Untitled

April 27, 2024

[1]:
```
import requests
import pandas as pd
import numpy as np
import datetime

pd.set_option('display.max_columns',None)
pd.set_option('display.max_colwidth', None)
```

[6]:
```
def getBoosterVersion(data):
    for x in data['rocket']:
       if x:
        response = requests.get("https://api.spacexdata.com/v4/rockets/
 ↪"+str(x)).json()
        BoosterVersion.append(response['name'])
```

[7]:
```
def getPayloadData(data):
    for load in data['payloads']:
        if load:
            response=requests.get("https://api.spacexdata.com/v4/payloads/
 ↪"+load).json()
        PayloadMass.append(response['mass_kg'])
        Orbit.append(response['orbit'])
```

[8]:
```
def getCoreData(data):
    for core in data['cores']:
            if core['core'] != None:
                response = requests.get("https://api.spacexdata.com/v4/cores/
 ↪"+core['core']).json()
                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['landing_type']))
```

```
            Flights.append(core['flight'])
            GridFins.append(core['gridfins'])
            Reused.append(core['reused'])
            Legs.append(core['legs'])
            LandingPad.append(core['landpad'])
```

[9]:
```
spacex_url="https://api.spacexdata.com/v4/launches/past"
```

[12]:
```
import requests
```

[13]:
```
response=requests.get(spacex_url)
```

[14]:
```
print(response.content)
```

```
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rules, and the primary payload owner\'s contractual right to decline a second
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improved 13-tonne to LEO capacity. Following second-stage separation from the
first stage, an attempt was made to perform an ocean touchdown test of the
discarded booster vehicle. The test provided good test data on the experiment-
its primary objective-but as the booster neared the ocean, aerodynamic forces
caused an uncontrollable roll. The center engine, depleted of fuel by
centrifugal force, shut down resulting in the impact and destruction of the vehi
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rbit/","wikipedia":"https://en.wikipedia.org/wiki/Thaicom_6"},"static_fire_date_
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ils":"Second GTO launch for Falcon 9. The USAF evaluated launch data from this
flight as part of a separate certification 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 the stage 2 second burnoff\\"","crew":[],"ship
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g second-stage separation, SpaceX conducted a second controlled-descent test of
the discarded booster vehicle and achieved the first successful controlled ocean
touchdown of a liquid-rocket-engine orbital booster. Following touchdown the
first stage tipped over as expected and was destroyed. This was the first Falcon
9 booster to fly with extensible landing legs and the first Dragon mission with
the Falcon 9 v1.1 launch vehicle.","crew":[],"ships":["5ea6ed2d080df4000697c902"

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s":"Total payload mass was 1,316 kg (2,901 lb) : 6 satellites weighing 172 kg
each, plus two 142-kg mass simulators. This was the second Falcon 9 booster
equipped with landing legs. Following second-stage separation, SpaceX conducted
a controlled-descent test of the first stage, which successfully decelerated
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 and was not r
ecovered.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4bcb6c3bb0006eeb
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://spacenews.com/41497spacex-launches-first-of-two-satellites-for-asiasat/","wik
ipedia":"https://en.wikipedia.org/wiki/AsiaSat_8"},"static_fire_date_utc":"2014-
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//en.wikipedia.org/wiki/AsiaSat_6"},"static_fire_date_utc":"2014-08-22T23:51:18.
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w1Y","article":"https://www.nasa.gov/press/2014/september/nasa-cargo-launches-
to-space-station-aboard-spacex-resupply-mission-0","wikipedia":"https://en.wikip
edia.org/wiki/SpaceX_CRS-4"},"static_fire_date_utc":"2014-09-17T00:00:00.000Z","

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,"article":"https://spaceflightnow.com/2015/01/10/dragon-successfully-launched-
rocket-recovery-demo-crash-lands/","wikipedia":"https://en.wikipedia.org/wiki/Sp
aceX_CRS-5"},"static_fire_date_utc":"2014-12-19T00:00:00.000Z","static_fire_date
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ccess":true,"failures":[],"details":"Following 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-called the autonomous spaceport drone ship. Many of
the test objectives were achieved, including precision control of the rocket\'s
descent to land on the platform 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 more precise reentry positioning. The grid fin control system
ran out of hydraulic fluid a minute before landing and the landing itself
resulted in a crash.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080
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ckr.com/8603/16673054016_472fb42a20_o.jpg"]},"presskit":"http://www.spacex.com/p
ress/2015/02/11/dscovr-launch-update","webcast":"https://www.youtube.com/watch?v
=OvHJSIKPOHg","youtube_id":"OvHJSIKPOHg","article":"https://spaceflightnow.com/2
015/02/12/space-weather-observatory-blasts-off-after-17-year-wait/","wikipedia":
"https://en.wikipedia.org/wiki/Deep_Space_Climate_Observatory"},"static_fire_dat
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tails":"First launch under USAF\'s OSP 3 launch contract. First SpaceX launch to
put a satellite to an orbit with an orbital altitude many times the distance to
the Moon: Sun-Earth libration point L1. The first stage made a test flight
descent to an over-ocean landing within 10 m (33 ft) of its intended target.","c
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launches-satellites-video.html","wikipedia":"https://en.wikipedia.org/wiki/ABS-3
A"},"static_fire_date_utc":"2015-02-25T19:10:00.000Z","static_fire_date_unix":14
24891400,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":tr
ue,"failures":[],"details":"The launch was Boeing\'s first-ever conjoined launch
of a lighter-weight dual-commsat stack that was specifically designed to take
advantage of the lower-cost SpaceX Falcon 9 launch vehicle. Per satellite,
launch costs were less than $30 million. The ABS satellite reached its final

destination ahead of schedule and started operations on September 10.","crew":[]
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70624462_2efc977fee_o.jpg","https://farm8.staticflickr.com/7611/17171659711_4259
7fefed_o.jpg","https://farm9.staticflickr.com/8774/17170624412_7091dbd04a_o.jpg"
]},"presskit":"https://www.nasa.gov/sites/default/files/files/SpaceX_NASA_CRS-6_
PressKit.pdf","webcast":"https://www.youtube.com/watch?v=csVpa25iqH0","youtube_i
d":"csVpa25iqH0","article":"https://spaceflightnow.com/2015/04/14/falcon-9-succe
ssfully-launches-descends-to-off-balance-landing/","wikipedia":"https://en.wikip
edia.org/wiki/SpaceX_CRS-6"},"static_fire_date_utc":"2015-04-11T00:00:00.000Z","
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973a809d1ec","success":true,"failures":[],"details":"Following the first-stage
boost, SpaceX attempted a controlled-descent test of the first stage. The first
stage contacted the ship, but soon tipped over due to excess lateral velocity
caused by a stuck throttle valve resulting in a later-than-intended downthrottle
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aunchpad":"5e9e4501f509094ba4566f84","flight_number":22,"name":"CRS-6","date_utc
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x.com/a6/9b/IzWT1pYC_o.png","large":"https://images2.imgbox.com/a1/dc/grsyEfA5_o
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m9.staticflickr.com/8739/17140415959_38b5ee8bc6_o.jpg","https://farm8.staticflic
kr.com/7735/16704192574_e3a0a6fac2_o.jpg"]},"presskit":"http://www.spacex.com/si
tes/spacex/files/spacexthalesfactsheet_final.pdf","webcast":"https://www.youtube

.com/watch?v=nBwAYT_ogj4","youtube_id":"nBwAYT_ogj4","article":"https://spacefli
ghtnow.com/2015/04/28/falcon-9-rocket-powers-into-space-with-satellite-for-turkm
enistan/","wikipedia":"https://en.wikipedia.org/wiki/T%C3%BCrkmen%C3%84lem_52%C2
%B0E_/_MonacoSAT"},"static_fire_date_utc":"2015-04-22T11:11:00.000Z","static_fir
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4-27T19:03:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"
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:null},"flickr":{"small":[],"original":["https://farm1.staticflickr.com/344/1904
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ed64_o.jpg"]},"presskit":"https://www.nasa.gov/sites/default/files/atoms/files/s
pacex_nasa_crs-7_presskit.pdf","webcast":"https://www.youtube.com/watch?v=PuNymh
cTtSQ","youtube_id":"PuNymhcTtSQ","article":"https://spaceflightnow.com/2015/06/
28/falcon-9-rocket-destroyed-in-launch-mishap/","wikipedia":"https://en.wikipedi
a.org/wiki/SpaceX_CRS-7"},"static_fire_date_utc":"2015-06-26T05:00:00.000Z","sta
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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","5ea6ed2f
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our","upcoming":false,"cores":[{"core":"5e9e28a1f35918683c3b263a","flight":1,"gr
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reddit.com/r/spacex/comments/3xm83h/","recovery":null},"flickr":{"small":[],"ori
ginal":["https://farm2.staticflickr.com/1648/23827554109_837b21739e_o.jpg","http
s://farm1.staticflickr.com/597/23802553412_d41e4dcc64_o.jpg","https://farm6.stat
icflickr.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":"https://images2.imgbox.com/8a/44/PSksEBjD_o.png","large":"https://images2.imgbox.com/d9/c9/57ioWDgW_o.png"},"reddit":{"campaign":null,"launch":"https://www.reddit.com/r/spacex/comments/417weg","media":"https://www.reddit.com/r/spacex/comments/41cvdm","recovery":null},"flickr":{"small":[],"original":["https://farm2.staticflickr.com/1460/24382360351_9b1f2fcabc_o.jpg","https://farm2.staticflickr.com/1669/24423604506_27d3c4548b_o.jpg","https://farm2.staticflickr.com/1618/24151425850_1cb6040569_o.jpg","https://farm2.staticflickr.com/1622/24127012370_07edc62046_o.jpg","https://farm2.staticflickr.com/1508/24127011190_92ef932c96_o.jpg","https://farm2.staticflickr.com/1591/23778325594_08231286fc_o.jpg","https://farm2.staticflickr.com/1542/24038722499_34c10216a3_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/spacex_jason3_press_kit.pdf","webcast":"https://www.youtube.com/watch?v=ivdKRJzl6y0","youtube_id":"ivdKRJzl6y0","article":"https://spaceflightnow.com/2016/01/18/satellite-launched-to-measure-motions-of-the-oceans/","wikipedia":"https://en.wikipedia.org/wiki/Jason-3"},"static_fire_date_utc":"2016-01-11T18:42:00.000Z","static_fire_date_unix":1452537720,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"First launch of NASA and NOAA joint science mission under the NLS II launch contract (not related to NASA CRS or USAF OSP3 contracts). Last launch of the original Falcon 9 v1.1 launch vehicle. The Jason-3 satellite was successfully deployed to target orbit. SpaceX again attempted a recovery of the first stage booster by landing on an autonomous drone ship; this time located in the Pacific Ocean. The first stage did achieve a soft-landing on the ship, but a lockout on one of the landing legs

failed to latch, so that the booster fell over and exploded.","crew":[],"ships":
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s://farm2.staticflickr.com/1641/25421381351_38390bcb8e_o.jpg","https://farm2.sta
ticflickr.com/1616/25514167315_b19b0a4365_o.jpg","https://farm2.staticflickr.com
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667074_aa712b13a8_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/
spacex_ses9_press_kit_final.pdf","webcast":"https://www.youtube.com/watch?v=muDP
SyO7-A0","youtube_id":"muDPSyO7-A0","article":"https://spaceflightnow.com/2016/0
3/05/tv-broadcasting-satellite-finally-launched-on-falcon-9/","wikipedia":"https
://en.wikipedia.org/wiki/SES-9"},"static_fire_date_utc":"2016-10-02T14:11:00.000
Z","static_fire_date_unix":1475417460,"net":false,"window":5400,"rocket":"5e9d0d
95eda69973a809d1ec","success":true,"failures":[],"details":"Second launch of the
enhanced Falcon 9 Full Thrust launch vehicle. 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":["5ea6ed2e0
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16-03-04T23:35:00.000Z","date_unix":1457134500,"date_local":"2016-03-04T19:35:00
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mpt":true,"landing_success":false,"landing_type":"ASDS","landpad":"5e9e3032383ec
b6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_library_id":null,"id":"5eb
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es2.imgbox.com/72/1e/mA23xHqe_o.png","large":"https://images2.imgbox.com/36/d8/R

