

Space Activities in 2019

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Contents

Preface	3
1 Orbital Launch Attempts	3
1.1 Launch statistics by country	3
1.2 Launch failures	4
1.3 Commercial Launches	4
2 Satellite Launch Statistics	6
2.1 Satellites of the major space powers, past 8 years	6
2.2 Satellite ownership by country	7
2.3 Satellite manufacture by country	11
3 Scientific Space Programs	11
4 Military Space Activities	12
4.1 Military R&D	12
4.2 Space surveillance	12
4.3 Reconnaissance and Signals Intelligence	13
4.4 Space Weapons	13
5 Special Topics	13
5.1 The Indian antisatellite test and its implications	13
5.2 Starlink	19
5.3 Lightsail-2	24
5.4 Kosmos-2535/2536	25
5.5 Kosmos-2542/2543	29
5.6 Starliner	29
5.7 OTV-5 and its illegal secret deployments	32
5.8 TJS-3	33
6 Orbital Debris and Orbital Decay	35
6.1 Disposal of launch vehicle upper stages	36
6.2 Orbitaries	39
6.3 Retirements in the GEO belt	42
6.4 Debris events	43
7 Acknowledgements	43
Appendix 1: 2019 Orbital Launch Attempts	44

Appendix 2a: Satellite payloads launched in 2018 (Status end 2019)	46
Appendix 2b: Satellite payloads deployed in 2018 (Revised; Status end 2019)	55
Appendix 2c: Satellite payloads launched in 2019	63
Appendix 2d: Satellite payloads deployed in 2019	72

Rev 1.0 - Jan 02 Initial version

Rev 1.1 - Jan 02 Fixed two incorrect values in tables 4a/4b

Rev 1.2 - Jan 02 Minor typos fixed

Rev 1.3 - Jan 12 Corrected RL10 variant, added K2491 debris event, more typos

Preface

In this paper I present some statistics characterizing astronomical activity in calendar year 2019. In the 2014 edition of this review, I described my methodological approach and some issues of definitional ambiguity; that discussion is not repeated here, and it is assumed that the reader has consulted the earlier document, available at <https://planet4589.org/space/papers/space14.pdf> (The present work may be found as space19.pdf at the same location).

I am adding one significant change (and complication) this year. How many satellites were launched in a particular year? That depends on whether you actually mean (A) launched from Earth, i.e. departed the launch pad or (B) deployed, i.e. became physically separate orbiting objects (launched from an orbiting rocket stage or parent spacecraft). In 2014 I noted that this gave slightly different answers due to a few satellites being held aboard ISS over the year boundary for later deployment. In 2018-2019 the difference include over 100 Sprite satellites, which went up on a Cygnus in 2018 and were deployed from their parent satellite in 2019. Since this distinction is no longer a small nitpick, this year I am giving both versions (and updating the 2018 data for good measure, since the Sprites were omitted).

1 Orbital Launch Attempts

1.1 Launch statistics by country

During 2019 there were 102 orbital launch attempts, with 97 reaching orbit.

	2009-2013 Average	2014	2015	2016	2017	2018	2019
USA	19.0	24	20	22	29	31	21
Russia	30.2	32	26	17	19	17	22
China	14.8	16	19	22	18	39	34
Europe		11	12	11	11	11	9
<i>Japan</i>		4	4	4	7	6	2
<i>India</i>		4	5	7	5	7	6
<i>Israel</i>		1	0	1	0	0	0
<i>N Korea</i>		0	0	1	0	0	0
<i>S Korea</i>		0	0	0	0	0	0
<i>Iran</i>		0	1	0	1	0	2
<i>New Zealand</i>		0	0	0	1	3	6
Other		9	10	13	14	16	16
Total	79.0	92	87	85	91	114	102

The Arianespace-managed Soyuz launches from French Guiana are counted as European.

Electron is licensed in the USA but launched from New Zealand territory by the New Zealand subsidiary of the US-headquartered Rocket Lab. I go back and forth on this, but for now I consider Electron to be a New Zealand launch of a US-manufactured rocket.

Five launches failed to reach orbit (2 Chinese, 2 Iranian, 1 European).

1.2 Launch failures

During the year there were 5 orbital launch failures. In general I award partial success scores to launches which reach orbit but do not successfully deploy their payloads in the targeted orbit; there were no such cases in 2019.

In addition to the two Iranian launch failures, on Aug 29 another Safir rocket exploded on the launchpad during launch preparations, before its satellite payload had been installed. I count this as an industrial accident, not a launch attempt.

Table 2: 2019 orbital launch failures and partial failures

Designation	Date	LV State	LV	Payload	Type of failure	Launch Score
2019-F01	Jan 15	Iran	Simorgh	Payam	Stage 2 failure?	0.00
2019-F02	Feb 5	Iran	Safir	Dousti	Stage 1 failure?	0.00
2019-F03	Mar 27	China	OS-M1	Lingque 1B	Stage 2 failure	0.00
2019-F04	May 22	China	Chang Zheng 4C	Yaogan 33	Stage 3 restart failed	0.00
2019-F05	Jul 11	Europe	Vega	FalconEye 1	Stage 2 failure	0.00

1.3 Commercial Launches

Of the 102 orbital launch attempts: 57 were carried out by governments; 19 by commercial companies under contract to their host governments, and 26 for commercial customers, including foreign governments.

I count US Commercial Cargo and Crew flights as ‘under contract to host government’; although the launch contract is through a commercial intermediary, the choice of vehicle is negotiated as part of a government contract.

Table 3: Commercial versus government launches

Launch provider	Launches	Type	Customers
US Launch providers			
ULA/Boeing Delta 4	3	CSP	3 US Gov
ULA/LM Atlas 5	2	CSP	2 US Gov
SpaceX Falcon 9	11	FCS	4 US Gov, 7 Comm
SpaceX Falcon Heavy	2	FCS	1 US Gov, 1 commercial
NG Antares	2	FCS	2 US Gov
NG Pegasus	1	CSP	1 US Gov
European Launch providers			
Arianespace Vega	2	FC?	1 Eur gov, 1 comm./foreign
Arianespace Ariane 5	4	FC	0.5 Eur gov, 3.5 comm./for.
Arianespace Soyuz	3	FC	1 Eur gov, 2 comm.
Russian Launch providers			
Khrunichev Proton	5	GOV	3 Ru gov, 2 comm/for.
Khrunichev Rokot	2	GOV	2 Ru gov
Roskosmos Soyuz	9	GOV	9 Ru gov (civil)
VVKO Soyuz	6	GOV	5 Ru gov (military), 1 foreign
Chinese Launch providers			
CALT CZ-2C	1	GOV	Chinese gov
CALT CZ-3A/B/C	12	GOV	12 Chinese gov
CALT CZ-5	1	GOV	Chinese gov
CALT CZ-6/7	1	GOV	1 commercial
CALT CZ-2F	0	GOV	Chinese gov
CALT CZ-11	3	GOV	3 commercial
SBA CZ-2D/4B/4C	8	GOV	8 Chinese gov
EXPACE KZ-1A	5	CO?	1 Chinese gov, 4 Comm
LANDSPACE ZQ-1	0	CO	Comm
China Long March JL-1	1	CO?	Comm
ONESPACE OS-M1	1	FC	Comm
ISPACE SQ-1	1	FC	Comm
Other Launch providers			
Rocket Labs Electron	6	FC	4 Comm, 2 US Gov
MHI H-IIA/B	1	CSP	1 Japan gov
JAXA Epsilon	1	GOV	1 Japan gov
ISRO/Antrix PSLV/GSLV	5	GOV	5 Indian gov
ISRO/Antrix GSLV3	1	GOV	1 Indian gov
IRSA Safir	1	GOV	1 Iranian gov
IRSA Simorgh	1	GOV	1 Iranian gov
ISA Shaviyt	0	GOV	0 Israeli gov
NADA Kwangmyongsong	0	GOV	0 North Korean gov

Here GOV = Government; CO = Commercial operation of government developed rocket; CSP = Commercial service provision to government; FCS = Fully commercial service (but customers may include gov); FC = Fully commercial (no gov involved); A = Amateur, academic, non-profit. See the 2014 document for full discussion.

2 Satellite Launch Statistics

2.1 Satellites of the major space powers, past 8 years

Here I give total payloads (1) launched (Table 4a) and (2) deployed (Table 4b). The 100+ Sprite satellites launched in 2018 but deployed in 2019 make a big difference between the two tables. These satellites remained in orbit for several days, but were not tracked or cataloged by the US.

The statistics for 2017 have been adjusted by adding three secret satellites as a placeholder for the unknown number of satellites covertly deployed by OTV-5 sometime during its mission (see Special Topics).

The 516 satellites listed here and in Appendix 2c as payloads launched in 2019 include two ODE Cal Sphere subsatellites attached to the AFOTEC-1 satellite, and 29 Probe subsatellites to be deployed by Aerocube 10a; only two of these have been cataloged to date and it is unclear when the others will be released. A further 19 satellites are listed as attached to deployers currently aboard either the ISS or the attached Cygnus NG-12 craft.

Not included in the count, but listed at the end of Appendix 2c, are several objects which are marginal cases, mostly payloads which remain attached to other payloads either deliberately (Kenobi, XS-6, Hecate-1, Cube-X1) or through failure to deploy (TEPCE 2). The two Oculus-ASR Spheres, one of which has been deployed, are not currently counted as payloads.

Table 4a: Payloads launched per year								
	2012	2013	2014	2015	2016	2017	2018	2019
USA	35	85	111	112	95	282	311	304
Russia	22	29	34	27	15	24	23	30
China	25	18	26	44	40	36	98	73
Europe	22	34	29	22	22	42	52	45
Other	28	41	62	31	50	60	86	64
Total	132	207	261	236	222	444	570	516

The 576 satellites listed here and in Appendix 2d as having been deployed during 2019 include many small satellites that were launched in 2018 and deployed in 2019, including the Sprite chipsats deployed from Kicksat-2 and the Thinsat satellites ejected from an Antares second stage. Neither Sprites nor Thinsats were cataloged in the US satellite catalog. Not included in the count, but listed at the end of Appendix 2d, are the same attached satellites mentioned above and also the SeeMe satellite, launched in 2018. This satellite should have deployed from the EXCITE PTB-1 satellite at some point in 2018 or 2019, but apparently did not do so.

Table 4b: Payloads deployed per year								
	2012	2013	2014	2015	2016	2017	2018	2019
USA	35	84	96	106	105	288	195	369
Russia	23	29	33	27	14	25	23	30
China	25	17	24	44	38	35	96	73
Europe	22	34	29	22	20	43	48	45
Other	28	41	56	31	44	65	81	59
Total	133	205	238	230	221	456	443	576

2.2 Satellite ownership by country

I now break this down by class for 2019 (first the launch powers, then other countries).

In 2019 the satellites deployed were owned by 43x countries and three European organizations: ESA, EUMETSAT and the European Union.

In general I consider western Europe, loosely defined, as a single 'space power' because of the tight integration of its aerospace industry. Within this view, the four leading space powers are USA, China, Russia and (W) Europe. The second tier of space powers is comprised of Japan and India; all others are lumped as 'Other', further broken down regionally (and arbitrarily) for convenience. The 'Other' powers have limited or no launch capability of their own. (South Korea and Canada have space industries that make them candidates for the second tier in the near future). Countries which owned satellites covered in previous editions of the report are included in the table even if they had no new satellites this year.

Table 5: 2019 payloads launched, by owner country and class

	A Academic/ NonProfit	B Business/ Commercial	C Civil	D Defense	SS Spaceship	Total Number	Total Mass (tonne)
USA	132	199	4	28	6	369	158
China	2	44	9	18	0	73	69
Russia	3	2	7	11	7	30	76
ESA/EU/EUM	0	0	3	0	0	3	3
AT Austria	0	0	0	0	0	0	0
B Belgium	0	0	0	0	0	0	0
CH Switzerland	0	1	0	0	0	1	0
D Germany	1	12	0	0	0	13	0
DK Denmark	1	0	0	0	0	1	0
E Spain	0	2	0	0	0	2	0
F France	1	4	2	0	0	7	6
FI Finland	0	2	0	0	0	2	0
GR Greece	0	0	0	0	0	0	0
I Italy	0	0	1	1	0	2	3
L Luxembourg	0	0	0	0	0	0	0
N Norway	0	0	0	0	0	0	0
NL Netherlands	0	0	0	0	0	0	0
S Sweden	0	1	0	0	0	1	0
UK	0	13	0	0	0	13	8
Europe (W)	3	35	6	1	0	45	20
Japan	6	4	1	0	1	12	17
India	0	0	5	2	0	7	10
BG Bulgaria	0	0	0	0	0	0	0
BY Belarus	0	0	0	0	0	0	0
CZ Czechia	0	1	0	0	0	1	0
EE Estonia	0	1	0	0	0	1	0
HU Hungary	1	1	0	0	0	2	0
LT Lithuania	0	2	0	0	0	2	0
LV Latvia	0	0	0	0	0	0	0
PL Poland	1	1	0	0	0	2	0
UA Ukraine	0	0	0	0	0	0	0
SK Slovakia	0	0	0	0	0	0	0
<i>Subtotal OTHER:</i>							
<i>Europe (E)</i>	2	6	0	0	0	8	0
(continued)							

Table 5: (continued)

	A Academic/ NonProfit	B Business/ Commercial	C Civil	D Defense	SS Spaceship	Total Number	Total Mass (tonne)
AO Angola	0	0	0	0	0	0	0
DZ Algeria	0	0	0	0	0	0	0
EG Egypt	0	1	3	0	0	4	7
ET Ethiopia	0	0	1	0	0	1	0
GH Ghana	0	0	0	0	0	0	0
KE Kenya	0	0	0	0	0	0	0
MA Morocco	0	0	0	0	0	0	0
NG Nigeria	0	0	0	0	0	0	0
SD Sudan	0	0	1	0	0	1	0
ZA South Africa	0	0	0	0	0	0	0
<i>Subtotal OTHER: Africa</i>	0	1	5	0	0	6	7
AR Argentina	0	0	0	0	0	0	0
BR Brazil	1	0	0	0	0	1	0
CL Chile	0	0	0	0	0	0	0
CO Colombia	0	0	0	0	0	0	0
CR Costa Rica	0	0	0	0	0	0	0
EC Ecuador	1	0	0	0	0	1	0
MX Mexico	0	0	0	1	0	1	0
PE Peru	0	0	0	0	0	0	0
UY Uruguay	0	0	0	0	0	0	0
VE Venezuela	0	0	0	0	0	0	0
<i>Subtotal OTHER: Latin America</i>	2	0	0	1	0	3	0
IL Israel	2	3	0	0	0	5	6
JO Jordan	0	0	0	0	0	0	0
PK Pakistan	0	0	0	0	0	0	0
QA Qatar	0	0	0	0	0	0	0
SA Saudi Arabia	0	1	1	0	0	2	13
TR Turkey	0	0	0	0	0	0	0
UAE United Arab Em.	1	0	0	0	0	1	1
<i>Subtotal OTHER: Mideast</i>	3	4	1	0	0	8	20
(continued)							

Table 5: (continued)

	A Academic/ NonProfit	B Business/ Commercial	C Civil	D Defense	SS Spaceship	Total Number	Total Mass (tonne)
AZ Azerbaijan	0	0	0	0	0	0	0
BD Bangladesh	0	0	0	0	0	0	0
BT Bhutan	0	0	0	0	0	0	0
ID Indonesia	0	1	0	0	0	1	5
KP N Korea	0	0	0	0	0	0	0
KR S Korea	0	0	0	0	0	0	0
KZ Kazakhstan	0	0	0	0	0	0	0
LK Sri Lanka	1	0	0	0	0	1	0
MN Mongolia	0	0	0	0	0	0	0
MY Malaysia	0	0	0	0	0	0	0
NP Nepal	0	0	1	0	0	1	0
PH Phillipines	0	0	0	0	0	0	0
SG Singapore	0	1	0	0	0	1	0
T Thailand	0	1	0	0	0	1	0
TW Taiwan	0	0	6	0	0	6	2
VN Vietnam	0	0	1	0	0	1	0
<i>Subtotal OTHER:</i>							
<i>Asia (other)</i>	1	3	8	0	0	12	7
CA Canada	0	0	3	0	0	3	0
AU Australia	0	0	0	0	0	0	0
NZ New Zealand	0	0	0	0	0	0	0
<i>Subtotal OTHER:</i>							
<i>Can/Australasia</i>	0	0	3	0	0	3	4
Other	8	14	17	1	0	40	38
Total	154	298	49	61	14	576	384

2.3 Satellite manufacture by country

Most countries build only very small (cubesat) satellites, purchasing their larger satellites from one of the main space powers. Here I tabulate the manufacturers of the 253 satellites launched in 2019 with estimated launch masses of 100 kg or more.

HSF is 'Human spaceflight', including related robotic missions such as cargo ships to support ISS. 'Surv.' is surveillance, including early warning and space debris surveillance; visible and radar imaging recon satellites and weather sats are under 'Imaging'. Microgravity research, geodesy and planetary probes are included under Sci (Science). Satellites built in the UK, France, Germany, Italy, Spain and the Netherlands are lumped together as 'Europe' to reflect the integration of the western European aerospace industry.

Table 6: 2019 payloads by manufacturer country - 100 kg and up only									
	HSF	Comms	Imaging	Nav	SIGINT	Surv.	Sci	Tech	Total
USA	7	138	2	1	0	0	1	5	154
China	0	5	10	10	9	0	1	1	36
Europe	0	15	8	0	0	0	1	0	24
Russia	7	6	2	2	0	1	2	4	24
India	0	1	4	0	1	0	1	0	7
Japan	1	0	1	0	0	0	0	1	3
Ukraine	0	0	1	0	0	0	0	0	1
Israel	0	0	0	0	0	0	1	0	1
Canada	0	0	3	0	0	0	0	0	3
Total	15	165	31	13	10	1	7	11	253

3 Scientific Space Programs

Notable Earth orbital science missions launched in 2019 include:

- CHEOPS, an ESA satellite to carry out transit photometry of exoplanets to determine their radii.
- Spektr-RG, a Russian high energy astronomy observatory stationed at Earth-Sun L2. It carries two instruments: ART-XS, an 8-telescope cluster of X-ray telescopes from IKI/Moscow with mirrors from NASA-MSFC, and eROSITA, a 7-telescope imaging X-ray system from MPE/Munich. ART-XS has 1 arcmin resolution and operates in the 4-30 keV energy range. eROSITA covers the 0.3-10 keV energy range and has 0.25 arcmin resolution.
- ICON, a NASA satellite to study the ionosphere
- Taichi-1, a Chinese satellite testing technology for a future gravitational wave observatory. The system reached 1 ng of acceleration control and 0.1 nm position accuracy. A small test satellite called Tianqin-1 was launched later in the year with a related technology payload.

In deep space:

- On Jan 1, 42.8 AU from the Sun, the New Horizons space probe made a 3500 km flyby of transneptunian object (486958) Arrokoth (previously nicknamed Ultima Thule and carrying the provisional designation 2014 MU69).
- The Parker Solar Probe (launched 2018) made its 2nd and 3rd perihelia at 0.166 AU, and performed a Venus flyby on Dec 26 to reduce its next perihelion to 0.130 AU.
- Hayabusa-2 completed its exploration of Ryugu, with sample-collection touch-and-go landings on Feb 21 and Jul 11, an artificial crater creation experiment on Apr 5, and the deployment of the Minerva-II2 lander on Oct 2. (Minerva-II2 did not return useful data). On Nov 19 Hayabusa-2 departed Ryugu's gravitational sphere and began an ion-engine-assisted return to Earth, with landing expected in late 2020.
- Chang'e-4 landed on the lunar farside on Jan 3 near 177.6E 45.5S and deployed the Yutu-2 rover, which continued to operate at the end of 2019. The Queqiao relay satellite, in an Earth-Moon L2 halo orbit, continues to relay data.
- Israel's B'reshit (Beresheet) lunar lander entered lunar orbit on Apr 4 and made an unsuccessful landing attempt on Apr 11, impacting the surface at 32.6N 19.3E.
- India's Chandrayaan-2 entered lunar orbit on Aug 20. The orbiter spacecraft continues a lunar survey at the end of 2019. The Vikram lander separated on Sep 2 and made an unsuccessful landing attempt on Sep 6, impacting the surface at 22.8E 70.9S.

