion but was lost upon splashdown because its software did not contain provisions for parachute deployment on launch vehicle failure.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90c"],"capsules":["5e9e2c5cf35918407d3b266c"],"payloads":["5eb0e4beb6c3bb0006eeb1fc"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":24,"name":"CRS-7","date_utc":"2015-06-28T14:21:00.000Z","date_unix":1435501260,"date_local":"2015-06-28T10:21:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a1f35918683c3b263a","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":null,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87ceeffd86e000604b341"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/6a/7e/J7IQfBqg_o.png","large":"https://images2.imgbox.com/99/d4/0aIlpFpw_o.png"},"reddit":{"campaign":null,"launch":"https://www.reddit.com/r/spacex/comments/3xgxh5","media":"https://www.reddit.com/r/spacex/comments/3xm83h/","recovery":null},"flickr":{"small":[],"original":["https://farm2.staticflickr.com/1648/23827554109_837b21739e_o.jpg","https://farm1.staticflickr.com/597/23802553412_d41e4dcc64_o.jpg","https://farm6.staticflickr.com/5806/23802550622_9ff8c90098_o.jpg","https://farm1.staticflickr.com/571/23604164970_2a1a2366e4_o.jpg","https://farm6.staticflickr.com/5773/23271687254_5e64d726ba_o.jpg","https://farm6.staticflickr.com/5766/23526044959_5bfe74bc88_o.jpg","https://farm6.staticflickr.com/5723/23785609832_83038751d1_o.jpg","https://farm1.staticflickr.com/715/23833499336_d3fde6a25a_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/spacex_orbcomm_press_kit_final2.pdf","webcast":"https://www.youtube.com/watch?v=O5bTbVbe4e4","youtube_id":"O5bTbVbe4e4","article":"https://spaceflightnow.com/2015/12/22/round-trip-rocket-flight-gives-spacex-a-trifecta-of-successes/","wikipedia":"https://en.wikipedia.org/wiki/Falcon_9_flight_20"},"static_fire_date_utc":"2015-12-19T00:09:00.000Z","static_fire_date_unix":1450483740,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Total payload mass was 2,034 kg (4,484 lb) : 11 satellites weighing 172 kg each, plus a 142-kg mass simulator. This was the first launch of the upgraded v1.1 variant (later called Falcon 9 Full Thrust), with a 30 percent power increase. Orbcomm had originally agreed to be the third flight of the enhanced-thrust rocket, but the change to the maiden flight position was announced in October 2015. SpaceX received a permit from the FAA to land the booster on solid ground at Cape Canaveral, and succeeded.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4beb6c3bb0006eeb1fd"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":25,"name":"OG-2 Mission 2","date_utc":"2015-12-22T01:29:00.000Z","date_unix":1450747740,"date_local":"2015-12-22T21:29:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a1f3591867753b263b","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb267a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cefffd86e000604b342"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"http

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hicle. Following the launch, SpaceX attempted an experimental landing test to a drone ship, although a successful landing was not expected because launch mass exceeded previously indicated limit for a GTO there was little fuel left. As predicted, booster recovery failed: the spent first stage \\"landed hard \\", 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 9s.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90c","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4beb6c3bb0006eeb1ff"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":27,"name":"SES-9","date_utc":"2016-03-04T23:35:00.000Z","date_unix":1457134500,"date_local":"2016-03-04T19:35:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a1f359188def3b263d","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":false,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cf2ffd86e000604b344"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/72/1e/mA23xHqe_o.png","large":"https://images2.imgbox.com/36/d8/RyPKsTpC_o.png"},"reddit":{"campaign":null,"launch":"https://www.reddit.com/r/spacex/comments/4dtoly","media":"https://www.reddit.com/r/spacex/comments/4dtpxn/","recovery":"https://www.reddit.com/r/spacex/comments/4ee2zy"},"flickr":{"small":[],"original":["https://farm2.staticflickr.com/1633/25788014884_6a3f9ae183_o.jpg","https://farm2.staticflickr.com/1650/26300505022_8b8b9035e8_o.jpg","https://farm2.staticflickr.com/1486/25787998624_3ca213be1e_o.jpg","https://farm2.staticflickr.com/1450/26326628031_e1b08ec0b3_o.jpg","https://farm2.staticflickr.com/1670/26239020092_05e5e4c538_o.jpg","https://farm2.staticflickr.com/1709/26305479266_76b4d01caf_o.jpg","https://farm2.staticflickr.com/1645/26239017922_28c7ac50e0_o.jpg","https://farm2.staticflickr.com/1559/26288402056_6c5997ce66_o.jpg","https://farm2.staticflickr.com/1449/25709481274_60f8c77358_o.jpg","https://farm2.staticflickr.com/1671/26217360302_b66c3e384e_o.jpg","https://farm2.staticflickr.com/1704/26283822056_838c1103b9_o.jpg","https://farm2.staticflickr.com/1508/26217345472_118767c608_o.jpg","https://farm2.staticflickr.com/1495/25916886442_821a152917_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/spacex_crs8_press_kit.pdf","webcast":"https://www.youtube.com/watch?v=7pUAydjne5M","youtube_id":"7pUAydjne5M","article":"https://spaceflightnow.com/2016/04/08/spacex-lands-rocket-on-floating-platform-after-station-resupply-launch/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-8"},"static_fire_date_utc":"2016-04-05T00:00:00.000Z","static_fire_date_unix":1459814400,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Dragon carried over 1500 kg of supplies and delivered (stowed in its trunk) the inflatable Bigelow Expandable Activity Module (BEAM) to the ISS for two years of in-orbit tests. The rocket\'s first stage landed smoothly on SpaceX\'s autonomous spaceport drone ship 9 minutes after liftoff, making this the first ever successful landing of a rocket booster on a ship at sea as part of an orbital launch. The first stage B1021 was later also the first orbital booster to be used again, when launching SES-10 on March 30, 2017.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90c","5ea6ed30080df4000697c912","5ea6ed30080df4000697c913"],"capsules":["5e9e2c5cf3591885d43b266d"],"payloads":["5eb0e4bfb6c3bb0006eeb200"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":28,"name":"CRS-8","date_utc":"2016-04-08T20:43:00.000Z","date_unix":1460148180,"date_local":"2016-04-08T16:43:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a2f359182d0b3b263e","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cf3ffd86e000604b345"},{"fairings":{"reused":false,"recovery_attempt":false,"r

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om/r/spacex/comments/4ihp1p"},"flickr":{"small":[],"original":["https://farm
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s://farm8.staticflickr.com/7085/26809208046_d77bd31fd0_o.jpg","https://farm8.
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spacex.com/sites/spacex/files/spacex_jcsat_press_kit_final.pdf","webcast":"ht
tps://www.youtube.com/watch?v=L0bMeDj76ig","youtube_id":"L0bMeDj76ig","articl
e":"https://spaceflightnow.com/2016/05/06/falcon-9-succeeds-in-middle-of-the-
night-launch/","wikipedia":"https://en.wikipedia.org/wiki/JCSAT-2B"},"static_
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e,"failures":[],"details":"Launched the JCSAT 14 communications satellite for
Tokyo-based SKY Perfect JSAT Corp. JCSAT 14 will support data networks, telev
ision broadcasters and mobile communications users in Japan, East Asia, Russi
a, Oceania, Hawaii and other Pacific islands. This was the first time a boost
er successfully landed after a GTO mission.","crew":[],"ships":["5ea6ed2e080d
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s://farm8.staticflickr.com/7698/27294261525_82c4b7e604_o.jpg","https://farm8.
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7/spacex-logs-successful-late-afternoon-launch-for-thaicom/","wikipedia":"htt
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actured by Orbital ATK, the 3,100-kilogram (6,800 lb) Thaicom 8 communication
s satellite will serve Thailand, India and Africa from the 78.5\xc2\xb0 East
geostationary location. It is equipped with 24 active Ku-band transponder
s.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90
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ghtnow.com/2016/06/15/spacex-successfully-fires-satellites-into-orbit-but-los
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a809d1ec","success":true,"failures":[],"details":"One year after pioneering t
his technique on flight 16, Falcon again launched two Boeing 702SP gridded io
n thruster satellites in a dual-stack configuration, with the two customers s
haring the rocket and mission costs. First stage landing attempt on drone shi
p failed on landing due to low thrust on one of the three landing engine
s.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90
b","5ea6ed2f080df4000697c90c","5ea6ed30080df4000697c913"],"capsules":[],"payl
oads":["5eb0e4bfb6c3bb0006eeb203","5eb0e4bfb6c3bb0006eeb204"],"launchpad":"5e
9e4501f509094ba4566f84","flight_number":31,"name":"ABS-2A / Eutelsat 117W
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l":"2016-06-15T10:29:00-04:00","date_precision":"hour","upcoming":false,"core
s":[{"core":"5e9e28a2f359184f403b2641","flight":1,"gridfins":true,"legs":tru
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cex/comments/4tayth","recovery":"https://www.reddit.com/r/spacex/comments/4zn
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["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90c","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4c1b6c3bb0006eeb206"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":33,"name":"JCSAT-16","date_utc":"2016-08-14T05:26:00.000Z","date_unix":1471152360,"date_local":"2016-08-14T01:26:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a2f35918b8243b2643","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cfaffd86e000604b34a"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/0d/5b/8X01C3ov_o.png","large":"https://images2.imgbox.com/ff/19/KCI4DVla_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/4pv7jl","launch":null,"media":null,"recovery":null},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://www.youtube.com/watch?v=_BgJEXQkjNQ","youtube_id":"_BgJEXQkjNQ","article":"https://spaceflightnow.com/2016/09/01/spacex-rocket-and-israeli-satellite-destroyed-in-launch-pad-explosion/","wikipedia":"https://en.wikipedia.org/wiki/Amos-6"},"static_fire_date_utc":"2016-09-01T13:07:00.000Z","static_fire_date_unix":1472735220,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":false,"failures":[{"time":-165180,"altitude":0,"reason":"buckled liner in several of the COPV tanks, causing perforations that allowed liquid and/or solid oxygen to accumulate underneath the lining, which was ignited by friction."}],"details":"The rocket and Amos-6 payload were lost in a launch pad explosion on September 1, 2016 during propellant fill prior to a static fire test. The pad was clear of personnel and there were no injuries.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4c1b6c3bb0006eeb207"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":34,"name":"Amos-6","date_utc":"2016-09-01T13:07:00.000Z","date_unix":1472735220,"date_local":"2016-09-01T09:07:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a2f359187ee83b2644","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":null,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87cfbffd86e000604b34b"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/89/2a/bkI6LN0R_o.png","large":"https://images2.imgbox.com/24/c3/9MKjvOdD_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/5dii6z","launch":"https://www.reddit.com/r/spacex/comments/5nsaqm","media":"https://www.reddit.com/r/spacex/comments/5nsico","recovery":"https://www.reddit.com/r/spacex/comments/5oe9kk"},"flickr":{"small":[],"original":["https://farm1.staticflickr.com/658/32394688795_55a9873ea7_o.jpg","https://farm1.staticflickr.com/506/32394688095_a3339f3c6d_o.jpg","https://farm1.staticflickr.com/745/32394687645_63ae2b4740_o.jpg","https://farm1.staticflickr.com/318/31548291014_e3a30abca8_o.jpg","https://farm1.staticflickr.com/670/32351549066_e9cffe8d2b_o.jpg","https://farm6.staticflickr.com/5518/31579784413_83aeac560a_o.jpg","https://farm6.staticflickr.com/5556/32312421135_22c197c156_o.jpg","https://farm1.staticflickr.com/529/32312420015_5d2403a847_o.jpg","https://farm1.staticflickr.com/435/32312417695_19c0e50c4b_o.jpg","https://farm1.staticflickr.com/735/32312416415_b90892af0a_o.jpg","https://farm1.staticflickr.com/293/32312415025_cae16d1994_o.jpg","https://farm1.staticflickr.com/738/31467130724_92e02c9524_o.jpg","https://farm1.staticflickr.com/464/31467130374_9f7a7d380e_o.jpg","https://farm1.staticflickr.com/581/31467129424_bac77d594a_o.jpg","https://farm1.staticflickr.com/380/32308163845_c1731a4b1f_o.jpg","https://farm1.staticflickr.com/447/31450835954_72ed10a19e_o.jpg","https://farm1.staticflickr.com/507/31450834974_b8a3f4aca5_o.jpg"]},"presskit":"https://drive.google.com/open?id=0BwA3a65ef1OvZC1aU3FuMlQzalE","webcast":"https://www.y

outube.com/watch?v=7WimRhydggo","youtube_id":"7WimRhydggo","article":"http
s://spaceflightnow.com/2017/01/14/spacex-resumes-flights-with-on-target-laun
ch-for-iridium/","wikipedia":"https://en.wikipedia.org/wiki/Iridium_satellit
e_constellation#Next-generation_constellation"},"static_fire_date_utc":"2017
-01-05T19:40:00.000Z","static_fire_date_unix":1483645200,"net":false,"windo
w":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"detai
ls":"Return-to-flight mission after the loss of Amos-6 in September 2016. Ir
idium NEXT will replace the original Iridium constellation, launched in the
late 1990s. Each Falcon mission will carry 10 satellites, with a goal to com
plete deployment of the 66 plus 9 spare satellite constellation by mid 2018.
The first two Iridium qualification units were supposed to ride a Dnepr rock
et in April 2016 but were delayed, so Iridium decided to qualify the first b
atch of 10 satellites instead.","crew":[],"ships":["5ea6ed2f080df4000697c91
0","5ea6ed30080df4000697c912","5ea6ed30080df4000697c915"],"capsules":[],"pay
loads":["5eb0e4c2b6c3bb0006eeb208"],"launchpad":"5e9e4502f509092b78566f8
7","flight_number":35,"name":"Iridium NEXT Mission 1","date_utc":"2017-01-14
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17/02/19/historic-launch-pad-back-in-service-with-thundering-blastoff-by-spa
cex/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-10"},"static_fir
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lures":[],"details":"First Falcon 9 flight from the historic LC-39A launchpa
d at Kennedy Space Center, carrying supplies and materials to support dozens
of science and research investigations scheduled during ISS Expeditions 50 a
nd 51. The first stage returned to launch site and landed at LZ-1.","crew":
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7a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5e
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ostar-23/","wikipedia":"https://en.wikipedia.org/wiki/EchoStar#Satellite_fle
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Star Corp. EchoStar XXIII, based on a spare platform from the cancelled CMBS
tar 1 satellite program, will provide direct-to-home television broadcast se
rvices over Brazil. There was no attempt at a first-stage recovery so this r
ocket did not have landing legs or grid fins.","crew":[],"ships":[],"capsule
s":[],"payloads":["5eb0e4c3b6c3bb0006eeb20a"],"launchpad":"5e9e4502f50909418
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s":"At 6,070 kg this was the heaviest payload launched to GTO by a Falcon 9
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mance improvements allowed the mission to be carried out by an expendable Fa
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s://spaceflightnow.com/2017/06/03/reused-dragon-cargo-capsule-launched-on-jo
urney-to-space-station/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_C