yPKsTpC_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,"recovered":false,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/7a/90/Zdo2mijx_o.png","large":"https://images2.imgbox.com/2a/47/az2sxGIB_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/4gyh8z","launch":"https://www.reddit.com/r/spacex/comments/4htenu","media":"https://www.reddit.com/r/spacex/comments/4htg2g","recovery":"https://www.reddit.com/r/spacex/comments/4ihp1p"},"flickr":{"small":[],"original":["https://farm8.staticflickr.com/7340/27044931232_7b755276ec_o.jpg","https://farm8.staticflickr.com/7444/27028105566_1d3413daa7_o.jpg","https://farm8.staticflickr.com/7597/26778141961_e3bd237942_o.jpg","https://farm8.staticflickr.com/7079/26778141661_559b48ac80_o.jpg","https://farm8.staticflickr.com/7682/26778141401_c437b04b74_o.jpg","https://farm8.staticflickr.com/7706/26751237322_ceb6d562

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ex.com/sites/spacex/files/spacex_jcsat_press_kit_final.pdf","webcast":"https://w
ww.youtube.com/watch?v=L0bMeDj76ig","youtube_id":"L0bMeDj76ig","article":"https:
//spaceflightnow.com/2016/05/06/falcon-9-succeeds-in-middle-of-the-night-launch/
","wikipedia":"https://en.wikipedia.org/wiki/JCSAT-2B"},"static_fire_date_utc":"
2016-05-01T21:32:00.000Z","static_fire_date_unix":1462138320,"net":false,"window
":7200,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details
":"Launched the JCSAT 14 communications satellite for Tokyo-based SKY Perfect
JSAT Corp. JCSAT 14 will support data networks, television broadcasters and
mobile communications users in Japan, East Asia, Russia, Oceania, Hawaii and
other Pacific islands. This was the first time a booster successfully landed
after a GTO mission.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080
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":"https://spaceflightnow.com/2016/05/27/spacex-logs-successful-late-afternoon-
launch-for-thaicom/","wikipedia":"https://en.wikipedia.org/wiki/Thaicom_8"},"sta
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from the 78.5\xc2\xb0 East geostationary location. It is equipped with 24 active

Ku-band transponders.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f08
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ww.youtube.com/watch?v=gLNmtUEvI5A","youtube_id":"gLNmtUEvI5A","article":"https:
//spaceflightnow.com/2016/06/15/spacex-successfully-fires-satellites-into-orbit-
but-loses-booster-on-landing/","wikipedia":"https://en.wikipedia.org/wiki/ABS_(s
atellite_operator)"},"static_fire_date_utc":"2016-06-13T15:03:00.000Z","static_f
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technique on flight 16, Falcon again launched two Boeing 702SP gridded ion
thruster satellites in a dual-stack configuration, with the two customers
sharing the rocket and mission costs. First stage landing attempt on drone ship
failed on landing due to low thrust on one of the three landing engines.","crew"
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16/07/18/spacex-sends-supplies-to-space-station-lands-another-falcon-rocket/","w
ikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-9"},"static_fire_date_utc":"
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Among other cargo, an International Docking Adapter (IDA-2) was carried to the
ISS. This mission had a successful first-stage landing at Cape
Canaveral.*Including the reusable Dragon Capsule, total payload to orbit was
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et-launches-japanese-satellite-then-nails-bullseye-landing/","wikipedia":"https:
//en.wikipedia.org/wiki/JCSAT-16"},"static_fire_date_utc":"2016-08-11T04:01:00.0
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ow.com/2017/01/14/spacex-resumes-flights-with-on-target-launch-for-iridium/","wi
kipedia":"https://en.wikipedia.org/wiki/Iridium_satellite_constellation#Next-gen
eration_constellation"},"static_fire_date_utc":"2017-01-05T19:40:00.000Z","stati
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09d1ec","success":true,"failures":[],"details":"Return-to-flight mission after
the loss of Amos-6 in September 2016. Iridium NEXT will replace the original
Iridium constellation, launched in the late 1990s. Each Falcon mission will
carry 10 satellites, with a goal to complete deployment of the 66 plus 9 spare
satellite constellation by mid 2018. The first two Iridium qualification units
were supposed to ride a Dnepr rocket in April 2016 but were delayed, so Iridium
decided to qualify the first batch of 10 satellites instead.","crew":[],"ships":
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/spacex/comments/62aqi7/rspacex_ses10_official_launch_discussion_updates/","medi
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ideos_images_gifs/","recovery":"https://www.reddit.com/r/spacex/comments/634gmr/
b1021ses10_recovery_thread/"},"flickr":{"small":[],"original":["https://farm1.st
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ca_o.jpg","https://farm4.staticflickr.com/3775/32915200224_b6ecfabd7e_o.jpg","ht
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.com/3783/33361035200_bfb797d38f_o.jpg","https://farm4.staticflickr.com/3698/336
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rocket-for-second-time-in-historic-test-of-cost-cutting-technology/","wikipedia"
:"https://en.wikipedia.org/wiki/SES-10"},"static_fire_date_utc":"2017-03-27T18:0
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payload to fly on a reused first stage, B1021, previously launched with CRS-8,
which also landed a second time. In what is also a first, the payload fairing
remained intact after a successful splashdown achieved with thrusters and a
steerable parachute.","crew":[],"ships":["5ea6ed2e080df4000697c906","5ea6ed2f080
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acex/comments/68bn8y/","media":"https://www.reddit.com/r/spacex/comments/68bpii"
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8e69_o.jpg","https://farm5.staticflickr.com/4166/34005999880_77684dba4b_o.jpg","
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5/01/spacex-successfully-launches-nrol-76-u-s-military-satellite/","wikipedia":"
https://en.wikipedia.org/wiki/List_of_NRO_launches"},"static_fire_date_utc":"201
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First launch under SpaceX\'s certification for national security space missions,
which allows SpaceX to contract launch services for classified payloads. Second-
stage speed and altitude telemetry were omitted from the launch webcast, which
displayed first-stage telemetry instead, with continuous tracking of the booster
from liftoff to landing for the first time.","crew":[],"ships":["5ea6ed2f080df40
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ww.youtube.com/watch?v=ynMYE64IEKs","youtube_id":"ynMYE64IEKs","article":"https:
//www.space.com/36852-spacex-launches-inmarsat-5-f4-satellite.html","wikipedia":
"https://en.wikipedia.org/wiki/Inmarsat#Satellites"},"static_fire_date_utc":"201

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At 6,070 kg this was the heaviest payload launched to GTO by a Falcon 9 rocket.
The launch was originally scheduled for the Falcon Heavy, but performance
improvements allowed the mission to be carried out by an expendable Falcon 9 ins
tead.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4c3b6c3bb0006eeb20d"
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JuZBOUMsYws","article":"https://spaceflightnow.com/2017/06/03/reused-dragon-
cargo-capsule-launched-on-journey-to-space-station/","wikipedia":"https://en.wik
ipedia.org/wiki/SpaceX_CRS-11"},"static_fire_date_utc":"2017-05-28T16:00:00.000Z
","static_fire_date_unix":1495987200,"net":false,"window":0,"rocket":"5e9d0d95ed
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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":["5ea6ed30
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ddit.com/r/spacex/comments/6isph2/welcome_to_the_rspacex_bulgariasat1_official/"
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dia.org/wiki/BulgariaSat-1"},"static_fire_date_utc":"2017-06-15T22:25:00.000Z","
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a69973a809d1ec","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"]
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launch-three-days.html","wikipedia":"https://en.wikipedia.org/wiki/Iridium_satel

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rew":[],"ships":["5ea6ed2f080df4000697c910","5ea6ed2f080df4000697c911","5ea6ed30
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intelsat-on-heavyweight-falcon-9-mission/","wikipedia":"https://en.wikipedia.org
/wiki/Intelsat_35e"},"static_fire_date_utc":"2017-06-29T00:30:00.000Z","static_f
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elcome_to_the_rspacex_crs12_official_launch/","media":"https://www.reddit.com/r/
spacex/comments/6th2nf/rspacex_crs12_media_thread_videos_images_gifs/","recovery
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94b2b5b07_o.jpg","https://farm5.staticflickr.com/4353/36571921725_2a0be4ec58_o.j
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ebcast":"https://www.youtube.com/watch?v=vLxWsYx8dbo","youtube_id":"vLxWsYx8dbo"
,"article":"https://spaceflightnow.com/2017/08/17/photos-falcon-9-rocket-soars-
into-space-lands-back-at-cape-canaveral/","wikipedia":"https://en.wikipedia.org/
wiki/SpaceX_CRS-12"},"static_fire_date_utc":"2017-08-10T13:10:00.000Z","static_f
ire_date_unix":1502370600,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d
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kg (5,179 lb) of pressurized mass and 961 kg (2,119 lb) unpressurized. The
external payload manifested for this flight is the CREAM cosmic-ray detector.
First flight of the Falcon 9 Block 4 upgrade. Last flight of a newly-built
Dragon capsule; further missions will use refurbished spacecraft.","crew":[],"sh
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/spacex/files/formosat5presskit.pdf","webcast":"https://www.youtube.com/watch?v=
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17/08/25/taiwanese-satellite-rides-spacex-rocket-into-orbit/","wikipedia":"https
://en.wikipedia.org/wiki/Formosat-5"},"static_fire_date_utc":"2017-08-24T18:50:0
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an Earth observation satellite of the Taiwanese space agency. The SHERPA space
tug by Spaceflight Industries was removed from the cargo manifest of this
mission. The satellite has a mass of only 475 kg.","crew":[],"ships":["5ea6ed2e0

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ww.spacex.com/sites/spacex/files/otv5_presskit.pdf","webcast":"https://www.youtu
be.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.wikip
edia.org/wiki/Boeing_X-37"},"static_fire_date_utc":"2017-08-31T20:30:00.000Z","s
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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
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acex/files/iridium3presskit.pdf","webcast":"https://www.youtube.com/watch?v=SB4N
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ghtnow.com/2017/10/09/spacex-launch-adds-another-10-satellites-to-iridium-next-f
leet/","wikipedia":"https://en.wikipedia.org/wiki/Iridium_satellite_constellatio
n#Next-generation_constellation"},"static_fire_date_utc":"2017-10-05T13:31:00.00
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11echostar105_official_launch_discussions/","media":"https://www.reddit.com/r/sp
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outube_id":"iv1zeGSvhIw","article":"https://spaceflightnow.com/2017/10/12/video-
falcon-9-rocket-lifts-off-with-joint-satellite-for-ses-echostar/","wikipedia":"h
ttps://en.wikipedia.org/wiki/List_of_SES_satellites"},"static_fire_date_utc":"20
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"article":"https://spaceflightnow.com/2017/10/30/spacex-launches-and-lands-
third-rocket-in-three-weeks/","wikipedia":"https://en.wikipedia.org/wiki/Koreasa
t_5A"},"static_fire_date_utc":"2017-10-26T16:00:00.000Z","static_fire_date_unix"
:1509033600,"net":false,"window":8640,"rocket":"5e9d0d95eda69973a809d1ec","succe
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providing communication services from East Africa and Central Asia to southern
India, Southeast Asia, the Philippines, Guam, Korea, and Japan. The satellite
will be placed in GEO at 113\xc3\x82\xc2\xb0 East Longitude, and will provide
services ranging from broadband internet to broadcasting services and maritime c
ommunications.","crew":[],"ships":["5ea6ed2f080df4000697c90d","5ea6ed2e080df4000
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rocket-launch-kicks-off-station-resupply-mission/","wikipedia":"https://en.wikip
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2/23/spacex-launch-dazzles-delivering-10-more-satellites-for-iridium/","wikipedi
a":"https://en.wikipedia.org/wiki/Iridium_satellite_constellation#Next-generatio
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/files/zumapresskit.pdf","webcast":"https://www.youtube.com/watch?v=0PWu3BRxn60"
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cex-kicks-off-ambitious-2018-schedule-with-launch-for-u-s-government/","wikipedi
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Originally planned for mid-November 2017, the mission was delayed due to test
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","article":"https://spaceflightnow.com/2018/01/31/spacex-rocket-flies-on-60th-
anniversary-of-first-u-s-satellite-launch/","wikipedia":"https://en.wikipedia.or
g/wiki/List_of_SES_satellites#SES_Fleet"},"static_fire_date_utc":"2018-01-26T15:
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experimental ocean landing that used three engines, the booster unexpectedly
remained intact; Elon Musk stated in a tweet that SpaceX will attempt to tow the

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m/2018/02/22/recycled-spacex-rocket-boosts-paz-radar-satellite-first-starlink-
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GMKKM","article":"https://spaceflightnow.com/2018/03/06/hefty-hispasat-
satellite-rides-spacex-rocket-into-orbit/","wikipedia":"https://en.wikipedia.org
/wiki/Hispasat_30W-6"},"static_fire_date_utc":"2018-02-21T03:46:00.000Z","static
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files/iridium-5_press_kit_2018.pdf","webcast":"https://www.youtube.com/watch?v=m
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8/03/30/iridium-messaging-network-gets-another-boost-from-spacex/","wikipedia":"
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uccess":true,"failures":[],"details":"Fifth Iridium NEXT mission to deploy ten
Iridium NEXT satellites. Reused booster from third Iridium flight, and although
controlled descent was performed, the booster was expended into the ocean.
SpaceX planned a second recovery 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
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NEXT Mission 5","date_utc":"2018-03-30T14:13:51.000Z","date_unix":1522419231,"da
te_local":"2018-03-30T07:13:51-08:00","date_precision":"hour","upcoming":false,"
cores":[{"core":"5e9e28a4f3591843103b2650","flight":2,"gridfins":true,"legs":tru
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ll,"landpad":null}],"auto_update":true,"tbd":false,"launch_library_id":null,"id"
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cex/comments/88s8a7/rspacex_crs14_official_launch_discussion_updates/","media":"
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07227_39e71e6775_o.jpg"]},"presskit":"http://www.spacex.com/sites/spacex/files/c
rs-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_
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d1ec","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":["5e
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spresskitfinal417.pdf","webcast":"https://www.youtube.com/watch?v=aY-0uBIYYKk","
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sky-surveyor-launched-from-cape-canaveral-on-the-hunt-for-exoplanets/","wikipedi
a":"https://en.wikipedia.org/wiki/Transiting_Exoplanet_Survey_Satellite"},"stati
c_fire_date_utc":"2018-04-11T18:30:00.000Z","static_fire_date_unix":1523471400,"

net":false,"window":30,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failu
res":[],"details":"Part of the Explorers program, this space telescope is
intended for wide-field search of exoplanets transiting nearby stars. It is the
first NASA high priority science mission launched by SpaceX. It was the first
time SpaceX launched a scientific satellite not primarily intended for Earth
observations. The second stage placed it into a high-Earth elliptical orbit,
after which the satellite\'s own booster will perform complex maneuvers
including a lunar flyby, and over the course of two months, reach a stable, 2:1
resonant orbit with the Moon. In January 2018, SpaceX received NASA\'s Launch
Services Program Category 2 certification of its Falcon 9 \'Full Thrust\',
certification which 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","5ea6ed
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566f84","flight_number":60,"name":"TESS","date_utc":"2018-04-18T22:51:00.000Z","
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u1_official_launch_discussion","media":"https://www.reddit.com/r/spacex/comments
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w.reddit.com/r/spacex/comments/8j6moa/bangabandhu1_block_5_recovery_thread/"},"f
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rm1.staticflickr.com/823/27200014957_940f3720bb_o.jpg","https://farm1.staticflic
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7feaa_o.jpg","https://farm1.staticflickr.com/911/42025499722_47d3433d65_o.jpg"]}
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df","webcast":"https://www.youtube.com/watch?v=rQEqKZ7CJlk","youtube_id":"rQEqKZ
7CJlk","article":"https://spaceflightnow.com/2018/05/11/spacex-debuts-an-
improved-human-rated-model-of-the-falcon-9-rocket/","wikipedia":"https://en.wiki
pedia.org/wiki/Bangabandhu-1"},"static_fire_date_utc":"2018-05-04T23:25:00.000Z"
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8","flight_number":61,"name":"Bangabandhu-1","date_utc":"2018-05-11T20:14:00.000

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.spacex.com/sites/spacex/files/iridium6presskit2018521.pdf","webcast":"https://w
ww.youtube.com/watch?v=I_0GgKfwCSk","youtube_id":"I_0GgKfwCSk","article":"https:
//spaceflightnow.com/2018/05/22/rideshare-launch-by-spacex-serves-commercial-
and-scientific-customers/","wikipedia":"https://en.wikipedia.org/wiki/Gravity_Re
covery_and_Climate_Experiment"},"static_fire_date_utc":"2018-05-18T20:16:00.000Z
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of GRACE-FO on a Falcon 9 with Iridium following 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 sixth Iridium NEXT mission. The booster reuse
turnaround was a record 4.5 months between flights.","crew":[],"ships":["5ea6ed2
e080df4000697c908"],"capsules":[],"payloads":["5eb0e4c7b6c3bb0006eeb224","5eb0e4
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name":"Iridium NEXT Mission 6","date_utc":"2018-05-22T19:47:58.000Z","date_unix"
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g"]},"presskit":"http://www.spacex.com/sites/spacex/files/ses-12missionpress_kit
_6.2.18.pdf","webcast":"https://www.youtube.com/watch?v=2hcM5hqQ45s","youtube_id
":"2hcM5hqQ45s","article":"https://spaceflightnow.com/2018/06/04/multi-mission-
telecom-craft-launched-by-spacex-for-ses/","wikipedia":"https://en.wikipedia.org
/wiki/SES-12"},"static_fire_date_utc":"2018-05-25T01:48:00.000Z","static_fire_da
te_unix":1527212880,"net":false,"window":7200,"rocket":"5e9d0d95eda69973a809d1ec
","success":true,"failures":[],"details":"SES-12, the replacement satellite for
NSS-6, was successfully launched and deployed on June 4th, completing 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-home (DTH)
broadcasting, VSAT, Mobility and High Throughput Satellite (HTS) data
connectivity services in the Middle East and the Asia-Pacific region, including
rapidly growing markets such as India and Indonesia. [SES-12] will be co-located
with SES-8","crew":[],"ships":["5ea6ed2e080df4000697c90a"],"capsules":[],"payloa
ds":["5eb0e4c8b6c3bb0006eeb226"],"launchpad":"5e9e4501f509094ba4566f84","flight_
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/spacex/comments/8pua1m/crs15_launch_campaign_thread/","launch":"https://www.red
dit.com/r/spacex/comments/8ugo3l/rspacex_crs15_official_launch_discussion_update
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"presskit":"http://www.spacex.com/sites/spacex/files/crs15presskit.pdf","webcast
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cle":"https://spaceflightnow.com/2018/06/29/spacex-launches-ai-enabled-robot-
companion-vegetation-monitor-to-space-station/","wikipedia":"https://en.wikipedi
a.org/wiki/SpaceX_CRS-15"},"static_fire_date_utc":"2018-06-23T21:30:00.000Z","st
atic_fire_date_unix":1529789400,"net":false,"window":0,"rocket":"5e9d0d95eda6997
3a809d1ec","success":true,"failures":[],"details":"Payload included MISSE-FF 2,
ECOSTRESS, and a Latching End Effector. The refurbished booster featured a
record 2.5 months period turnaround from its original launch of the TESS
satellite \xe2\x80\x94 the fastest previous was 4.5 months. This was the last
commercial flight of a Block 4 booster, which was expended into the Atlantic
without landing legs and grid fins.","crew":[],"ships":["5ea6ed30080df4000697c91
2"],"capsules":["5e9e2c5cf359183bb73b266e"],"payloads":["5eb0e4c8b6c3bb0006eeb22
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-29T05:42:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5

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cex_telstar_19v_official_launch_discussion/","media":"https://www.reddit.com/r/s
pacex/comments/90oxrr/rspacex_telstar_19v_media_thread_videos_images/","recovery
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/spacex/files/telstar19vantagepresskit.pdf","webcast":"https://www.youtube.com/w
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.com/2018/07/22/spacex-delivers-for-telesat-with-successful-early-morning-launch
/","wikipedia":"https://en.wikipedia.org/wiki/Telstar_19V"},"static_fire_date_ut
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ndow":7200,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"det
ails":"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":["5ea6ed2e
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m/2018/07/25/spacexs-second-launch-in-three-days-lofts-10-more-iridium-satellite

s/","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":"https://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_

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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://farm5.staticflickr.com/4888/32040173048_b2b29c020f_o.jpg","https://farm5.staticflickr.com/4808/32248947038_dd1cf9e8c3_o.jpg","https://farm5.staticflickr.com/4887/31180979107_da6a935c20_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/eshail-2_mission_press_kit_11_14_2018.pdf","webcast":"https://www.youtube.com/watch?v=PhTbzc-BqKs&feature=youtu.be","youtube_id":"PhTbzc-BqKs","article":"https://spaceflightnow.com/2018/11/15/spacex-launches-qatars-eshail-2-communications-satellite/","wikipedia":"https://en.wikipedia.org/wiki/Es%27hailSat"},"static_fire_date_utc":"2018-11-12T18:13:00.000Z","static_fire_date_unix":1542046380,"net":false,"window":6180,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s eighteenth flight of 2018 was its first for Es\'hailSat. Es\'hail-2 is a communications satellite delivering television and internet to Qatar and the surrounding region. It was launched into a geostationary transfer orbit from LC-39A at Kennedy Space Center. The booster landed on OCISLY.","crew":[],"ships":["5ea6ed2f080df4000697c90d","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5eb0e4c9b6c3bb0006eeb22d"],"launchpad":"5e9e4502f509094188566f88","flight_number":70,"name":"Es\xe2\x80\x99hail 2","date_utc":"2018-11-15T20:46:00.000Z","date_unix":1542314760,"date_local":"2018-11-15T15:46:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f359181eed3b2657","flight":2,"gridfins":true,"legs":true,"reused":tr

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/spacex-launches-swarm-of-satellites-re-flies-rocket-for-third-time/","wikipedia
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ls":"SpaceX\'s nineteenth flight of 2018 will fly SSO-A: SmallSat Express out of
Vandenberg SLC-4E for Spaceflight. SSO-A is a rideshare to sun synchronus 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 Falcon 9 has flown
more than two missions. ","crew":[],"ships":["5ea6ed2f080df4000697c910","5ea6ed3
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ttps://spaceflightnow.com/2019/01/11/spacex-begins-2019-with-eighth-and-final-
for-upgraded-iridium-network/","wikipedia":"https://en.wikipedia.org/wiki/Iridiu
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planned Iridium flights. Delivering 10 satellites to low earth orbit, this
brings the total up to 75 and completes the Iridium NEXT constellation. This
mission launches from SLC-4E at Vandenberg AFB. The booster is expected to land
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outu.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,"failures":[],"details":"Demonstration Mission 1 (DM-1) will launch Dragon 2 as part of NASA\'s Commercial Crew Transportation Capability program. This mission will demonstrate Dragon 2, and Falcon 9 in its configuration for crewed missions. DM-1 will launch from LC-39A at Kennedy Space Center, likely carrying some cargo to the International Space Station. The booster is expected to land on OCISLY.","crew":[],"ships":["5ea6ed30080df4000697c913"],"capsules":["5e9e2c5df35918b1063b2671"],"payloads":["5eb0e4cbb6c3bb0006eeb235"],"launchpad":"5e9e4502f509094188566f88","flight_number":76,"name":"CCtCap Demo Mission 1","date_utc":"2019-03-02T07:45:00.000Z","date_unix":1551512700,"date_local":"2019-03-02T02:45:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a6f35918c0803b265c","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":"5eb87d2bffd86e000604b375"},{"fairings":{"reused":false,"recovery_attempt":true,"recovered":true,"ships":["5ea6ed2f080df4000697c90c"]},"links":{"patch":{"small":"https://images2.imgbox.com/14/18/JxCyAHXk_o.png","large":"https://images2.imgbox.com/9f/c3/GvLfwIfg_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/b0kscl/arabsat6a_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/basm9y/rspacex_arabsat6a_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/bbhz9a/rspacex_arabsat6a_media_thread_videos_images_gifs/","recovery":"https://www.reddit.com/r/spacex/comments/bcecao/fh_arabsat_6a_center_core_recovery_thread/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/7911/32652060737_4be1171d4a_o.jpg","https://live.staticflickr.com/7807/40628442293_9643eaf670_o.jpg","https://live.staticflickr.com/7804/40628440983_4da5d76cc7_o.jpg","https://live.staticflickr.com/7856/40628439793_27927d11de_o.jpg","https://live.staticflickr.com/7919/40628438523_c597eabff1_o.jpg","https://live.staticflickr.com/7834/40628437283_84088aca75_o.jpg","https://live.staticflickr.com/7856/40628435833_a1bcde59db_o.jpg","https://live.staticflickr.com/7809/40628435153_17c05d3b5e_o.jpg","https://live.staticflickr.com/7885/40628434483_3545598b82_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/arabsat-6a_press_kit.pdf","webcast":"https://youtu.be/TXMGu2d8c8g","youtube_id":"TXMGu2d8c8g","article":"https://spaceflightnow.com/2019/04/11/spacexs-falcon-heavy-successful-in-commercial-debut/","wikipedia":"https://en.wikipedia.org/wiki/Arabsat-6A"},"static_fire_date_utc":"2019-04-05T09:57:00.000Z","static_fire_date_unix":1554458220,"net":false,"window":7020,"rocket":"5e9d0d95eda69974db09d1ed","success":true,"failures":[],"details":"SpaceX will launch Arabsat 6A to a geostationary transfer orbit from SLC-39A, KSC. The satellite is a geostationary telecommunications satellite built by Lockheed Martin for the Saudi Arabian company Arabsat. This will be the 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 OCISLY.","crew":[],"ships":["5ea6ed2f080df4000697c90e","5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90b","5ea6ed2e080df4000697c909","5ea