4 Military Space Activities

Military satellites include navigation, communications, and technology development missions in addition to the intelligence gathering activities that I report here.

4.1 Military R&D

DARPA's R3D2 satellite was launched in March using the small Electron vehicle to demonstrate new antenna technology. The Air Force Academy's FalconSat 7, which was to test a new kind of telescope optic, apparently failed after launch in June. The long-delayed USAF Space Test Program DSX satellite was launched to a 5983 x 12057 km x 42.2 deg orbit in June; its status is unknown.

4.2 Space surveillance

The US continued to experiment with spaceborne assets to track other satellites and space debris. The Air Force Research Lab's small S5 satellite was launched on Feb 22 and deployed from its parent satellite on Mar 4. However, it quickly failed and another near-synchronous asset, MYCROFT (launched in 2018) was sent to rendezvous with it in November. MYCROFT's own parent satellite, EAGLE, also maneuvered to approach the pair in late November. The satellites are in a 36035 km orbit 250 km above GEO. A 12U cubesat, the AFSMC's TDO, is also testing orbital debris tracking technologies. It was placed in geotransfer orbit on Aug 8.

Russia is also carrying out similar experiments; the Kosmos-2543 satellite deployed from Kosmos-2542 in December is discussed under Special Topics.

Russia also launched the third Kupol elliptical-orbit infrared early warning satellite. The Kupol (formerly Tundra) system replaces the older Okeanos system.

4.3 Reconnaissance and Signals Intelligence

The US National Reconnaissance Office launched USA 290, believed to be a CRYSTAL/KH-11-derivative imaging reconnaissance satellite. USA 290, according to hobbyist observers, is in a 396 x 421 km x 73.6 deg orbit.

China launched the 5th triplet of Yaogan 30 signals intelligence satellites on Jul 26. The TJS 4 satellite, launched to geostationary orbit on Oct 17, may also have a signals intelligence role. GaoFen 10 No. 2, launched on Oct 4, and GaoFen 12, launched Nov 27, are high resolution imaging satellites, probably operated by the military (lower-numbered GaoFen satellites seem to be civilian.) A Yaogan 33 radar imaging satellite was lost in a May 22 launch failure.

The first of Italy's COSMO-SkyMed Second Generation (CSG) radar imaging satellites was launched on Dec 18. The series will replace the four first-generation satellites launched in 2007-2010. FalconEye 1, the UAE's first spy satellite, was lost in the Vega launch failure on Jul 11.

Noteworthy this year and last is the launch of various commercial systems performing radio geolocation and radio spectrum background mapping that would normally be regarded as signals intelligence. These include Hawk A to C (Hawkeye 360, Virginia, from 2018); THEA (Aurora/SpaceQuest, Washington DC); BRO-ONE (Unseen, Brittany, France); Ningxia 1-1 to 1-5 (Ninxia Jingui, Zhongwei, China); and ATL-1 (ATL, Hungary).

4.4 Space Weapons

India carried out an antisatellite test on Mar 27; see the Special Topics section.

The Kosmos-2535/Kosmos-2536 satellites launched by Russia in July have been carrying out proximity experiments; they are discussed further under Special Topics.

5 Special Topics

5.1 The Indian antisatellite test and its implications

On Mar 27 India's DRDO defence agency tested an antisatellite weapon, the Prithvi Defense Vehicle PDV-II. The PDV-II was launched from Kalam Island at 0540 UTC and intercepted the Microsat-R satellite three minutes later. Microsat-R had been launched to a 265 x 279 km x 96.5 deg orbit on Jan 24.

India claimed that the orientation of and low altitude of the test would ensure that little debris would be left in orbit and that it would be almost all gone by 45 days after the test. Nevertheless, 125 objects were cataloged in orbit with apogees up to 2000 km. While some of the debris did reenter quickly, 5 months after the test 46 objects remained in orbit, and 17 objects were still being tracked at the end of 2019.

Indian advocates of the test pointed out that of order 100 debris objects is a tiny fraction of the circa 16000 cataloged debris objects in orbit. While this is true, they turn out to be a large fraction of the debris in the low-LEO regime in which human spaceflight activities take place. In Low LEO (below 500 km) debris orbital lifetimes are short so the population is relatively small and recent. How much debris is there in different altitude ranges? One complication is that some debris is in elliptical orbits. To address this, for each altitude range (h1,h2) I studied and for each debris object S, I took the most recent orbital data for the object and calculated the fraction f(S) of time the object S spent between altitude h1 and h2. f(S) is therefore between 0 and 1 for each object and the sum $N=f(S)$ over all S gives the time-averaged number of objects in that altitude range (where the time average is taken over a few days during which the orbits are assumed constant). If all objects were in circular orbits, f(S) is either exactly 0 or exactly 1 and N would just be the number of objects orbiting at the right height.

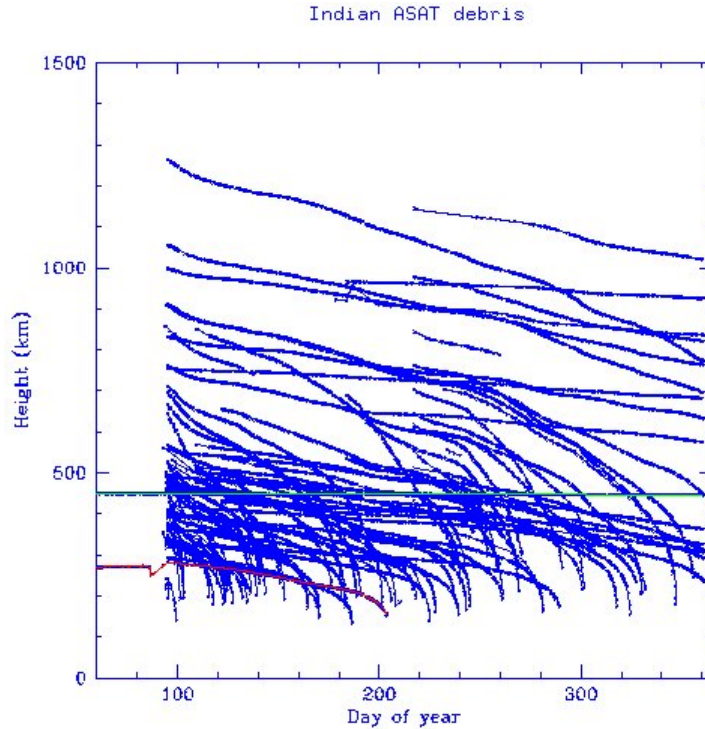


Figure 1: 2019-006 objects, altitude (average of apogee and perigee) versus day of year. Green - PSLV rocket. Red - Parent satellite, then main debris object. Blue - debris objects.

In the following charts, for each height range, I summarize active payloads and debris objects in the upper and lower panels, versus owner country or ‘country group’. Western European countries are grouped together in a single ‘country group’. Russian, Chinese, US, Indian and Japanese objects are shown separately. All remaining countries are lumped together in an ‘other’ group. The data are for mid 2019.

The height ranges I looked at were (1) Low LEO, below 500 km (Fig 2). (2) Upper LEO, 500-1500 km (Fig 3); (3) Objects between 1500 km and 34000 km. (Fig 4) This medium altitude range above LEO and below GEO includes many debris objects from geostationary transfer orbits; and finally. (4) objects between 34000 and 38000 km (Fig 5). This includes GEO objects as well as objects in the GEO graveyard.

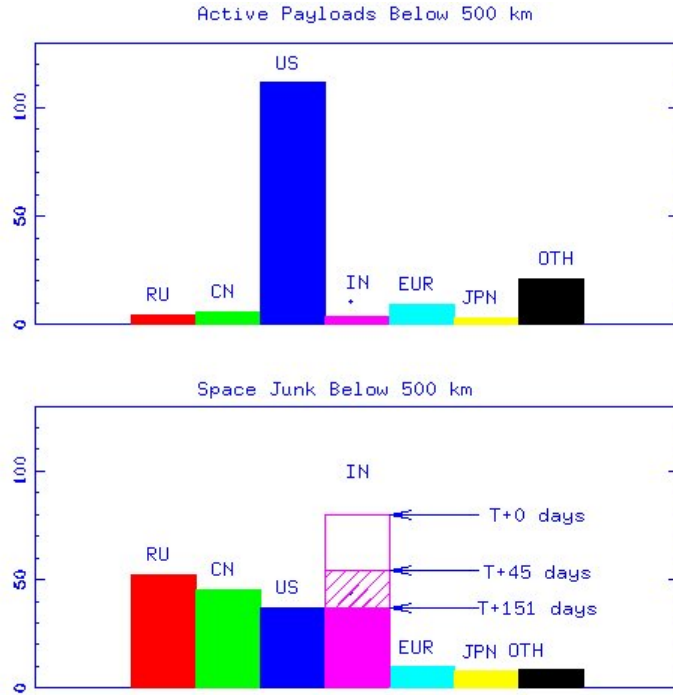


Figure 2: Upper panel: Time-average number of active payloads below 500 km, by owner country or country grouping. Lower panel: time-average number of debris objects below 500 km, by owner country or country grouping. RU: Russia. CN: China. US: United States. IN: India. EUR: Western European grouping. JPN: Japan. OTH: All other. For the Indian debris objects, the data are shown for just after the ASAT test, 45 day after, and 151 days after.

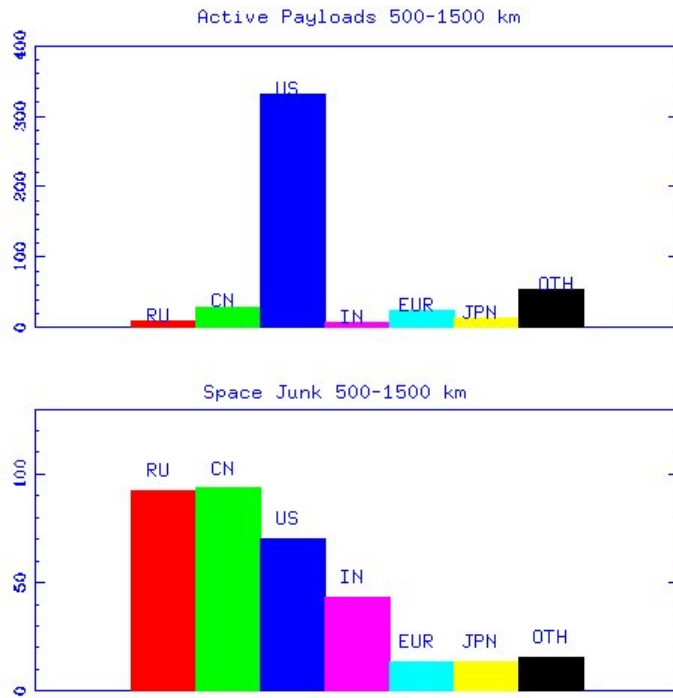


Figure 3: Upper panel: Time-average number of active payloads between 500 and 1500 km. Lower panel: Time-average number of debris objects, between 500 and 1500 km. Details as for previous figure.

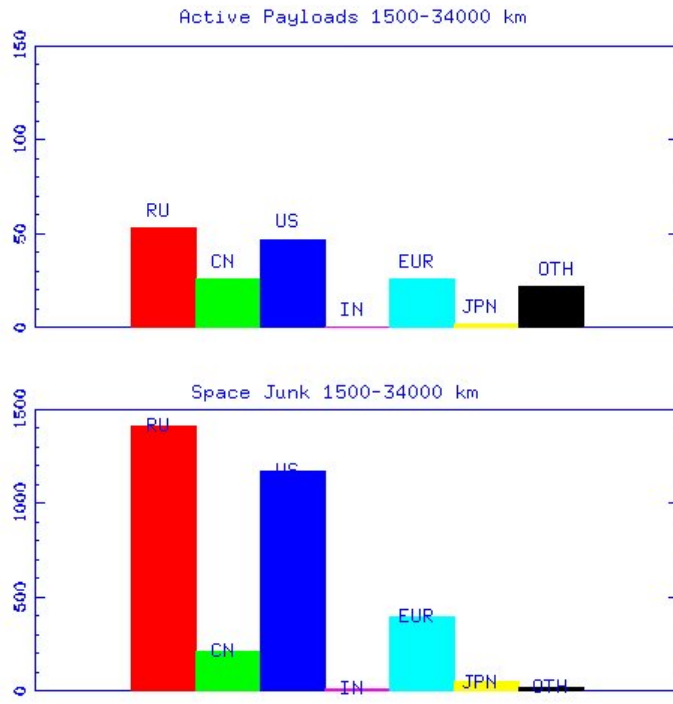


Figure 4: Upper panel: Time-average number of active payloads between 1500 and 34000 km. Lower panel: Time-average number of debris objects. between 1500 and 34000 km. Details as for previous figure.

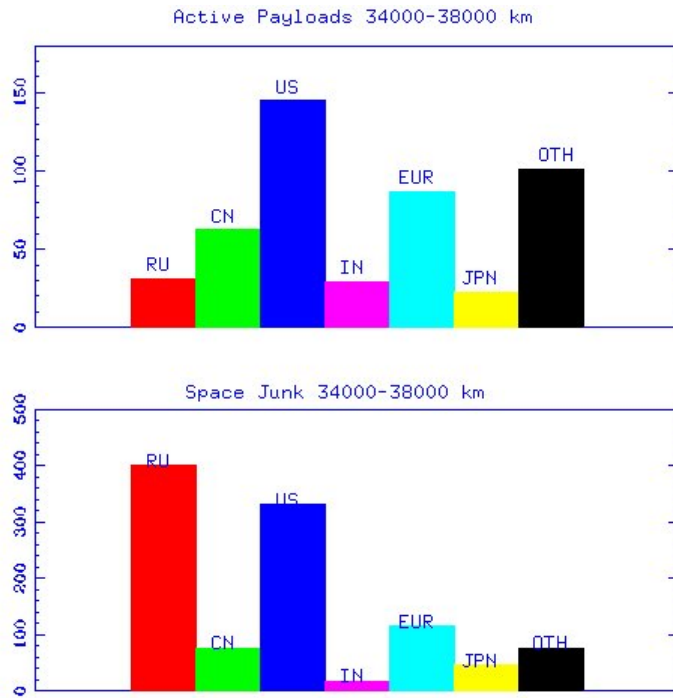


Figure 5: Upper panel: Time-average number of active payloads between 34000 km and 38000 km. Lower panel: Time-average number of debris objects. between 34000 and 38000 km. Details as for previous figure.

5.2 Starlink

On May 24 SpaceX launched its first batch ('Batch 0') of Starlink low orbit internet distribution satellites. The Falcon 9 rocket placed a stack of 60 'flat pack' satellites in orbit; 4 debris objects were also left in orbit, thought to be rods that connected the satellites during ascent. The second stage was deorbited.

In the first days after launch observers were surprised to see that the satellites were unusually bright - magnitude 2 or so. After a few days, when the satellites had oriented their solar panels to the sun, their brightness decreased somewhat, but nevertheless sparked a discussion in the astronomical community about the light-pollution implications of the full proposed constellation of 12,000 Starlink satellites - and indeed of other similar 'megaconstellations'. After a few weeks, the satellites had raised their orbits to the operational 550 km altitude. Following this, in July and August, hobbyist observers carried out an observation campaign to estimate their visual magnitudes. The bulk of the satellites were determined to be in the range magnitude 4 to 7. A full constellation that bright would change the appearance of the night sky in areas away from bright city lights, and significantly affect many professional astronomical observations. SpaceX stated that they would look into reducing satellite albedo in future iterations of the design.

Of the 60 satellites, 10 did not reach the final operational orbit. This includes one or two which were deliberately moved to lower orbits to test controllability in the denser atmosphere, to support the capability to safely deorbit the satellites.

In late 2019 the bulk of the constellation was moved slightly lower, from 550 km down to 530 km.

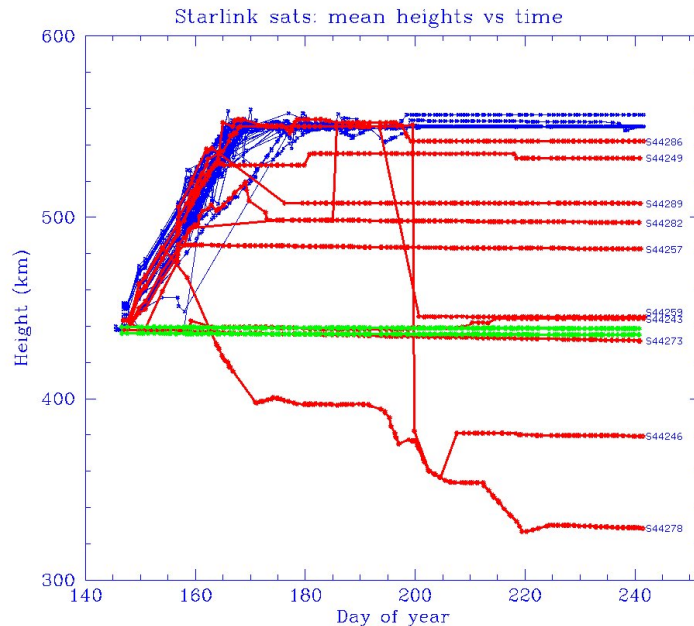


Figure 6: Starlink Launch 0 satellite altitudes versus time as of 1 Sep. Altitudes are average of perigee and apogee. Blue: payloads which are in 'operational' orbit. Red: payloads in lower orbits. Green: debris objects.

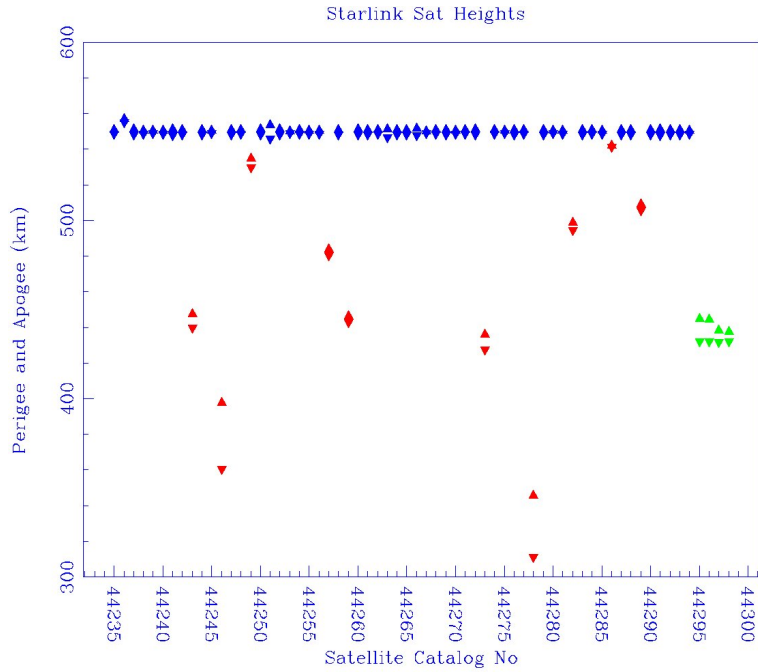


Figure 7: Starlink satellite altitudes in Aug 2019, versus catalog number. Upward pointing triangles: Apogee height. Downward pointing triangles: perigee height. Blue: payloads which are in ‘operational’ orbit. Red: payloads in lower orbits. Green: debris objects.