RS-11"},"static_fire_date_utc":"2017-05-28T16:00:00.000Z","static_fire_date_unix":1495987200,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission delivered the Neutron Star Interior Composition Explorer (NICER) to the ISS, along with the MUSES Earth imaging platform and ROSA solar array. For the first time, this mission launched a refurbished Dragon capsule, serial number C106 which first flew in September 2014 on the CRS-4 mission. Originally scheduled to launch on June 1, but was scrubbed due to inclement weather.","crew":[],"ships":["5ea6ed30080df4000697c912"],"capsules":["5e9e2c5bf3591880643b2669"],"payloads":["5eb0e4c4b6c3bb0006eeb20e"],"launchpad":"5e9e4502f509094188566f88","flight_number":41,"name":"CRS-11","date_utc":"2017-06-03T21:07:00.000Z","date_unix":1496524020,"date_local":"2017-06-03T17:07:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a3f3591856803b264a","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb267a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d03ffd86e000604b352"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/fa/1b/3vvXwAf9_o.png","large":"https://images2.imgbox.com/e2/f3/RZJ7ET73_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/69hhkm/bulgariasat1_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/6isph2/welcome_to_the_rspacex_bulgariasat1_official/","media":"https://www.reddit.com/r/spacex/comments/6iuj1z/rspacex_bulgariasat1_media_thread_videos_images/","recovery":"https://www.reddit.com/r/spacex/comments/6k3kop/b10292_bulgariasat_1_recovery_thread/"},"flickr":{"small":[],"original":["https://farm5.staticflickr.com/4216/35496028185_ac5456195f_o.jpg","https://farm5.staticflickr.com/4278/35496027525_9ab9d90417_o.jpg","https://farm5.staticflickr.com/4277/35496026875_fd25c46934_o.jpg","https://farm5.staticflickr.com/4257/35496026065_02fe65754b_o.jpg","https://farm5.staticflickr.com/4289/35491530485_5a4d0f39ae_o.jpg","https://farm5.staticflickr.com/4279/35491529875_1e35ee0a1e_o.jpg","https://farm5.staticflickr.com/4230/34681559323_53f05581ca_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/bulgariasat1presskit.pdf","webcast":"https://www.youtube.com/watch?v=Y8mLi-rRTh8","youtube_id":"Y8mLi-rRTh8","article":"https://en.wikipedia.org/wiki/BulgariaSat-1","wikipedia":"https://en.wikipedia.org/wiki/BulgariaSat-1"},"static_fire_date_utc":"2017-06-15T22:25:00.000Z","static_fire_date_unix":1497565500,"net":false,"window":7200,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Second time a booster will be reused: Second flight of B1029 after the Iridium mission of January 2017. The satellite will be the first commercial Bulgarian-owned communications satellite and it will provide television broadcasts and other communications services over southeast Europe.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90c","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4c4b6c3bb0006eeb20f"],"launchpad":"5e9e4502f509094188566f88","flight_number":42,"name":"BulgariaSat-1","date_utc":"2017-06-23T19:10:00.000Z","date_unix":1498245000,"date_local":"2017-06-23T15:10:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a3f359189e3a3b2645","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d04ffd86e000604b353"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/dc/51/LrdAbm5y_o.png","large":"https://images2.imgbox.com/84/18/ahmKQNIj_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/6bp4fj/","launch":"https://www.reddit.com/r/spacex/comments/6j67ti/","media":"https://www.reddit.com/r/spacex/comments/6j7va6/","recover

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-spacex-second-launch-three-days.html","wikipedia":"https://en.wikipedia.or
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eavyweight-falcon-9-mission/","wikipedia":"https://en.wikipedia.org/wiki/Int
elsat_35e"},"static_fire_date_utc":"2017-06-29T00:30:00.000Z","static_fire_d
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ding a heavy satellite (~6,000 kg) to GTO, the rocket will fly in its expend
able configuration and the first-stage booster will not be recovered.","cre
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n. The satellite has a mass of only 475 kg.","crew":[],"ships":["5ea6ed2e080df4000697c905","5ea6ed2f080df4000697c910"],"capsules":[],"payloads":["5eb0e4c4b6c3bb0006eeb213"],"launchpad":"5e9e4502f509092b78566f87","flight_number":46,"name":"FormoSat-5","date_utc":"2017-08-24T18:50:00.000Z","date_unix":1503600600,"date_local":"2017-08-24T11:50:00-07:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a4f359182d843b264e","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d08ffd86e000604b357"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/12/7c/p8btH0CD_o.png","large":"https://images2.imgbox.com/32/61/cX8ZlEJQ_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/6u6q1t/x37b_otv5_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/6ygmf1/rspacex_x37b_otv5_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/6yih4g/rspacex_x37b_otv5_media_thread_videos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["https://farm5.staticflickr.com/4411/37087809715_08a6d9904d_o.jpg","https://farm5.staticflickr.com/4384/37087808315_4dc9575d1b_o.jpg","https://farm5.staticflickr.com/4363/36251815974_8b996dbbfb_o.jpg","https://farm5.staticflickr.com/4374/36251814644_1a469f63ee_o.jpg","https://farm5.staticflickr.com/4388/36251812554_006501315f_o.jpg","https://farm5.staticflickr.com/4355/36250895284_8c24cb4232_o.jpg","https://farm5.staticflickr.com/4342/36689886890_99709e6934_o.jpg","https://farm5.staticflickr.com/4364/36689885100_c3c427c6bf_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/otv5_presskit.pdf","webcast":"https://www.youtube.com/watch?v=9M6Zvi-fFv4","youtube_id":"9M6Zvi-fFv4","article":"https://spaceflightnow.com/2017/09/07/spacex-beats-hurricane-with-smooth-launch-of-militarys-x-37b-spaceplane/","wikipedia":"https://en.wikipedia.org/wiki/Boeing_X-37"},"static_fire_date_utc":"2017-08-31T20:30:00.000Z","static_fire_date_unix":1504211400,"net":false,"window":18300,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Notable because Boeing is the primary contractor of the X-37B, which has until now been launched by ULA, a SpaceX competitor and Boeing partnership. Second flight of the Falcon 9 Block 4 upgrade.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080df4000697c90b"],"capsules":[],"payloads":["5eb0e4c5b6c3bb0006eeb214"],"launchpad":"5e9e4502f509094188566f88","flight_number":47,"name":"Boeing X-37B OTV-5","date_utc":"2017-09-07T13:50:00.000Z","date_unix":1504792200,"date_local":"2017-09-07T09:50:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a4f3591845123b264f","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb267a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d09ffd86e000604b358"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/fb/5b/LNVLRITr_o.png","large":"https://images2.imgbox.com/48/d4/MKsibD8N_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/6ygwxw/iridium_next_constellation_mission_3_launch/","launch":"https://www.reddit.com/r/spacex/comments/753e0m/iridium_next_mission_3_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/755m2z/rspacex_iridium3_media_thread_videos_images_gifs/","recovery":"https://www.reddit.com/r/spacex/comments/75z823/b10411_recovery_thread/"},"flickr":{"small":[],"original":["https://farm5.staticflickr.com/4509/37610550066_b56bc5d743_o.jpg","https://farm5.staticflickr.com/4487/37610548356_1b7d30001e_o.jpg","https://farm5.staticflickr.com/4514/37610547696_9114038d60_o.jpg","https://farm5.staticflickr.com/4483/37610547226_01d19395a3_o.jpg","https://farm5.staticflickr.com/4504/36984625383_d7707548ec_o.jpg","https://farm5.staticflickr.com/4505/36984623903_7bb6643649_o.jpg","https://farm5.staticflickr.com/4

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a_official_launch_discussion_updates/","media":"https://www.reddit.com/r/spac
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ttp://www.spacex.com/sites/spacex/files/zumapresskit.pdf","webcast":"https://
www.youtube.com/watch?v=0PWu3BRxn60","youtube_id":"0PWu3BRxn60","article":"ht
tps://spaceflightnow.com/2018/01/08/spacex-kicks-off-ambitious-2018-schedule-
with-launch-for-u-s-government/","wikipedia":"https://en.wikipedia.org/wiki/Z
uma_(satellite)"},"static_fire_date_utc":"2017-11-11T23:00:00.000Z","static_f
ire_date_unix":1510441200,"net":false,"window":7200,"rocket":"5e9d0d95eda6997
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of another customer. First-stage booster will attempt landing at LZ-1","cre
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s://farm5.staticflickr.com/4741/39128355825_7c4166dbbe_o.jpg","https://farm5.
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spacex.com/sites/spacex/files/govsat1presskit.pdf","webcast":"https://www.you
tube.com/watch?v=ScYUA51-POQ","youtube_id":"ScYUA51-POQ","article":"https://s
paceflightnow.com/2018/01/31/spacex-rocket-flies-on-60th-anniversary-of-first
-u-s-satellite-launch/","wikipedia":"https://en.wikipedia.org/wiki/List_of_SE
S_satellites#SES_Fleet"},"static_fire_date_utc":"2018-01-26T15:27:00.000Z","s
tatic_fire_date_unix":1516980420,"net":false,"window":8460,"rocket":"5e9d0d95
eda69973a809d1ec","success":true,"failures":[],"details":"Reused booster from
the classified NROL-76 mission in May 2017. Following a successful experiment
al ocean landing that used three engines, the booster unexpectedly remained i
ntact; Elon Musk stated in a tweet that SpaceX will attempt to tow the booste
r to shore.","crew":[],"ships":["5ea6ed2f080df4000697c90b"],"capsules":[],"pa
yloads":["5eb0e4c6b6c3bb0006eeb21b"],"launchpad":"5e9e4501f509094ba4566f8
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77be77c227_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/hisp
asat30w6_presskit.pdf","webcast":"https://www.youtube.com/watch?v=Kpfrp-GMKK
M","youtube_id":"Kpfrp-GMKKM","article":"https://spaceflightnow.com/2018/03/0
6/hefty-hispasat-satellite-rides-spacex-rocket-into-orbit/","wikipedia":"http
s://en.wikipedia.org/wiki/Hispasat_30W-6"},"static_fire_date_utc":"2018-02-21
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aunch/","launch":"https://www.reddit.com/r/spacex/comments/88184i/rspacex_iri
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ttps://spaceflightnow.com/2018/03/30/iridium-messaging-network-gets-another-
boost-from-spacex/","wikipedia":"https://en.wikipedia.org/wiki/Iridium_satel
lite_constellation#Next-generation_constellation"},"static_fire_date_utc":"2
018-03-25T12:23:00.000Z","static_fire_date_unix":1521980580,"net":false,"win
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ails":"Fifth Iridium NEXT mission to deploy ten Iridium NEXT satellites. Reu
sed booster from third Iridium flight, and although controlled descent was p
erformed, the booster was expended into the ocean. SpaceX planned a second r

ecovery attempt of one half of the fairing using the specially modified boat Mr. Steven. However, the fairing\'s parafoil twisted during the recovery, which led to water impact at high speed","crew":[],"ships":["5ea6ed2e080df4000697c908"],"capsules":[],"payloads":["5eb0e4c7b6c3bb0006eeb220"],"launchpad":"5e9e4502f509092b78566f87","flight_number":58,"name":"Iridium NEXT Mission 5","date_utc":"2018-03-30T14:13:51.000Z","date_unix":1522419231,"date_local":"2018-03-30T07:13:51-08:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a4f3591843103b2650","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":false,"landing_success":null,"landing_type":null,"landpad":null}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d16ffd86e000604b363"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/49/e8/6Tmdhwlq_o.png","large":"https://images2.imgbox.com/28/c4/dc3rQbGy_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/82op7a/crs14_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/88s8a7/rspacex_crs14_official_launch_discussion_updates/","media":"https://www.reddit.com/r/spacex/comments/88l52i/rspacex_crs14_media_thread_videos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["https://farm1.staticflickr.com/819/26326005987_c3aec29db5_o.jpg","https://farm1.staticflickr.com/791/40303273215_4926c917c4_o.jpg","https://farm1.staticflickr.com/867/26326007227_39e71e6775_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/crs-14presskit2018.pdf","webcast":"https://www.youtube.com/watch?v=BPQHG-LevZM","youtube_id":"BPQHG-LevZM","article":"https://spaceflightnow.com/2018/04/02/spacex-supply-ship-departs-cape-canaveral-for-space-station/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-14"},"static_fire_date_utc":"2018-03-28T15:52:00.000Z","static_fire_date_unix":1522252320,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"The launch used a refurbished booster (from CRS-12) for the 11th time, and a refurbished capsule (C110 from CRS-8) for the third time. External payloads include a materials research platform MISSE-FF phase 3 of the Robotic Refueling Mission TSIS, heliophysics sensor several crystallization experiments, and the RemoveDebris spacecraft aimed at space junk removal. The booster was expended in order to test a new landing profile.","crew":[],"ships":["5ea6ed30080df4000697c912"],"capsules":["5e9e2c5cf3591885d43b266d"],"payloads":["5eb0e4c7b6c3bb0006eeb221"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":59,"name":"CRS-14","date_utc":"2018-04-02T20:30:41.000Z","date_unix":1522701041,"date_local":"2018-04-02T16:30:41-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a4f3591884ee3b264d","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":false,"landing_success":null,"landing_type":null,"landpad":null}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d16ffd86e000604b364"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/4d/55/TQjhUrc7_o.png","large":"https://images2.imgbox.com/22/84/wfppRwXb_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/88l46q/tess_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/8cm61o/rspacex_tess_official_launch_discussion_updates/","media":"https://www.reddit.com/r/spacex/comments/8cmzop/rspacex_tess_media_thread_videos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["https://farm1.staticflickr.com/799/27684194488_0d9a703c1c_o.jpg","https://farm1.staticflickr.com/854/41512967372_0c37360126_o.jpg","https://farm1.staticflickr.com/832/41512968122_20c2e31de3_o.jpg","https://farm1.staticflickr.com/803/27684194678_c1ccd0680b_o.jpg","https://farm1.staticflickr.com/902/41512967962_74913ef5b0_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/tesspresskitfinal417.pdf","webcast":"https://www.youtube.com/watch?v=aY-0uBIYYKk","youtube_id":"aY-0uBIYYKk","article":"https://spaceflightnow.com/2018/04/19/all-sky-surveyor-launched-from-cape-canaveral-on-