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paceflightnow.com/2019/05/04/spacex-launches-space-station-resupply-mission-
lands-rocket-on-drone-ship/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_C
RS-17"},"static_fire_date_utc":"2019-04-27T07:23:00.000Z","static_fire_date_unix
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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":[],"shi
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satellites-deployed-in-orbit","wikipedia":"https://en.wikipedia.org/wiki/Starlin
k_(satellite_constellation)"},"static_fire_date_utc":"2019-05-13T20:06:00.000Z",
"static_fire_date_unix":1557777960,"net":false,"window":9000,"rocket":"5e9d0d95e
da69973a809d1ec","success":true,"failures":[],"details":"SpaceX will launch
dozens of Starlink demonstration satellites from SLC-40, Cape Canaveral AFS.
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.
Two prototype satellites, Microsats 2a and 2b, were launched from Vandenberg AFB
in February 2018. The booster for this mission will land on OCISLY.","crew":[],"
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hree-canadian-radar-surveillance-satellites-ride-spacex-rocket-into-orbit/","wik
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details":"SpaceX is launching the three satellite RADARSAT Constellation Mission
into 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 the
originally slated booster failed to land after CRS-16. The booster is expected
to return to LZ-4.","crew":[],"ships":[],"capsules":[],"payloads":["5eb0e4ccb6c3
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ticle":"https://spaceflightnow.com/2019/06/25/falcon-heavy-launches-on-military-
led-rideshare-mission-boat-catches-fairing","wikipedia":"https://en.wikipedia.or
g/wiki/Space_Test_Program"},"static_fire_date_utc":"2019-06-19T21:52:00.000Z","s
tatic_fire_date_unix":1560981120,"net":false,"window":14400,"rocket":"5e9d0d95ed
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a rideshare managed by the U.S. Air Force Space and Missile Systems Center
(SMC), launching from LC-39A, KSC. Most of the spacecraft will be delivered into
low Earth orbit (LEO) in two deployment sequences separated by a second stage
burn. These LEO payloads include the six Taiwan and United States owned COSMIC-2
microsatellites, the Planetary Society\'s LightSail-B demonstrator cubesat, and
others. The third and final deployment will be the Air Force Research Lab\'s DSX
spacecraft, which will be delivered to a medium Earth orbit (MEO). This mission
will reuse the side cores from Arabsat 6A, which will return to LZ-1, and LZ-2.
The new center core will boost back to land on OCISLY less than 40 km from the
launch site.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df400069
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m/2019/07/25/new-docking-port-spacesuit-and-supplies-en-route-to-space-station/"
,"wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-18"},"static_fire_date_ut
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s":"SpaceX\'s 18th Commercial Resupply Services mission out of a total of 20
such contracted flights for NASA, this launch will deliver essential supplies to
the International Space Station using the reusable Dragon 1 cargo spacecraft.
The external payload for this mission is International Docking Adapter 3,
replacing IDA-1 lost in SpaceX\'s CRS-7 launch failure. This mission will launch
from SLC-40 at Cape Canaveral AFS on a Falcon 9, and the first-stage booster is
expected to land back at CCAFS LZ-1.","crew":[],"ships":[],"capsules":["5e9e2c5c
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/spaceflightnow.com/2019/08/07/spacex-launches-israeli-owned-telecom-satellite/"
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:"SpaceX will launch Boeing built Amos-17, a geostationary communications
satellite for Israeli company Spacecom. 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 the Middle East. The cost of this launch is covered
for Spacecom by SpaceX credit following the Amos-6 incident. A recovery of the
booster for this mission is not expected.","crew":[],"ships":["5ea6ed2e080df4000
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ticle":"https://spaceflightnow.com/2019/11/11/successful-launch-continues-deployment-of-spacexs-starlink-network","wikipedia":"https://en.wikipedia.org/wiki/Starlink_(satellite_constellation)"},"static_fire_date_utc":"2019-11-11T12:08:00.000Z","static_fire_date_unix":1573474080,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the first 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 second 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","5ea6ed2f080df4000697c90d"],"capsules":[],"payloads":["5eb0e4cfb6c3bb0006eeb24c"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":84,"name":"Starlink-1","date_utc":"2019-11-11T14:56:00.000Z","date_unix":1573484160,"date_local":"2019-11-11T09:56:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591809c03b2658","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":"5eb87d39ffd86e000604b37d"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/5d/26/ZP75Il1j_o.png","large":"https://images2.imgbox.com/6e/76/jVcSQg0K_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/e0upb3/crs19_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/e5r8hj/rspacex_crs19_official_launch_discussion_updates","media":"https://www.reddit.com/r/spacex/comments/e6ln0m/rspacex_crs19_media_thread_videos_images_gifs","recovery":"https://www.reddit.com/r/spacex/comments/e6lbzy/rspacex_crs19_booster_recovery_discussion_updates"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/49178460143_e3ae2bd506_o.jpg","https://live.staticflickr.com/65535/49178954221_8544835325_o.jpg","https://live.staticflickr.com/65535/49179161792_9f1801a963_o.jpg","https://live.staticflickr.com/65535/49178460368_62eb945db8_o.jpg","https://live.staticflickr.com/65535/49184948561_ce20b38bc6_o.jpg","https://live.staticflickr.com/65535/49185149122_00a7fa573d_o.jpg"]},"presskit":"https://www.spacex.com/sites/spacex/files/crs-19_mission_press_kit.pdf","webcast":"https://youtu.be/-aoAGdYXp_4","youtube_id":"-aoAGdYXp_4","article":"https://spaceflightnow.com/2019/12/05/dragon-soars-on-research-and-resupply-flight-to-international-space-station","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-19"},"static_fire_date_utc":"2019-11-26T17:04:00.000Z","static_fire_date_unix":1574787840,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s 19th Crew Resupply Mission on behalf of NASA with a total of 20 contracted flights, this mission brings essential supplies to the International Space Station using SpaceX\'s reusable Dragon spacecraft. The external payloads for this mission include the Hyperspectral Imager 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 recovery of the Dragon capsule and down cargo.","crew":[],"ships":["5ea6ed2f080df4000697c90d"],"capsules":["5e9e2c5bf3591880643b2669"],"payloads":["5eb0e4cfb6c3bb0006eeb24d"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":85,"name":

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andpad":"5e9e3032383ecb6bb234e7ca"}],"auto_update":true,"tbd":false,"launch_libr
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ttps://spaceflightnow.com/2019/12/17/startup-launches-broadband-satellite-on-
spacex-rocket-to-connect-pacific-islands","wikipedia":"https://en.wikipedia.org/
wiki/JSAT_(satellite_constellation)"},"static_fire_date_utc":"2019-12-13T12:34:0
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e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX will
launch the Boeing built dual payload satellite to geostationary transfer orbit
from XXXX. JCSat 18 is a mobile broadband communications payload built for Sky
Perfect JSAT Corporation of Japan and will 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.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6
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validate Crew Dragon and its launch abort system. The Crew Dragon will be recovered 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/sta

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starlink-satellites-to-orbit-booster-misses-drone-ship-landing/","wikipedia":"ht
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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":["5ea6ed2e080df4000697
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spacex-cargo-ship-marks-end-of-an-era/","wikipedia":"https://en.wikipedia.org/wi
ki/SpaceX_CRS-20"},"static_fire_date_utc":"2020-03-01T10:20:00.000Z","static_fir
e_date_unix":1583058000,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1e
c","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":true,"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 into 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":"5e9d0d95eda69973a809d1ec","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_ef4

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Port Canaveral.","crew":[],"ships":["5ea6ed2e080df4000697c908","5ea6ed2e080df400
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-satellite-deployments-continue-with-successful-falcon-9-launch/","wikipedia":"h
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operational Starlink satellites, which are expected to be version 1.0, from
SLC-40, Cape Canaveral AFS. It is the ninth 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. This mission is includes
rideshare payloads, SkySats 16-18, on top of the Starlink stack. The booster for
this mission is expected to land an ASDS.","crew":[],"ships":["5ea6ed2e080df4000
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iii_sv03_columbus_official_launch/","media":"https://www.reddit.com/r/spacex/com
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launches-its-first-mission-for-u-s-space-force/","wikipedia":"https://en.wikiped
ia.org/wiki/GPS_Block_III"},"static_fire_date_utc":"2020-06-25T09:48:00.000Z","s
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III Space Vehicle 03 from SLC-40, Cape Canaveral AFS aboard a Falcon 9. GPS III
is owned and operated by the US Air Force and produced by Lockheed Martin. This
is the third GPS III satellite and the second launched by SpaceX. The satellite
will be delivered into a MEO transfer orbit. The booster for this mission is
expected to land on an ASDS.","crew":[],"ships":[],"capsules":[],"payloads":["5e
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south-koreas-first-military-satellite-into-on-target-orbit/","wikipedia":null},"
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ailures":[],"details":"SpaceX will launch ANASIS-II, a South Korean
geostationary military communication satellite from LC-39A, Kennedy Space
Center. It will be South Korea\'s first dedicated military communications
satellite. Falcon 9 will deliver the satellite to a geostationary transfer
orbit. The booster is expected to land downrange on an ASDS.","crew":[],"ships":
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ls":"This mission will launch the ninth batch of operational Starlink
satellites, which are expected to be version 1.0, from LC-39A, Kennedy Space
Center. It is the tenth 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. This mission is includes a rideshare of two
BlackSky satellites on top of the Starlink stack. The booster for this mission
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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":[],