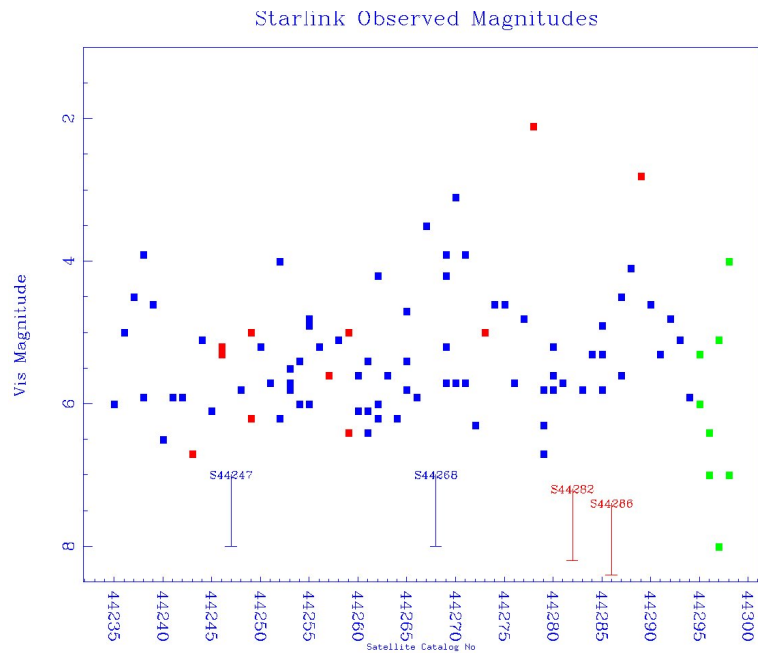


Figure 8: Starlink satellite brightness, Jul-Aug 2019 visual magnitude estimates, versus catalog number. Color scheme as for the two previous figures. Vertical bars denote objects with no observed magnitude values.

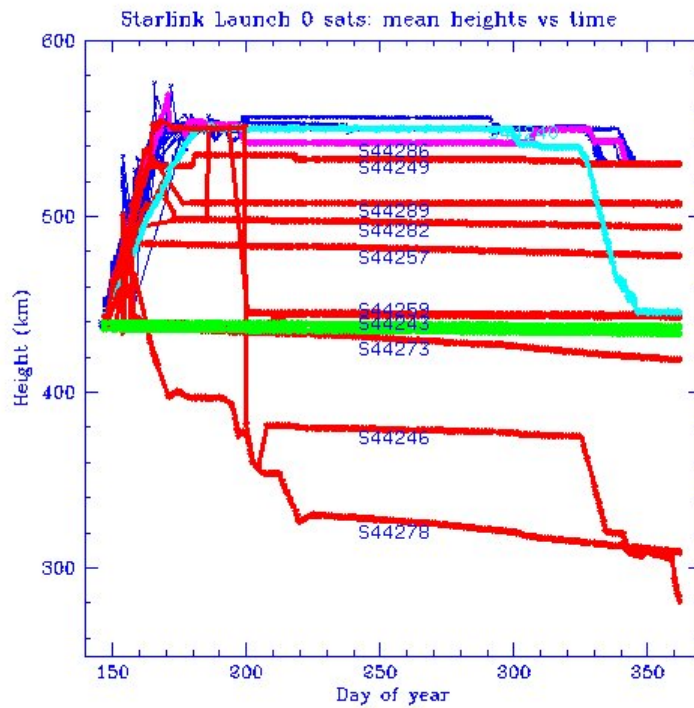


Figure 9: Starlink Launch 0 satellite altitudes versus time as of 28 Dec. Altitudes are average of perigee and apogee. Blue: payloads which are in ‘operational’ orbit. Red: payloads in lower orbits. Green: debris objects.

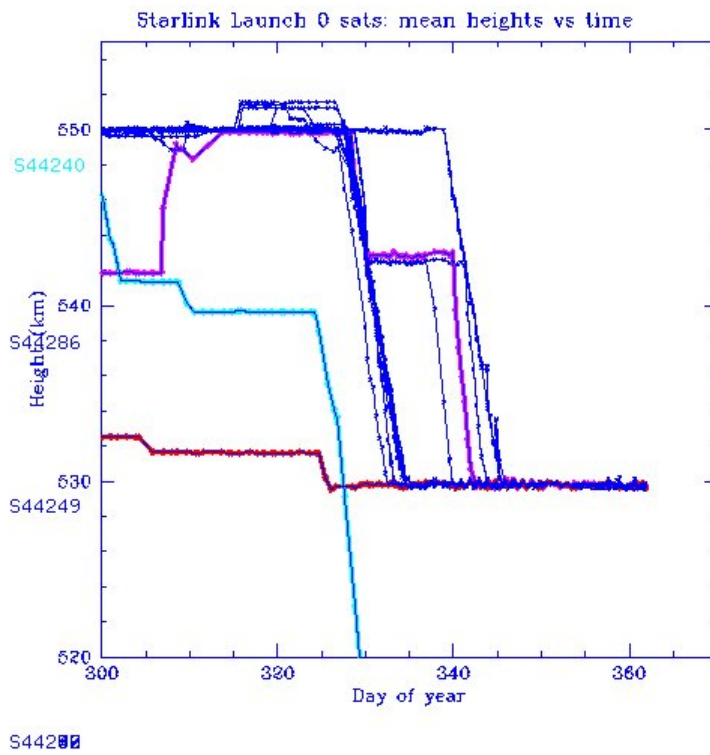


Figure 10: Zoom of previous figure showing details of the redeployment from 550 to 530 km in early Dec 2019.

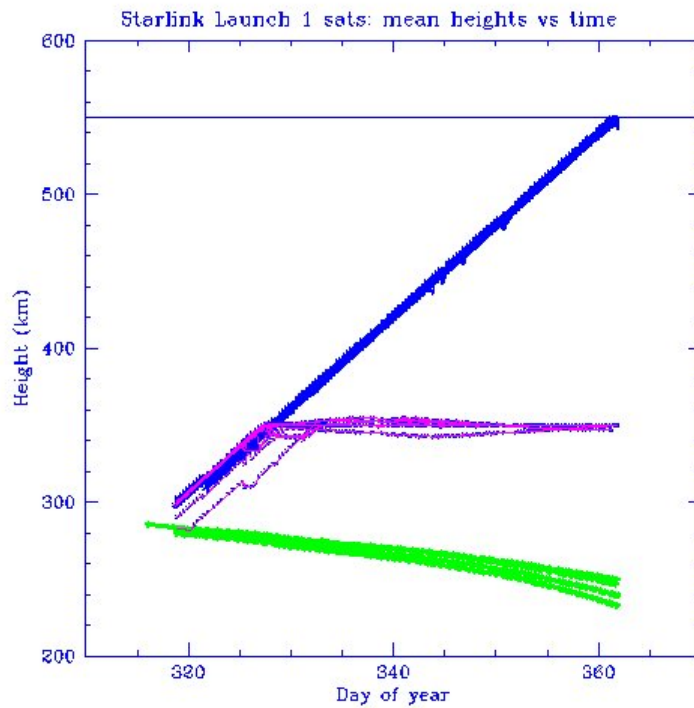


Figure 11: Starlink Launch 1 satellite altitudes versus time as of 28 Dec. Altitudes are average of perigee and apogee. Blue: 20 payloads in ‘upper’ group, completing ascent to 550 km. Magenta: 40 payloads in ‘lower’ group, at 350 km. Green: debris objects.

5.3 Lightsail-2

In June the STP-2 mission was launched on a Falcon Heavy. One of the payloads, Georgia Tech’s PROX-1, carried the Planetary Society’s LightSail-2 inside it and was deployed from the second stage at 0749 UTC Jun 25. The 3U LightSail-2 cubesat was ejected at 0749 UTC on Jul 2 into a 709 x 725 km x 24.0 deg orbit. It deployed its 32-square-metre sail at 1847 UTC Jul 23. As Lightsail-2 orbited the Earth it changed its orientation to control the acceleration generated by solar radiation pressure.

The Planetary Society reported that ‘Lightsail 2 is successfully raising its orbit solely on the power of sunlight’. This was misleading, however: the overall orbit decreased due to atmospheric drag; the orbit eccentricity increased largely due to solar radiation pressure at all orientations - just as would have happened for a spherical balloon with the same area-to-mass ratio. The actual ‘sailing’ effect may have been present - external observers are skeptical - but if so it was a small effect only detectable by subtracting the actual orbital parameters from a model of the orbital changes expected without any sailing, and this was not apparent in the publicity surrounding the achievement.

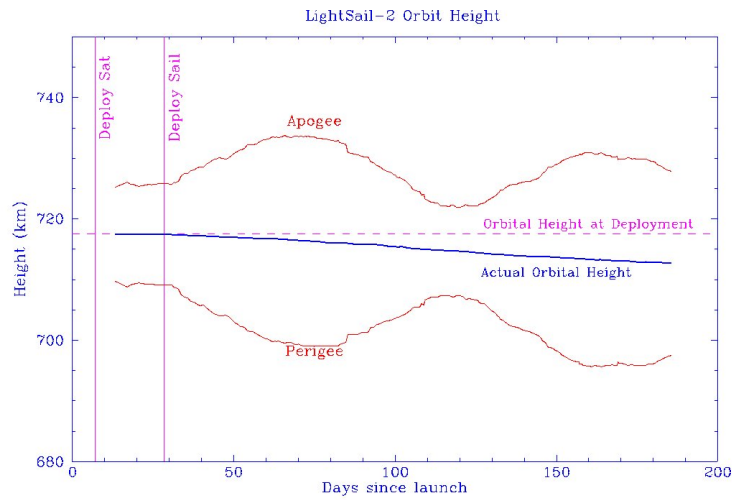


Figure 12: LightSail-2 orbital height vs time. Red: Perigee and apogee heights. Blue: orbit height, defined as average of perigee and apogee.

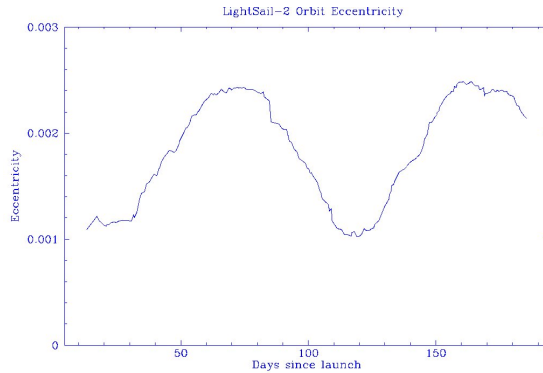


Figure 13: LightSail-2 orbital eccentricity vs time.

5.4 Kosmos-2535/2536

In Jul 2019 four satellites were launched by Soyuz-2-1v from Plesetsk, and code-named Kosmos-2535 to 2538. Comparing Russian statements to US orbital data, it is clear that Kosmos-2536 is 44424 (object D), not 44422 (object B) as recorded in the US satellite catalog. Objects B and C have not maneuvered and are suspected to be passive radar calibration satellites. Objects A and D, Kosmos-2535 and 2536, have carried out a series of maneuvers and close approaches (to within about 1 km or less). After the first close approach on Aug 1, Russian statements described a satellite servicing test, and implied that the inspector satellite had made physical contact with the target. In part, the Russian Defense Ministry stated

An inspection has been carried out and in-orbit servicing has been performed of a registering satellite with the help of an inspector satellite and in addition to that special-purpose information and telemetry has been transmitted on the state of the registering satellite

The two satellites remained close until early October; after a pause in November, they returned to resume proximity operations in early December.

Below I tabulate close approaches based on analysis of the TLEs, together with the maximum separation reached prior to the approach. Close approaches are within 1 to 2 km (the TLE accuracy) except where noted.

Close Approaches of Kosmos-2535/2536

	Approach date UTC	Approached from distance (km)
1	2019 Jul 31-Aug 1	8000
2	2019 Aug 07 1200?	30
3	2019 Aug 11 2300-12 0700?	3
4	2019 Aug 16 0500?	400
5	2019 Aug 18 1900?	30
6	2019 Aug 19 1630?	180
7?	2019 Aug 20?	30
8	2019 Aug 22	30
9	2019 Aug 27 1500?	210
10	2019 Sep 03 2000?	5
11	2019 Sep 10 1415	330
12	2019 Sep 11 1200 (at 5 km)	250
13	2019 Sep 11 2000	50
14	2019 Sep 13 0800	2
15	2019 Sep 17 2100	180
16	2019 Sep 26 0030	380
17	2019 Oct 08 1200?	90
18	2019 Oct 09 1200?	300
	2019 Nov 28	Max sep at 6000 km
19	2019 Dec 05 1200?	6000
20	2019 Dec 16	60
21	2019 Dec 18	6
22	2019 Dec 23	100
23	2019 Dec 24 1200?	10
	2019 Dec 25? [3 km flyby]	10
25	2019 Dec 27 1200? [2 km flyby?]	24

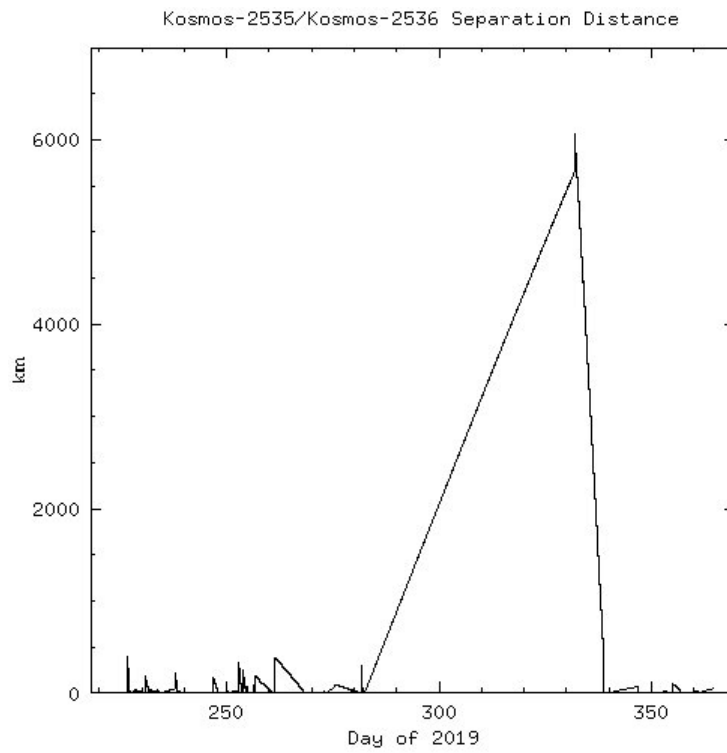


Figure 14: Kosmos-2535/2536 separation versus day of 2019: Overview

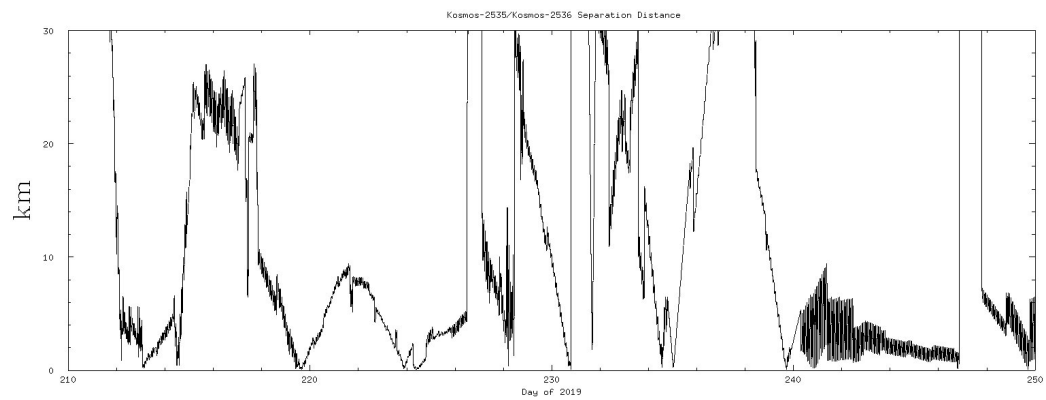


Figure 15: Kosmos-2535/2536 separation versus day of 2019: Close approaches day 210-250 (Aug-Sep)

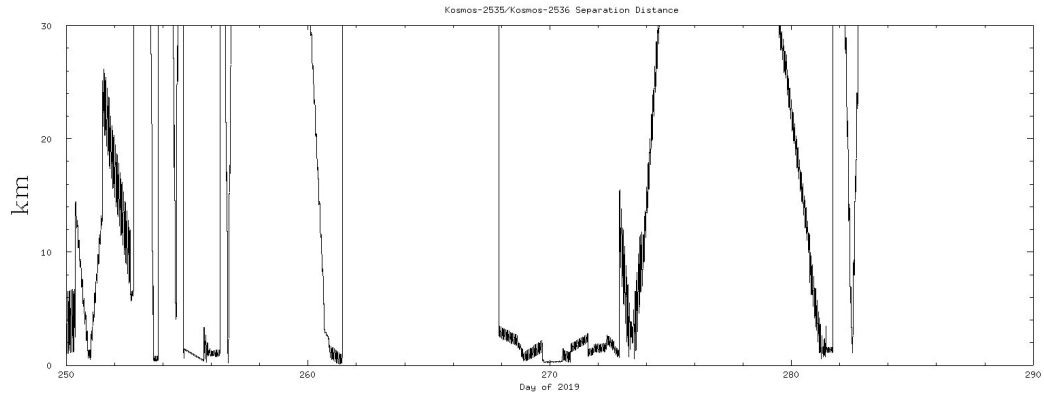


Figure 16: Kosmos-2535/2536 separation versus day of 2019: Close approaches day 250-290 (Sep-Oct)

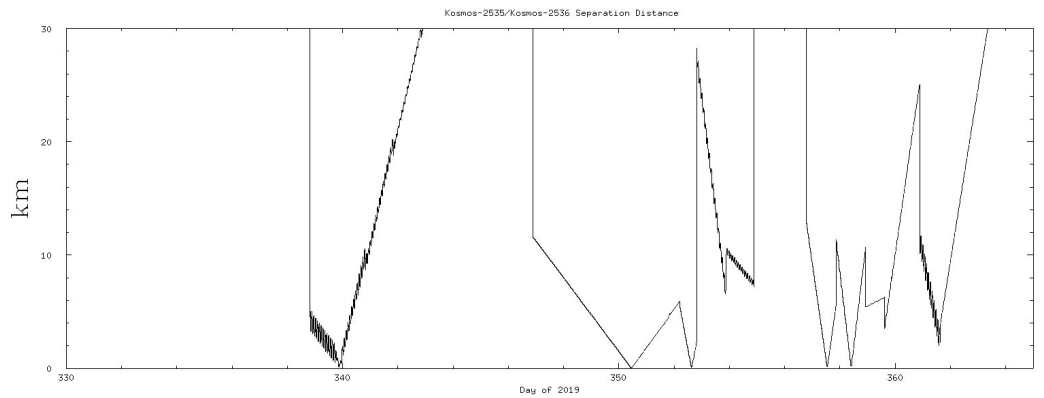


Figure 17: Kosmos-2535/2536 separation versus day of 2019: Close approaches day 330-365 (Nov-Dec). Note that there were no close approaches during day 290-330.

On about Aug 3, an energetic event occurred from which 9 debris objects have been cataloged. One has an apogee of over 1400 km, representing an ejection velocity of over 0.2 km/s. The Gabbard diagram for these debris objects is shown below. The nature of the explosive event is unclear.