the-hunt-for-exoplanets/","wikipedia":"https://en.wikipedia.org/wiki/Transit
ing_Exoplanet_Survey_Satellite"},"static_fire_date_utc":"2018-04-11T18:30:0
0.000Z","static_fire_date_unix":1523471400,"net":false,"window":30,"rocke
t":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Part o
f the Explorers program, this space telescope is intended for wide-field sea
rch of exoplanets transiting nearby stars. It is the first NASA high priorit
y science mission launched by SpaceX. It was the first time SpaceX launched
a scientific satellite not primarily intended for Earth observations. The se
cond stage placed it into a high-Earth elliptical orbit, after which the sat
ellite\'s own booster will perform complex maneuvers including a lunar flyb
y, and over the course of two months, reach a stable, 2:1 resonant orbit wit
h the Moon. In January 2018, SpaceX received NASA\'s Launch Services Program
Category 2 certification of its Falcon 9 \'Full Thrust\', certification whic
h is required for launching medium risk missions like TESS. It was the last
launch of a new Block 4 booster, and marked the 24th successful recovery of
the booster. An experimental water landing was performed in order to attempt
fairing recovery.","crew":[],"ships":["5ea6ed2e080df4000697c90a","5ea6ed2f08
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s/bangabandhupresskit51118.pdf","webcast":"https://www.youtube.com/watch?v=r
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m/2018/05/11/spacex-debuts-an-improved-human-rated-model-of-the-falcon-9-roc
ket/","wikipedia":"https://en.wikipedia.org/wiki/Bangabandhu-1"},"static_fir
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w.spacex.com/sites/spacex/files/iridium6presskit2018521.pdf","webcast":"http
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e":"https://spaceflightnow.com/2018/05/22/rideshare-launch-by-spacex-serves-
commercial-and-scientific-customers/","wikipedia":"https://en.wikipedia.org/
wiki/Gravity_Recovery_and_Climate_Experiment"},"static_fire_date_utc":"2018-
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ls":"GFZ arranged a rideshare of GRACE-FO on a Falcon 9 with Iridium followi
ng the cancellation of their Dnepr launch contract in 2015. Iridium CEO Matt
Desch disclosed in September 2017 that GRACE-FO would be launched on the six
th Iridium NEXT mission. The booster reuse turnaround was a record 4.5 month
s between flights.","crew":[],"ships":["5ea6ed2e080df4000697c908"],"capsule
s":[],"payloads":["5eb0e4c7b6c3bb0006eeb224","5eb0e4c8b6c3bb0006eeb225"],"la
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5s","article":"https://spaceflightnow.com/2018/06/04/multi-mission-telecom-c
raft-launched-by-spacex-for-ses/","wikipedia":"https://en.wikipedia.org/wik
i/SES-12"},"static_fire_date_utc":"2018-05-25T01:48:00.000Z","static_fire_da
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d1ec","success":true,"failures":[],"details":"SES-12, the replacement satell
ite for NSS-6, was successfully launched and deployed on June 4th, completin

g SpaceX\'s eleventh flight of 2018. According to SES Luxembourg, The SES-12 satellite will expand SES\xe2\x80\x99s capabilities to provide direct-to-hom e (DTH) broadcasting, VSAT, Mobility and High Throughput Satellite (HTS) dat a connectivity services in the Middle East and the Asia-Pacific region, incl uding rapidly growing markets such as India and Indonesia. [SES-12] will be co-located with SES-8","crew":[],"ships":["5ea6ed2e080df4000697c90a"],"capsu les":[],"payloads":["5eb0e4c8b6c3bb0006eeb226"],"launchpad":"5e9e4501f509094 ba4566f84","flight_number":63,"name":"SES-12","date_utc":"2018-06-04T04:45:0 0.000Z","date_unix":1528087500,"date_local":"2018-06-04T00:45:00-04:00","dat e_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a4f3591845123b2 64f","flight":2,"gridfins":false,"legs":false,"reused":true,"landing_attemp t":false,"landing_success":null,"landing_type":null,"landpad":null}],"auto_u pdate":true,"tbd":false,"launch_library_id":null,"id":"5eb87d1bffd86e000604b 368"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.co m/b3/12/t63UKas5_o.png","large":"https://images2.imgbox.com/15/3c/W0LEnrZx_ o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/8pua1 m/crs15_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/c omments/8ugo3l/rspacex_crs15_official_launch_discussion_updates","media":"ht tps://www.reddit.com/r/spacex/comments/8ujcwo/rspacex_crs15_media_thread_vid eos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["http s://farm1.staticflickr.com/836/42374725204_dae09db889_o.jpg","https://farm2. staticflickr.com/1781/41281636860_71dca92ab4_o.jpg","https://farm2.staticfli ckr.com/1829/42374725534_325e676d19_o.jpg","https://farm2.staticflickr.com/1 810/42374724974_e50b050403_o.jpg","https://farm1.staticflickr.com/843/412816 36620_437528bd1f_o.jpg","https://farm2.staticflickr.com/1790/41281637670_f6a 6a2cf6c_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/crs15p resskit.pdf","webcast":"https://www.youtube.com/watch?v=ycMagB1s8XM","youtub e_id":"ycMagB1s8XM","article":"https://spaceflightnow.com/2018/06/29/spacex-launches-ai-enabled-robot-companion-vegetation-monitor-to-space-station/","w ikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-15"},"static_fire_date_u tc":"2018-06-23T21:30:00.000Z","static_fire_date_unix":1529789400,"net":fals e,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures": [],"details":"Payload included MISSE-FF 2, ECOSTRESS, and a Latching End Eff ector. The refurbished booster featured a record 2.5 months period turnaroun d from its original launch of the TESS satellite \xe2\x80\x94 the fastest pr evious was 4.5 months. This was the last commercial flight of a Block 4 boos ter, which was expended into the Atlantic without landing legs and grid fin s.","crew":[],"ships":["5ea6ed30080df4000697c912"],"capsules":["5e9e2c5cf359 183bb73b266e"],"payloads":["5eb0e4c8b6c3bb0006eeb227"],"launchpad":"5e9e4501 f509094ba4566f84","flight_number":64,"name":"CRS-15","date_utc":"2018-06-29T 09:42:00.000Z","date_unix":1530265320,"date_local":"2018-06-29T05:42:00-04:0 0","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f35918 863d3b2655","flight":2,"gridfins":false,"legs":false,"reused":true,"landing_ attempt":false,"landing_success":null,"landing_type":null,"landpad":nul l}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d1cff d86e000604b369"},{"fairings":{"reused":false,"recovery_attempt":false,"recov ered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.co m/2b/de/2CF8Q4Bq_o.png","large":"https://images2.imgbox.com/c0/d8/Jt7Es9az_ o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/8w19y g/telstar_19v_launch_campaign_thread/","launch":"https://www.reddit.com/r/sp acex/comments/90p1a6/rspacex_telstar_19v_official_launch_discussion/","medi a":"https://www.reddit.com/r/spacex/comments/90oxrr/rspacex_telstar_19v_medi a_thread_videos_images/","recovery":null},"flickr":{"small":[],"original": ["https://farm1.staticflickr.com/856/28684550147_49802752b3_o.jpg","https:// farm1.staticflickr.com/927/28684552447_956a9744f1_o.jpg","https://farm2.stat icflickr.com/1828/29700007298_8ac5891d2c_o.jpg","https://farm1.staticflickr.

com/914/29700004918_31ed7b73ef_o.jpg","https://farm1.staticflickr.com/844/29700002748_3047e50a0a_o.jpg","https://farm2.staticflickr.com/1786/29700000688_2514cd3cbb_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/telstar19vantagepresskit.pdf","webcast":"https://www.youtube.com/watch?v=xybp6zLaGx4","youtube_id":"xybp6zLaGx4","article":"https://spaceflightnow.com/2018/07/22/spacex-delivers-for-telesat-with-successful-early-morning-launch/","wikipedia":"https://en.wikipedia.org/wiki/Telstar_19V"},"static_fire_date_utc":"2018-07-18T21:00:00.000Z","static_fire_date_unix":1531947600,"net":false,"window":7200,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SSL-manufactured communications satellite intended to be placed at 63\xc2\xb0 West over the Americas. At 7,075 kg, it became the heaviest commercial communications satellite ever launched.","crew":[],"ships":["5ea6ed2e080df4000697c90a","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90d","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4c8b6c3bb0006eeb228"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":65,"name":"Telstar 19V","date_utc":"2018-07-22T05:50:00.000Z","date_unix":1532238600,"date_local":"2018-07-22T01:50:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f359181eed3b2657","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d1effd86e000604b36a"},{"fairings":{"reused":false,"recovery_attempt":true,"recovered":false,"ships":["5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/b4/96/LRfRepkO_o.png","large":"https://images2.imgbox.com/e6/10/oZPCNx0m_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/8v4wcm/iridium_next_constellation_mission_7_launch/","launch":"https://www.reddit.com/r/spacex/comments/91i1ru/rspacex_iridium_next_7_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/91gx44/rspacex_iridium_next_constellation_mission_7/","recovery":null},"flickr":{"small":[],"original":["https://farm1.staticflickr.com/934/41868222930_0a850d30dc_o.jpg","https://farm1.staticflickr.com/852/41868222500_2ff5f6e5f9_o.jpg","https://farm1.staticflickr.com/929/28787338307_7c0cfce99a_o.jpg","https://farm1.staticflickr.com/928/28787338507_3be74590d2_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/iridium7_press_kit_7_24.pdf","webcast":"https://www.youtube.com/watch?v=vsDknmK30C0","youtube_id":"vsDknmK30C0","article":"https://spaceflightnow.com/2018/07/25/spacexs-second-launch-in-three-days-lofts-10-more-iridium-satellites/","wikipedia":"https://en.wikipedia.org/wiki/Iridium_satellite_constellation#Next-generation_constellation"},"static_fire_date_utc":"2018-07-20T21:08:00.000Z","static_fire_date_unix":1532120880,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s fourteenth flight of 2018 and seventh of eight launches in a half-a-billion-dollar contract with Iridium. Will use a Block 5 first stage, to be recovered in the Pacific Ocean. Only one mission will be left for Iridium, with 10 more satellites. First attempt to recover a Fairing with the upgraded net. Fairing recovery was not successful.","crew":[],"ships":["5ea6ed2f080df4000697c910","5ea6ed2e080df4000697c908","5ea6ed30080df4000697c912","5ea6ed30080df4000697c914"],"capsules":[],"payloads":["5eb0e4c9b6c3bb0006eeb229"],"launchpad":"5e9e4502f509092b78566f87","flight_number":66,"name":"Iridium NEXT Mission 7","date_utc":"2018-07-25T11:39:26.000Z","date_unix":1532518766,"date_local":"2018-07-25T04:39:26-07:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591809c03b2658","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d1fffd86e000604b36b"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"http

s://images2.imgbox.com/46/b2/NUQmyHR4_o.png","large":"https://images2.imgbox.com/9e/eb/uGUYOYfZ_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/91gwfg/merah_putih_telkom4_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/9539nr/rspacex_merah_putih_telkom4_official_launch/","media":"https://www.reddit.com/r/spacex/comments/94zr0b/rspacex_merah_putih_media_thread_videos_images/","recovery":null},"flickr":{"small":[],"original":["https://farm2.staticflickr.com/1798/43862495212_8fe1688c4b_o.jpg","https://farm1.staticflickr.com/935/43006330655_f1623a3fa1_o.jpg","https://farm1.staticflickr.com/938/28974313177_d16381ff5f_o.jpg","https://farm2.staticflickr.com/1780/43006334045_fb7b4a8714_o.jpg","https://farm1.staticflickr.com/929/28974335747_ffd87ff274_o.jpg","https://farm1.staticflickr.com/930/30041972208_f735b9690b_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/merahputihpresskit.pdf","webcast":"https://www.youtube.com/watch?v=FjfQNBYv2IY","youtube_id":"FjfQNBYv2IY","article":"https://spaceflightnow.com/2018/08/07/indonesian-communications-satellite-deployed-in-orbit-by-spacex/","wikipedia":"https://en.wikipedia.org/wiki/Telkom_Indonesia"},"static_fire_date_utc":"2018-08-02T15:53:00.000Z","static_fire_date_unix":1533225180,"net":false,"window":7200,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s fifteenth flight of 2018 launched the Merah Putih (also known as Telkom-4) geostationary communications satellite for Telkom Indonesia. It marked the first reuse of any Block 5 first stage; the booster B1046 had previously launched Bangabandhu-1. The stage was recovered and is expected to become the first Falcon 9 booster to fly three missions.","crew":[],"ships":["5ea6ed2f080df4000697c90d","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4c9b6c3bb0006eeb22a"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":67,"name":"Merah Putih","date_utc":"2018-08-07T05:18:00.000Z","date_unix":1533619080,"date_local":"2018-08-07T01:18:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f359182b023b2656","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d20ffd86e000604b36c"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/55/54/73EXeMfo_o.png","large":"https://images2.imgbox.com/fd/59/nv3Ih3Am_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/95cte4/telstar_18v_apstar_5c_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/9e7bmq/rspacex_telstar_18v_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/9ebkqw/rspacex_telstar_18v_media_thread_videos_images/","recovery":"https://www.reddit.com/r/spacex/comments/9erxlh/telstar_18_vantage_recovery_thread/"},"flickr":{"small":[],"original":["https://farm2.staticflickr.com/1878/43690848045_492ef182dd_o.jpg","https://farm2.staticflickr.com/1856/43881229604_6d42e838b6_o.jpg","https://farm2.staticflickr.com/1852/43881223704_93777e34af_o.jpg","https://farm2.staticflickr.com/1841/43881217094_558b7b214e_o.jpg","https://farm2.staticflickr.com/1869/43881193934_423eff8c86_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/telstar18vantagepresskit.pdf","webcast":"https://www.youtube.com/watch?v=Apw3xqwsG1U","youtube_id":"Apw3xqwsG1U","article":"https://spaceflightnow.com/2018/09/10/spacex-telesat-achieve-repeat-success-with-midnight-hour-launch/","wikipedia":"https://en.wikipedia.org/wiki/Telstar_18V"},"static_fire_date_utc":"2018-09-05T07:21:00.000Z","static_fire_date_unix":1536132060,"net":false,"window":14400,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s sixteenth flight of 2018 launched the Telstar 18v GEO communication satellite for Telesat, the second launch for the canadian company in a few months. The first stage was a new Falcon 9 V1.2 Block 5 which was successfully recovered on OCISLY.","crew":[],"ships":["5ea6ed30080

df4000697c913","5ea6ed2f080df4000697c90d","5ea6ed2f080df4000697c90b"],"capsules":[],"payloads":["5eb0e4c9b6c3bb0006eeb22b"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":68,"name":"Telstar 18V","date_utc":"2018-09-10T04:45:00.000Z","date_unix":1536554700,"date_local":"2018-09-10T00:45:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591833b13b2659","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d22ffd86e000604b36d"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/cb/41/RQIY0BjQ_o.png","large":"https://images2.imgbox.com/df/2c/DsfygPln_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/9fwj9o/saocom_1a_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/9lazvr/rspacex_saocom_1a_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/9m3ly5/rspacex_saocom_1a_media_thread_videos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["https://farm2.staticflickr.com/1940/44262177535_9582184d3f_o.jpg","https://farm2.staticflickr.com/1917/30234800687_fd94fde151_o.jpg","https://farm2.staticflickr.com/1951/30234801997_b5a65426ca_o.jpg","https://farm2.staticflickr.com/1910/44262169525_e4c6b27299_o.jpg","https://farm2.staticflickr.com/1923/44451125454_8d26929d0b_o.jpg","https://farm2.staticflickr.com/1914/44262170545_22fe55d4bb_o.jpg","https://farm2.staticflickr.com/1934/44262166295_3f84597f09_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/saocom1apresskit.pdf","webcast":"https://www.youtube.com/watch?v=vr_C6LQ7mHc","youtube_id":"vr_C6LQ7mHc","article":"https://spaceflightnow.com/2018/10/08/spacex-aces-first-rocket-landing-in-california-after-launching-argentine-satellite/","wikipedia":"https://en.wikipedia.org/wiki/SAOCOM"},"static_fire_date_utc":"2018-10-02T21:00:00.000Z","static_fire_date_unix":1538514000,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s seventeenth flight of 2018 was the first launch of the Saocom Earth observation satellite constellation of the Argentine Space Agency CONAE. The second launch of Saocom 1B will happen in 2019. This flight marked the first RTLS launch out of Vandenberg, with a landing on the concrete pad at SLC-4W, very close to the launch pad.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4c9b6c3bb0006eeb22c"],"launchpad":"5e9e4502f509092b78566f87","flight_number":69,"name":"SAOCOM 1A","date_utc":"2018-10-08T02:22:00.000Z","date_unix":1538965320,"date_local":"2018-10-07T19:22:00-07:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591809c03b2658","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb554034e7c9"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d23ffd86e000604b36e"},{"fairings":{"reused":false,"recovery_attempt":false,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/ad/40/oCtCFYfl_o.png","large":"https://images2.imgbox.com/7c/8a/j6Hu3TqR_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/9p82jt/eshail_2_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/9x9w9v/rspacex_eshail_2_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/9xaa76/rspacex_eshail_2_media_thread_videos_images_gifs/","recovery":"https://www.reddit.com/r/spacex/comments/9xmpa7/eshail_2_recovery_thread/"},"flickr":{"small":[],"original":["https://farm5.staticflickr.com/4834/32040174268_b71d703417_o.jpg","https://farm5.staticflickr.com/4810/32040174058_a65fa64e85_o.jpg","https://farm5.staticflickr.com/4814/32040173268_0ab571e7bc_o.jpg","https://farm5.staticflickr.com/4899/32040173568_bb5c991565_o.jpg","https://farm5.staticflickr.com/4875/32040173278_b5578ba6be_o.jpg","https://farm5.staticflickr.com/4862/32040173928_afdfb09939_o.jpg","https://farm