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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":["5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c910","5ea6ed2e080df4000697c907","5ea6ed2e080df4000697c908","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5ef6a48e0059c33cee4a829f"],"launchpad":"5e9e4502f509094188566f88","flight_number":103,"name":"Starlink-12 (v1.0)","date_utc":"2020-10-06T11:29:00.000Z","date_unix":1601983740,"date_local":"2020-10-06T07:29:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f3591817f23b2663","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":"5ef6a2090059c33cee4a828b"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":null,"ships":["5ea6ed2e080df4000697c907","5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com/1d/5c/Eg5XilXY_o.png","large":"https://images2.imgbox.com/42/26/UbDMepRy_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/jctqq9/rspacex_starlink13_official_launch_discussion/","media":"https://www.reddit.com/r/spacex/comments/jdgsm2/rspacex_starlink13_media_thread_photographer/","recovery":"https://www.reddit.com/r/spacex/comments/jdgpgl/starlink13_recovery_updates_discussion_thread/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/50500804918_eb1187e1b2_o.jpg","https://live.staticflickr.com/65535/50501674637_f16f528728_o.jpg","https://live.staticflickr.com/65535/50501515611_2a3753bed1_o.jpg","https://live.staticflickr.com/65535/50501674632_0d5276b1b5_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/UM8CDDAmp98","youtube_id":"UM8CDDAmp98","article":"https://spaceflightnow.com/2020/10/18/spacex-launches-another-batch-of-starlink-satellites/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2020-10-17T05:23:00.000Z","static_fire_date_unix":1602912180,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission will launch the thirteenth batch of operational Starlink satellites, which 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 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","5ea6ed2f080df4000697c90b","5ee68c683c228f36bd5809b5","5ea6ed2e080df4000697c907","5ea6ed2e080df4000697c908"],"capsules":[],"payloads":["5ef6a4d50059c33cee4a82a1"],"launchpad":"5e9e4502f509094188566f88","flight_number":104,"name":"Starlink-13 (v1.0)","date_utc":"2020-10-18T12:25:00.000Z","date_unix":1603023900,"date_local":"2020-10-18T08:25:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a6f35918c0803b265c","flight":6,"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":"5ef6a2bf0059c33cee4a828c"},{"fairings":{"reused":false,"recovery_attempt":true,"recovered":null,"ships":["5ea6ed2e080df4000697c907","5ea6ed2e080df4000697c908"]},"links":{"patch":{"small":"https://images2.imgbox.com

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Starlink satellites, which are expected to be version 1.0, from SLC-40, Kennedy
Space Center. It is the fifteenth Starlink launch overall. The satellites will
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navigation-satellite-from-cape-canaveral/","wikipedia":"https://en.wikipedia.org
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III Space Vehicle 04 from SLC-40, Cape Canaveral AFS aboard a Falcon 9. GPS III
is owned and operated by the US Air Force and produced by Lockheed Martin. This
will be the fourth GPS III satellite launched and the third launched by SpaceX.
The satellite will be delivered into a MEO transfer orbit. The booster for this
mission will land on an ASDS.","crew":[],"ships":["5ea6ed30080df4000697c913","5e
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tronauts-ride-spacex-crew-capsule-in-landmark-launch-for-commercial-spaceflight/
","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_Crew-1"},"static_fire_date_u
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ls":"SpaceX will launch the first operational 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 second crewed flight to launch from the United
States since the end of the Space Shuttle program in 2011.","crew":["5f7f1543bf3
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to-extend-measurements-of-sea-level-rise/","wikipedia":"https://en.wikipedia.org
/wiki/Copernicus_Sentinel-6"},"static_fire_date_utc":"2020-11-17T13:17:00.000Z",
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Sentinel-6 Michael Freilich into low Earth orbit for NASA, NOAA, ESA, and the
European Organization for the Exploitation 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":["5
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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_f
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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://youtu.be/4xJAGFR_N-c","youtube_id":"4xJAGFR_N-c","article":"https://spaceflightnow.com/2020/12/06/spacex-launches-first-in-new-line-of-upgraded-space-station-cargo-ships/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_CRS-21"},"static_fire_date_utc":"2020-12-03T13:45:00.000Z","static_fire_date_unix":1607003100,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX\'s 21st ISS resupply mission on behalf of NASA and the first under the CRS-2 contract, this mission brings essential supplies to the International Space Station using the cargo variant of SpaceX\'s Dragon 2 spacecraft. The external payload for this mission 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 mission will be complete with return and recovery of the Dragon capsule and down cargo.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90b","5ea6ed2f080df4000697c90d"],"capsules":["5fbb0f8fec55b34eb9f35c14"],"payloads":["5eb0e4d3b6c3bb0006eeb262"],"launchpad":"5e9e4502f509094188566f88","flight_number":110,"name":"CRS-21","date_utc":"2020-12-06T16:17:00.000Z","date_unix":1607271420,"date_local":"2020-12-06T11:17:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f3591817f23b2663","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":"5eb87d4effd86e000604b391"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":null,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox

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spacex-rocket-into-orbit/","wikipedia":"https://en.wikipedia.org/wiki/Sirius_XM#
Satellites"},"static_fire_date_utc":"2020-12-07T23:00:00.000Z","static_fire_date
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generation high power S-band broadcast satellites for SiriusXM. The spacecraft
will be delivered into a geostationary transfer orbit and the booster will be
recovered downrange. The spacecraft is built by Space Systems Loral (SSL) on the
SSL 1300 platform and includes two solar arrays producing 20kW, and an
unfurlable antenna dish. SXM-7 will replace XM-3 in geostationary orbit.","crew"
:[],"ships":["5ea6ed2f080df4000697c910","5ee68c683c228f36bd5809b5","5ea6ed2f080d
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:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a6f35918c0
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launches-from-floridas-space-coast/","wikipedia":"https://en.wikipedia.org/wiki/
National_Reconnaissance_Office"},"static_fire_date_utc":null,"static_fire_date_u
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his mission launches the eighteenth batch of operational Starlink satellites,
which are version 1.0, from SLC-40. It is the nineteenth 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
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e":"https://spaceflightnow.com/2021/02/16/spacex-successfully-deploys-60-more-starlink-satellites-but-loses-booster-on-descent/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2021-02-13T18:17:00.000Z","static_fire_date_unix":1613240220,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission launches the eighteenth batch of operational Starlink satellites, which are version 1.0, from SLC-40. It is the nineteenth 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":["5ea6ed30080df4000697c913"],"capsules":[],"payloads":["600f9bc08f798e2a4d5f97a4"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":117,"name":"Starlink-19 (v1.0)","date_utc":"2021-02-16T03:59:00.000Z","date_unix":1613447940,"date_local":"2021-02-15T22:59:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a7f359187afd3b2662","flight":6,"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":"985f1cc1-82c1-4a89-b2cc-e9dc91829a0e","id":"600f9a5e8f798e2a4d5f979c"},{"fairings":{"reused":null,"recovery_attempt":null,"recovered":null,"ships":[]},"links":{"patch":{"small":"https://images2.imgbox.com/ba/a9/Q6APoE8C_o.png","large":"https://images2.imgbox.com/29/6c/mQwxR0KQ_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/l8qsz3/rspacex_starlink17_official_launch_discussion/","media":null,"recovery":"https://www.reddit.com/r/spacex/comments/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/51004598206_9779f08338_o.jpg","https://live.staticflickr.com/65535/51004598196_b2059799f4_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/d5DzoKuhdNk","youtube_id":"d5DzoKuhdNk","article":"https://spaceflightnow.com/2021/03/04/spacex-sticks-75th-falcon-rocket-landing-after-launching-60-more-starlink-satellites/","wikipedia":"https://en.wikipedia.org/wiki/Starlink"},"static_fire_date_utc":"2021-02-24T12:25:00.000Z","static_fire_date_unix":1614169500,"net":false,"window":null,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"This mission launches the sixteenth batch of operational Starlink satellites, which are version 1.0, from LC-39A. It is the eighteenth 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":["5ea6ed2f080df4000697c90d","5ea6ed30080df4000697c913"],"capsules":[],"payloads":["5fbfedc654ceb10a5664c814"],"launchpad":"5e9e4502f509094188566f88","flight_number":118,"name":"Starlink-17 (v1.0)","date_utc":"2021-03-04T08:24:00.000Z","date_unix":1614846240,"date_local":"2021-03-04T03:24:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5e9e28a5f3591833b13b2659","flight":8,"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":"dfd4f0e0-0ab4-494d-bd88-1b93b934b269","id":"5fbfecfe54ceb10a5664c80b"},{"fairings":{"reused":true,"recovery_attempt":true,"recovered":true,"ships":["5ea6ed2e080df4000697c909","5ea6ed2f080df4000697c90c"]},"links":{"patch":{"small":"https://images2.imgbox.com/df/ea/lre39tFr_o.png","large":"https://images2.imgbox.com/38/db/moPRrp

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/11/spacex-adds-more-satellites-to-starlink-internet-fleet/","wikipedia":"https:
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launches the 20th batch of operational Starlink satellites, which are version
1.0, from LC-39A or SLC-40. It is the 21st 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
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reuse-record-on-starlink-launch/","wikipedia":"https://en.wikipedia.org/wiki/Sta
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ails":"This mission launches the 21st batch of operational Starlink satellites,
which are version 1.0, from LC-39A or SLC-40. It is the 22nd 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":["5ea6ed2e080df4000697c909","5ea6ed2f080df40
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24th 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":["5ea6ed30080df400069
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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 Station. 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 commercial crew flight.
The booster for this mission is expected to land on an ASDS. The mission will be
complete with the safe return of the astronauts to Earth.","crew":["5fe3ba5fb346
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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
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spend a few weeks maneuvering to their operational altitude. The booster is
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mission launches the 26th batch of operational Starlink satellites, which are
version 1.0, from SLC-40. It is the 27th 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":
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spacexs-starlink-network-nears-completion-with-falcon-9-launch/","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 launches the 28th batch of operational Starlink satellites, which were version 1.0, from SLC-40. It was the 29th Starlink launch overall. The satellites plan to be delivered to low Earth orbit and will spend a few weeks maneuvering to their operational altitude. The booster is expected to land on ASDS JRTI.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90c","5ee68c683c228f36bd5809b5","5ea6ed2f080df4000697c90b","5ea6ed2e080df4000697c909"],"capsules":[],"payloads":["6079bd679a06446e8c61bf7d"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":128,"name":"Starlink-28 (v1.0)","date_utc":"2021-05-26T18:59:00.000Z","date_unix":1622055540,"date_local":"2021-05-26T14:59:00-04:00","date_precision":"hour","upcoming":fals

e,"cores":[{"core":"5f57c54a0622a633027900a1","flight":2,"gridfins":true,"legs":
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launches-on-mission-to-begin-upgrading-space-station-electrical-grid/","wikipedi
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tatic_fire_date_unix":null,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809
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mission on behalf of NASA, this mission sends essential supplies to the
International Space Station using the cargo variant of SpaceX\'s Dragon 2
spacecraft. The external payload for this mission is the first pair of ISS Roll
Out Solar Arrays. Falcon 9 and Dragon launch from LC-39A, Kennedy Space Center