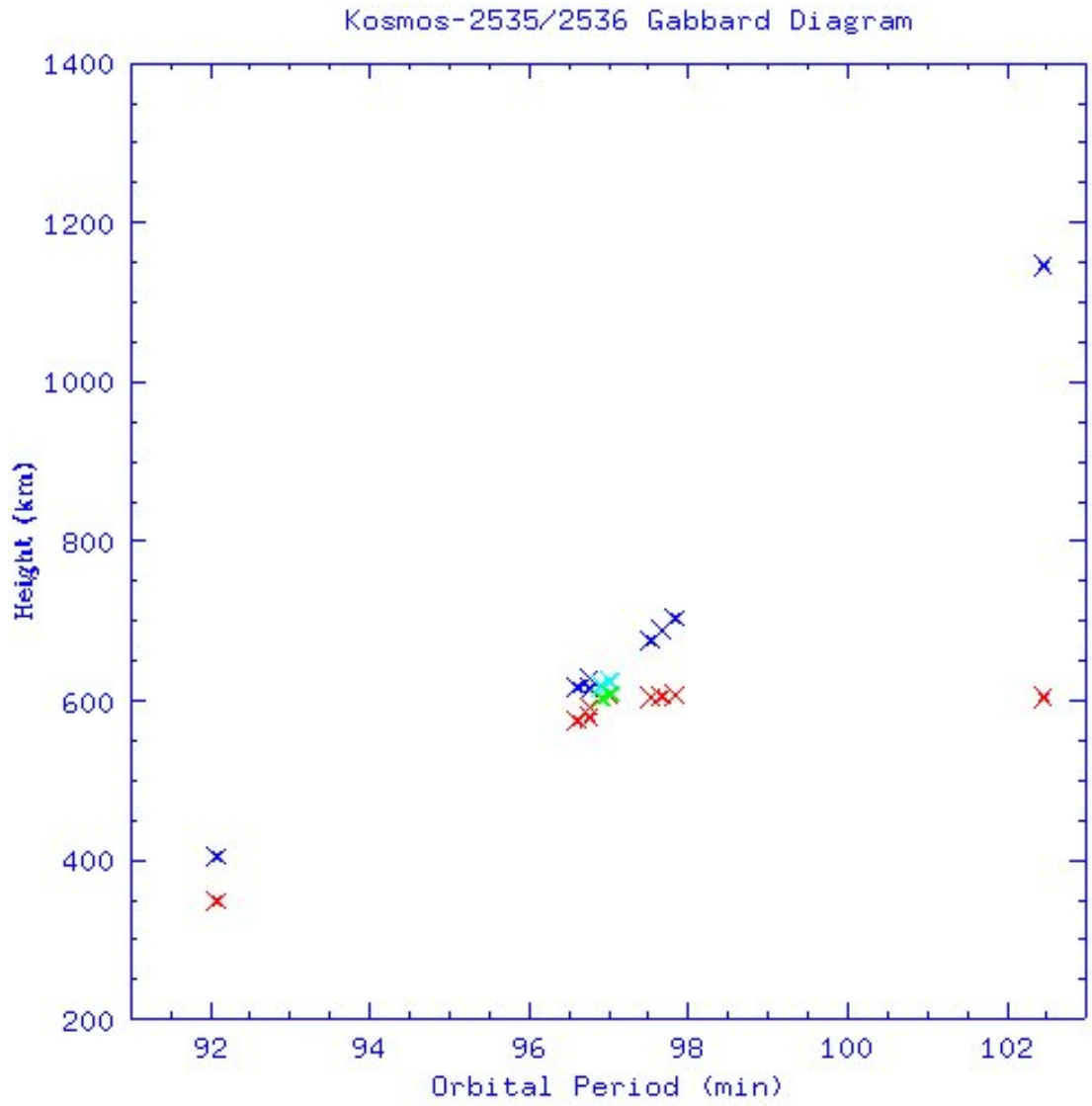


Figure 18: Kosmos-2535/2536 Gabbard diagram, showing perigee (red) and apogee (blue) of debris objects versus their orbital period. Cyan/green points represent the payloads.

5.5 Kosmos-2542/2543

On Nov 25 Russia launched another Soyuz-2-1V flight placing Kosmos-2542 in orbit. On Dec 6 at around 0800 UTC it ejected a subsatellite, Kosmos-2543. The subsatellite remained within 2 km of the parent until 1100 UTC on Dec 9 when it began orbit raising.

Kosmos-2543 maneuvers			
Burn	Date	dV	Orbit
Sep	2019 Dec 06 0800?	0	368 x 858 km x 97.9 deg
1	2019 Dec 09 1100?	1 m/s	372 x 858 km x 97.9 deg
2	2019 Dec 14 0800?	26 m/s	454 x 858 km x 97.9 deg
3	2019 Dec 16 0907?	36 m/s	590 x 859 km x 97.9 deg

Some analysts suggested the inspector was chasing the NRO's USA 245 satellite, based on the fact that both launches were in an 0940 local time sun-synchronous orbit. However, USA 245 has not been seen by hobbyists since early Dec 2019, so a detailed orbital comparison cannot be done. My own opinion at the moment is that the similarity in orbital planes is probably a coincidence.

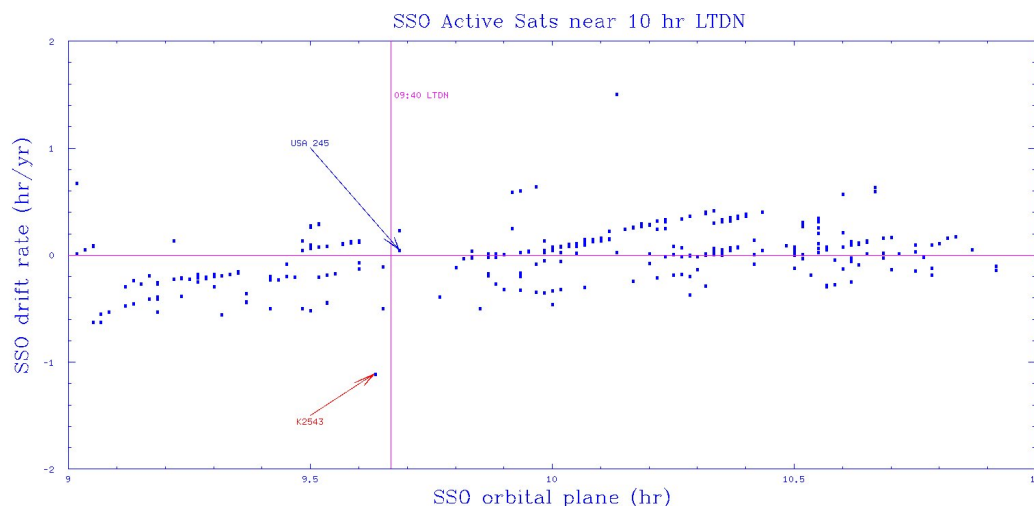


Figure 19: Sun-synchronous local time of descending node (LTDN) for satellites near 10h LTDN, versus drift rate relative to ideal SSO.

5.6 Starliner

On 2019 Dec 20 ULA launched flight AV-080, the first Atlas V N22, from Cape Canaveral, The N22 has two solid boosters, a dual engine Centaur with two RL10-A4-2 engines (the first DEC to fly since 2004) and carries the Boeing CST-100 Starliner spaceship, flying on its Orbital Flight Test (OFT) without a crew. The mission was to test launch and landing and to rendezvous and dock with ISS, delivering 272 kg of cargo and carrying an instrumented anthropomorphic test dummy (ATD) dubbed 'Rosie',

AV-080's Centaur reached its targeted 73 x 181 km x 51.6 deg orbit. Boeing Space's Starliner, vehicle SC3, separated at 1150 UTC. Starliner set its master event timer reading data from the launch vehicle, but apparently because of a software (interface) mistake the value was read into the Boeing vehicle from an incorrect location in the ULA vehicle's memory, resulting in an 11 hour offset. Starliner was meant to fire its Aerojet Rocketdyne OMAC thrusters at 1207 UTC to raise its orbit, but due to the software timing error this did not occur. After comms problems possibly

related to a TDRS handover, a contingency RCS burn was finally commanded by the ground, possibly at around 1216 UTC, which raised perigee by an unknown (to me) amount. Further RCS burns at unknown times over the next half hour or so raised perigee further and placed Starliner in a 180 x 221 km x 51.6 deg orbit.

During the period before the burn, the timer error meant that Starliner was in an incorrect software state and used up too much propellant controlling its attitude. This precluded the planned rendezvous with ISS. Later on Dec 20 Starliner raised its orbit to around 250 km and tested extension and retraction of its docking apparatus as well as other systems tests. SC3 then returned on Dec 22, landing at about 106.420W 32.952N near the runway at White Sands Space Harbor, New Mexico.

The flight did demonstrate the basic design of the vehicle including its life support system and its ability to safely return to Earth; I do not expect the omitted rendezvous or the software issues to create major delays to the programme or to require a further uncrewed test flight.

Starliner consists of the following components, with very approximate guesstimated masses:

	Height	Dia	Mass	
Crew Module	2.2m	4.5m	8.3t?	
Service Module	2.5m	4.5m	3.3t? (dry)	- Jettisoned after deorbit burn
SM propellant	-	-	2.3t?	

Total at Cen sep			13.9t?	
Ascent cover	0.3m	1.7m	0.1t?	- Jettisoned suborbital, before Centaur burn
Aeroskirt	1.8m	4.5m	1.0t?	- Jettisoned suborbital, 20s into Centaur burn

Total at launch			15.0t?	
Total at docking			13.6t?	

The SM has 20 6kN OMAC thrusters for orbit adjust (plus 4 x 180 kN abort engines and 28 RCS thrusters). The CM includes a 750 kg base heat shield, a 150 kg forward heat shield, and two 34 kg drogue chutes, as well as about 90 kg of hydrazine, all of which are jettisoned in the atmosphere prior to landing. Landing mass is about 7200 kg including crew and cargo. Starliner is built in Boeing's facility at the C3PF (former OPF3) at Kennedy Space Center; spacecraft development is carried out there (and possibly at the new Boeing Space headquarters in Titusville) and mission control is at a Boeing control room in the mission control building at NASA-JSC/Houston.

Here is the approximate timeline of the mission as far as I can estimate it for now: (times UTC, as always) - I expect a number of these details to change as better info becomes available.

```
Dec 20 1136:43 Launch by Atlas V/N22 from SLC41
      1141:12 Atlas cutoff
      1141:18 Atlas separation
      1141:24 Starliner ascent cover jettisoned
      1141:28 Centaur AV-080 main engine burn 1
      1141:48 Starliner aeroskirt jettisoned
      1148:37 AV-080 shutdown, reach 73 x 181 km x 51.6 deg orbit
      1151:37 Starliner separates from AV-080
      1202   AV-080 propellant 'blowdown'
      1207:38 Planned Starliner OMAC orbit insertion burn does not occur
              Excessive attitude control thruster use
```

1215? Commanded RCS burn performs initial orbit insertion
 Initial orbit UNKNOWN; burn start time UNKNOWN
 1234 AV-080 Centaur reentered and hits ocean SW of Australia
 1300? Further RCS burn(s); reach 180 x 221 km x 51.6 deg orbit.
 Burn start time UNKNOWN.
 2200? OMAC burn 1, 20 m/s?, to approx 214 x 242 km x 51.6 deg orbit
 2235? OMAC burn 2, 20 m/s?, to 241 x 265 km x 51.6 deg orbit.
 [Times of these burns are highly uncertain]
 Dec 22 1223:47 Starliner OMAC deorbit, 150 m/s , 55 s burn; E of New Zealand
 1224:42 Deorbit burn cutoff, orbit about -230 x 246 x 51.6
 1225:59 Service Module jettison
 1241:42 Entry interface, 120 km, 7.5 km/s over equatorial Pacific
 1242? Service Module destructive reentry over equatorial Pacific
 1253? Forward heat shield (FHS) separation at 3 km alt.
 1253:06 Main parachutes deploy
 1254:00? Base Heat Shield sep
 1254:40? Airbags inflate
 1257 Base Heat Shield impact
 1257:55 CM landing at White Sands Space Harbor 106.420W 32.952N
 1302:48 Forward heat shield touchdown

Starliner SC1 was used for the pad abort test; SC2 will fly the CFT crewed flight next year; then SC3 will fly again on the PCM-1 mission to ISS. For that flight SC3 will have the name 'Calypso', chosen by mission commander Suni Williams. SC2 has not yet been named; and it's not clear whether SC3 will retain the same name for later flights or if they'll get new names under each new commander.

5.7 OTV-5 and its illegal secret deployments

The US Air Force Rapid Capabilities Office’s X-37B spaceplane was flown on its fifth mission, OTV-5, from 2017 Sep 7 to 2019 Oct 27, making an automated landing at Kennedy Space Center. The flight is thought to be the third mission of the X-37B No. 2 vehicle. In a statement included in a post-landing press release, Randy Walden, director of the USAF RCO, revealed that

“This mission successfully hosted Air Force Research Laboratory experiments, among others, as well as providing a ride for small satellites.”

The implication is that at some time during the mission the X-37B released multiple subsatellites - probably cubesats, but maybe larger payloads. These subsatellites have not been cataloged in the US Satellite Catalog and have not been registered with the United Nations. This is an apparently unprecedented violation of UN Resolution 3235 (XXIX), Convention on Registration of Objects Launched into Outer Space. Transparency of space activities was a hard-won achievement of 1960s negotiations between the US and the USSR following concerns over unannounced satellites launched by the USSR in 1962 (which turned out to be failed interplanetary probes stuck in parking orbit). Secret satellite deployments are a threat to safety of flight and to international confidence and security.

We don’t know how many satellites were released or when they were released, or whether they are still in orbit. For the time being, as a placeholder, I have added three entries to my auxiliary satellite catalog (nos. A09449, A09450, and A09455) called ‘Secret DoD Satellite 1, 2, 3’ with a guessed deployment date of Oct 2017 and reentry date of ‘sometime in 2018’. My intent is that by adding these to the list of satellites, this transgression gets more visibility and doesn’t get forgotten.

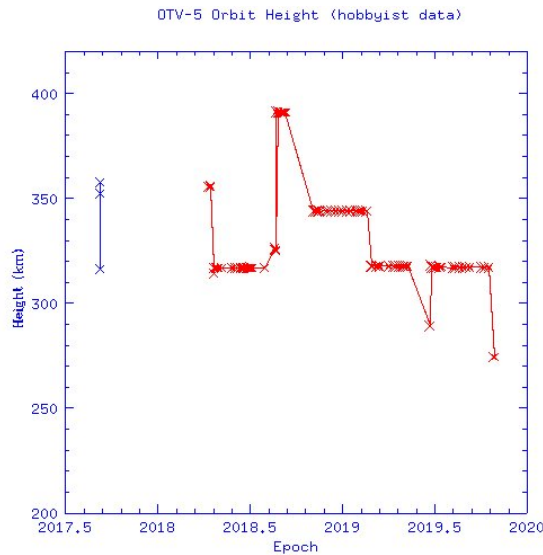


Figure 20: OTV-5 orbit height versus time based on hobbyist data. The blue points at left are various early guesses for the insertion orbit and are not based on actual data.

5.8 TJS-3

China's TJS-3 satellite (43874, 2018-110A, hereafter object A) was launched in Dec 2018 and entered geostationary orbit sometime between Dec 26 and Dec 31 (possibly around 1200 UTC Dec 31). On 2018 Dec 31 a subsatellite (43917, 2018-110C, hereafter object C) was cataloged. As of Dec 2019 this subsatellite is still called 'TJS-3 AKM' in the US satellite catalog, indicating that the US believes it is an Apogee Kick Motor. This was a good first guess but since early 2019 it's been obvious that guess was incorrect, since an AKM would be inert and object C has been maneuvering and stationkeeping: it is a second payload.

On Jan 1 object A was located near 59.0E. Object C took up station 100 km away and remains there. Then on May 21 object A moved to an eastward drift orbit, braking on Jul 6 to a new station at 173 deg East where it remained at the end of the year.

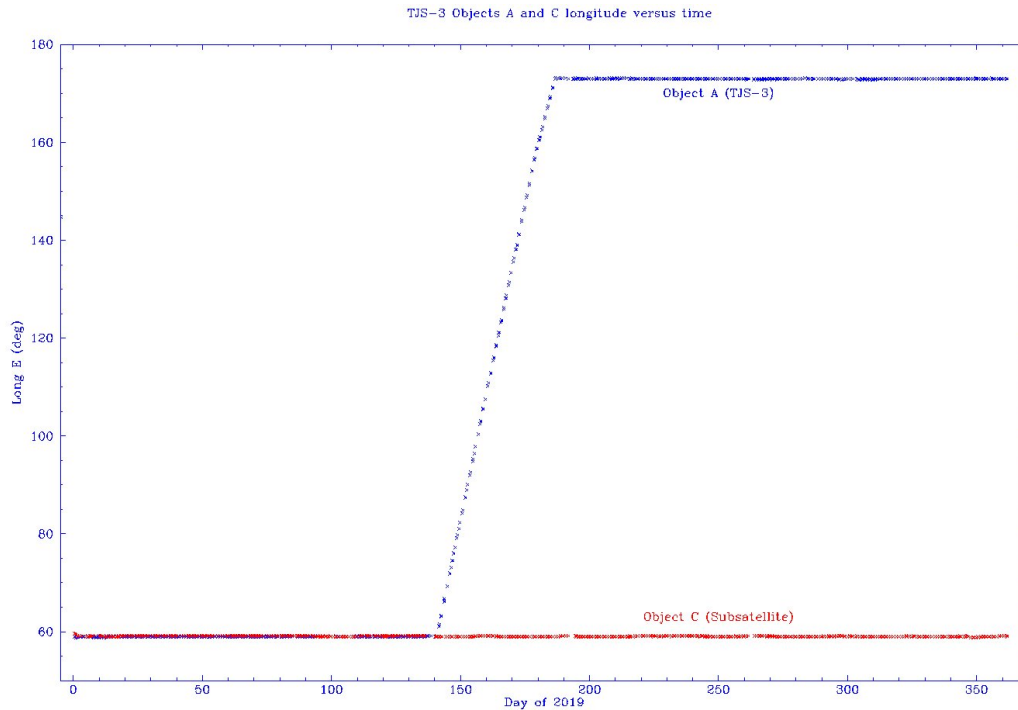


Figure 21: TJS-3 and subsatellite geostationary longitude versus time

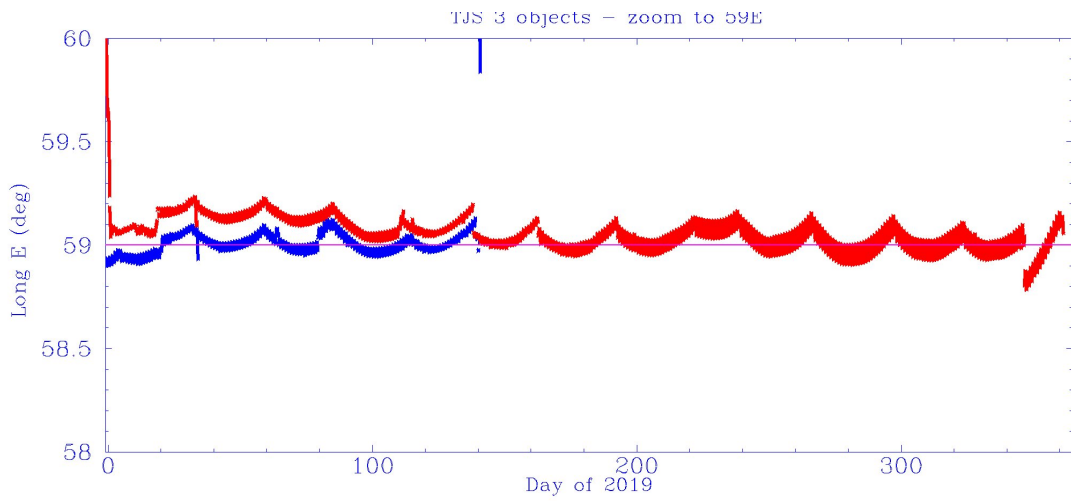


Figure 22: TJS-3 and subsatellite geostationary longitude versus time, zoom to 59E region

6 Orbital Debris and Orbital Decay

At the end of 2019 there were 19629 cataloged objects in orbit or beyond and the total known mass in orbit increased to 8958 tonnes.

I include as active payloads any satellite thought to be still transmitting even occasionally, while other sources may only include those thought to be in full operational service. In either case, distinguishing active from dead payloads is often partly guesswork for those satellites which do not perform regular orbital maintenance manuevers, and the uncertainty in the total number of active satellites is probably of order 10%.

Estimates of total debris masses have been updated, and are somewhat lower than in previous editions of this report. A new category ‘Alt.Pay.’ (alternative payloads) has been added as a bookkeeping convenience to account for objects that are in a marginal category - could arguably be considered payloads but are not counted as such in most lists. They are mostly short lived and so make only a small contribution here.