5.staticflickr.com/4888/32040173048_b2b29c020f_o.jpg","https://farm5.staticf
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zc-BqKs","article":"https://spaceflightnow.com/2018/11/15/spacex-launches-qa
tars-eshail-2-communications-satellite/","wikipedia":"https://en.wikipedia.o
rg/wiki/Es%27hailSat"},"static_fire_date_utc":"2018-11-12T18:13:00.000Z","st
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th flight of 2018 was its first for Es\'hailSat. Es\'hail-2 is a communicati
ons satellite delivering television and internet to Qatar and the surroundin
g region. It was launched into a geostationary transfer orbit from LC-39A at
Kennedy Space Center. The booster landed on OCISLY.","crew":[],"ships":["5ea
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8ac_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/ssoa_pres
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nches-swarm-of-satellites-re-flies-rocket-for-third-time/","wikipedia":"http
s://en.wikipedia.org/wiki/Spaceflight_Industries"},"static_fire_date_utc":"20
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w":1680,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"det
ails":"SpaceX\'s nineteenth flight of 2018 will fly SSO-A: SmallSat Express o
ut of Vandenberg SLC-4E for Spaceflight. SSO-A is a rideshare to sun synchron
us low earth orbit consisting of 64 individual microsatellites and cubesats.
It is also likely to be the third flight of core B1046 which previously flew
Bangabandhu-1 and Merah Putih. If this happens it will be the first time a Fa
lcon 9 has flown more than two missions. ","crew":[],"ships":["5ea6ed2f080df4
000697c910","5ea6ed30080df4000697c912","5ea6ed30080df4000697c914","5ea6ed2e08
0df4000697c908"],"capsules":[],"payloads":["5eb0e4c9b6c3bb0006eeb22e"],"launc
hpad":"5e9e4502f509092b78566f87","flight_number":71,"name":"SSO-A","date_ut
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T10:34:00-08:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5
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e,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpa
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ww.reddit.com/r/spacex/comments/9z7i4j/crs16_launch_campaign_thread/","launc
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unch_discussion_updates/","media":"https://www.reddit.com/r/spacex/comments/a
2uojp/rspacex_crs16_media_thread_videos_images_gifs/","recovery":"https://ww
w.reddit.com/r/spacex/comments/a3n3vm/crs16_emergency_recovery_thread/"},"fli
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g","https://farm5.staticflickr.com/4856/45473445134_d9384878f8_o.jpg","http
s://farm5.staticflickr.com/4840/45473446114_7d5e5d6fe2_o.jpg"]},"presskit":"h
ttps://www.spacex.com/sites/spacex/files/crs16_press_kit_12_4.pdf","webcas
t":"https://www.youtube.com/watch?v=Esh1jHT9oTA","youtube_id":"Esh1jHT9oT
A","article":"https://spaceflightnow.com/2018/12/05/spacex-falcon-9-boosts-dr
agon-cargo-ship-to-orbit-first-stage-misses-landing-target/","wikipedia":"htt
ps://en.wikipedia.org/wiki/SpaceX_CRS-16"},"static_fire_date_utc":"2018-11-30
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cket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Spac
eX\'s 16th Crew Resupply Mission on behalf of NASA, with a total of 20 contra
cted flights. This will bring essential supplies to the International Space S
tation using SpaceX\'s reusable Dragon spacecraft. The Falcon 9 will launch f
rom SLC-40 at Cape Canaveral Air Force Station. During the landing of the fir
st stage, a grid fin hydraulic pump stalled, causing the core to enter an unc
ontrolled roll, and resulting in a (succesful) water landing.","crew":[],"shi
ps":["5ea6ed2f080df4000697c90b"],"capsules":["5e9e2c5cf359185d753b266f"],"pay
loads":["5eb0e4cab6c3bb0006eeb22f"],"launchpad":"5e9e4501f509094ba4566f84","f
light_number":72,"name":"CRS-16","date_utc":"2018-12-05T18:16:00.000Z","date_
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our","upcoming":false,"cores":[{"core":"5e9e28a6f359185c603b265a","flight":
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7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d26ff
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g"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/a4516o/gps
_iii2_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comm
ents/a71wyn/rspacex_gps_iii2_official_launch_discussion/","media":"https://ww
w.reddit.com/r/spacex/comments/a73kz5/rspacex_gps_iii2_media_thread_videos_im
ages_gifs/","recovery":null},"flickr":{"small":[],"original":["https://farm5.
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kr.com/7926/45525648155_32fdab17a5_o.jpg","https://farm8.staticflickr.com/787
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c385_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/gps_iii_p
ress_kit.pdf","webcast":"https://youtu.be/yRiLPoy_Mzc","youtube_id":"yRiLPoy_
Mzc","article":"https://spaceflightnow.com/2018/12/23/spacex-closes-out-year-
with-successful-gps-satellite-launch/","wikipedia":"https://en.wikipedia.org/
wiki/GPS_Block_IIIA"},"static_fire_date_utc":"2018-12-13T21:24:00.000Z","stat
ic_fire_date_unix":1544736240,"net":false,"window":1560,"rocket":"5e9d0d95eda

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_updates_thread/"},"flickr":{"small":[],"original":["https://farm8.staticflickr.com/7800/47173936271_b8ddb5bc5b_o.jpg","https://farm8.staticflickr.com/7821/47121969172_37428a280e_o.jpg","https://farm8.staticflickr.com/7923/47173936181_c0bf7a22a6_o.jpg","https://farm8.staticflickr.com/7829/46259779115_8982c2c8c2_o.jpg","https://farm8.staticflickr.com/7889/46259778995_68130be69d_o.jpg","https://farm8.staticflickr.com/7895/47130341432_3772641a68_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/nusantara_satu_press_kit.pdf","webcast":"https://www.youtube.com/watch?v=XS0E35aYJcU","youtube_id":"XS0E35aYJcU","article":"https://spaceflightnow.com/2019/02/22/israeli-moon-lander-hitches-ride-on-spacex-launch-with-indonesian-comsat/","wikipedia":"https://en.wikipedia.org/wiki/PT_Pasifik_Satelit_Nusantara"},"static_fire_date_utc":"2019-02-18T17:03:00.000Z","static_fire_date_unix":1550509380,"net":false,"window":1920,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX will launch this rideshare to GTO for Space Systems Loral (SSL). The primary payload for this mission is Nusantara Satu, a communications satellite built by SSL for the private Indonesian company PT Pasifik Satelit Nusantara (PSN). Spaceflight Industries\' GTO-1 mission consists of two secondary payloads. One of those is Beresheet, the lunar lander built by the Israeli non-profit organization, SpaceIL. Beresheet will make its own way to the moon from GTO. The other secondary is Air Force Research Lab\'s (Space Situational Awareness) S5 mission, which hitches a ride to GEO aboard Nusantara Satu. This mission launches from SLC-40 at Cape Canaveral AFS. The booster is expected to land on OCISLY.","crew":[],"ships":["5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4cab6c3bb0006eeb232","5eb0e4cab6c3bb0006eeb233","5eb0e4cab6c3bb0006eeb234"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":75,"name":"Nusantara Satu (PSN-6) / S5 / Beresheet","date_utc":"2019-02-22T01:45:00.000Z","date_unix":1550799900,"date_local":"2019-02-21T20:45:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591809c03b2658","flight":3,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d2affd86e000604b374"},{"fairings":{"reused":null,"recovery_attempt":null,"recovered":null,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/59/a8/q5IEqsOJ_o.png","large":"https://images2.imgbox.com/ee/a6/x4AyUIc3_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/a65clm/dm1_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/av1asz/rspacex_cctcap_demo_mission_1_official_launch/","media":"https://www.reddit.com/r/spacex/comments/aw6g7j/rspacex_cctcap_demo_mission_1_media_thread_videos/","recovery":"https://www.reddit.com/r/spacex/comments/awo5lf/cctcap_demo_mission_1_official_booster_recovery/"},"flickr":{"small":[],"original":["https://farm8.staticflickr.com/7899/39684491043_f0289164bd_o.jpg","https://farm8.staticflickr.com/7804/39684490433_70337aa4e5_o.jpg","https://farm8.staticflickr.com/7826/32774791628_e2234480db_o.jpg","https://farm5.staticflickr.com/4882/39684490143_7df3838d2c_o.jpg","https://farm8.staticflickr.com/7851/46535572784_7eb295968e_o.jpg","https://farm8.staticflickr.com/7826/46535572564_a022f9c43a_o.jpg","https://farm8.staticflickr.com/7889/40294395933_f429c12e83_o.jpg","https://farm8.staticflickr.com/7914/40294395873_0a328f2d87_o.jpg","https://farm8.staticflickr.com/7866/46535572294_22499c1223_o.jpg","https://farm8.staticflickr.com/7850/46535573034_03da10f899_o.jpg","https://farm8.staticflickr.com/7848/46535572664_316c466742_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/crew_demo-1_press_kit.pdf","webcast":"https://youtu.be/2ZL0tbOZYhE","youtube_id":"2ZL0tbOZYhE","article":"https://spaceflightnow.com/2019/03/02/spacex-launches-first-crew-dragon-ferry-ship/","wikipedia":"https://en.wikipedia.org/wiki/SpX-DM1"},"static_fire_date_utc":"2019-01-24T19:03:00.000Z","static_fire_date_unix":1548356580,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failu

res":[],"details":"Demonstration Mission 1 (DM-1) will launch Dragon 2 as par
t of NASA\'s Commercial Crew Transportation Capability program. This mission
will demonstrate Dragon 2, and Falcon 9 in its configuration for crewed missi
ons. DM-1 will launch from LC-39A at Kennedy Space Center, likely carrying so
me cargo to the International Space Station. The booster is expected to land
on OCISLY.","crew":[],"ships":["5ea6ed30080df4000697c913"],"capsules":["5e9e2
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pacex.com/sites/spacex/files/arabsat-6a_press_kit.pdf","webcast":"https://you
tu.be/TXMGu2d8c8g","youtube_id":"TXMGu2d8c8g","article":"https://spaceflightn
ow.com/2019/04/11/spacexs-falcon-heavy-successful-in-commercial-debut/","wiki
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w":7020,"rocket":"5e9d0d95eda69974db09d1ed","success":true,"failures":[],"det
ails":"SpaceX will launch Arabsat 6A to a geostationary transfer orbit from S
LC-39A, KSC. The satellite is a geostationary telecommunications satellite bu
ilt by Lockheed Martin for the Saudi Arabian company Arabsat. This will be th
e first operational flight of Falcon Heavy, and also the first Block 5 Falcon
Heavy. All three cores will be new Block 5 cores. The side cores are expected
to land at LZ-1 and LZ-2, and the center core is expected to land on OCISL
Y.","crew":[],"ships":["5ea6ed2f080df4000697c90e","5ea6ed30080df4000697c91
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9e4502f509094188566f88","flight_number":77,"name":"ArabSat 6A","date_utc":"20
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d":false,"landing_attempt":true,"landing_success":true,"landing_type":"RTL

S","landpad":"5e9e3032383ecb90a834e7c8"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d2dffd86e000604b376"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/97/8e/YbVKIUZB_o.png","large":"https://images2.imgbox.com/0d/05/zH7YqLRe_o.png"},"reddit":{"campaign":"https://new.reddit.com/r/spacex/comments/bd2l28/crs17_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/bjsn0v/rspacex_crs17_official_launch_discussion_updates","media":"https://www.reddit.com/r/spacex/comments/bkc4d5/rspacex_crs17_media_thread_videos_images_gifs","recovery":"https://www.reddit.com/r/spacex/comments/bjy7p5/rspacex_crs17_recovery_discussion_updates_thread"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/46856594435_206c773b5a_o.jpg","https://live.staticflickr.com/65535/47720639872_284e49381d_o.jpg","https://live.staticflickr.com/65535/46856594755_88f1b22e50_o.jpg","https://live.staticflickr.com/65535/47720639542_1b7c1a71b0_o.jpg","https://live.staticflickr.com/65535/47720639732_e04b2a9ed7_o.jpg","https://live.staticflickr.com/65535/32829382467_087d024428_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/crs-17_press_kit.pdf","webcast":"https://youtu.be/AQFhX5TvP0M","youtube_id":"AQFhX5TvP0M","article":"https://spaceflightnow.com/2019/05/04/spacex-launches-space-station-resupply-mission-lands-rocket-on-drone-ship/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-17"},"static_fire_date_utc":"2019-04-27T07:23:00.000Z","static_fire_date_unix":1556349780,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s 17th Commercial Resupply Services mission for NASA out of a total of 20 contracted flights, this mission brings essential supplies to the International Space Station using SpaceX\'s reusable Dragon 1 spacecraft. The external payloads for this mission include Orbital Carbon Observatory 3 and Space Test Program-Houston 6. The Falcon 9 launches from SLC-40 at Cape Canaveral AFS. The booster was expected to land at LZ-1, however, due to the ongoing investigation and clean-up following the Crew Dragon testing incident, it is likely to land on OCISLY instead.\\n   ","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90e","5ea6ed2f080df4000697c90b"],"capsules":["5e9e2c5cf3591869b63b2670"],"payloads":["5eb0e4cbb6c3bb0006eeb237"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":78,"name":"CRS-17","date_utc":"2019-05-04T06:48:00.000Z","date_unix":1556952480,"date_local":"2019-05-04T02:48:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f3591809313b2660","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d2effd86e000604b377"},{"fairings":{"reused":false,"recovery_attempt":true,"recovered":true,"ships":["5ea6ed2f080df4000697c90c"]},"links":{"patch":{"small":"https://images2.imgbox.com/79/ec/TOE2PBJq_o.png","large":"https://images2.imgbox.com/39/aa/5of7buxK_o.png"},"reddit":{"campaign":"https://www.reddit.com/comments/bjybrl","launch":"https://www.reddit.com/r/spacex/comments/brfbic/rspacex_starlink_official_launch_discussion","media":"https://www.reddit.com/r/spacex/comments/bp0479/rspacex_starlink_media_thread_videos_images_gifs","recovery":"https://www.reddit.com/r/spacex/comments/bsaljm/rspacex_starlink_b10493_recovery_discussion_and"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/47926143711_4a0b2680bf_o.jpg","https://live.staticflickr.com/65535/47926136902_d8ce35223d_o.jpg","https://live.staticflickr.com/65535/47926144123_2a828b66d5_o.jpg","https://live.staticflickr.com/65535/47926137127_ef58152b6b_o.jpg","https://live.staticflickr.com/65535/47926137017_e6d86fa820_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/starlink_press_kit.pdf","webcast":"https://www.youtube.com/watch?v=riBaVeDTEWI","youtube_id":"riBaVeDTEWI","article":"https://spaceflightnow.com/2019/05/24/spacexs-first-60-starlink-broadband-satellites-deployed-in-orbit","wikipedia":"https://en.wikipedia.org/wiki/Starlink_(satellite_constellation)"},"static_fire_date_