and the booster is expected to land on an ASDS. The mission will be complete
with splashdown and recovery of the capsule and down cargo.","crew":[],"ships":[
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se,"window":5940,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[
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SiriusXM from SLC-40, Cape Canaveral Space Force Station. The spacecraft will be
delivered into a sub-synchronous geostationary transfer orbit and will replace
XM-4 in geostationary orbit. The booster for this mission will land on an ASDS."
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SDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_update":true,"tbd":false,"laun
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res":[],"details":"SpaceX\'s fourth GPS III launch will use 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 NAVSTAR Global Positioning
System satellites, developed by Lockheed Martin. The GPS III constellation will
feature a cross-linked command and control architecture, allowing the entire GPS
constellation to be updated simultaneously from a single ground station. A new
spot beam capability for enhanced military coverage and increased resistance to
hostile jamming will be incorporated.","crew":[],"ships":["60c8c7a45d4819007ea69
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75440,"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"
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on behalf of NASA, this mission brings essential supplies to the International
Space Station using the cargo variant of SpaceX\'s Dragon 2 spacecraft. 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":["5ea6ed2d080df4000697c904"],"
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ilures":[],"details":"Inspiration4 is the world\xe2\x80\x99s first all-civilian mission to space. The mission will be commanded by Jared Isaacman, the 37-year-old founder and Chief Executive Officer of Shift4 Payments and an accomplished pilot and adventurer. Inspiration4 will leave Earth from Kennedy Space Center\xe2\x80\x99s historic Launch Complex 39A, the embarkation point for Apollo and Space Shuttle missions, and travel across a low 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-person crew that will raise awareness and funds for St. Jude Children\xe2\x80\x99s Research Hospital, this milestone represents a new era for human spaceflight and exploration.","crew":["607a3a5f5a906a44023e0870","607a3ab45a906a44023e0872","607b48375a906a44023e08b8","607b48da5a906a44023e08b9"],"ships":["5ea6ed2f080df4000697c910","5ee68c683c228f36bd5809b5","614251b711a64135defb3654"],"capsules":["5f6f99fddcfdf403df379709"],"payloads":["607a382f5a906a44023e0867"],"launchpad":"5e9e4502f509094188566f88","flight_number":135,"name":"Inspiration4","date_utc":"2021-09-16T00:02:00.000Z","date_unix":1631750520,"date_local":"2021-09-15T20:02:00-04:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5f57c5440622a633027900a0","flight":3,"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":"621d64e6-0513-45dc-8ffa-c9fd56518398","id":"607a37565a906a44023e0866"},{"fairings":null,"links":{"patch":{"small":"https://images2.imgbox.com/5a/2f/w3woVyro_o.png","large":"https://images2.imgbox.com/80/34/J7ROsgsi_o.png"},"reddit":{"campaign":"https://www.reddit.com/r/spacex/comments/q8r52a/crew3_launch_campaign_thread/","launch":"https://www.reddit.com/r/spacex/comments/qij6f4/rspacex_crew3_launch_discussion_updates_thread/","media":null,"recovery":null},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/51673353699_e3da266245_o.jpg","https://live.staticflickr.com/65535/51673548360_64354b760f_o.jpg","https://live.staticflickr.com/65535/51672676881_3b88410a96_o.jpg","https://live.staticflickr.com/65535/51673548330_7acc53d2fb_o.jpg","https://live.staticflickr.com/65535/51671874407_4f56a87855_o.jpg","https://live.staticflickr.com/65535/51672676961_36371a6a76_o.jpg","https://live.staticflickr.com/65535/51672915563_7f5b373701_o.jpg","https://live.staticflickr.com/65535/51672915633_947e35cabc_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/WZvtrnFItNs","youtube_id":"WZvtrnFItNs","article":"https://spaceflightnow.com/2021/11/11/spacex-debuts-new-dragon-capsule-in-launch-to-the-international-space-station/","wikipedia":"https://en.wikipedia.org/wiki/SpaceX_Crew-3"},"static_fire_date_utc":"2021-10-28T05:46:00.000Z","static_fire_date_unix":1635399960,"net":false,"window":0,"rocket":"5e9d0d95eda69973a809d1ec","success":true,"failures":[],"details":"SpaceX will launch the third operational mission of its Crew Dragon vehicle as part of NASA\'s Commercial Crew Program, carrying four astronauts to the International Space Station, including 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 Crew-2 mission returns from the space station in November.","crew":["5fe3c587b3467846b3242198","5fe3c5beb3467846b3242199","5fe3c5f6b3467846b324219a","60c4b5ad4e041c0b356db393"],"ships":["5ea6ed2d080df4000697c904","5ee68c683c228f36bd5809b5","614251b711a64135defb3654","5ea6ed2f080df4000697c90c","5ea6ed2e080df4000697c909"],"capsules":["617c05591bad2c661a6e2909"],"payloads":["5fe3b3bab3467846b3242174"],"launchpad":"

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ASA\'s Double Asteroid Redirect Test (DART) will demonstrate the use of a kinetic impactor to alter an asteroid\'s trajectory, an intervention that could be used in the future to prevent devastating Earth impacts. The target system consists of Didymos, 780 meters in diameter, and its moonlet Dimorphos, 160 meters. The DART spacecraft will intercept the double asteroid, using autonomous guidance to crash into the smaller one. Moving at about 6 km/s, the transferred momentum should alter Dimorphos\'s 12 hour orbital period around its companion by several minutes. The mission tests several technologies, including the Small-body Maneuvering Autonomous Real-Time Navigation (SMART Nav) used to differentiate and steer toward the target body and Roll-Out Solar Arrays (ROSA) with Transformational Solar Array concentrators. NASA\xe2\x80\x99s Evolutionary Xenon Thruster \xe2\x80\x94 Commercial (NEXT\xe2\x80\x93C) ion engine will also be demonstrated, although the spacecraft\'s primary propulsion is hydrazine thrusters. DART should arrive at Didymos in late September 2022, when it is about 11 million kilometers from Earth. Ten days before impact, the Italian Space Agency\'s cubesat LICIACube will be deployed to observe the collision and ejecta with its two cameras. Earth-based telescopes will be used to measure the altered orbit.","crew":[],"ships":["5ea6ed30080df4000697c913","5ea6ed2f080df4000697c90b","5ea6ed30080df4000697c912"],"capsules":[],"payloads":["5fe3c4a6b3467846b3242192"],"launchpad":"5e9e4502f509092b78566f87","flight_number":138,"name":"DART","date_utc":"2021-11-24T06:20:00.000Z","date_unix":1637734800,"date_local":"2021-11-23T22:20:00-08:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5f57c54a0622a633027900a1","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":"c4b2f90e-3385-4cbe-a89f-fc5f57da1bfb","id":"5fe3b107b3467846b324216b"},{"fairings":{"reused":null,"recovery_attempt":true,"recovered":null,"ships":["618fad7e563d69573ed8caa9"]},"links":{"patch":{"small":"https://images2.imgbox.com/fc/e7/esvHlHwA_o.png","large":"https://images2.imgbox.com/91/15/2LRaHihk_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/r79osa/spacex_starlink_43_launch_discussion_and_updates/","media":null,"recovery":"https://www.reddit.com/r/spacex/comments/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"original":["https://live.staticflickr.com/65535/51732172914_4efa7d5210_o.jpg","https://live.staticflickr.com/65535/51730706247_4b5bf2899f_o.jpg","https://live.staticflickr.com/65535/51732172879_4ce91546ed_o.jpg"]},"presskit":null,"webcast":"https://youtu.be/594TbXriaAk","youtube_id":"594TbXriaAk","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":null,"crew":[],"ships":["5ea6ed2d080df4000697c904","618fad7e563d69573ed8caa9","5ee68c683c228f36bd5809b5"],"capsules":[],"payloads":["6161d0f26db1a92bfba85355"],"launchpad":"5e9e4501f509094ba4566f84","flight_number":139,"name":"Starlink 4-3 (v1.5)","date_utc":"2021-12-01T23:20:00.000Z","date_unix":1638400800,"date_local":"2021-12-01T18:20:00-05:00","date_precision":"hour","upcoming":false,"cores":[{"core":"5ef670f10059c33cee4a826c","flight":9,"gridfins":true,"legs":true,"reused":true,"landing_attempt":true,"landing_success":true,"landing_type":"ASDS","landpad":"5e9e3033383ecb075134e7cd"}],"auto_update":true,"tbd":false,"laun

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satellites to Shell number 4 at 53.2\xc2\xb0. This is unusual as the mission is
launching from Vandenberg as these missions usually launch from the East Coast."
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htnow.com/2021/12/19/spacex-two-for-two-in-companys-first-falcon-9-launch-double
header/","wikipedia":"https://en.wikipedia.org/wiki/T%C3%BCrksat_5B"},"static_fi
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at Airbus Defense and Space\'s facilities in Toulouse, France, will soon be sent
to the Cape Canaveral Space Launch Station located in Florida, United States.
The satellite will be launched into space onboard the Falcon 9 rocket following
pre-launch preparations. With an estimated in-orbit lifetime of 30 years and the
aim of securing Turkey\xe2\x80\x99s orbital and frequency rights, T\xc3\xbcrksat
5B will be launched into an orbital slot at 42 degrees East. 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 Middle East, the Persian Gulf,
the Red Sea, the Mediterranean, North Africa, East Africa, South Africa and
Nigeria. Apart from that, the satellite will also provide customized services
for airlines and commercial ship operators around the world thanks to the fact
that it operates in Ka-Band.","crew":[],"ships":["618fad7e563d69573ed8caa9","5ee
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mission brings essential supplies to the International Space Station using the
cargo variant of SpaceX\'s Dragon 2 spacecraft. 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

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deploys-49-more-starlink-satellites-in-first-launch-of-2022/","wikipedia":"https
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2/01/italian-radar-satellite-rides-spacex-rocket-into-polar-orbit/","wikipedia":

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orbit from Florida as part of CSG-2 Mission. 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","crew":[],"ships":[],"capsules":[],"payloads":["6161d3a0
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/spaceflightnow.com/2022/02/02/spacex-launches-classified-nro-satellite-from-
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/k2ts1q/rspacex_fleet_updates_discussion_thread/"},"flickr":{"small":[],"origina
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,"flight_number":186,"name":"Starlink 4-35 (v1.5)","date_utc":"2022-09-24T23:30:
00.000Z","date_unix":1664062200,"date_local":"2022-09-24T19:30:00-04:00","date_p
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ng_success":true,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"a
uto_update":true,"tbd":false,"launch_library_id":"1c903b65-6667-4fd5-944d-296c5f

13e01f","id":"63161339ffc78f3b8567070c"},{"fairings":null,"links":{"patch":{"sma
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mgbox.com/33/2e/k6VE4iYl_o.png"},"reddit":{"campaign":null,"launch":"https://www
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n_and/","media":null,"recovery":null},"flickr":{"small":[],"original":[]},"press
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3e","62dd7253202306255024d13f"],"ships":[],"capsules":["617c05591bad2c661a6e2909
"],"payloads":["62dd73ed202306255024d145"],"launchpad":"5e9e4502f509094188566f88
","flight_number":187,"name":"Crew-5","date_utc":"2022-10-05T16:00:00.000Z","dat
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ur","upcoming":false,"cores":[{"core":"633d9da635a71d1d9c66797b","flight":1,"gri
dfins":true,"legs":true,"reused":false,"landing_attempt":true,"landing_success":
true,"landing_type":"ASDS","landpad":"5e9e3033383ecbb9e534e7cc"}],"auto_update":
true,"tbd":false,"launch_library_id":"f33d5ece-e825-4cd8-809f-1d4c72a2e0d3","id"
:"62dd70d5202306255024d139"}]'

[ ]:
```
static_json_url='https://cf-courses-data.s3.us.cloud-object-storage.appdomain.
↪cloud/IBM-DS0321EN-SkillsNetwork/datasets/API_call_spacex_api.json'
```

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

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

[ ]:
```
data=pd.json_normalize(response.content)
```

[ ]:
```
data.head()
```

[ ]:
```
import requests
import json
import pandas as pd
```

[ ]:
```
static_json_url='https://cf-courses-data.s3.us.cloud-object-storage.appdomain.
↪cloud/IBM-DS0321EN-SkillsNetwork/datasets/API_call_spacex_api.json'
```

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

[ ]:
```
if response.status_code == 200:
    json_data=response.json()
    df=pd.json_normalize(json_data)
```

[ ]:
```
df.head()
```

[ ]:
```
df['rocket']
```

[ ]:
```
df[['rocket','payloads','launchpad','cores']]
```

[ ]:
```
data = data[['rocket', 'payloads', 'launchpad', 'cores', 'flight_number',␣
 ↪'date_utc']]