Table 7 (a): Debris objects in orbit 2014-2019

	Active Payloads	Dead Payloads	Alt Pay	Rocket Bodies	Op'l Debris	PRC FY1C debris	Strela Iridium deb	Other debris	Spurious	Total
2014	1284	2534	10	1683	1535	2940	1590	5806	5	17387
2015	1400	2562	11	1720	1537	2873	1480	6434	5	18022
2016	1524	2590	10	1753	1549	2850	1436	6490	5	18207
2017	1864	2642	10	1784	1569	2836	1415	6481	5	18606
2018	2157	2671	10	1844	1632	2823	1394	6598	5	19133
2019	2514	2685	10	1874	1662	2812	1385	6679	8	19629

Table 7 (b): Mass of debris objects in orbit 2014-2019

	Active Payloads	Dead Payloads	Alt Pay.	Rocket Bodies	Op'l Debris	PRC FY1C debris (tonnes)	Strela Iridium deb	Other debris	Spurious	Total
2014	2580	1790	3	2917	149	-	-	-	-	7442
2015	2745	1813	3	3020	156	-	-	-	-	7738
2016	2893	1851	3	3103	161	-	-	-	-	8012
2017	3060	1882	3	3205	165	-	-	-	-	8317
2018	3260	1890	3	3733	165	-	-	-	-	8692
2019	3443	1909	3	3432	170	-	-	-	-	8958

6.1 Disposal of launch vehicle upper stages

For the 97 successful orbital launches I look at which launches went to which type of orbit, and whether rockets disposed of their upper stages in a controlled deorbit or whether they left one or more stages (and possibly associated debris) in orbit to decay naturally. Upper stages that achieve Earth escape are also counted as a controlled disposal.

The orbit categories are SSO (Sun-synchronous low Earth orbit), ISS (International Space Station launches), Other LEO (Low Earth orbit except for SSO and ISS); GTO (Geotransfer orbit), GEO direct (where launch vehicle upper stage deploys payload directly in geostationary orbit), 12-hour circular MEO orbits (as used by GPS), deep space (beyond about 150,000 km) and ‘other high orbit’.

I will note that some SSO/other LEO launches perform a perigee lowering disposal burn to ensure stage reentry within a few weeks. However, the reentry location is still uncontrolled in these cases. Cases where the perigee lowering is to below 180 km are noted with an asterisk in the table.

Table 8: Launches by orbit and launch-associated Earth orbit debris, 2019

Launch vehicle	Total launches	Launches with upper stage disposal	Stages left in Earth orbit	Other LV debris
(a) SSO				
SpaceX Falcon 9	1	1	0	0
Arianespace Vega	1	1	0	0
Arianespace Soyuz-ST	1	1	0	1
Eurockot Rokot	1	0	1	0
Roskosmos Soyuz	2	2	0	0
VVKO Soyuz	2	1	1	0
CALT CZ-11	2	0	2 (2*)	0
SAST CZ-2D	1	0	1	1
SAST CZ-4B/4C	6	0	6	9?
EXPACE KZ-1A	4	0	4 (1*)	0
CLMRC Jielong-1	1	0	1	0
RocketLab Electron	1	0	2 (1*)	0
JAXA Epsilon	1	0	2	0
ISRO PSLV	3	0	3	0
Total SSO	27	6	23	11
(b) ISS				
SpaceX Falcon 9	4	4	0	0
ULA Atlas V-N22	1	1	0	0
Orbital Antares	2	0	2	0
Roskosmos Soyuz	7	0	7	0
MHI H-IIB	1	1	0	0
Total ISS	15	6	9	0
(c) Other LEO				
NorthropGr. Pegasus XL	1	0	1	0
ULA/Boeing Delta 4	1	1	0	0
SpaceX Falcon 9	4	4	0	8
Rocket Labs Electron	5	1	9 (1*)	3
Krunichev Rokot	1	0	1	0
Arianespace Soyuz	1	1	0	0
CALT CZ-2C	1	0	1	0
CALT CZ-11	1	0	1	8
CALT CZ-6	1	0	1	0
EXPACE KZ-1A	1	0	1	0
iSpace SQ-1	1	0	1	0
ISRO PSLV	1	0	1	1
Total Other LEO	19	7	17	20

Table 8 (cont):				
Launch vehicle	Total launches	Launches with upper stage disposal	Stages left in Earth orbit	Other LV debris
(d) GTO / 12h MEO transfer				
ULA/LM Atlas 5	1	0	1	0
ULA/B Delta 4	2	2	0	0
SpaceX Falcon 9	3	0	3	0
SpaceX F Heavy	2	0	2	0
Arianespace Ariane 5	4	0	4	4
Khrunichev Proton	2	0	2	2
VVKO Soyuz	2	0	2	0
CALT CZ-5	1	0	1	0
CALT CZ-3A/3A/3C	9	0	9	0
ISRO GSLV Mk III	1	0	1	0
Total GTO	27	2	25	6
(e) GEO Direct				
Khrunichev Proton	2	0	2	1
Total GEO direct	2	0	2	1
(f) 12-hour MEO direct				
VVKO Soyuz/Fregat	2	0	2	0
CALT CZ-3B/YZ-1	3	0	6	0
Total 12-hour MEO	5	0	8	0
(f) Deep space and escape				
Khrunichev Proton	1	0	1	0
Total Deep	1	0	1	0
(f) Other high orbit				
Arianespace Soyuz-ST	1	0	1	0
Total Other High	1	0	1	0
Total Overall	97	21	86	38

6.2 Orbituaries

Table 9 gives statistics on reentries in 2019, not including deliberate deorbit and landing. (Acknowledgements to Collin Krum for the revised section name).

Table 9: Uncontrolled Reentries 2019		
	Number	Mass (t)
Active Payloads	142	0.2
Dead Payloads	37	15.6
Rocket bodies	56	104.1
Operational debris	46	4.2
PRC ASAT/FY-1C debris	11	-
Strela/Iridium debris	9	-
Other fragment debris	126	-

In this table, ‘active payloads’ represents payloads which were thought to be active at the beginning of the year.

Controlled deorbits and landings

14 first-generation Iridium satellites, each with a mass around 560 kg, reentered during 2019 after orbit lowering (They are counted in the previous section). This completes the deorbit of the operational satellites. 30 defunct first-generation Iridium satellites remain in orbit (as well as 4 dummy Iridium mass models). There were no very large uncontrolled reentries this year; the biggest were 4-tonne Chinese upper stages.

In addition to uncontrolled reentries, there were 9 controlled landings and 8 controlled deorbitings of spacecraft during 2019, representing the safe removal of around 47 tonnes from the orbital environment. 3 Russian Soyuz ships landed in Kazakhstan and four Dragon spacecraft splashed down in the Pacific near California. The X-37B OTV-5 mission landed on the runway at Kennedy Space Center and the Starliner OFT landed on airbags at the White Sands Space Harbor.

Seven ISS cargo ships (four Cygnus, one HTV and two Progress) were deorbited, all over the southern Pacific Ocean.

Ten objects reentered and burned up on controlled trajectories associated with landings of spacecraft (Soyuz orbital and propulsion modules, Dragon trunks, Starliner service module).

In addition, 19 rocket stages were deorbited after only one or two Earth orbits (8 Falcon 9, 2 Delta 4, 3 Fregat, 1 Volga, 1 Vega AVUM, 1 H2B, 1 Electron kick stage, 1 Centaur.) Only one of these was assigned a US Space Command catalog number. A further 18 rocket stages were inserted into slightly suborbital trajectories that ensured controlled disposal without the need for a deorbit burn (4 Ariane EPC, 1 Vega Z9A, 5 Proton stage 3, 8 Soyuz-2 stage 3).

Table 10: Most massive reentries, 2019

COSPAR	Spacecraft	Date	Mass/kg	Location	Coords	Type
2018-056D	CZ-2C-SMA Y3 St.2	2019 Apr 30 0006	4000	NE Pacific	149W 47N	Reentry
2018-112H	CZ-2D Stage 2	2019 Jan 1 0001?	4000	Unknown		Reentry
2018-083F	CZ-2C Stage 2	2019 Feb 5 0353	3800?	Cent.Pacific	118W 10S	Reentry
2015-036B	Delta 372	2019 Jul 22 0353	3450?	E Pacific	92W 19S	Reentry
2018-089B	GSLV-3-D2 St. 2	2019 May 12 1621	3300	Senegal	13W 14N	Reentry
2019-042B	GSLV-3-M1 St. 2	2019 Oct 16 1028	3300	Indian Ocean	89E 19S	Reentry
2016-031B	Falcon 9 025 St.2	2019 Jan 6	3000	Unknown		Reentry
2018-049B	Falcon 9 057 St.2	2019 Mar 23	3000	Unknown		Reentry
2018-090B	Falcon 9 064 St.2	2019 Apr 15 0210	3000	Indian Ocean	110E 16S	Reentry
Landings and deorbits, 2019						
2018-101A	Dragon CRS-16	2019 Jan 14 0510?	5000?	Pacific	117W 28N	Splashdown
2019-011A	Crew Dragon DM1	2019 Mar 8 1345	9000?	Pacific	77W 30N	Splashdown
2019-025A	Dragon CRS-17	2019 Jun 3 2148	5000?	Pacific	121W 32N	Splashdown
2018-098A	Soyuz MS-11	2019 Jun 25 0247	2900?	Kazakhstan	69E 47N	Landing
2019-044A	Dragon CRS-18	2019 Aug 27 2021	5000?	Pacific	124W 33N	Splashdown
2019-055A	Soyuz MS-14	2019 Sep 6 2132	2900?	Kazakhstan	69E 47N?	Landing
2019-013A	Soyuz MS-12	2019 Oct 3 1059	2900?	Kazakhstan	69E 47N	Landing
2017-052A	X-37B OTV-5	2019 Oct 27 0751	7000?	KSC SLF		Landing
2019-094A	Starliner OFT	2019 Dec 22 1258	7000?	WSSH	106W 33N	Landing
2018-058A	Progress MS-09	2019 Jan 25 1650	4300?	Pacific		Deorbit
2018-092A	SS John Young	2019 Feb 25 0905	6900?	Pacific	145W 40S?	Deorbit
2018-091A	Progress MS-10	2019 Jun 4 1229	4300?	Pacific	150W 50S?	Deorbit
2016-057A	Tiangong 2	2019 Jul 19 1310	8260?	Pacific	140W 31S	Deorbit
2019-019A	Progress MS-11	2019 Jul 29 1423	4300?	Pacific		Deorbit
2019-062A	Kounotori 8	2019 Nov 3 0209	14000?	Pacific	176W 42S	Deorbit
2019-047A	Progress MS-12	2019 Nov 29 1419	4300?	Pacific	160W 36S?	Deorbit
2019-022A	SS Roger Chaffee	2019 Dec 6 1655?	6900?	Pacific	145W 40S?	Deorbit

For rocket upper stages deorbited soon after launch, the target impact zones are often many degrees in length along the orbit track, so the locations given below should not be taken too seriously.

Table 10 (continued):
Vehicles deorbited soon after launch, 2019

COSPAR	Spacecraft	Date	Mass/kg	Location	Coords	Type
2019-002L	Falcon 9-068 Stage 2	2019 Jan 11 1750?	S Atlantic	22E 62S?	Deorbit	
2019-004B	Delta 382	2019 Jan 19 2045?	Pacific	146W 40N	Deorbit	
2019-008C	Fregat No. 112-07	2019 Feb 21 1900?	Pacific	135W 5N?	Deorbit	
2019-010	Fregat-M No. 133-15	2019 Feb 28 0200	Indian Ocean	63E 32S?	Deorbit	
2019-011B	Falcon 9-066 Stage 2	2019 Mar 2 0839?	S Ocean	87E 27S?	Deorbit	
2019-014B	Delta 383	2019 Mar 16 1236	Pacific	155E 14N?	Deorbit	
2019-015B	Vega AVUM VV14	2019 Mar 22 0420?	Pacific	121W 5N?	Deorbit	
2019-025	Falcon 9-071 Stage 2	2019 May 4 0747?	S Ocean	118E 46S?	Deorbit	
2019-029	Falcon 9-072 Stage 2	2019 May 24 0325?	S Ocean	95E 52S?	Deorbit	
2019-033D	Falcon 9-073 Stage 2	2019 Jun 12 1602?	Pacific	150W 14N?	Deorbit	
2019-044	Falcon 9-074 Stage 2	2019 Jul 25 2318?	Pacific	151S 35S?	Deorbit	
2019-056B	Delta 384	2019 Aug 22 2014	S Ocean	15E 42S?	Deorbit	
2019-062B	H-2B F8 Stage 2	2019 Sep 24 1815?	Pacific	125W 51S?	Deorbit	
2019-069B	Electron 9 Kick Stage	2019 Oct 17 0405?	N Atlantic?	40W 44N?	Deorbit	
2019-074	Falcon 9-076 Stage 2	2019 Nov 11 1720?	S Ocean	95E 52S?	Deorbit	
2019-079B	Volga 14S46 No. 5?	2019 Nov 26 0609?	Antarctic	110W 65S?	Deorbit	
2019-083D	Falcon 9-077 Stage 2	2019 Dec 5 2302?	S Ocean	58E 58S?	Deorbit	
2019-092C	Fregat-M No. 133-12	2019 Dec 18 1509	S Pacific	126W 61S	Deorbit	
2019-094B	Centaur AV-080	2019 Dec 20 1234	S Ocean	108E 41S?	Deorbit	

6.3 Retirements in the GEO belt

During 2019, 11 satellites were retired from GEO, 4 satellites failed in or near GEO, and three debris objects were placed in the graveyard. The recommended graveyard orbit begins at an altitude of 36086 km, 300 km above GEO.

The table gives perigee and apogee altitude minus the GEO height of 35786 km.

Table 11: GEO retirements			
ID	Satellite	Retired	Height above GEO in Jan 2020 km x km
016-004A	Intelsat IS-29e	2019 Apr 10 (Failed)	-152 x -48
1994-087A	DSP F17	2019 Feb? (Failed?)	-1 x 3
2008-007A	Kizuna	2019 Feb 27 (Failed)	29 x 39
1986-096A	FLTSATCOM F7	2019 Mar 29	196 x 564
2003-060A	Ekspress AM-22	2019 Mar 17	235 x 283
2019-009D	S5	2019 Mar? (Failed)	260 x 270
2001-052A	DirecTV 4S	2019 Oct 30	275 x 298
2005-049A	Insat 4A	2019 Oct 24	294 x 312
2000-060A	N-SAT-110	2019 Jan 9	298 x 318
2004-003A	AMC 10	2019 Feb 21	318 x 332
2004-024A	Telstar 18	2019 Jul 19	325 x 387
1999-033A	Astra 1H	2019 Oct 17	358 x 397
2003-033A	Echostar XII	2019 Nov 5	378 x 411
1998-035A	Thor III	2019 Jul 9?	402 x 419
2006-053A	Feng Yun 2D	2019 Jan 25	542 x 645
Table 11 (b): Near-GEO debris			
2019-009E	B'reshit adapter	2019 Mar 4	324 x 405
2019-048B	Briz-M 99566	2019 Aug 5	-188 x 6300
2019-095B	DM-03 No. 3L	2019 Dec 24	-1081 x -398

6.4 Debris events

There were 6 significant breakups during 2019.

Date	Object	Orbit km x km x deg	Notes
2019 Feb 6	43682 H2A F40 Stage 2	519 x 600 x 98.9	Upper stage
2019 Mar 25	35816 Centaur AV-018	6663 x 34714 x 23.3	No objects cataloged
2019 Mar 27	43947 Microsat-R	260 x 282 x 96.6	Weapons test
2019 Apr 6	43652 Centaur AV-073	8526 x 35092 x 12.0	54 objects cataloged
2019 Jul 22	22079 Ariane V52	1297 x 1403 x 66.1	Upper stage
2019 Dec 23	39497 Kosmos-2491	1482 x 1502 x 82.5	Unknown reason

In addition, more fragments were cataloged from the earlier breakups of Centaur AV-049, Orbcomm FM16. and SOZ 2010-041,

7 Acknowledgements

The data presented here are extracted from my satellite and launch database, generated from open source media reports combined with analysis of US Space-Track orbital elements. The analysis has benefited from the opinions of many colleagues, notably Dwayne Day, Gil Denis, Brian Weeden, Jeffrey Lewis, Laura Grego, David Todd, Igor Lissov, David Wright, Phillip Clark, Rui Barbosa and posters on the forums at nasaspaceflight.com.

The author is an employee of the Smithsonian Institution, but the work reported here was performed independently and does not represent the views of the Smithsonian.