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s":[],"details":"SpaceX will launch dozens of Starlink demonstration satellit
es from SLC-40, Cape Canaveral AFS. Starlink is a low Earth orbit broadband i
nternet constellation developed and owned by SpaceX which will eventually con
sist of nearly 12 000 satellites and will provide low latency internet servic
e to ground terminals around the world. Two prototype satellites, Microsats 2
a and 2b, were launched from Vandenberg AFB in February 2018. The booster for
this mission will land on OCISLY.","crew":[],"ships":["5ea6ed30080df4000697c9
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8","article":"https://spaceflightnow.com/2019/06/12/three-canadian-radar-surv
eillance-satellites-ride-spacex-rocket-into-orbit/","wikipedia":"https://en.w
ikipedia.org/wiki/RADARSAT_Constellation"},"static_fire_date_utc":"2019-06-08
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to Sun Synchronous orbit from SLC-4E, VAFB. The RCM spacecraft are synthetic
aperture radar (SAR) Earth observation satellites built by the Canadian space
company, MDA, for the Canadian Space Agency. This mission was delayed when th
e originally slated booster failed to land after CRS-16. The booster is expec
ted to return to LZ-4.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e
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s://spaceflightnow.com/2019/07/25/new-docking-port-spacesuit-and-supplies-en-
route-to-space-station/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CR
S-18"},"static_fire_date_utc":"2019-07-19T15:31:00.000Z","static_fire_date_un
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ccess":true,"failures":[],"details":"SpaceX\'s 18th Commercial Resupply Servi
ces mission out of a total of 20 such contracted flights for NASA, this launc
h will deliver essential supplies to the International Space Station using th
e reusable Dragon 1 cargo spacecraft. The external payload for this mission i
s International Docking Adapter 3, replacing IDA-1 lost in SpaceX\'s CRS-7 la
unch failure. This mission will launch from S
LC-40 at Cape Canaveral AFS on a Falcon 9, and the first-stage booster is ex
pected to land back at CCAFS LZ-1.","crew":[],"ships":[],"capsules":["5e9e2c
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0-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7
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ttps://live.staticflickr.com/65535/48478269442_08479bed36_o.jpg"]},"presski
t":"https://www.spacex.com/sites/spacex/files/amos-17_mission_press_kit_8_6_
2019.pdf","webcast":"https://youtu.be/fZh82-WcCuo","youtube_id":"fZh82-WcCu
o","article":"https://spaceflightnow.com/2019/08/07/spacex-launches-israeli-
owned-telecom-satellite/","wikipedia":"https://en.wikipedia.org/wiki/Spaceco
m"},"static_fire_date_utc":"2019-08-01T00:00:00.000Z","static_fire_date_uni
x":1564617600,"net":false,"window":5280,"rocket":"5e9d0d95eda69973a809d1e
c","success":true,"failures":[],"details":"SpaceX will launch Boeing built A
mos-17, a geostationary communications satellite for Israeli company Spaceco
m. The satellite will be delivered to GTO from KSC LC-39A or possibly CCAFS
SLC-40, and will replace the defunct Amos-5 at 17\xc2\xb0 E. Amos-17 carries
multi-band high throughput and regional beams servicing Africa, Europe and t
he Middle East. The cost of this launch is covered for Spacecom by SpaceX cr
edit following the Amos-6 incident. A recovery of the booster for this missi
on is not expected.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed2e
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om/r/spacex/comments/du1duu/starlink1_booster_and_fairing_recovery_discussio
n"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49
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Q","article":"https://spaceflightnow.com/2019/11/11/successful-launch-contin
ues-deployment-of-spacexs-starlink-network","wikipedia":"https://en.wikipedi
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w":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"detai
ls":"This mission will launch the first batch of Starlink version 1.0 satell
ites, from SLC-40, Cape Canaveral AFS. They are expected to contribute to th
e 550 km x 53\xc2\xb0 shell. It is the second Starlink launch overall. Starl
ink is a low Earth orbit broadband internet constellation developed and owne
d by SpaceX which will eventually consist of nearly 12 000 satellites and wi
ll provide low latency internet service to ground terminals around the worl
d. The booster for this mission is expected to land on OCISLY.","crew":[],"s
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019/12/05/dragon-soars-on-research-and-resupply-flight-to-international-spac
e-station","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-19"},"stati
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e,"failures":[],"details":"SpaceX\'s 19th Crew Resupply Mission on behalf of
NASA with a total of 20 contracted flights, this mission brings essential su
pplies to the International Space Station using SpaceX\'s reusable Dragon sp
acecraft. The external payloads for this mission include the Hyperspectral I
mager Suite and a lithium-ion battery. Falcon 9 and Dragon will launch from
SLC-40, Cape Canaveral AFS. The mission will be complete with return and rec
overy of the Dragon capsule and down cargo.","crew":[],"ships":["5ea6ed2f080
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ess_kit.pdf","webcast":"https://youtu.be/sbXgZg9JmkI","youtube_id":"sbXgZg9J
mkI","article":"https://spaceflightnow.com/2019/12/17/startup-launches-broad
band-satellite-on-spacex-rocket-to-connect-pacific-islands","wikipedia":"htt
ps://en.wikipedia.org/wiki/JSAT_(satellite_constellation)"},"static_fire_dat
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alse,"window":5280,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failu
res":[],"details":"SpaceX will launch the Boeing built dual payload satellit
e to geostationary transfer orbit from XXXX. JCSat 18 is a mobile broadband
communications payload built for Sky Perfect JSAT Corporation of Japan and w
ill service Asia Pacific. Kacific 1 is a high throughput broadband internet
payload built for Kacific Broadband Satellites and will service certain high
demand areas of Southeast Asia and the Pacific. Both payloads share a single
chassis. The booster for this mission is expected to land on OCISLY.","cre
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eb0e4cfb6c3bb0006eeb24e"],"launchpad":"5e9e4501f509094ba4566f84","flight_num
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234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb
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h":"https://www.reddit.com/r/spacex/comments/eko0hr/rspacex_starlink_2_official_launch_discussion","media":"https://www.reddit.com/r/spacex/comments/ekybzb/rspacex_starlink2_media_thread_videos_images_gifs","recovery":"https://www.reddit.com/r/spacex/comments/elgp5k/rspacex_starlink_l2_recovery_discussion_updates"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49346907238_b27507e4d9_o.jpg","https://live.staticflickr.com/65535/49347368761_f4e45bd38a_o.jpg","https://live.staticflickr.com/65535/49347368406_8f9acf1e2a_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/starlink_press_kit_jan2020.pdf","webcast":"https://youtu.be/HwyXo6T7jC4","youtube_id":"HwyXo6T7jC4","article":"https://spaceflightnow.com/2020/01/07/spacex-launches-more-starlink-satellites-tests-design-change-for-astronomers","wikipedia":"https://en.wikipedia.org/wiki/Starlink_(satellite_constellation)"},"static_fire_date_utc":"2020-01-04T11:45:00.000Z","static_fire_date_unix":1578138300,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the second batch of Starlink version 1.0 satellites, from SLC-40, Cape Canaveral AFS. They are expected to contribute to the 550 km x 53\xc2\xb0 shell. It is the third Starlink launch overall. Starlink is a low Earth orbit broadband internet constellation developed and owned by SpaceX which will eventually consist of nearly 12 000 satellites and will provide low latency internet service to ground terminals around the world. The booster for this mission is expected to land on OCISLY.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed30080df4000697c913","5ea6ed2e080df4000697c909","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90d"],"capsules":[],"payloads":["5eb0e4cfb6c3bb0006eeb24f"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":87,"name":"Starlink-2","date_utc":"2020-01-07T02:19:00.000Z","date_unix":1578363540,"date_local":"2020-01-06T21:19:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591833b13b2659","flight":4,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d3cffd86e000604b380"},{"fairings":{"reused":null,"recovery_attempt":null,"recovered":null,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/c0/9d/SJYvC4hT_o.png","large":"https://images2.imgbox.com/19/df/IH0nVnSr_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/ek7eny/in_flight_abort_test_launch_campaign_thread","launch":"https://www.reddit.com/r/spacex/comments/eq24ap/rspacex_inflight_abort_test_official_launch","media":"https://www.reddit.com/r/spacex/comments/eq7pg4/rspacex_inflight_abort_test_media_thread_videos/","recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49421605028_b7ba890f0e_o.jpg","https://live.staticflickr.com/65535/49422067976_cda2b8f021_o.jpg","https://live.staticflickr.com/65535/49422067876_13ed519fe6_o.jpg","https://live.staticflickr.com/65535/49421604803_0093a5d2cb_o.jpg","https://live.staticflickr.com/65535/49422294602_0d5e7d8e82_o.jpg","https://live.staticflickr.com/65535/49422068111_2ed613b19b_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/in-flight_abort_test_press_kit.pdf","webcast":"https://youtu.be/mhrkdHshb3E","youtube_id":"mhrkdHshb3E","article":"https://spaceflightnow.com/2020/01/19/spacex-aces-final-major-test-before-first-crew-mission","wikipedia":"https://en.wikipedia.org/wiki/Commercial_Crew_Development"},"static_fire_date_utc":"2020-01-11T09:42:00.000Z","static_fire_date_unix":1578735720,"net":false,"window":14400,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX will launch a Crew Dragon capsule from LC-39A, KSC on a fully fueled Falcon 9 rocket and then trigger the launch escape system during the period of maximum dynamic pressure. As part of NASA\'a Commercial Crew Integrated Capability program (CCiCap) this test will contribute valuable data to help validate Crew Dragon and its launch abort system. The Crew Dragon will be recove

red by GO Searcher after splashdown in the Atlantic Ocean. This flight does not go to orbit. The booster and upper stage are expected to break up following capsule separation and there will be no landing attempt.","crew":[],"ships":["5ea6ed2f080df4000697c90c"],"capsules":["5e9e2c5df359184c9a3b2672"],"payloads":["5eb0e4d0b6c3bb0006eeb250"],"launchpad":"5e9e4502f509094188566f88","flight_number":88,"name":"Crew Dragon In Flight Abort Test","date_utc":"2020-01-19T14:00:00.000Z","date_unix":1579442400,"date_local":"2020-01-19T09:00:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f359182b023b2656","flight":4,"gridfins":false,"legs":false,"reused":true,"landing_attempt":false,"landing_success":null,"landing_type":null,"landpad":null}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d3dffd86e000604b381"},{"fairings":{"reused":false,"recovery_attempt":true,"recovered":true,"ships":["5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/3a/c6/ueu9Acdh_o.png","large":"https://images2.imgbox.com/1c/55/xNcIOR8Z_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/eof5pr/starlink3_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/eudve3/rspacex_starlink_3_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/evjdws/rspacex_starlink3_media_thread_videos_images_gifs/","recovery":"https://www.reddit.com/r/spacex/comments/evnyij/rspacex_starlink3_recovery_discussion_updates/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49461673512_f4e01c8b27_o.jpg","https://live.staticflickr.com/65535/49461673792_b1804c2a2b_o.jpg","https://live.staticflickr.com/65535/49461673707_cb7fc4a3a8_o.jpg","https://live.staticflickr.com/65535/49461673552_65cc294f82_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/starlink_press_kit_jan272020.pdf","webcast":"https://youtu.be/1KmBDCiL7MU","youtube_id":"1KmBDCiL7MU","article":"https://spaceflightnow.com/2020/01/29/spacex-boosts-60-more-starlink-satellites-into-orbit-after-weather-delays/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_Starlink"},"static_fire_date_utc":"2020-01-20T13:17:00.000Z","static_fire_date_unix":1579526220,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the third batch of Starlink version 1.0 satellites, from SLC-40, Cape Canaveral AFS. It is the fourth Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude of 550 km. The booster for this mission is expected to land on OCISLY.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed2e080df4000697c907","5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90d"],"capsules":[],"payloads":["5eb0e4d0b6c3bb0006eeb251"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":89,"name":"Starlink-3","date_utc":"2020-01-29T14:06:00.000Z","date_unix":1580306760,"date_local":"2020-01-29T09:06:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a6f35918c0803b265c","flight":3,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d3fffd86e000604b382"},{"fairings":{"reused":false,"recovery_attempt":true,"recovered":false,"ships":["5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/4f/07/GJWgTmKM_o.png","large":"https://images2.imgbox.com/90/7c/MlD6s04z_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/ex0ilm/starlink4_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/f4d8sg/rspacex_starlink4_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/f56mb4/rspacex_starlink4_media_thread_videos_images_gifs/","recovery":"https://www.reddit.com/r/spacex/comments/f5es7j/rspacex_starlink4_recovery_discussion_updates/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49549022017_18738a2552_o.jpg","https://live.staticf