data = data[data['cores'].map(len)==1]
data = data[data['payloads'].map(len)==1]


data['cores'] = data['cores'].map(lambda x : x[0])
data['payloads'] = data['payloads'].map(lambda x : x[0])

data['date'] = pd.to_datetime(data['date_utc']).dt.date


data = data[data['date'] <= datetime.date(2020, 11, 13)]
```

[ ]:
```
df=df[['rocket', 'payloads', 'launchpad', 'cores', 'flight_number', 'date_utc']]
```

[ ]:
```
df=df[df['cores'].map(len)==1]
df=df[df['payloads'].map(len)==1]
```

[ ]:
```
df['cores'] = df['cores'].map(lambda x : x[0])
df['payloads'] = df['payloads'].map(lambda x : x[0])
```

[ ]:
```
df['date']=pd.to_datetime(df['date_utc']).dt.date
```

[ ]:
```
df=df[df['date']<=datetime.date(2020, 11,13)
```

[ ]:
```
df = df[df['date'] <= datetime.date(2020, 11, 13)]
```

[ ]:
```
BoosterVersion = []
PayloadMass = []
Orbit = []
LaunchSite = []
Outcome = []
Flights = []
GridFins = []
Reused = []
Legs = []
LandingPad = []
Block = []
ReusedCount = []
Serial = []
```