Appendix 1: 2019 Orbital Launch Attempts

LAUNCH ID	Launch date UTC	Launch vehicle	LV Flight ID	Site	Agency
2019-001	2019 Jan 10 1711:04	Chang Zheng 3B	Y56	XSC LC2	CALT
2019-002	2019 Jan 11 1531:33	Falcon 9	068/B1049.2	VS SLC4E	SPX
2019-F01	2019 Jan 15 0030	Simorgh	3	SEM	IRSA
2019-003	2019 Jan 18 0050:20	Epsilon	E-4	USC EP	JAXA
2019-004	2019 Jan 19 1910:00	Delta 4H	D4-38/D382	VS SLC6	ULAB
2019-005	2019 Jan 21 0542:21	Chang Zheng 11	Y6	JQ SLS-E	CALT
2019-006	2019 Jan 24 1807:00	PSLV-DL	PSLV-C44	SHAR FLP	ISRO
2019-F02	2019 Feb 5	Safir	-	SEM SAF	IRSA
2019-007	2019 Feb 5 2101:07	Ariane 5ECA	VA247 (5106)	CSG ELA3	AE
2019-008	2019 Feb 21 1647:14	Soyuz-2-1B	E 15000-024/112-07	GIK-5 LC31	FKA
2019-009	2019 Feb 22 0145	Falcon 9	069/B1048.3	CC LC40	SPX
2019-010	2019 Feb 27 2137:00	Soyuz-ST-B	U 15000-016/133-15	CSG ELS	AE
2019-011	2019 Mar 2 0749	Falcon 9	070/B1051	KSC LC39A	SPX
2019-012	2019 Mar 9 1628:04	Chang Zheng 3B	Y54	XSC LC3	CALT
2019-013	2019 Mar 14 1914:09	Soyuz-FG	Ya15000-070	GIK-5 LC1	FKA
2019-014	2019 Mar 16 0226	Delta 4M+(5,2)	D4-39/D383	CC SLC37B	ULAB
2019-015	2019 Mar 22 0150:35	Vega	VV14	CSG ZLV	AE
2019-F03	2019 Mar 27 0939	OS-M1	OS-M1	JQ	LYK
2019-016	2019 Mar 28 2327	Electron	5	MAHIA LC1	RLABN
2019-017	2019 Mar 31 1551:04	Chang Zheng 3B	Y44	XSC	CALT
2019-018	2019 Apr 1 0357:00	PSLV-QL	PSLV-C45	SHAR SLP	ISRO
2019-019	2019 Apr 4 1101:35	Soyuz-2-1A	Ya15000-036	GIK-5 LC31	FKA
2019-020	2019 Apr 4 1703:37	Soyuz-ST-B	N 15000-017/133-17	CSG ELS	AE
2019-021	2019 Apr 11 2235	Falcon Heavy	002	KSC LC39A	SPX
2019-022	2019 Apr 17 2046:07	Antares 230	2TRS2S1.10 (10)	MARS Pad 0A	NGIS
2019-023	2019 Apr 20 1441:03	Chang Zheng 3B	Y59	XSC LC3	CALT
2019-024	2019 Apr 29 2252:05	Chang Zheng 4B	Y36	TYSC LC9	SAST
2019-025	2019 May 4 0648:58	Falcon 9	071/B1056	CC LC40	SPX
2019-026	2019 May 5 0600	Electron	6	MAHIA LC1	RLABN
2019-027	2019 May 17 1548:05	Chang Zheng 3C	Y16	XSC LC2	CALT
2019-028	2019 May 22 0000	PSLV	PSLV-C46	SHAR FLP	ISRO
2019-F04	2019 May 22 2249	Chang Zheng 4C	Y23	TYSC LC9	SAST
2019-029	2019 May 24 0230	Falcon 9	072/B1049.3	CC LC40	SPX
2019-030	2019 May 27 0623:00	Soyuz-2-1B	Ya15000-053/112-09	GIK-1 LC43/4	VVKO
2019-031	2019 May 30 1742:00	Proton-M/Briz-M	935-69/99564	GIK-5 LC200/39	KHRU
2019-032	2019 Jun 5 0406	Chang Zheng 11	Y7 WEY	CCOC HHAI	CALT
2019-033	2019 Jun 12 1417	Falcon 9	073/B1051.2	VS SLC4E	SPX
2019-034	2019 Jun 20 2143	Ariane 5ECA	VA248 (5107)	CSG ELA3	AE
2019-035	2019 Jun 24 1809	Chang Zheng 3B	Y60	XSC LC3	CALT
2019-036	2019 Jun 25 0630	Falcon Heavy	003	KSC LC39A	SPX
2019-037	2019 Jun 29 0430	Electron	7	MAHIA LC1	RLABN
2019-038	2019 Jul 5 0541:46	Soyuz-2-1B	Ya15000-002/122-04	VOST PUIS	FKA
2019-039	2019 Jul 10 1714	Soyuz-2-1V	780-72 -004	GIK-1 LC43/4	VVKO
2019-F05	2019 Jul 11 0153:03	Vega	VV15	CSG ZLV	AE
2019-040	2019 Jul 13 1230:57	Proton-M/DM-3	535-47/4L	GIK-5 LC81/24	KHRU
2019-041	2019 Jul 20 1628:20	Soyuz-FG	N 15000-069	GIK-5 LC1	FKA
2019-042	2019 Jul 22 0913	GSLV Mk III	M1	SHAR SLP	ISRO
2019-043	2019 Jul 25 0500:00	Shuang Quxian 1	Y1	JQ	XJRY
2019-044	2019 Jul 25 2201:56	Falcon 9	074/B1056.2	CC LC40	SPX
2019-045	2019 Jul 26 0357	Chang Zheng 2C	Y37	XSC	CALT
2019-046	2019 Jul 30 0557	Soyuz-2-1A	- /1036	GIK-1 LC43/4	VVKO
2019-047	2019 Jul 31 1210:46	Soyuz-2-1A	N 15000-035	GIK-5 LC31	FKA
2019-048	2019 Aug 5 2156:00	Proton-M/Briz-M	935-64/99566	GIK-5 LC81/24	KHRU
2019-049	2019 Aug 6 1930:07	Ariane 5ECA	VA249 (5109)	CSG ELA3	AE
2019-050	2019 Aug 6 2323:00	Falcon 9	075/B1047.3	CC LC40	SPX
2019-051	2019 Aug 8 1013	Atlas V 551	AV-083	CC SLC41	ULAL
2019-052	2019 Aug 17 0411	Jielong-1	Y1	JQ	CZJH
2019-053	2019 Aug 19 1203	Chang Zheng 3B	Y58	XSC	CALT
2019-054	2019 Aug 19 1212	Electron	8	MAHIA LC1	RLABN
2019-055	2019 Aug 22 0338:31	Soyuz-2-1A	Ya15000-037	GIK-5 LC31	FKA
2019-056	2019 Aug 22 1306:00	Delta 4M+(4,2)	D4-40/D384	CC SLC37B	ULAB
2019-057	2019 Aug 30 1400	Rokot	492-3921-129/72530	GIK-1 LC133/3	KVR
2019-058	2019 Aug 30 2341	Kuaizhou-1A	Y10	JQ SLS-E	EXPACE
2019-059	2019 Sep 12 0326	Chang Zheng 4B	Y39	TYSC LC9	SAST
2019-060	2019 Sep 19 0642	Chang Zheng 11	Y7	JQ SLS-E	CALT
2019-061	2019 Sep 22 2110:04	Chang Zheng 3B/YZ-1	Y65	XSC LC2	CALT
2019-062	2019 Sep 24 1605:05	H-IIB	H-IIB-F8	TNSC Y2	MHI
2019-063	2019 Sep 25 0054:34	Chang Zheng 2D	Y43	JQ	SAST
2019-064	2019 Sep 25 1357:43	Soyuz-FG	Ya15000-071	GIK-5 LC1	FKA
2019-065	2019 Sep 26 0746	Soyuz-2-1B	-	GIK-1 LC43/4	VVKO
2019-066	2019 Oct 4 1851:05	Chang Zheng 4C	Y33	TYSC LC9	SAST
2019-067	2019 Oct 9 1017:56	Proton-M/Briz-M	937-04/99573	GIK-5 LC200/39	ILSK
2019-068	2019 Oct 11 0200	Pegasus XL	F44 /N51	L-1011 CC RW13 -i MFWA	OSC
2019-069	2019 Oct 17 0122	Electron	9	MAHIA LC1	RLABN
2019-070	2019 Oct 17 1521:04	Chang Zheng 3B	Y57	XSC LC3	CALT
2019-071	2019 Nov 2 1359:47	Antares 230+	2TRS2S1.11 (11)	MARS Pad 0A	NGIS
2019-072	2019 Nov 3 0322	Chang Zheng 4B	Y38	TYSC LC9	SAST
2019-073	2019 Nov 4 1743:04	Chang Zheng 3B	Y61	XSC LC3?	CALT
2019-074	2019 Nov 11 1456	Falcon 9	076/B1048.4	CC LC40	SPX
2019-075	2019 Nov 13 0340	Kuaizhou-1A	Y11	JQ SLS-E	EXPACE
2019-076	2019 Nov 13 0635	Chang Zheng 6	Y3	TYSC	CALT
2019-077	2019 Nov 17 1000	Kuaizhou-1A	Y7	JQ SLS-E	EXPACE
2019-078	2019 Nov 23 0055	Chang Zheng 3B/YZ-1	Y66	XSC LC3	CALT
2019-079	2019 Nov 25 1752	Soyuz-2-1V	-	GIK-1 LC43/4	VVKO
2019-080	2019 Nov 26 2123	Ariane 5ECA	VA250 (5108)	CSG ELA3	AE
2019-081	2019 Nov 27 0358	PSLV-XL	PSLV-C47	SHAR SLP	ISRO
2019-082	2019 Nov 27 2352	Chang Zheng 4C	Y24	TYSC	SAST
2019-083	2019 Dec 5 1729:24	Falcon 9	077/B1059	CC LC40	SPX
2019-084	2019 Dec 6 0818	Electron	10	MAHIA LC1	RLABN

2019-085	2019 Dec 6 0934:11	Soyuz-2-1A	N 15000-034	GIK-5 LC31	FKA
2019-086	2019 Dec 7 0255:46	Kuaizhou-1A	Y2	TYSC	EXPACE
2019-087	2019 Dec 7 0852	Kuaizhou-1A	Y12	TYSC	EXPACE
2019-088	2019 Dec 11 0854	Soyuz-2-1B	N 15000-046/112-01	GIK-1 LC43/3	VVKO
2019-089	2019 Dec 11 0955	PSLV-QL	PSLV-C48	SHAR FLP	ISRO
2019-090	2019 Dec 16 0722	Chang Zheng 3B/YZ-1	Y67	XSC LC3	CALT
2019-091	2019 Dec 17 0010	Falcon 9	078/B1056.3	CC LC40	SPX
2019-092	2019 Dec 18 0854	Soyuz-ST-A	-	CSG ELS	AE
2019-093	2019 Dec 20 0322:29	Chang Zheng 4B	Y44	TYSC	SAST
2019-094	2019 Dec 20 1136:43	Atlas V N22	AV-080	CC SLC41	ULAL
2019-095	2019 Dec 24 1203:02	Proton-M/DM-3	935-66/6L	GIK-5 LC81/24	KHRU
2019-096	2019 Dec 26 2311:58	Rokot	-	GIK-1 LC133/3	KVR
2019-097	2019 Dec 27 1245	Chang Zheng 5	Y3	WEN LC101	CALT

Note: Owner, Agency and Country codes in the tables are defined in <http://planet4589.org/space/lvdb/sdb/Orgs>.
Launch Sites are defined in <http://planet4589.org/space/lvdb/sdb/Sites>.

Appendix 2a: Satellite payloads launched in 2018 (Status end 2019)

This table should be compared with Appendix 2 in the 2018 report. However, the Sprite satellites were omitted in that report.

CATID	LAUNCH ID	Name	Launch date UTC	Owner	Country	Perigee	Apogee	Inc	Status
S43098	2018-001A	USA 280	2018 Jan 8 01:00:00	NROC	US	1000	1000	50.00	Reentered Att to Falcon 9-048 Stage 2
S43099	2018-002A	GaoJing yi hao 03 xing	2018 Jan 9 03:24:33	BHSJ	CN	517	536	97.58	In Earth orbit
S43100	2018-002B	GaoJing yi hao 04 xing	2018 Jan 9 03:24:33	BHSJ	CN	515	535	97.58	In Earth orbit
S43107	2018-003A	Beidou DW 26	2018 Jan 11 23:18:04	CNSA	CN	21514	21541	55.03	In Earth orbit
S43108	2018-003B	Beidou DW 27	2018 Jan 11 23:18:04	CNSA	CN	21516	21539	55.02	In Earth orbit
S43111	2018-004A	Cartosat-2 Series Satellite	2018 Jan 12 03:59:00	ISRO	IN	495	510	97.56	In Earth orbit
S43113	2018-004C	LEO Vantage 1	2018 Jan 12 03:59:00	TCANL	CA	494	506	97.56	In Earth orbit
S43114	2018-004D	ICEYE-X1	2018 Jan 12 03:59:00	ICEYE	FI	494	506	97.56	In Earth orbit
S43115	2018-004E	VividX2	2018 Jan 12 03:59:00	EARI/UKSPOC	UK	493	505	97.56	In Earth orbit
S43116	2018-004F	INS-1C	2018 Jan 12 03:59:00	ISRO	IN	495	508	97.56	In Earth orbit
S43118	2018-004H	Landmapper-BC 3	2018 Jan 12 03:59:00	ADIG	US	496	502	97.55	In Earth orbit
S43119	2018-004J	Flock 3p-1-3	2018 Jan 12 03:59:00	PLABS	US	495	501	97.56	In Earth orbit
S43120	2018-004K	Flock 3p-1-2	2018 Jan 12 03:59:00	PLABS	US	493	504	97.56	In Earth orbit
S43121	2018-004L	Flock 3p-1-1	2018 Jan 12 03:59:00	PLABS	US	493	504	97.56	In Earth orbit
S43122	2018-004M	Flock 3p-1-4	2018 Jan 12 03:59:00	PLABS	US	492	504	97.55	In Earth orbit
S43123	2018-004N	Lemur-2-McCafferty	2018 Jan 12 03:59:00	SPIRE	US	493	504	97.56	In Earth orbit
S43124	2018-004P	Lemur-2-PeterWebster	2018 Jan 12 03:59:00	SPIRE	US	493	504	97.56	In Earth orbit
S43125	2018-004Q	Lemur-2-BrownCov	2018 Jan 12 03:59:00	SPIRE	US	493	504	97.56	In Earth orbit
S43126	2018-004R	Lemur-2-DaveWilson	2018 Jan 12 03:59:00	SPIRE	US	495	502	97.56	In Earth orbit
S43127	2018-004S	DemoSat-2	2018 Jan 12 03:59:00	ASTRAN	US	494	505	97.56	In Earth orbit
S43128	2018-004T	Microsoft-TD	2018 Jan 12 03:59:00	ISRO	IN	327	368	97.22	In Earth orbit
S43130	2018-004V	Arkyd-6A	2018 Jan 12 03:59:00	PLRES	US	493	505	97.56	In Earth orbit
S43131	2018-004W	MicroMAS-2A	2018 Jan 12 03:59:00	MITLL	US	493	505	97.56	In Earth orbit
S43132	2018-004X	PICOSAT	2018 Jan 12 03:59:00	OPM	F	494	505	97.56	In Earth orbit
S43133	2018-004Y	Papillon	2018 Jan 12 03:59:00	CNU	KR	493	506	97.55	In Earth orbit
S43134	2018-004Z	KHUSAT-3	2018 Jan 12 03:59:00	KHUS	KR	493	506	97.56	In Earth orbit
S43135	2018-004A	KAUSAT-5	2018 Jan 12 03:59:00	KRAU	KR	493	506	97.56	In Earth orbit
S43136	2018-004B	TOM	2018 Jan 12 03:59:00	YONS	KR	494	510	97.42	In Earth orbit
S43137	2018-004C	AMSAT AO-92	2018 Jan 12 03:59:00	AMNA	US	494	507	97.56	In Earth orbit
S43138	2018-004D	STEP Cube Lab	2018 Jan 12 03:59:00	CHOSU	KR	492	506	97.56	In Earth orbit
S43139	2018-004E	SpaceBEE 4	2018 Jan 12 03:59:00	SWARM	US	493	505	97.56	In Earth orbit
S43140	2018-004F	SpaceBEE 3	2018 Jan 12 03:59:00	SWARM	US	493	505	97.56	In Earth orbit
S43141	2018-004G	SpaceBEE 2	2018 Jan 12 03:59:00	SWARM	US	493	505	97.56	In Earth orbit
S43142	2018-004H	SpaceBEE 1	2018 Jan 12 03:59:00	SWARM	US	493	505	97.56	In Earth orbit
S43143	2018-004J	CICERO-7	2018 Jan 12 03:59:00	GEOOPT	US	493	504	97.56	In Earth orbit
S43144	2018-004K	GEOSTARE	2018 Jan 12 03:59:00	LN/L/TYVAK	US	493	504	97.56	In Earth orbit
A09102	2018-004G	JERRY	2018 Jan 12 03:59:00	YONS	KR	494	510	97.42	Attached to TOM
S43145	2018-005A	USA 281	2018 Jan 12 22:11:00	NROC	US	1047	1057	106.00	In Earth orbit
S43146	2018-006A	Ludi Kancha Weixing san hao	2018 Jan 13 07:10:00	GCDX?	CN	488	503	97.34	In Earth orbit
S43152	2018-007A	ASNARO-2	2018 Jan 17 21:06:11	USEF	J	493	505	97.38	In Earth orbit
S43155	2018-008A	Hunan xiangjian xinqiu hao	2018 Jan 19 04:12:50	CTYK	CN	527	547	97.55	In Earth orbit
S43156	2018-008B	Huai'an hao Enlai xing	2018 Jan 19 04:12:50	HQZS	CN	529	547	97.54	In Earth orbit
S43157	2018-008C	KIPP	2018 Jan 19 04:12:50	KEPLER	CA	528	547	97.54	In Earth orbit
S43158	2018-008D	Quan Tu Tong 1	2018 Jan 19 04:12:50	QTT	CN	528	546	97.54	In Earth orbit
S43159	2018-008E	Deqing-1	2018 Jan 19 04:12:50	CGSTZ/CGSTL	CN	523	547	97.54	In Earth orbit
S43160	2018-008F	Jilin-1 Lingye-2	2018 Jan 19 04:12:50	CGSTL	CN	527	546	97.54	In Earth orbit
S43162	2018-009A	SBIRS GEO-3	2018 Jan 20 00:48:00	AFSPC	US	35758	35815	6.33	In Earth orbit
S43163	2018-010A	Dove Pioneer	2018 Jan 21 01:43:00	PLABS	US	288	533	82.93	Reentered
S43165	2018-010C	Lemur-2-Marshal	2018 Jan 21 01:43:00	SPIRE	US	494	534	82.93	In Earth orbit
S43167	2018-010E	Lemur-2-Falhamm-ATC	2018 Jan 21 01:43:00	SPIRE	US	492	532	82.93	In Earth orbit
S43168	2018-010F	Humanity Star	2018 Jan 21 01:43:00	RLABN	NZ	295	530	82.92	Reentered
S43169	2018-011A	Weina-1 01 weixing	2018 Jan 25 05:39:05	WEINA	CN	594	601	35.00	In Earth orbit
S43170	2018-011B	Yaogan 30 hao 04 zu 01 xing	2018 Jan 25 05:39:05	ZZB	CN	591	601	34.99	In Earth orbit
S43171	2018-011C	Yaogan 30 hao 04 zu 02 xing	2018 Jan 25 05:39:05	ZZB	CN	591	601	34.99	In Earth orbit
S43172	2018-011D	Yaogan 30 hao 04 zu 03 xing	2018 Jan 25 05:39:05	ZZB	CN	591	602	34.99	In Earth orbit
S43174	2018-012A	AI Yan 3	2018 Jan 25 22:20:00	YAHBR	BR	30077	42365	2.71	In Earth orbit
S43175	2018-012B	SES-14	2018 Jan 25 22:20:00	SESSL	UK	9001	53246	13.09	Sold from SESSL to SESBR
S43178	2018-013A	GovSat-1	2018 Jan 31 21:25:00	LUXG	L	35772	35801	0.02	In Earth orbit