lickr.com/65535/49548795221_edd6dc7ef6_o.jpg","https://live.staticflickr.com/65535/49548795401_93ef80caf5_o.jpg","https://live.staticflickr.com/65535/49549022057_d4dbd6a492_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/fifth_starlink_press_kit.pdf","webcast":"https://youtu.be/8xeX62mLcf8","youtube_id":"8xeX62mLcf8","article":"https://spaceflightnow.com/2020/02/17/spacex-delivers-more-starlink-satellites-to-orbit-booster-misses-drone-ship-landing/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_Starlink"},"static_fire_date_utc":"2020-02-14T08:31:00.000Z","static_fire_date_unix":1581669060,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the fourth batch of Starlink version 1.0 satellites, from SLC-40, Cape Canaveral AFS. It is the fifth Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude of 550 km. The booster for this mission is expected to land on OCISLY.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed2e080df4000697c907","5ea6ed2f080df4000697c90b","5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90d"],"capsules":[],"payloads":["5eb0e4d0b6c3bb0006eeb252"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":90,"name":"Starlink-4","date_utc":"2020-02-17T15:05:55.000Z","date_unix":1581951955,"date_local":"2020-02-17T10:05:55-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f3591809313b2660","flight":4,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":false,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d41ffd86e000604b383"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/9b/93/k1hCBIG8_o.png","large":"https://images2.imgbox.com/dd/50/KsiuGQL4_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/ezn6n0/crs20_launch_campaign_thread","launch":"https://www.reddit.com/r/spacex/comments/fe8pcj/rspacex_crs20_official_launch_discussion_updates/","media":"https://www.reddit.com/r/spacex/comments/fes64p/rspacex_crs20_media_thread_videos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49635401403_96f9c322dc_o.jpg","https://live.staticflickr.com/65535/49636202657_e81210a3ca_o.jpg","https://live.staticflickr.com/65535/49636202572_8831c5a917_o.jpg","https://live.staticflickr.com/65535/49635401423_e0bef3e82f_o.jpg","https://live.staticflickr.com/65535/49635985086_660be7062f_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/crs-20_mission_press_kit.pdf","webcast":"https://youtu.be/1MkcWK2PnsU","youtube_id":"1MkcWK2PnsU","article":"https://spaceflightnow.com/2020/03/07/late-night-launch-of-spacex-cargo-ship-marks-end-of-an-era/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-20"},"static_fire_date_utc":"2020-03-01T10:20:00.000Z","static_fire_date_unix":1583058000,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s 20th and final Crew Resupply Mission under the original NASA CRS contract, this mission brings essential supplies to the International Space Station using SpaceX\'s reusable Dragon spacecraft. It is the last scheduled flight of a Dragon 1 capsule. (CRS-21 and up under the new Commercial Resupply Services 2 contract will use Dragon 2.) The external payload for this mission is the Bartolomeo ISS external payload hosting platform. Falcon 9 and Dragon will launch from SLC-40, Cape Canaveral Air Force Station and the booster will land at LZ-1. The mission will be complete with return and recovery of the Dragon capsule and down cargo.","crew":[],"ships":[],"capsules":["5e9e2c5cf359185d753b266f"],"payloads":["5eb0e4d0b6c3bb0006eeb253"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":91,"name":"CRS-20","date_utc":"2020-03-07T04:50:31.000Z","date_unix":1583556631,"date_local":"2020-03-06T23:50:31-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f359187afd3b2662","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":tr

ue,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb267a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d42ffd86e000604b384"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":false,"ships":["5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/dc/14/DLlaYbmf_o.png","large":"https://images2.imgbox.com/e4/fd/2NPlCwzs_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/f8awv0/starlink5_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/fhymy3/rspacex_starlink_5_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/fizrn1/rspacex_starlink5_media_thread_videos_images_gifs/","recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49673373182_93a517e140_o.jpg","https://live.staticflickr.com/65535/49672551378_fabc17ef6f_o.jpg","https://live.staticflickr.com/65535/49672551303_564ce21658_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/sixth_starlink_press_kit.pdf","webcast":"https://youtu.be/I4sMhHbHYXM","youtube_id":"I4sMhHbHYXM","article":"https://spaceflightnow.com/2020/03/18/falcon-9-rocket-overcomes-engine-failure-to-deploy-starlink-satellites/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2020-03-13T18:37:00.000Z","static_fire_date_unix":1584124620,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"The sixth Starlink launch overall and the fifth operational batch of Starlink satellites will launch into orbit aboard a Falcon 9 rocket. This mission is expected to deploy all sixty satellites into an elliptical orbit about fifteen minutes into flight. In the weeks following launch the satellites are expected to utilize their onboard ion thrusters to raise their orbits to 550 km in three groups of 20, making use of precession rates to separate themselves in to three planes. The booster will land on a drone ship approximately 628 km downrange.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90d"],"capsules":[],"payloads":["5eb0e4d0b6c3bb0006eeb254"],"launchpad":"5e9e4502f509094188566f88","flight_number":92,"name":"Starlink-5","date_utc":"2020-03-18T12:16:00.000Z","date_unix":1584533760,"date_local":"2020-03-18T08:16:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591809c03b2658","flight":5,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":false,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d43ffd86e000604b385"},{"fairings":{"reused":true,"recovery_attempt":false,"recovered":null,"ships":["5ea6ed2e080df4000697c908","5ea6ed2f080df4000697c90d"]},"links":{"patch":{"small":"https://images2.imgbox.com/ef/36/h10Ds3kT_o.png","large":"https://images2.imgbox.com/ab/12/2cQPNTCZ_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/fxkc7k/starlink6_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/g5jmx0/rspacex_starlink_6_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/g5fqka/rspacex_starlink6_media_thread_photographer/","recovery":"https://www.reddit.com/r/spacex/comments/g6kztd/rspacex_starlink_v1_l6_recovery_discussion/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49673373182_93a517e140_o.jpg","https://live.staticflickr.com/65535/49672551378_fabc17ef6f_o.jpg","https://live.staticflickr.com/65535/49672551303_564ce21658_o.jpg","https://live.staticflickr.com/65535/49806771628_fef13c852d_o.jpg","https://live.staticflickr.com/65535/49807633862_e5abcb41a6_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/seventh_starlink_mission_overview.pdf","webcast":"https://youtu.be/wSge0I7pwFI","youtube_id":"wSge0I7pwFI","article":"https://spaceflightnow.com/2020/04/22/spacexs-starlink-network-surpasses-400-satellite-mark-after-successful-launch/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2020-04-17T11:48:00.000Z","static_fire_date_unix":1587687810,"net":false,"window":0,"rocket":"5e9d0d95eda6997

3a809d1ec","success":true,"failures":[],"details":"This mission will launch the sixth batch of operational Starlink satellites, which are expected to be version 1.0, from SLC-40, Cape Canaveral AFS. It is the seventh Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude of 550 km. The booster for this mission is expected to land on OCISLY.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2e080df4000697c908","5ea6ed2e080df4000697c907","5ee68c683c228f36bd5809b5"],"capsules":[],"payloads":["5eb0e4d1b6c3bb0006eeb255"],"launchpad":"5e9e4502f509094188566f88","flight_number":93,"name":"Starlink-6","date_utc":"2020-04-22T19:30:00.000Z","date_unix":1587583800,"date_local":"2020-04-22T15:30:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a6f35918c0803b265c","flight":4,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d44ffd86e000604b386"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/48/a8/LTqq8OrE_o.png","large":"https://images2.imgbox.com/e3/b7/DeT7QTkx_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/fjf6rr/dm2_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/glwz6n/rspacex_cctcap_demonstration_mission_2_general","media":"https://www.reddit.com/r/spacex/comments/gp1gf5/rspacex_dm2_media_thread_photographer_contest/","recovery":"https://www.reddit.com/r/spacex/comments/gu5gkd/cctcap_demonstration_mission_2_stage_1_recovery/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49927519643_b43c6d4c44_o.jpg","https://live.staticflickr.com/65535/49927519588_8a39a3994f_o.jpg","https://live.staticflickr.com/65535/49928343022_6fb33cbd9c_o.jpg","https://live.staticflickr.com/65535/49934168858_cacb00d790_o.jpg","https://live.staticflickr.com/65535/49934682271_fd6a31becc_o.jpg","https://live.staticflickr.com/65535/49956109906_f88d815772_o.jpg","https://live.staticflickr.com/65535/49956109706_cffa847208_o.jpg","https://live.staticflickr.com/65535/49956109671_859b323ede_o.jpg","https://live.staticflickr.com/65535/49955609618_4cca01d581_o.jpg","https://live.staticflickr.com/65535/49956396622_975c116b71_o.jpg","https://live.staticflickr.com/65535/49955609378_9b77e5c771_o.jpg","https://live.staticflickr.com/65535/49956396262_ef41c1d9b0_o.jpg"]},"presskit":"https://www.nasa.gov/sites/default/files/atoms/files/commercialcrew_press_kit.pdf","webcast":"https://youtu.be/xY96v0OIcK4","youtube_id":"xY96v0OIcK4","article":"https://spaceflightnow.com/2020/05/30/nasa-astronauts-launch-from-us-soil-for-first-time-in-nine-years/","wikipedia":"https://en.wikipedia.org/wiki/Crew_Dragon_Demo-2"},"static_fire_date_utc":"2020-05-22T17:39:00.000Z","static_fire_date_unix":1590169140,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX will launch the second demonstration mission of its Crew Dragon vehicle as part of NASA\'s Commercial Crew Transportation Capability Program (CCtCap), carrying two NASA astronauts to the International Space Station. Barring unexpected developments, this mission will be the first crewed flight to launch from the United States since the end of the Space Shuttle program in 2011. DM-2 demonstrates the Falcon 9 and Crew Dragon\'s ability to safely transport crew to the space station and back to Earth and it is the last major milestone for certification of Crew Dragon. Initially the mission duration was planned to be no longer than two weeks, however NASA has been considering an extension to as much as six weeks or three months. The astronauts have been undergoing additional training for the possible longer mission.","crew":["5ebf1a6e23a9a60006e03a7a","5ebf1b7323a9a60006e03a7b"],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90c","5ea6ed2e080df4000697c909","5ea6ed2f080df4000697c90d"],"capsules":["5e9e2c5df359188aba3b2676"],"payloads":["5eb0e4d1b6c3bb0006eeb257"],"launchpad":"5e9e4502f509094188566f88","flight_number":94,"nam

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se-10-years-after-first-falcon-9-launch/","wikipedia":"https://en.wikipedia.o
rg/wiki/Starlink"},"static_fire_date_utc":"2020-05-13T11:11:00.000Z","static_
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809d1ec","success":true,"failures":[],"details":"This mission will launch the
seventh batch of operational Starlink satellites, which are expected to be ve
rsion 1.0, from SLC-40, Cape Canaveral AFS. It is the eighth Starlink launch
overall. The satellites will be delivered to low Earth orbit and will spend a
few weeks maneuvering to their operational altitude of 550 km. The booster fo
r this mission is expected to land on JRTI on its first mission since arrivin
g at Port Canaveral.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed2e
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rue,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_updat
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tellite-deployments-continue-with-successful-falcon-9-launch/","wikipedia":"h
ttps://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":null,"static_f
ire_date_unix":null,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1e
c","success":true,"failures":[],"details":"This mission will launch the eight
h batch of operational Starlink satellites, which are expected to be version
1.0, from SLC-40, Cape Canaveral AFS. It is the ninth Starlink launch overal
l. The satellites will be delivered to low Earth orbit and will spend a few w
eeks maneuvering to their operational altitude of 550 km. This mission is inc

ludes rideshare payloads, SkySats 16-18, on top of the Starlink stack. The bo
oster for this mission is expected to land an ASDS.","crew":[],"ships":["5ea6
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om/2020/06/30/spacex-launches-its-first-mission-for-u-s-space-force/","wikipe
dia":"https://en.wikipedia.org/wiki/GPS_Block_III"},"static_fire_date_utc":"2
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ow":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"detai
ls":"SpaceX will launch GPS Block III Space Vehicle 03 from SLC-40, Cape Cana
veral AFS aboard a Falcon 9. GPS III is owned and operated by the US Air Forc
e and produced by Lockheed Martin. This is the third GPS III satellite and th
e second launched by SpaceX. The satellite will be delivered into a MEO trans
fer orbit. The booster for this mission is expected to land on an ASDS.","cre
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Coast in 60 years. The launch azimuth will be southward and the booster will land at LZ-1.","crew":[],"ships":["5ea6ed2e080df4000697c907"],"capsules":[],"payloads":["5eb0e4d1b6c3bb0006eeb259"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":101,"name":"SAOCOM 1B, GNOMES-1, Tyvak-0172","date_utc":"2020-08-30T23:18:00.000Z","date_unix":1598829480,"date_local":"2020-08-30T19:18:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f359187afd3b2662","flight":4,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb267a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb87d47ffd86e000604b38a"},{"fairings":{"reused":null,"recovery_attempt":true,"recovered":null,"ships":["5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/38/09/yStzn5Er_o.png","large":"https://images2.imgbox.com/83/11/smudwRMI_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/i63bst/starlink_general_discussion_and_deployment_thread/","launch":"https://www.reddit.com/r/spacex/comments/iip8h3/rspacex_starlink11_launch_discussion_updates/","media":"https://www.reddit.com/r/spacex/comments/ij8mxf/rspacex_starlink11_saocom_1b_media_thread/","recovery":null},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://youtu.be/_j4xR7LMCGY","youtube_id":"_j4xR7LMCGY","article":null,"wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":null,"static_fire_date_unix":null,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the eleventh batch of operational Starlink satellites, which are expected to be version 1.0, from SLC-40, Cape Canaveral Air Force Station. It is the twelfth Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude of 550 km. The booster for this mission is expected to land on an ASDS.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed2f080df4000697c90b","5ee68c683c228f36bd5809b5"],"capsules":[],"payloads":["5ef6a4600059c33cee4a829e"],"launchpad":"5e9e4502f509094188566f88","flight_number":102,"name":"Starlink-11 (v1.0)","date_utc":"2020-09-03T12:46:00.000Z","date_unix":1599137160,"date_local":"2020-09-03T08:46:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5ef670f10059c33cee4a826c","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5ef6a1e90059c33cee4a828a"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":true,"ships":["5ea6ed2e080df4000697c907","5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/3b/c3/kd7H9FTQ_o.png","large":"https://images2.imgbox.com/79/1f/hBdiixIW_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/i63bst/starlink_general_discussion_and_deployment_thread/","launch":"https://www.reddit.com/r/spacex/comments/iu0vtg/rspacex_starlink12_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/iudifm/rspacex_starlink12_media_thread_photographer/","recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/50428228397_6151927733_o.jpg","https://live.staticflickr.com/65535/50427359318_67b3397892_o.jpg","https://live.staticflickr.com/65535/50428050591_36defbe958_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/UZkaE_9zwQQ","youtube_id":"UZkaE_9zwQQ","article":null,"wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":null,"static_fire_date_unix":null,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the twelfth batch of operational Starlink satellites, which are expected to be version 1.0, from SLC-40, Cape Canaveral Air Force Station. It is the thirteenth Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude of 550 km. The booster for this mission

is expected to land on an ASDS.","crew":[],"ships":["5ea6ed2f080df4000697c90
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b"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":null,"ship
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mages2.imgbox.com/42/26/UbDMepRy_o.png"},"reddit":{"campaign":"https://www.re
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arlink13_official_launch_discussion/","media":"https://www.reddit.com/r/space
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8/spacex-launches-another-batch-of-starlink-satellites/","wikipedia":"http
s://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2020-10-17T05:2
3:00.000Z","static_fire_date_unix":1602912180,"net":false,"window":null,"rock
et":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This m
ission will launch the thirteenth batch of operational Starlink satellites, w
hich are expected to be version 1.0, from LC-39A, Kennedy Space Center. It is
the fourteenth Starlink launch overall. The satellites will be delivered to l
ow Earth orbit and will spend a few weeks maneuvering to their operational al
titude of 550 km. The booster for this mission is expected to land on an ASD
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nch_library_id":null,"id":"5ef6a2bf0059c33cee4a828c"},{"fairings":{"reused":f
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907","5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.
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h_discussion/","media":"https://www.reddit.com/r/spacex/comments/jhcwun/rspac
ex_starlink14_media_thread_photographer/","recovery":null},"flickr":{"small":
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cex-adds-another-60-satellites-to-starlink-network/","wikipedia":"https://en.
wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2020-10-21T12:55:00.000