```
Longitude = []
Latitude = []
```

[ ]:
```
getBoosterVersion(df)
```

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

[ ]:
```
getlaunchSite(df)
getPayloadData(df)
getCoreData(df)
```

[ ]:
```
import pandas as pd
```

[ ]:
```
launch_dict  =  {'FlightNumber': list(df['flight_number']),
'Date': list(df['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}
```

[ ]:
```
min_length = min([len(v) for v in launch_dict.values()])
```

[ ]:
```
import pandas as pd

# Example dictionary with lists of different lengths
launch_dict = {
    'FlightNumber': [1, 2, 3],
    'Date': ['2022-01-01', '2022-02-01', '2022-03-01'],
    'BoosterVersion': ['B1010', 'B1011', 'B1012'],
    'PayloadMass': [5000, 6000, 7000],
    'Orbit': ['LEO', 'GTO', 'MEO'],
    'LaunchSite': ['CCAFS SLC 40', 'CCAFS SLC 40', 'KSC LC 39A'],
    'Outcome': ['Success', 'Success', 'Failure'],
    'Flights': [1, 2, 3],
    'GridFins': [True, True, False],
```

```
    'Reused': [False, True, True],
    'Legs': [False, True, True],
    'LandingPad': ['LZ-1', 'LZ-1', 'LZ-2'],
    'Block': [1, 2, 3],
    'ReusedCount': [0, 1, 2],
    'Serial': ['B0001', 'B0002', 'B0003'],
    'Longitude': [-80.5774, -80.5774, -80.5774],
    'Latitude': [28.5619, 28.5619, 28.5619]
}


# Create the DataFrame
df = pd.DataFrame(launch_dict)

print(df)
```

[ ]:
```
df = pd.DataFrame(launch_dict)

print(df)
```

[ ]:
```
df.head()
```

[ ]:
```
data_falcon9=df[df['BoosterVersion']!= 'Falcon1']
```

[ ]:
```
data_falcon9['FlightNumber']=list(range(1,len(data_falcon9)+1))
```

[ ]:
```
data_falcon9.head()
```

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

[3]:
```
data_falcon9['Flights']
```

```
---------------------------------------------------------------------------
NameError                                 Traceback (most recent call last)
/tmp/ipykernel_1077/2852323957.py in <module>
----> 1 data_falcon9['Flights']

NameError: name 'data_falcon9' is not defined
```

[4]:
```
# Pandas is a software library written for the Python programming language for␣
 ↪data manipulation and analysis.
import pandas as pd
#NumPy is a library for the Python programming language, adding support for␣
 ↪large, multi-dimensional arrays and matrices, along with a large collection␣
 ↪of high-level mathematical functions to operate on these arrays
import numpy as np
```

[5]:
```
df=pd.read_csv("https://cf-courses-data.s3.us.cloud-object-storage.appdomain.
↪cloud/IBM-DS0321EN-SkillsNetwork/datasets/dataset_part_1.csv")
df.head(10)
```

[5]:

	FlightNumber	Date	BoosterVersion	PayloadMass	Orbit	LaunchSite
0	1	2010-06-04	Falcon 9	6104.959412	LEO	CCAFS SLC 40
1	2	2012-05-22	Falcon 9	525.000000	LEO	CCAFS SLC 40
2	3	2013-03-01	Falcon 9	677.000000	ISS	CCAFS SLC 40
3	4	2013-09-29	Falcon 9	500.000000	PO	VAFB SLC 4E
4	5	2013-12-03	Falcon 9	3170.000000	GTO	CCAFS SLC 40
5	6	2014-01-06	Falcon 9	3325.000000	GTO	CCAFS SLC 40
6	7	2014-04-18	Falcon 9	2296.000000	ISS	CCAFS SLC 40
7	8	2014-07-14	Falcon 9	1316.000000	LEO	CCAFS SLC 40
8	9	2014-08-05	Falcon 9	4535.000000	GTO	CCAFS SLC 40
9	10	2014-09-07	Falcon 9	4428.000000	GTO	CCAFS SLC 40

	Outcome	Flights	GridFins	Reused	Legs	LandingPad	Block
0	None None	1	False	False	False	NaN	1.0
1	None None	1	False	False	False	NaN	1.0
2	None None	1	False	False	False	NaN	1.0
3	False Ocean	1	False	False	False	NaN	1.0
4	None None	1	False	False	False	NaN	1.0
5	None None	1	False	False	False	NaN	1.0
6	True Ocean	1	False	False	True	NaN	1.0
7	True Ocean	1	False	False	True	NaN	1.0
8	None None	1	False	False	False	NaN	1.0
9	None None	1	False	False	False	NaN	1.0

	ReusedCount	Serial	Longitude	Latitude
0	0	B0003	-80.577366	28.561857
1	0	B0005	-80.577366	28.561857
2	0	B0007	-80.577366	28.561857
3	0	B1003	-120.610829	34.632093
4	0	B1004	-80.577366	28.561857
5	0	B1005	-80.577366	28.561857
6	0	B1006	-80.577366	28.561857
7	0	B1007	-80.577366	28.561857
8	0	B1008	-80.577366	28.561857
9	0	B1011	-80.577366	28.561857

[6]:
```
df.isnull().sum()/len(df)*100
```

[6]:
```
FlightNumber       0.000000
Date               0.000000
BoosterVersion     0.000000
PayloadMass        0.000000
Orbit              0.000000
```

```
LaunchSite         0.000000
Outcome            0.000000
Flights            0.000000
GridFins           0.000000
Reused             0.000000
Legs               0.000000
LandingPad        28.888889
Block              0.000000
ReusedCount        0.000000
Serial             0.000000
Longitude          0.000000
Latitude           0.000000
dtype: float64
```

[7]:
```
df.dtypes
```

[7]:
```
FlightNumber        int64
Date               object
BoosterVersion     object
PayloadMass       float64
Orbit              object
LaunchSite         object
Outcome            object
Flights             int64
GridFins             bool
Reused               bool
Legs                 bool
LandingPad         object
Block             float64
ReusedCount         int64
Serial             object
Longitude         float64
Latitude          float64
dtype: object
```

[27]:
```
launch_counts=df['LaunchSite'].value_counts()
print(launch_counts)
```

```
CCAFS SLC 40    55
KSC LC 39A      22
VAFB SLC 4E     13
Name: LaunchSite, dtype: int64
```

[13]:
```
landing_outcomes=df['Outcome'].value_counts()
print(landing_outcomes)
```

```
True ASDS      41
None None      19
```

```
True RTLS      14
False ASDS      6
True Ocean      5
False Ocean     2
None ASDS       2
False RTLS      1
Name: Outcome, dtype: int64
```

[14]:
```
for i,outcome in enumerate(landing_outcomes.keys()):
    print(i,outcome)
```

```
0 True ASDS
1 None None
2 True RTLS
3 False ASDS
4 True Ocean
5 False Ocean
6 None ASDS
7 False RTLS
```

[15]:
```
bad_outcomes=set(landing_outcomes.keys()[[1,3,5,6,7]])
bad_outcomes
```

[15]:
```
{'False ASDS', 'False Ocean', 'False RTLS', 'None ASDS', 'None None'}
```

[16]:
```
bad_outcomes={'Rapid Unplanned Disassembly','Destroyed'}
```

[20]:
```
landing_class=[0 if outcome in bad_outcomes else 1 for outcome in df['Outcome']]
```

[23]:
```
print(landing_class[:5])
```

```
[1, 1, 1, 1, 1]
```

[24]:
```
df['Class']=landing_class
df[['Class']].head(8)
```

[24]:

	Class
0	1
1	1
2	1
3	1
4	1
5	1
6	1
7	1

[25]:
```
df.head(5)
```

[25]:

	FlightNumber	Date	BoosterVersion	PayloadMass	Orbit	LaunchSite	Outcome	Flights	GridFins	Reused	Legs	LandingPad	Block	ReusedCount	Serial	Longitude	Latitude	Class
0	1	2010-06-04	Falcon 9	6104.959412	LEO	CCAFS SLC 40	None None	1	False	False	False	NaN	1.0	0	B0003	-80.577366	28.561857	1
1	2	2012-05-22	Falcon 9	525.000000	LEO	CCAFS SLC 40	None None	1	False	False	False	NaN	1.0	0	B0005	-80.577366	28.561857	1
2	3	2013-03-01	Falcon 9	677.000000	ISS	CCAFS SLC 40	None None	1	False	False	False	NaN	1.0	0	B0007	-80.577366	28.561857	1
3	4	2013-09-29	Falcon 9	500.000000	PO	VAFB SLC 4E	False Ocean	1	False	False	False	NaN	1.0	0	B1003	-120.610829	34.632093	1
4	5	2013-12-03	Falcon 9	3170.000000	GTO	CCAFS SLC 40	None None	1	False	False	False	NaN	1.0	0	B1004	-80.577366	28.561857	1

[26]:
```
df["Class"].mean()
```

[26]:
```
1.0
```

[ ]:
```

```