S43180	2018-014A	Kanopus-V No. 3	2018 Feb 1 0207:18	VNIEM	RU	505	510	97.47	In Earth orbit
S43181	2018-014B	Kanopus-V No. 4	2018 Feb 1 0207:18	VNIEM	RU	500	509	97.47	In Earth orbit
S43182	2018-014C	Lemur-2-Jin-Luen	2018 Feb 1 0207:18	SPIRE	US	571	589	97.73	In Earth orbit
S43183	2018-014D	Lemur-2-UramChanSol	2018 Feb 1 0207:18	SPIRE	US	571	589	97.73	In Earth orbit
S43184	2018-014E	Lemur-2-Kadi	2018 Feb 1 0207:18	SPIRE	US	571	588	97.73	In Earth orbit
S43185	2018-014F	Lemur-2-TheNickMolo	2018 Feb 1 0207:18	SPIRE	US	571	588	97.73	In Earth orbit
S43186	2018-014G	S-NET D	2018 Feb 1 0207:18	TUB	D	572	588	97.73	In Earth orbit
S43187	2018-014H	S-NET B	2018 Feb 1 0207:18	TUB	D	571	588	97.73	In Earth orbit
S43188	2018-014J	S-NET A	2018 Feb 1 0207:18	TUB	D	571	588	97.73	In Earth orbit
S43189	2018-014K	S-NET C	2018 Feb 1 0207:18	TUB	D	571	588	97.73	In Earth orbit
A09123	2018-014L	D-Star One v1.1 Phoenix	2018 Feb 1 0207:18	GOS	D	571	588	97.73	Reentered Att to Fregat No. 122-03
S43192	2018-015A	FengMaNiu 1	2018 Feb 2 0751:04	LINK	CN	440	508	97.22	In Earth orbit
S43194	2018-015C	Zhang Heng 1	2018 Feb 2 0751:04	CAS	CN	488	509	97.34	In Earth orbit
S43195	2018-015D	Ada	2018 Feb 2 0751:04	URUGUS	UY	493	503	97.21	In Earth orbit
S43196	2018-015E	GOMX-4B	2018 Feb 2 0751:04	GOMSP/ESA	DK	483	506	97.33	In Earth orbit
S43197	2018-015F	Ulloriaq	2018 Feb 2 0751:04	FMI	DK	486	508	97.33	In Earth orbit
S43199	2018-015H	Shaonian Xing	2018 Feb 2 0751:04	SHAOX	CN	483	507	97.33	In Earth orbit
S43200	2018-015K	Maryam	2018 Feb 2 0751:04	URUGUS	UY	487	508	97.33	In Earth orbit
S43201	2018-016A	Tasuki	2018 Feb 3 0503:00	TOK	J	187	208	30.90	Reentered
S43205	2018-017A	Tesla Roadster	2018 Feb 6 2045:00	SPX	US	180	6939	29.02	Deep Space Att to Falcon Heavy-001 Stage 2
S43207	2018-018A	Beidou DW 28	2018 Feb 12 0503:04	CNSA	CN	21505	21550	54.99	In Earth orbit
S43208	2018-018B	Beidou DW 29	2018 Feb 12 0503:04	CNSA	CN	21501	21554	54.99	In Earth orbit
S43211	2018-019A	Progress MS-08	2018 Feb 13 0813:33	RKKE	RU	318	324	51.64	In Earth orbit
S43597	1998-067PJ	Tanyusha YuZGU No. 3	2018 Feb 13 0813:33	YUZGU	RU	402	405	51.64	In Earth orbit
S43598	1998-067PK	Tanyusha YuZGU No. 4	2018 Feb 13 0813:33	YUZGU	RU	400	408	51.64	In Earth orbit
S43215	2018-020A	Paz	2018 Feb 22 1417:00	HISD	E	503	518	97.46	In Earth orbit
S43216	2018-020B	Tintin A	2018 Feb 22 1417:00	SPXS	US	500	517	97.46	In Earth orbit
S43217	2018-020C	Tintin B	2018 Feb 22 1417:00	SPXS	US	499	516	97.46	In Earth orbit
S43223	2018-021A	ISE kougaku 6 gounki	2018 Feb 27 0434:00	CSICE	J	485	499	97.21	In Earth orbit
S43226	2018-022A	G0ES 17	2018 Mar 1 2202:00	NOAA	US	35779	35794	0.05	In Earth orbit
S43228	2018-023A	Hispasat 30W-6	2018 Mar 6 0533:00	HISP	E	35774	35798	0.05	In Earth orbit
S43229	2018-023B	PODSAT	2018 Mar 6 0533:00	DARPA	US	180	22166	27.07	In Earth orbit
S43231	2018-024A	O3b FM15	2018 Mar 9 1710:06	O3B	UK	8061	8069	0.05	In Earth orbit
S43232	2018-024B	O3b FM16	2018 Mar 9 1710:06	O3B	UK	8061	8069	0.05	In Earth orbit
S43233	2018-024C	O3b FM14	2018 Mar 9 1710:06	O3B	UK	8062	8069	0.05	In Earth orbit
S43234	2018-024D	O3b FM13	2018 Mar 9 1710:06	O3B	UK	8062	8069	0.05	In Earth orbit
S43236	2018-025A	Ludi Kancha Weixing si hao	2018 Mar 17 0710:04	GCDX?	CN	489	502	97.33	In Earth orbit
S43238	2018-026A	Soyuz MS-08	2018 Mar 21 1744:23	RKKE	RU	311	320	51.64	Landed
S43241	2018-027A	GSAT-6A	2018 Mar 29 1126:00	ISRO	IN	25977	36370	3.20	In Earth orbit
S43243	2018-028A	Kosmos-2525	2018 Mar 29 1738:42	MORF	RU	315	318	96.64	In Earth orbit
S43245	2018-029A	Beidou DW 30	2018 Mar 29 1756:04	CNSA	RU	21523	21532	55.05	In Earth orbit
S43246	2018-029B	Beidou DW 31	2018 Mar 29 1756:04	CNSA	CN	21512	21543	55.04	In Earth orbit
S43249	2018-030A	Iridium Next SV144	2018 Mar 30 1413:51	IRID	US	606	625	86.68	In Earth orbit
S43250	2018-030B	Iridium Next SV149	2018 Mar 30 1413:51	IRID	US	608	626	86.68	In Earth orbit
S43251	2018-030C	Iridium Next SV157	2018 Mar 30 1413:51	IRID	US	607	626	86.68	In Earth orbit
S43252	2018-030D	Iridium Next SV142	2018 Mar 30 1413:51	IRID	US	607	626	86.68	In Earth orbit
S43253	2018-030E	Iridium Next SV145	2018 Mar 30 1413:51	IRID	US	607	626	86.68	In Earth orbit
S43254	2018-030F	Iridium Next SV146	2018 Mar 30 1413:51	IRID	US	608	627	86.68	In Earth orbit
S43255	2018-030G	Iridium Next SV148	2018 Mar 30 1413:51	IRID	US	606	626	86.68	In Earth orbit
S43256	2018-030H	Iridium Next SV147	2018 Mar 30 1413:51	IRID	US	608	626	86.68	In Earth orbit
S43257	2018-030J	Iridium Next SV150	2018 Mar 30 1413:51	IRID	US	606	626	86.68	In Earth orbit
S43258	2018-030K	Iridium Next SV143	2018 Mar 30 1413:51	IRID	US	608	626	86.68	In Earth orbit
S43259	2018-031A	Gao Fen 1 02 xing	2018 Mar 31 0322:08	CNSAS	CN	638	642	98.04	In Earth orbit
S43260	2018-031B	Gao Fen 1 03 xing	2018 Mar 31 0322:08	CNSAS	CN	638	641	98.04	In Earth orbit
S43262	2018-031D	Gao Fen 1 04 xing	2018 Mar 31 0322:08	CNSAS	CN	638	642	98.04	In Earth orbit
S43267	2018-032A	Dragon CRS-14	2018 Apr 2 2030:38	SPX	US	391	396	51.64	Landed
S43466	1998-067NP	UBAKUSAT	2018 Apr 2 2030:38	ITUTR	TR	402	402	51.64	In Earth orbit
S43467	1998-067NQ	IKUNSPF	2018 Apr 2 2030:38	NAHR	KE	396	408	51.66	In Earth orbit
S43468	1998-067NR	Batsu-C51	2018 Apr 2 2030:38	ACAE/ITCR	CR	400	402	51.64	In Earth orbit
S43510	1998-067NT	RemoveDebris	2018 Apr 2 2030:38	SSTL	UK	401	407	51.64	In Earth orbit
S43621	1998-067PM	DebrisSat-1/Net	2018 Apr 2 2030:38	SSTL	UK	398	405	51.65	Reentered
S43680	1998-067PR	DebrisSat-2	2018 Apr 2 2030:38	SSTL	UK	398	403	51.64	In Earth orbit
S43271	2018-033A	Kirameki 1	2018 Apr 5 2134:07	DSNC	J	35772	35800	0.02	In Earth orbit
S43272	2018-033B	Hylas 4	2018 Apr 5 2134:07	AVANTI	UK	35778	35796	0.02	In Earth orbit

S43275	2018-034A	Yaogan 31 hao 01 zu 01 xing	2018 Apr 10 0425:03	ZZB	CN	1086	1099	63.41	In Earth orbit
S43276	2018-034B	Yaogan 31 hao 01 zu 02 xing	2018 Apr 10 0425:03	ZZB	CN	1088	1099	63.41	In Earth orbit
S43277	2018-034C	Yaogan 31 hao 01 zu 03 xing	2018 Apr 10 0425:03	ZZB	CN	1087	1099	63.41	In Earth orbit
S43279	2018-034E	Weina-1 02 weixing	2018 Apr 10 0425:03	WEINA	CN	1085	1098	28.63	In Earth orbit
S43286	2018-035A	IRNSS-R1H	2018 Apr 11 2234:00	ISRO	IN	35702	35868	0.01	In Earth orbit
S43339	2018-036A	CBAS-SATCOM	2018 Apr 14 2313:00	AFSMC	US	35740	35834	0.03	In Earth orbit
S43340	2018-036B	EAGLE	2018 Apr 14 2313:00	AFRL	US	35587	35618	0.07	In Earth orbit
S43445	2018-036E	USA 285	2018 Apr 14 2313:00	AFRL	US	35573	35633	0.06	In Earth orbit
S43446	2018-036F	USA 286	2018 Apr 14 2313:00	AFRL	US	35288	35288	0.06	In Earth orbit
S43465	2018-036G	MYCROFT	2018 Apr 14 2313:00	AFRL	US	35288	35288	0.06	In Earth orbit
S43432	2018-037A	Kosmos-2526	2018 Apr 18 2212:00	KVR/VOENT	RU	35668	35669	0.05	In Earth orbit
S43435	2018-038A	TESS	2018 Apr 18 2251:30	GSFC	US	258	268488	29.59	Deep Space
S43437	2018-039A	Sentinel-3B	2018 Apr 25 1757:51	COPERN/ESA	I-EU	802	815	98.62	In Earth orbit
S43439	2018-040A	Qingkeka 1	2018 Apr 26 0442:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S43440	2018-040B	OVS-2	2018 Apr 26 0442:00	ZHUORB	CN	493	512	97.40	In Earth orbit
S43441	2018-040C	OHS-1 02 xing	2018 Apr 26 0442:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S43442	2018-040D	Guiyang-1	2018 Apr 26 0442:00	ZHUORB	CN	493	512	97.40	In Earth orbit
S43443	2018-040E	OHS-1 04 xing	2018 Apr 26 0442:00	ZHUORB	CN	491	511	97.40	In Earth orbit
S43450	2018-041A	Apstar 6C	2018 May 3 1606:05	APT	HK	35779	35793	0.05	In Earth orbit
S43457	2018-042A	Mars InSight Lander	2018 May 5 1105:01	NASA/JPL	US	115	-110126	63.54	Deep Space
S43458	2018-042B	MarCO-A	2018 May 5 1105:01	NASA/JPL	US	115	-110126	63.54	Deep Space
S43459	2018-042C	MarCO-B	2018 May 5 1105:01	NASA/JPL	US	115	-110126	63.54	Deep Space
S43461	2018-043A	Gao Fen 5	2018 May 8 1828:40	GWHYZ	CN	677	695	98.12	In Earth orbit
S43463	2018-044A	Bangabandhu 1	2018 May 11 2014:00	BSCCL	BD	35776	35797	0.03	In Earth orbit
S43470	2018-045A	Queqiao	2018 May 20 2128:50	CASC	CN	394	383109	27.50	Deep Space
S43471	2018-045B	Longjiang 1	2018 May 20 2128:50	CASC/HARB	CN	200	384347	28.50	Deep Space
S43472	2018-045C	Longjiang 2	2018 May 20 2128:50	CASC/HARB	CN	200	384347	28.50	Deep Space
S43474	2018-046A	SS J.R. Thompson	2018 May 21 0844:06	OSC	US	402	407	51.65	Deorbited
S43546	1998-067NU	CubeRR1	2018 May 21 0844:06	OSU	US	399	407	51.64	In Earth orbit
S43547	1998-067NV	TEMPTEST-D	2018 May 21 0844:06	CSU/JPL	US	399	407	51.63	In Earth orbit
S43548	1998-067NW	RainCube	2018 May 21 0844:06	JPL	US	399	407	51.64	In Earth orbit
S43549	1998-067NX	HaloSat	2018 May 21 0844:06	UIA	US	399	407	51.64	In Earth orbit
S43550	1998-067NY	Radix	2018 May 21 0844:06	ANSP	US	400	406	51.64	In Earth orbit
S43551	1998-067NZ	Endurosat One	2018 May 21 0844:06	ENDUR	BGN	400	405	51.64	In Earth orbit
S43552	1998-067PA	Equisat	2018 May 21 0844:06	BROWN	US	398	407	51.64	In Earth orbit
S43553	1998-067PB	MemSat	2018 May 21 0844:06	ROWAN	US	400	406	51.64	In Earth orbit
S43554	1998-067PC	RadSat-g	2018 May 21 0844:06	MSU	US	398	407	51.64	In Earth orbit
S43556	2018-046C	Aerocube 12A	2018 May 21 0844:06	AERO	US	477	488	51.64	In Earth orbit
S43557	2018-046D	Aerocube 12B	2018 May 21 0844:06	AERO	US	476	488	51.64	In Earth orbit
S43558	2018-046E	Lemur-2-Yu	2018 May 21 0844:06	SPIRE	US	477	487	51.64	In Earth orbit
S43559	2018-046F	Lemur-2-Alexander	2018 May 21 0844:06	SPIRE	US	477	487	51.64	In Earth orbit
S43560	2018-046G	Lemur-2-Yuasa	2018 May 21 0844:06	SPIRE	US	477	488	51.64	In Earth orbit
S43561	2018-046H	Lemur-2-TomHenderson	2018 May 21 0844:06	SPIRE	US	477	488	51.64	In Earth orbit
S43476	2018-047A	GRACE-FO 1	2018 May 22 1947:58	JPL/GFZ	US	485	504	88.99	In Earth orbit
S43477	2018-047B	GRACE-FO 2	2018 May 22 1947:58	JPL/GFZ	US	484	504	88.99	In Earth orbit
S43478	2018-047C	Iridium Next SV161	2018 May 22 1947:58	IRID	US	489	714	86.71	In Earth orbit
S43479	2018-047D	Iridium Next SV152	2018 May 22 1947:58	IRID	US	489	710	86.72	In Earth orbit
S43480	2018-047E	Iridium Next SV147	2018 May 22 1947:58	IRID	US	489	714	86.71	In Earth orbit
S43481	2018-047F	Iridium Next SV110	2018 May 22 1947:58	IRID	US	488	718	86.71	In Earth orbit
S43482	2018-047G	Iridium Next SV162	2018 May 22 1947:58	IRID	US	491	715	86.71	In Earth orbit
S43484	2018-048A	Gao Fen 6	2018 Jun 2 0413:04	CNSAS	CN	634	647	98.05	In Earth orbit
S43485	2018-048B	Luojia-1 KSW 01 xing	2018 Jun 2 0413:04	WUHAN	CN	634	647	98.05	In Earth orbit
S43488	2018-049A	SES-12	2018 Jun 4 0445:00	SESSL	UK	8447	66120	10.03	In Earth orbit
S43491	2018-050A	Feng Yun 2H	2018 Jun 5 1307:04	NSMC	UK	35767	35803	2.22	In Earth orbit
S43493	2018-051A	Sovuz MS-09	2018 Jun 6 1112:39	RKKE	RU	273	275	51.64	Landed
S43495	2018-052A	ISE reda-6 gouki	2018 Jun 12 0420:00	CSICE	I	500	501	97.38	In Earth orbit
S43508	2018-053A	Kosmos-2527	2018 Jun 16 2146:28	ZZB	RU	19122	19153	64.83	In Earth orbit
S43518	2018-054A	Xin jishu shiyuan A xing	2018 Jun 27 0330:06	ZZB	CN	477	486	35.00	In Earth orbit
S43519	2018-054B	Xin jishu shiyuan B xing	2018 Jun 27 0330:06	ZZB	CN	477	486	35.00	In Earth orbit
S43522	2018-055A	Dragon CRS-15	2018 Jun 29 0942:42	SFX	CN	391	396	51.64	Landed
S43529	1998-067PD	UjTMSAT-1	2018 Jun 29 0942:42	UTM	MY	398	408	51.64	In Earth orbit
S43590	1998-067PE	Maya-1	2018 Jun 29 0942:42	DOST	PH	396	408	51.65	In Earth orbit
S43591	1998-067PF	Bhutan-1	2018 Jun 29 0942:42	BIDITT	BT	398	408	51.64	In Earth orbit
S43529	2018-056A	PRSS-1	2018 Jul 9 0356:14	SUPA	PK	588	624	98.05	In Earth orbit
S43530	2018-056B	PakTES-1a	2018 Jul 9 0356:14	SUPA	PK	594	628	98.05	In Earth orbit
S43539	2018-057A	Beidou DW 32	2018 Jul 9 2058:04	CNSA	CN	35695	35877	55.05	In Earth orbit

S43537	2018-058A	Progress MS-09	2018 Jul 9 21:51:34	RU	367	404	51.65	Deorbited
S43595	1998-067PG	SiriusSat-1	2018 Jul 9 21:51:34	RU	401	407	51.64	In Earth orbit
S43596	1998-067PH	SiriusSat-2	2018 Jul 9 21:51:34	RU	401	407	51.64	In Earth orbit
S43562	2018-059A	Telstar 19 Vantage	2018 Jul 22 05:50:00	CA	35771	35799	0.01	In Earth orbit
S43564	2018-060A	GalileoSat-25	2018 Jul 25 11:25:08	I-EU	22971	22982	56.37	In Earth orbit
S43565	2018-060B	GalileoSat-26	2018 Jul 25 11:25:08	I-EU	23019	23050	56.37	In Earth orbit
S43566	2018-060C	GalileoSat-23	2018 Jul 25 11:25:08	I-EU	23230	23252	56.38	In Earth orbit
S43567	2018-060D	GalileoSat-24	2018 Jul 25 11:25:08	I-EU	23087	23151	56.36	In Earth orbit
S43569	2018-061A	Iridium Next SV160	2018 Jul 25 11:39:26	US	609	624	86.68	In Earth orbit
S43570	2018-061B	Iridium Next SV166	2018 Jul 25 11:39:26	US	609	623	86.67	In Earth orbit
S43571	2018-061C	Iridium Next SV158	2018 Jul 25 11:39:26	US	609	623	86.67	In Earth orbit
S43572	2018-061D	Iridium Next SV165	2018 Jul 25 11:39:26	US	609	623	86.67	In Earth orbit
S43573	2018-061E	Iridium Next SV155	2018 Jul 25 11:39:26	US	608	623	86.67	In Earth orbit
S43574	2018-061F	Iridium Next SV154	2018 Jul 25 11:39:26	US	608	623	86.68	In Earth orbit
S43575	2018-061G	Iridium Next SV163	2018 Jul 25 11:39:26	US	607	623	86.68	In Earth orbit
S43576	2018-061H	Iridium Next SV156	2018 Jul 25 11:39:26	US	607	623	86.68	In Earth orbit
S43577	2018-061J	Iridium Next SV164	2018 Jul 25 11:39:26	US	607	623	86.67	In Earth orbit
S43578	2018-061K	Iridium Next SV159	2018 Jul 25 11:39:26	US	607	622	86.67	In Earth orbit
S43581	2018-062A	Beidou DW 33	2018 Jul 29 01:48:05	CN	21509	21546	54.95	In Earth orbit
S43582	2018-062B	Beidou DW 34	2018 Jul 29 01:48:05	CN	21515	21540	54.95	In Earth orbit
S43583	2018-063A	Gao Fen 11	2018 Jul 31 03:00:04	CN	241	689	97.43	In Earth orbit
S43587	2018-064A	Merah Putih	2018 Aug 7 05:18:00	ID	35781	35793	0.02	In Earth orbit
S43592	2018-065A	Parker Solar Probe	2018 Aug 12 07:31:00	US	617	-18602	32.95	Deep Space
S43600	2018-066A	Aeolus	2018 Aug 22 21:20:09	ESA	314	317	96.73	In Earth orbit
S43602	2018-067A	Beidou DW 35	2018 Aug 24 23:52:04	CN	21512	21543	54.99	In Earth orbit
S43603	2018-067B	Beidou DW 36	2018 Aug 24 23:52:04	CN	21517	21538	54.99	In Earth orbit
S43609	2018-068A	Hai Yang 1C	2018 Sep 7 03:15:05	CN	769	786	98.60	In Earth orbit
S43611	2018-069A	Hai Yang 1B	2018 Sep 10 04:45:00	CN	35778	35792	0.04	In Earth orbit
S43613	2018-070A	ICESAT 2	2018 Sep 12 13:02:00	US	455	468	93.02	In Earth orbit
S43614	2018-070B	SurfSat	2018 Sep 12 13:02:00	US	443	468	93.04	In Earth orbit
S43615	2018-070C	CP7	2018 Sep 12 13:02:00	US	447	466	93.03	In Earth orbit
S43616	2018-070D	ELFIN-STAR	2018 Sep 12 13:02:00	US	449	465	93.02	In Earth orbit
S43617	2018-070E	ELFIN	2018 Sep 12 13:02:00	US	443	469	93.04	In Earth orbit
S43618	2018-071A	SI-4	2018 Sep 16 16:38:00	UK	574	591	97.82	In Earth orbit
S43619	2018-071B	NovaSAR-S	2018 Sep 16 16:38:00	UK	574	592	97.82	In Earth orbit
S43622	2018-072A	Beidou DW 37	2018 Sep 19 14:07:04	CN	21514	21541	54.98	In Earth orbit
S43623	2018-072B	Beidou DW 38	2018 Sep 19 14:07:04	CN	21514	21540	54.98	In Earth orbit
S43630	2018-073A	Komotori 7 gunki	2018 Sep 22 17:52:27	J	276	302	51.64	Deorbited
S43638	1998-067PN	SPATIUM-1	2018 Sep 22 17:52:27	SG	400	406	51.64	In Earth orbit
S43639	1998-067PP	RSP-00	2018 Sep 22 17:52:27	J	400	406	51.64	In Earth orbit
S43640	1998-067PQ	Tenryu	2018 Sep 22 17:52:27	J	401	406	51.64	In Earth orbit
A09198	1998-067	STARS-Me HT	2018 Sep 22 17:52:27	J	401	406	51.64	Attached to Tenryu
A09199	1998-067	STARS-Me Chimber	2018 Sep 22 17:52:27	J	401	406	51.64	Attached to Tenryu
S43632	2018-074A	Azerspace-2	2018 Sep 25 22:38:00	AZ	19523	39918	1.28	In Earth orbit
S43633	2018-074B	Horizons 3e	2018 Sep 25 22:38:00	US	35780	35792	0.05	In Earth orbit
S43636	2018-075A	Xiangrikui 1	2018 Sep 29 04:13:30	CN	695	709	98.22	In Earth orbit
S43641	2018-076A	SAOCOM 1A	2018 Oct 8 02:21:28	AR	615	634	97.90	In Earth orbit
S43642	2018-077A	Yaogan 32 hao 01 zu 01 xing	2018 Oct 8 02:43:03	CN	689	704	98.27	In Earth orbit
S43643	2018-077B	Yaogan 32 hao 01 zu 02 xing	2018 Oct 8 02:43:03	CN	681	698	98.28	In Earth orbit
S43647	2018-078A	Beidou DW 39	2018 Oct 15 04:23:04	CN	21509	21545	55.02	In Earth orbit
S43648	2018-078B	Beidou DW 40	2018 Oct 15 04:23:04	CN	21535	21783	55.01	In Earth orbit
S43651	2018-079A	AEHF SV-4	2018 Oct 17 04:15:00	US	23513	35840	7.27	In Earth orbit
S43653	2018-080A	BepiColombo MPO	2018 Oct 20 01:45:28	I-ESA	170	-78605	5.50	Deep Space Att to Bepi-Colombo MTM
A09204	2018-080C	Mio	2018 Oct 20 01:45:28	J	170	-78605	5.50	Deep Space Att to Bepi-Colombo MOSIF
S43655	2018-081A	Hai Yang 2 02 xing	2018 Oct 24 22:57:00	CN	949	957	99.35	In Earth orbit
S43656	2018-081B	Tanggao Guan	2018 Oct 24 22:57:00	CN	640	940	99.45	Attached to CZ-4B Y36 Stage 3
A09210	2018-081	SPP/DSB-01	2018 Oct 24 22:57:00	CN	919	939	99.33	In Earth orbit
S43657	2018-082A	Kosmos-2528	2018 Oct 25 00:15:18	RU	244	900	67.14	In Earth orbit
S43662	2018-083A	Zhongfa Haiyang Weixing	2018 Oct 29 00:43:14	CN	509	523	97.53	In Earth orbit
S43663	2018-083B	Xinghe	2018 Oct 29 00:43:14	CN	505	523	97.54	In Earth orbit
S43664	2018-083C	Xiaoxiang-1 02 xing	2018 Oct 29 00:43:14	CN	509	522	97.52	In Earth orbit
S43665	2018-083D	Zhaojin-1	2018 Oct 29 00:43:14	CN	507	523	97.52	In Earth orbit
S43666	2018-083E	CubeBel-1	2018 Oct 29 00:43:14	BY	509	524	97.53	In Earth orbit