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ill launch the fourteenth batch of operational Starlink satellites, which are
expected to be version 1.0, from SLC-40, Kennedy Space Center. It is the fift
eenth Starlink launch overall. The satellites will be delivered to low Earth
orbit and will spend a few weeks maneuvering to their operational altitude of
550 km. The booster for this mission is expected to land on JRTI.","crew":
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now.com/2020/11/06/spacex-launches-gps-navigation-satellite-from-cape-canaver
al/","wikipedia":"https://en.wikipedia.org/wiki/GPS_Block_III"},"static_fire_
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ilures":[],"details":"SpaceX will launch GPS Block III Space Vehicle 04 from
SLC-40, Cape Canaveral AFS aboard a Falcon 9. GPS III is owned and operated b
y the US Air Force and produced by Lockheed Martin. This will be the fourth G
PS III satellite launched and the third launched by SpaceX. The satellite wil
l be delivered into a MEO transfer orbit. The booster for this mission will l
and on an ASDS.","crew":[],"ships":["5ea6ed30080df4000697c913","5ee68c683c228
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6,"name":"GPS III SV04 (Sacagawea)","date_utc":"2020-11-05T23:24:00.000Z","da
te_unix":1604618640,"date_local":"2020-11-05T18:24:00-05:00","date_precisio
n":"hour","upcoming":false,"cores":[{"core":"5f57c5440622a633027900a0","fligh
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ng_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7c
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ch-for-commercial-spaceflight/","wikipedia":"https://en.wikipedia.org/wiki/Sp
aceX_Crew-1"},"static_fire_date_utc":"2020-11-11T16:17:00.000Z","static_fire_
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ec","success":true,"failures":[],"details":"SpaceX will launch the first oper
ational mission of its Crew Dragon vehicle as part of NASA\'s Commercial Crew
Transportation Capability Program (CCtCap), carrying 3 NASA astronauts and 1
JAXA astronaut to the International Space Station. This mission will be the s
econd crewed flight to launch from the United States since the end of the Spa
ce Shuttle program in 2011.","crew":["5f7f1543bf32c864a529b23e","5f7f158bbf32
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h_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/jxsch
e/rspacex_sentinel6_official_launch_discussion/","media":"https://www.reddi
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nal-satellite-launches-to-extend-measurements-of-sea-level-rise/","wikipedi
a":"https://en.wikipedia.org/wiki/Copernicus_Sentinel-6"},"static_fire_date_
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se,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failure
s":[],"details":"SpaceX will launch Sentinel-6 Michael Freilich into low Ear
th orbit for NASA, NOAA, ESA, and the European Organization for the Exploita

tion of Meteorological Satellites aboard a Falcon 9 from SLC-4E, Vandenberg Air Force Station. Sentinel-6(A) is an ocean observation satellite providing radar ocean surface altimetry data and also atmospheric temperature profiles as a secondary mission. The booster for this mission is will land at LZ-4.","crew":[],"ships":[],"capsules":[],"payloads":["5ed9867c1f30554030d45c40"],"launchpad":"5e9e4502f509092b78566f87","flight_number":108,"name":"Sentinel-6 Michael Freilich","date_utc":"2020-11-21T17:17:00.000Z","date_unix":1605979020,"date_local":"2020-11-21T09:17:00-08:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5f57c54a0622a633027900a1","flight":1,"gridfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb554034e7c9"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5ed983aa1f30554030d45c31"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":null,"ships":["5ea6ed2e080df4000697c907"]},"links":{"patch":{"small":"https://images2.imgbox.com/54/00/2OgoVFlS_o.png","large":"https://images2.imgbox.com/4a/e7/h403ivFa_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/jhu37i/starlink_general_discussion_and_deployment_thread/","launch":"https://www.reddit.com/r/spacex/comments/jxyodz/rspacex_starlink15_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/k0mom0/starlink15_media_thread_photographer_contest/","recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/50644831893_bb40b60827_o.jpg","https://live.staticflickr.com/65535/50645580736_44af27257f_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/J442-ti-Dhg","youtube_id":"J442-ti-Dhg","article":"https://spaceflightnow.com/2020/11/25/spacex-launches-60-more-starlink-satellites-on-100th-falcon-9-flight/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2020-11-21T16:31:00.000Z","static_fire_date_unix":1605976260,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the fifteenth batch of operational Starlink satellites, which are version 1.0, from SLC-40, Cape Canaveral Air Force Station. It will be the sixteenth Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude of 550 km. The booster for this mission is expected to land on an ASDS.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90c","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90d","5ea6ed2e080df4000697c907"],"capsules":[],"payloads":["5fb95c263a88ae63c9546044"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":109,"name":"Starlink-15 (v1.0)","date_utc":"2020-11-25T02:13:00.000Z","date_unix":1606270380,"date_local":"2020-11-24T21:13:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591833b13b2659","flight":7,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5fb95b3f3a88ae63c954603c"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/a2/a0/cHJWyFCo_o.png","large":"https://images2.imgbox.com/dd/53/W10Rog1y_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/jw8bfe/crs21_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/k6my16/rspacex_crs21_official_launch_discussion_updates/","media":null,"recovery":"https://www.reddit.com/r/spacex/comments/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/50689254612_db8bc87d2c_o.jpg","https://live.staticflickr.com/65535/50689254712_98ef758c81_o.jpg","https://live.staticflickr.com/65535/50689254512_bb44826694_o.jpg","https://live.staticflickr.com/65535/50689254642_ba6b08d142_o.jpg","https://live.staticflickr.com/65535/50689254552_1d9f91a963_o.jpg"]},"presskit":"https://www.nasa.gov/sites/default/files/atoms/files/spacex_crs-21_mision_overview_high_res.pdf","webcast":"https://yout

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ow.com/2020/12/06/spacex-launches-first-in-new-line-of-upgraded-space-statio
n-cargo-ships/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-2
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c","success":true,"failures":[],"details":"SpaceX\'s 21st ISS resupply missi
on on behalf of NASA and the first under the CRS-2 contract, this mission br
ings essential supplies to the International Space Station using the cargo v
ariant of SpaceX\'s Dragon 2 spacecraft. The external payload for this missi
on is the Nanoracks Bishop Airlock. Falcon 9 and Dragon launch from LC-39A,
Kennedy Space Center and the booster is expected to land on an ASDS. The mis
sion will be complete with return and recovery of the Dragon capsule and dow
n cargo.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df400069
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ceflightnow.com/2020/12/13/siriusxm-satellite-rides-spacex-rocket-into-orbi
t/","wikipedia":"https://en.wikipedia.org/wiki/Sirius_XM#Satellites"},"stati
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rue,"failures":[],"details":"SpaceX will launch the first of two next genera
tion high power S-band broadcast satellites for SiriusXM. The spacecraft wil
l be delivered into a geostationary transfer orbit and the booster will be r
ecovered downrange. The spacecraft is built by Space Systems Loral (SSL) on
the SSL 1300 platform and includes two solar arrays producing 20kW, and an u
nfurlable antenna dish. SXM-7 will replace XM-3 in geostationary orbit.","cr
ew":[],"ships":["5ea6ed2f080df4000697c910","5ee68c683c228f36bd5809b5","5ea6e
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ue,"reused":true,"landing_attempt":true,"landing_success":true,"landing_typ
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t-landing-after-launching-60-more-starlink-satellites/","wikipedia":"http
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ch are version 1.0, from LC-39A. It is the eighteenth Starlink launch overal
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weeks maneuvering to their operational altitude. The booster is expected to
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ikipedia.org/wiki/SpaceX_Crew-2"},"static_fire_date_utc":"2021-04-17T11:01:0
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hes the second operational mission of its Crew Dragon vehicle as part of NASA
\'s Commercial Crew Program, carrying NASA astronauts Shane Kimbrough, Megan
McArthur, Thomas Pesquet, and Akihiko Hoshide to the International Space Stat
ion. The Falcon 9 and Crew Dragon lift off from LC-39A, Kennedy Space Center.
Both the booster and the capsule have flown previously, each a first for a co
mmercial crew flight. The booster for this mission is expected to land on an
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4/29/spacex-launches-60-more-starlink-spacecraft-fcc-clears-spacex-to-fly-satellites-at-lower-altitudes/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":null,"static_fire_date_unix":null,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission launches the 24th batch of operational Starlink satellites, which are version 1.0, from LC-39A or SLC-40. It is the 25th Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude. The booster is expected to land on an ASDS.","crew":[],"ships":["5ea6ed2f080df4000697c910","5ea6ed2f080df4000697c90d","5ee68c683c228f36bd5809b5","6059166413f40e27e8af34b6"],"capsules":[],"payloads":["605b4be3aa5433645e37d046"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":124,"name":"Starlink-24 (v1.0)","date_utc":"2021-04-29T03:44:00.000Z","date_unix":1619667840,"date_local":"2021-04-28T23:44:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5ef670f10059c33cee4a826c","flight":7,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_update":true,"tbd":false,"launch_library_id":"fbd23c86-89d0-4d3f-b5fb-5d7165d05cca","id":"605b4b6aaa5433645e37d03f"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":true,"ships":["6059166413f40e27e8af34b6"]},"links":{"patch":{"small":"https://images2.imgbox.com/33/03/aHKx9cu1_o.png","large":"https://images2.imgbox.com/8e/e0/wOt6ZecV_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/jhu37i/starlink_general_discussion_and_deployment_thread/","launch":"https://www.reddit.com/r/spacex/comments/n3z0aa/rspacex_starlink25_launch_discussion_updates/","media":null,"recovery":"https://www.reddit.com/r/spacex/comments/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://youtu.be/xpl_JnG7rcg","youtube_id":"xpl_JnG7rcg","article":null,"wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2021-05-03T05:00:00.000Z","static_fire_date_unix":1620018000,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission launches the 25th batch of operational Starlink satellites, which are version 1.0, from LC-39A. It is the 26th Starlink launch overall. The satellites will be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude. The booster is expected to land on OCISLY.","crew":[],"ships":["608c1a06cf7f3d6152666ad4","5ea6ed30080df4000697c913","6059166413f40e27e8af34b6"],"capsules":[],"payloads":["605b4befaa5433645e37d047"],"launchpad":"5e9e4502f509094188566f88","flight_number":125,"name":"Starlink-25 (v1.0)","date_utc":"2021-05-04T19:01:00.000Z","date_unix":1620154860,"date_local":"2021-05-04T15:01:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591833b13b2659","flight":9,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":"1ecc82c0-c5c8-41f0-aa58-b50a3b839ae0","id":"605b4b7daa5433645e37d040"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":true,"ships":["6059166413f40e27e8af34b6"]},"links":{"patch":{"small":"https://images2.imgbox.com/ad/eb/pq1vQuoW_o.png","large":"https://images2.imgbox.com/97/83/Y1Qj9iUC_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/jhu37i/starlink_general_discussion_and_deployment_thread/","launch":"https://www.reddit.com/r/spacex/comments/n7ju15/rspacex_starlink27_launch_discussion_updates/","media":null,"recovery":"https://www.reddit.com/r/spacex/comments/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"original":[]},"presskit":null,"webcast":"https://youtu.be/J71s2KmkSrc","youtube_id":"J71s2KmkSrc","article":null,"wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":null,"static_fire_date_unix":null,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":tru

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l Starlink satellites, which are version 1.0, from SLC-40. It is the 27th Sta
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will spend a few weeks maneuvering to their operational altitude. The booster
is expected to land on an ASDS.","crew":[],"ships":["5ea6ed30080df4000697c91
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will spend a few weeks maneuvering to their operational altitude. The booster
is expected to land on an ASDS.","crew":[],"ships":["5ea6ed30080df4000697c91
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pedia.org/wiki/Sirius_XM#Satellites"},"static_fire_date_utc":"2021-06-03T06:3
2:00.000Z","static_fire_date_unix":1622701920,"net":false,"window":5940,"rock
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launches the second of two next generation satellites for SiriusXM from SLC-4
0, Cape Canaveral Space Force Station. The spacecraft will be delivered into
a sub-synchronous geostationary transfer orbit and will replace XM-4 in geost
ationary orbit. The booster for this mission will land on an ASDS.","crew":
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0df4000697c90b","5ea6ed2e080df4000697c909"],"capsules":[],"payloads":["5fe3b5
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uccess":true,"failures":[],"details":"SpaceX\'s fourth GPS III launch will us
e the first stage from the previous GPS mission. This will be the first time
a National Security Space Launch has flown on a flight proven booster. Falcon
9 will launch from SLC-40, Cape Canaveral and the booster will land downrange
on a drone ship. GPS III is the third generation of the U.S. Space Force\'s N
AVSTAR Global Positioning System satellites, developed by Lockheed Martin. Th
e GPS III constellation will feature a cross-linked command and control archi
tecture, allowing the entire GPS constellation to be updated simultaneously f
rom a single ground station. A new spot beam capability for enhanced military
coverage and increased resistance to hostile jamming will be incorporate
d.","crew":[],"ships":["60c8c7a45d4819007ea69871","5ee68c683c228f36bd5809b

5","5ea6ed2f080df4000697c910"],"capsules":[],"payloads":["5eb0e4d2b6c3bb0006eeb261"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":131,"name":"GPS III SV05","date_utc":"2021-06-17T16:09:00.000Z","date_unix":1623946140,"date_local":"2021-06-17T12:09:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5f57c5440622a633027900a0","flight":2,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_update":true,"tbd":false,"launch_library_id":"110c808a-a091-47ab-8532-4fa058c1de7a","id":"5eb87d4effd86e000604b390"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":true,"ships":["60c8c7a45d4819007ea69871"]},"links":{"patch":{"small":"https://images2.imgbox.com/a9/3e/L2EqHznO_o.png","large":"https://images2.imgbox.com/96/8c/4HOqLFoZ_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/nz7rai/transporter2_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/o9ki7u/rspacex_transporter2_launch_discussion_and/","media":null,"recovery":"https://www.reddit.com/r/spacex/comments/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/51283430951_a9e5a41141_o.jpg","https://live.staticflickr.com/65535/51283430936_3852120bbe_o.jpg","https://live.staticflickr.com/65535/51283604493_d1a088b7c9_o.jpg","https://live.staticflickr.com/65535/51284454795_591717faee_o.jpg","https://live.staticflickr.com/65535/51284454810_9fdd0e8db4_o.jpg","https://live.staticflickr.com/65535/51283604443_6d92fe1231_o.jpg","https://live.staticflickr.com/65535/51283604428_b24ebf1b5f_o.jpg","https://live.staticflickr.com/65535/51283604438_7202e2a388_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/sSiuW1HcGjA","youtube_id":"sSiuW1HcGjA","article":null,"wikipedia":null},"static_fire_date_utc":"2021-06-22T15:24:00.000Z","static_fire_date_unix":1624375440,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"Falcon 9 launches to sun-synchronous polar orbit from Florida as part of SpaceX\'s Rideshare program dedicated to smallsat customers. The mission lifts off from SLC-40, Cape Canaveral on a southward azimuth and performs a dogleg maneuver. The booster for this mission is expected to return to LZ-1 based on FCC communications filings. This rideshare takes approximately 90 satellites and hosted payloads into orbit on a variety of deployers including three free-flying spacecraft which dispense their customers\' satellites after separation from the SpaceX stack.","crew":[],"ships":["60c8c7a45d4819007ea69871"],"capsules":[],"payloads":["608ac397eb3e50044e3630e7"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":132,"name":"Transporter-2","date_utc":"2021-06-30T19:31:00.000Z","date_unix":1625081460,"date_local":"2021-06-30T15:31:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5ef670f10059c33cee4a826c","flight":8,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"RTLS","landpad":"5e9e3032383ecb267a34e7c7"}],"auto_update":true,"tbd":false,"launch_library_id":"5d248abe-17ef-43ce-9c04-aef33af40520","id":"600f9b6d8f798e2a4d5f979f"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/23/8a/eyj3lHJk_o.png","large":"https://images2.imgbox.com/fd/60/g7jacgTb_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/p67i27/crs23_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/pcj0ao/rspacex_crs23_launch_docking_discussion_updates/","media":null,"recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/51411435986_82d7088b61_o.jpg","https://live.staticflickr.com/65535/51411702583_fe67991413_o.jpg","https://live.staticflickr.com/65535/51411702573_de10cdbc06_o.jpg","https://live.staticflickr.com/65535/51411435116_ac7b3cc3d1_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/x-KiDqxAMU0","youtube_id":"x-KiDqxAMU0","article":null,"wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-23"},"static_fire_date_utc":"2021-08-26T02:49:00.000Z","static_fire_date_unix":1629946140,"net":false,"window":0,"rocket":"5e9d0d95eda69973a8

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ission on behalf of NASA, this mission brings essential supplies to the Inter
national Space Station using the cargo variant of SpaceX\'s Dragon 2 spacecra
ft. Cargo includes several science experiments. The booster for this mission
is expected to land on an ASDS. The mission will be complete with return and
recovery of the Dragon capsule and down cargo.","crew":[],"ships":["5ea6ed2d0
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aceflightnow.com/2021/09/14/spacex-launches-first-full-batch-of-laser-equippe
d-starlink-satellites/","wikipedia":"https://en.wikipedia.org/wiki/Starlin
k"},"static_fire_date_utc":"2021-09-02T17:29:00.000Z","static_fire_date_uni
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com/r/spacex/comments/po651k/rspacex_inspiration4_launch_discussion_update
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c","success":true,"failures":[],"details":"Inspiration4 is the world\xe2\x80
\x99s first all-civilian mission to space. The mission will be commanded by J
ared Isaacman, the 37-year-old founder and Chief Executive Officer of Shift4
Payments and an accomplished pilot and adventurer. Inspiration4 will leave Ea
rth from Kennedy Space Center\xe2\x80\x99s historic Launch Complex 39A, the e
mbarkation point for Apollo and Space Shuttle missions, and travel across a l
ow earth orbit on a multi-day journey that will continually eclipse more than
90% of the earth\xe2\x80\x99s population. Named in recognition of the four-pe

rson crew that will raise awareness a
nd funds for St. Jude Children\xe2\x80\x99s Research Hospital, this mileston
e represents a new era for human spaceflight and exploration.","crew":["607a
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Crew Program, carrying four astronauts to the International Space Station, i
ncluding 1 international partner This mission will fly on a new capsule and
a once used booster. The booster will land downrange on a drone ship. The Cr
ew-2 mission returns from the space station in November.","crew":["5fe3c587b
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19/spacex-two-for-two-in-companys-first-falcon-9-launch-doubleheader/","wiki
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irbus Defense and Space\'s facilities in Toulouse, France, will soon be sent
to the Cape Canaveral Space Launch Station located in Florida, United State
s. The satellite will be launched into space onboard the Falcon 9 rocket fol
lowing pre-launch preparations. With an estimated in-orbit lifetime of 30 ye
ars and the aim of securing Turkey\xe2\x80\x99s orbital and frequency right
s, T\xc3\xbcrksat 5B will be launched into an orbital slot at 42 degrees Eas
t. With 12 kW power, T\xc3\xbcrksat 5B will provide TV broadcasting and data
communication services over a wide coverage area that reaches the entire Mid
dle East, the Persian Gulf, the Red Sea, the Mediterranean, North Africa, Ea
st Africa, South Africa and Nigeria. Apart from that, the satellite will als
o provide customized services for airlines and commercial ship operators aro
und the world thanks to the fact that it operates in Ka-Band.","crew":[],"sh
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SS resupply mission on behalf of NASA, this mission brings essential supplie
s to the International Space Station using the cargo variant of SpaceX\'s Dr
agon 2 spacecraft. Cargo includes several science experiments. The booster f
or this mission is expected to land on an ASDS. The mission will be complete
with return and recovery of the Dragon capsule and down cargo.","crew":[],"s
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You should see the response contains massive information about SpaceX launches. Next, let's try to discover some more relevant information for this project.

Task 1: Request and parse the SpaceX launch data using the GET request

To make the requested JSON results more consistent, we will use the following static response object for this project:

In [ ]:
```
static_json_url='https://cf-courses-data.s3.us.cloud-object-storage.appdomai
```

We should see that the request was successfull with the 200 status response code

In [ ]:
```
response.status_code
```

Out[ ]:
```
200
```

Now we decode the response content as a Json using `.json()` and turn it into a Pandas dataframe using `.json_normalize()`

In [ ]:
```
response = requests.get(static_json_url)
print(response.status_code)
```

```
200
```

In [ ]:
```
data = pd.json_normalize(response.json())
data.head()
```

Out[ ]:

	static_fire_date_utc	static_fire_date_unix	tbd	net	window	rc
0	2006-03-17T00:00:00.000Z	1.142554e+09	False	False	0.0	5e9d0d95eda69955f709
1	None	NaN	False	False	0.0	5e9d0d95eda69955f709
2	None	NaN	False	False	0.0	5e9d0d95eda69955f709
3	2008-09-20T00:00:00.000Z	1.221869e+09	False	False	0.0	5e9d0d95eda69955f709
4	None	NaN	False	False	0.0	5e9d0d95eda69955f709

	static_fire_date_utc	static_fire_date_unix	tbd	net	window	rc

You will notice that a lot of the data are IDs. For example the rocket column has no information about the rocket just an identification number.

We will now use the API again to get information about the launches using the IDs given for each launch. Specifically we will be using columns `rocket`, `payloads`, `launchpad`, and `cores`.

In [ ]:
```
# Lets take a subset of our dataframe keeping only the features we want and
data = data[['rocket', 'payloads', 'launchpad', 'cores', 'flight_number', 'c

# We will remove rows with multiple cores because those are falcon rockets w
data = data[data['cores'].map(len) == 1]
data = data[data['payloads'].map(len) == 1]

# Since payloads and cores are lists of size 1 we will also extract the sing
data['cores'] = data['cores'].map(lambda x : x[0])
data['payloads'] = data['payloads'].map(lambda x : x[0])

# We also want to convert the date_utc to a datetime datatype and then extra
data['date'] = pd.to_datetime(data['date_utc']).dt.date

# Using the date we will restrict the dates of the launches
data = data[data['date'] <= datetime.date(2020, 11, 13)]
```

- From the `rocket` we would like to learn the booster name
- From the `payload` we would like to learn the mass of the payload and the orbit that it is going to
- From the `launchpad` we would like to know the name of the launch site being used, the longitude, and the latitude.
- **From `cores` we would like to learn the outcome of the landing, the type of the landing, number of flights with that core, whether gridfins were used, whether the core is reused, whether legs were used, the landing pad used, the block of the core which is a number used to seperate version of cores, the number of times this specific core has been reused, and the serial of the core.**

The data from these requests will be stored in lists and will be used to create a new dataframe.

In [ ]:
```
#Global variables
BoosterVersion = []
PayloadMass = []
```

```
Orbit = []
LaunchSite = []
Outcome = []
Flights = []
GridFins = []
Reused = []
Legs = []
LandingPad = []
Block = []
ReusedCount = []
Serial = []
Longitude = []
Latitude = []
```

These functions will apply the outputs globally to the above variables. Let's take a looks at `BoosterVersion` variable. Before we apply `getBoosterVersion` the list is empty:

In [ ]:
```
BoosterVersion
```

Out[ ]:
```
[]
```

Now, let's apply `getBoosterVersion` function method to get the booster version

In [ ]:
```
getBoosterVersion(data)
```

In [ ]:
```
BoosterVersion[0:5]
```

Out[ ]:
```
['Falcon 1', 'Falcon 1', 'Falcon 1', 'Falcon 1', 'Falcon 9']
```

we can apply the rest of the functions here:

In [ ]:
```
# Call getLaunchSite
getLaunchSite(data)
```

In [ ]:
```
# Call getPayloadData
getPayloadData(data)
```

In [ ]:
```
# Call getCoreData
getCoreData(data)
```

In [ ]:
```
launch_dict = {'FlightNumber': list(data['flight_number']),
'Date': list(data['date']),
'BoosterVersion':BoosterVersion,
'PayloadMass':PayloadMass,
'Orbit':Orbit,
'LaunchSite':LaunchSite,
'Outcome':Outcome,
'Flights':Flights,
'GridFins':GridFins,
'Reused':Reused,
'Legs':Legs,
'LandingPad':LandingPad,
'Block':Block,
```

```
'ReusedCount':ReusedCount,
'Serial':Serial,
'Longitude': Longitude,
'Latitude': Latitude}
```

In [ ]:
```
falcon_data = pd.DataFrame(launch_dict)
```

In [ ]:
```
falcon_data.head()
```

Out[ ]:

	FlightNumber	Date	BoosterVersion	PayloadMass	Orbit	LaunchSite	Outcome	Fligl
0	1	2006-03-24	Falcon 1	20.0	LEO	Kwajalein Atoll	None None	
1	2	2007-03-21	Falcon 1	NaN	LEO	Kwajalein Atoll	None None	
2	4	2008-09-28	Falcon 1	165.0	LEO	Kwajalein Atoll	None None	
3	5	2009-07-13	Falcon 1	200.0	LEO	Kwajalein Atoll	None None	
4	6	2010-06-04	Falcon 9	NaN	LEO	CCSFS SLC 40	None None	

Task 2: Filter the dataframe to only include `Falcon 9` launches

Finally we will remove the Falcon 1 launches keeping only the Falcon 9 launches. Filter the data dataframe using the `BoosterVersion` column to only keep the Falcon 9 launches. Save the filtered data to a new dataframe called `data_falcon9`.

In [ ]:
```
data_falcon9 = falcon_data[falcon_data['BoosterVersion'] != 'Falcon 1']
data_falcon9.head()
```

Out[ ]:

	FlightNumber	Date	BoosterVersion	PayloadMass	Orbit	LaunchSite	Outcome	Fligl
4	6	2010-06-04	Falcon 9	NaN	LEO	CCSFS SLC 40	None None	
5	8	2012-05-22	Falcon 9	525.0	LEO	CCSFS SLC 40	None None	
6	10	2013-03-01	Falcon 9	677.0	ISS	CCSFS SLC 40	None None	
7	11	2013-09-29	Falcon 9	500.0	PO	VAFB SLC 4E	False Ocean	
8	12	2013-12-03	Falcon 9	3170.0	GTO	CCSFS SLC 40	None None	

Now that we have removed some values we should reset the FlgihtNumber column

In [ ]:
```
data_falcon9.loc[:,'FlightNumber'] = list(range(1, data_falcon9.shape[0] + 1
data_falcon9
```

Out[ ]:

	FlightNumber	Date	BoosterVersion	PayloadMass	Orbit	LaunchSite	Outcome	Flig
4	1	2010-06-04	Falcon 9	NaN	LEO	CCSFS SLC 40	None None	
5	2	2012-05-22	Falcon 9	525.0	LEO	CCSFS SLC 40	None None	
6	3	2013-03-01	Falcon 9	677.0	ISS	CCSFS SLC 40	None None	
7	4	2013-09-29	Falcon 9	500.0	PO	VAFB SLC 4E	False Ocean	
8	5	2013-12-03	Falcon 9	3170.0	GTO	CCSFS SLC 40	None None	
...	...	...	...	...	...	...	...	
89	86	2020-09-03	Falcon 9	15600.0	VLEO	KSC LC 39A	True ASDS	
90	87	2020-10-06	Falcon 9	15600.0	VLEO	KSC LC 39A	True ASDS	
91	88	2020-10-18	Falcon 9	15600.0	VLEO	KSC LC 39A	True ASDS	
92	89	2020-10-24	Falcon 9	15600.0	VLEO	CCSFS SLC 40	True ASDS	
93	90	2020-11-05	Falcon 9	3681.0	MEO	CCSFS SLC 40	True ASDS	

90 rows × 17 columns

Data Wrangling

We can see below that some of the rows are missing values in our dataset.

In [ ]:
```
data_falcon9.isnull().sum()
```

Out[ ]:
```
FlightNumber       0
Date               0
BoosterVersion     0
PayloadMass        5
Orbit              0
LaunchSite         0
Outcome            0
Flights            0
GridFins           0
Reused             0
Legs               0
LandingPad        26
Block              0
ReusedCount        0
Serial             0
Longitude          0
Latitude           0
dtype: int64
```

Before we can continue we must deal with these missing values. The `LandingPad` column will retain None values to represent when landing pads were not used.

Task 3: Dealing with Missing Values

Calculate below the mean for the `PayloadMass` using the `.mean()`. Then use the mean and the `.replace()` function to replace `np.nan` values in the data with the mean you calculated.

In [ ]:
```
# Calculate the mean value of PayloadMass column
mean = data_falcon9['PayloadMass'].mean()
# Replace the np.nan values with its mean value
data_falcon9['PayloadMass'].replace(np.nan, mean, inplace=True)
```

You should see the number of missing values of the `PayLoadMass` change to zero.

Now we should have no missing values in our dataset except for in `LandingPad`.

We can now export it to a **CSV** for the next section,but to make the answers consistent, in the next lab we will provide data in a pre-selected date range.

In [ ]:
```
data_falcon9.to_csv('dataset_part_1.csv', index=False)
```