Object ID	Object Name	Launch Date	Operator	Vehicle	Country	Altitude (km)	Orbit Type
S43668	Tianqi-1	2018 Oct 29 00:43:14	China	GUOQ	CN	510	In Earth orbit
S43669	Changsha gaoxin	2018 Oct 29 00:43:14	China	CITYK	CN	522	In Earth orbit
A09212	Unknown Chinese payload	2018 Oct 29 00:43:14	China	CAST	CN	522	In Earth orbit
S43672	Ibuki 2	2018 Oct 29 04:08:00	Japan	JAXA	J	585	In Earth orbit
S43676	KhalifaSat	2018 Oct 29 04:08:00	UAE	ELAST	J	597	In Earth orbit
S43677	Teo-Koh	2018 Oct 29 04:08:00	UAE	KYLUT	J	614	In Earth orbit
S43678	Philippines-OSCAR-101	2018 Oct 29 04:08:00	PH	DOST/UPD	PH	595	In Earth orbit
S43679	Aoi	2018 Oct 29 04:08:00	SHZ	SHZ	J	591	In Earth orbit
S43681	AUTCube-2	2018 Oct 29 04:08:00	J	AUT	J	608	In Earth orbit
S43683	Beidou DW 41	2018 Nov 1 15:57:04	CNSA	CNSA	CN	35783	In Earth orbit
S43687	Kosmos-2529	2018 Nov 3 20:17:53	KVIR/IACG	KVIR/IACG	RU	19145	In Earth orbit
S43689	METOP C	2018 Nov 7 00:47:28	EUMET	EUMET	L-EUM	806	In Earth orbit
S43690	CICERO-10	2018 Nov 11 03:50:00	US	GEOOPT	US	490	In Earth orbit
S43692	NABEO 'Pride of Bavaria'	2018 Nov 11 03:50:00	D	HPS	D	496	Attached to Electron 3
S43693	IRVINE01	2018 Nov 11 03:50:00	US	IPSF	US	496	Kick Stage
S43694	Proxima I	2018 Nov 11 03:50:00	AU	FLEET	AU	491	In Earth orbit
S43695	Lemur-2-Zupanski	2018 Nov 11 03:50:00	US	SPiRE	US	499	In Earth orbit
S43696	Proxima II	2018 Nov 11 03:50:00	AU	FLEET	AU	490	In Earth orbit
S43697	Lemur-2-Chanusiak	2018 Nov 11 03:50:00	US	SPiRE	US	497	In Earth orbit
S43698	GSAT-29	2018 Nov 14 11:38:00	IN	ISRO	IN	36125	In Earth orbit
S43700	Es'hailesat-2	2018 Nov 15 20:46:00	QA	ESHAIL	QA	35766	In Earth orbit
S43702	Progress MS-10	2018 Nov 16 18:14:08	RU	RKKE	RU	251	In Earth orbit
S43704	SS John Young	2018 Nov 17 09:01:23	US	OSC	US	401	Deorbited
S44004	CHEFSat 2	2018 Nov 17 09:01:23	US	NRL	US	454	Deorbited
S44045	MYSat-1	2018 Nov 17 09:01:23	UAE	MASDAR	UAE	454	In Earth orbit
S44046	KickSat-2	2018 Nov 17 09:01:23	ARC	ARC	US	297	In Earth orbit
A09283	Sprite (00.01)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09284	Sprite (02.03)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09285	Sprite (04.05)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09286	Sprite (06.07)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09287	Sprite (08.09)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09288	Sprite (10.11)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09289	Sprite (12.13)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09290	Sprite (14.15)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09291	Sprite (16.17)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09292	Sprite (18.19)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09293	Sprite (20.21)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09294	Sprite (22.23)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09295	Sprite (24.25)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09296	Sprite (26.27)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09297	Sprite (28.29)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09298	Sprite (30.31)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09299	Sprite (32.33)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09300	Sprite (34.35)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09301	Sprite (36.37)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09302	Sprite (38.39)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09303	Sprite (40.41)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09304	Sprite (42.43)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09305	Sprite (44.45)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09306	Sprite (46.47)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09307	Sprite (48.49)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09308	Sprite (50.51)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09309	Sprite (52.53)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09310	Sprite (54.55)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09311	Sprite (56.57)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09312	Sprite (58.59)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09313	Sprite (60.61)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09314	Sprite (62.63)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09315	Sprite (64.65)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09316	Sprite (66.67)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09317	Sprite (68.69)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09318	Sprite (70.71)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09319	Sprite (72.73)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09320	Sprite (74.75)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered
A09321	Sprite (76.77)	2018 Nov 17 09:01:23	US	STAN/ARC	US	260	Reentered

S43706	2018-093A	Beidou DW 42	2018 Nov 18 18:07:04	CNSA	21523	22194	54.99	In Earth orbit
S43707	2018-093B	Beidou DW 43	2018 Nov 18 18:07:04	CNSA	21532	22072	55.00	In Earth orbit
S43710	2018-094A	Tianzhong-1	2018 Nov 19 23:40:04	ISCAS	488	504	97.41	In Earth orbit
S43711	2018-094B	Shiyan 6	2018 Nov 19 23:40:04	CNSA	487	504	97.41	In Earth orbit
S43712	2018-094C	Tianping-1A	2018 Nov 19 23:40:04	GUOX?	486	504	97.41	In Earth orbit
S43713	2018-094D	Tianping-1	2018 Nov 19 23:40:04	GUOX?	489	503	97.41	In Earth orbit
S43714	2018-094E	Tianping-1B	2018 Nov 19 23:40:04	GUOX?	488	503	97.41	In Earth orbit
S43717	2018-095A	Mohammed VI-B	2018 Nov 21 01:42:31	RMAF	606	606	97.95	In Earth orbit
S43719	2018-096A	HySIS	2018 Nov 21 04:27:30	ISRO	628	647	97.97	In Earth orbit
S43720	2018-096B	HSAT-1	2018 Nov 29 04:27:30	HARR	476	499	97.48	In Earth orbit
S43721	2018-096C	FACSAT	2018 Nov 29 04:27:30	EMAVI	476	499	97.48	In Earth orbit
S43722	2018-096D	Centauri 2	2018 Nov 29 04:27:30	FLEET	476	499	97.47	In Earth orbit
S43723	2018-096E	Flock 3r-10	2018 Nov 29 04:27:30	PLABS	476	499	97.49	In Earth orbit
S43724	2018-096F	Flock 3r-12	2018 Nov 29 04:27:30	PLABS	474	499	97.49	In Earth orbit
S43725	2018-096G	Flock 3r-11	2018 Nov 29 04:27:30	PLABS	475	498	97.48	In Earth orbit
S43726	2018-096H	Flock 3r-5	2018 Nov 29 04:27:30	PLABS	468	499	97.48	In Earth orbit
S43727	2018-096J	Flock 3r-8	2018 Nov 29 04:27:30	PLABS	475	500	97.49	In Earth orbit
S43728	2018-096K	3Cat-1	2018 Nov 29 04:27:30	UPC	470	499	97.48	In Earth orbit
S43729	2018-096L	CASE	2018 Nov 29 04:27:30	KEPLER	476	499	97.48	In Earth orbit
S43730	2018-096M	Global-1	2018 Nov 29 04:27:30	BSKG	475	499	97.48	In Earth orbit
S43731	2018-096N	Lemur-2-Orzulak	2018 Nov 29 04:27:30	SPIRE	478	499	97.49	In Earth orbit
S43732	2018-096P	Lemur-2-Kobyszcze	2018 Nov 29 04:27:30	SPIRE	471	500	97.49	In Earth orbit
S43733	2018-096Q	Flock 3r-4	2018 Nov 29 04:27:30	PLABS	471	499	97.48	In Earth orbit
S43734	2018-096R	Flock 3r-3	2018 Nov 29 04:27:30	PLABS	469	500	97.49	In Earth orbit
S43735	2018-096S	Flock 3r-16	2018 Nov 29 04:27:30	PLABS	471	499	97.49	In Earth orbit
S43736	2018-096T	Flock 3r-15	2018 Nov 29 04:27:30	PLABS	472	499	97.48	In Earth orbit
S43737	2018-096U	CICERO-8	2018 Nov 29 04:27:30	GEOOPT	477	499	97.49	In Earth orbit
S43738	2018-096V	InnoSAT-2	2018 Nov 29 04:27:30	ATSB	474	500	97.50	In Earth orbit
S43740	2018-096X	Flock 3r-9	2018 Nov 29 04:27:30	PLABS	476	499	97.49	In Earth orbit
S43741	2018-096Y	Flock 3r-6	2018 Nov 29 04:27:30	PLABS	466	498	97.48	In Earth orbit
S43742	2018-096Z	Flock 3r-7	2018 Nov 29 04:27:30	PLABS	470	499	97.49	In Earth orbit
S43743	2018-096A	Reaktor Hello World	2018 Nov 29 04:27:30	REAKT	476	498	97.50	In Earth orbit
S43744	2018-096AB	Hiber 1	2018 Nov 29 04:27:30	HIBER	476	500	97.48	In Earth orbit
S43745	2018-096AC	Lemur-2-Duly	2018 Nov 29 04:27:30	SPIRE	471	499	97.49	In Earth orbit
S43746	2018-096AD	Lemur-2-Vladimir	2018 Nov 29 04:27:30	SPIRE	473	499	97.48	In Earth orbit
S43747	2018-096AE	Flock 3r-1	2018 Nov 29 04:27:30	PLABS	471	499	97.49	In Earth orbit
S43748	2018-096AF	Flock 3r-2	2018 Nov 29 04:27:30	PLABS	470	500	97.50	In Earth orbit
S43749	2018-096AG	Flock 3r-14	2018 Nov 29 04:27:30	PLABS	471	500	97.49	In Earth orbit
S43750	2018-096AH	Flock 3r-13	2018 Nov 29 04:27:30	PLABS	472	499	97.49	In Earth orbit
S43751	2018-097A	Kosmos-2530	2018 Nov 30 02:27:34	KVR	1482	1506	82.51	In Earth orbit
S43752	2018-097B	Kosmos-2531	2018 Nov 30 02:27:34	KVR	1484	1508	82.51	In Earth orbit
S43753	2018-097C	Kosmos-2532	2018 Nov 30 02:27:34	KVR	1485	1508	82.51	In Earth orbit
S43756	2018-098A	Sovuz MS-11	2018 Dec 3 11:31:52	RKKE	193	226	51.63	Landed
S43758	2018-099A	MinXSS 2	2018 Dec 3 18:34:05	CLASP	573	588	97.77	In Earth orbit
S43759	2018-099B	SIRION Pathfinder 2	2018 Dec 3 18:34:05	SIRION/HELW	574	592	97.76	In Earth orbit
S43760	2018-099C	SSO-A LFF	2018 Dec 3 18:34:05	SFLIN	573	590	97.77	In Earth orbit
S43761	2018-099D	WeissSat 1	2018 Dec 3 18:34:05	WEISS	573	590	97.77	In Earth orbit
S43762	2018-099E	STPSat 5	2018 Dec 3 18:34:05	STP	573	591	97.77	In Earth orbit
S43763	2018-099F	SSO-A UFF	2018 Dec 3 18:34:05	SFLIN	573	589	97.77	In Earth orbit
S43764	2018-099G	Kodiak	2018 Dec 3 18:34:05	USCG/DHSST	575	591	97.77	In Earth orbit
S43765	2018-099H	Hawk A	2018 Dec 3 18:34:05	HE360	577	590	97.77	In Earth orbit
S43766	2018-099J	SPAWAR-CAL-O	2018 Dec 3 18:34:05	SPAWAR	573	591	97.77	In Earth orbit
S43767	2018-099K	Landmapper-BC4	2018 Dec 3 18:34:05	ADIG	575	590	97.77	In Earth orbit
S43768	2018-099L	AISTECHSAT 2	2018 Dec 3 18:34:05	AISTS	574	592	97.77	In Earth orbit
S43769	2018-099M	Flock 3s-1	2018 Dec 3 18:34:05	PLABS	574	592	97.77	In Earth orbit
S43770	2018-099N	AMSAT-OSCAR-95	2018 Dec 3 18:34:05	AMNA	574	591	97.77	In Earth orbit
S43771	2018-099P	Orbital Reflector	2018 Dec 3 18:34:05	NVART	573	591	97.77	In Earth orbit
S43772	2018-099Q	RANGE B	2018 Dec 3 18:34:05	GHT	574	588	97.77	In Earth orbit
S43773	2018-099R	RANGE A	2018 Dec 3 18:34:05	GHT	572	588	97.77	In Earth orbit
S43774	2018-099S	Hiber 2	2018 Dec 3 18:34:05	HIBER	575	591	97.77	In Earth orbit
S43775	2018-099T	Vusat-OSCAR-96	2018 Dec 3 18:34:05	EXSEED	572	589	97.77	In Earth orbit
S43776	2018-099U	SPAWAR-CAL-R	2018 Dec 3 18:34:05	SPAWAR	573	591	97.77	In Earth orbit
S43777	2018-099V	ENOCH	2018 Dec 3 18:34:05	LACMA	577	591	97.77	In Earth orbit
S43778	2018-099W	SPAWAR-CAL-OR	2018 Dec 3 18:34:05	SPAWAR	573	591	97.77	In Earth orbit
S43779	2018-099X	RAAF M1	2018 Dec 3 18:34:05	RAAF	573	588	97.76	In Earth orbit
S43780	2018-099Y	MOVE-IIa	2018 Dec 3 18:34:05	TUM	572	590	97.76	In Earth orbit

S43781	2018-099Z	VESTA	2018 Dec 3 1834:05	HONEYA/UKSA	UK	573	592	97.77	In Earth orbit
S43782	2018-099A	SNUSAT 2	2018 Dec 3 1834:05	SNU	KR	572	588	97.76	In Earth orbit
S43783	2018-099AB	KazSTSat	2018 Dec 3 1834:05	GHALAM	KZ	573	589	97.77	In Earth orbit
S43784	2018-099AC	SNUGLITE	2018 Dec 3 1834:05	SNU	KR	572	591	97.77	In Earth orbit
S43785	2018-099AD	OrbWeaver 2	2018 Dec 3 1834:05	DARPA	US	572	587	97.76	In Earth orbit
S43786	2018-099AE	ITASAT-1	2018 Dec 3 1834:05	ITA	BR	573	592	97.77	In Earth orbit
S43787	2018-099AF	KazSciSat 1	2018 Dec 3 1834:05	GHALAM	KZ	572	589	97.77	In Earth orbit
S43788	2018-099AG	Flock 3s-3	2018 Dec 3 1834:05	PLABS	US	573	590	97.76	In Earth orbit
S43789	2018-099AH	IRVINE02	2018 Dec 3 1834:05	IPSF	US	572	591	97.77	In Earth orbit
S43790	2018-099AJ	Baglet 1	2018 Dec 3 1834:05	OHBI	I	573	591	97.77	In Earth orbit
S43791	2018-099AK	Denali	2018 Dec 3 1834:05	CAPSP	US	573	591	97.77	In Earth orbit
S43792	2018-099AL	ESEO	2018 Dec 3 1834:05	ESA	L-ESA	572	589	97.77	In Earth orbit
S43793	2018-099AM	CSIM-FD	2018 Dec 3 1834:05	CLASP	US	573	590	97.77	In Earth orbit
S43794	2018-099AN	Hawk B	2018 Dec 3 1834:05	HE360	US	577	590	97.77	In Earth orbit
S43795	2018-099AP	OrbWeaver 1	2018 Dec 3 1834:05	DARPA	US	572	587	97.77	In Earth orbit
S43796	2018-099AQ	THEA	2018 Dec 3 1834:05	AUNS/SPQ	US	571	589	97.77	In Earth orbit
S43797	2018-099AR	SkySat C12	2018 Dec 3 1834:05	PLABST	US	572	588	97.77	In Earth orbit
S43798	2018-099AS	Astrocast-0.1	2018 Dec 3 1834:05	ACAST	CH	574	590	97.77	In Earth orbit
S43799	2018-099AT	Hawk C	2018 Dec 3 1834:05	HE360	US	574	592	97.77	In Earth orbit
S43800	2018-099AU	ICEYE-X2	2018 Dec 3 1834:05	ICEYE	FI	570	588	97.77	In Earth orbit
S43801	2018-099AV	K2SAT	2018 Dec 3 1834:05	KAIST/KAFA	KR	571	591	97.77	In Earth orbit
S43802	2018-099AW	SkySat C13	2018 Dec 3 1834:05	PLABST	US	573	590	97.77	In Earth orbit
S43803	2018-099AX	Jordan-QSCAR-97	2018 Dec 3 1834:05	JUST	JO	573	590	97.77	In Earth orbit
S43804	2018-099AY	Suomi-100	2018 Dec 3 1834:05	AALTO	FI	573	589	97.77	In Earth orbit
S43805	2018-099AZ	Al-Farabi 2	2018 Dec 3 1834:05	KAZNU	KZ	573	589	97.77	In Earth orbit
S43806	2018-099BA	KNACKSAT	2018 Dec 3 1834:05	KMUTNB	T	573	589	97.77	In Earth orbit
S43807	2018-099BB	Eur-CROPIIS	2018 Dec 3 1834:05	DLR	D	574	591	97.77	In Earth orbit
S43808	2018-099BC	Yukon	2018 Dec 3 1834:05	USCG/DHSST	US	573	591	97.77	In Earth orbit
S43809	2018-099BD	Centauri 1	2018 Dec 3 1834:05	FLEET	AU	574	591	97.77	In Earth orbit
S43810	2018-099BE	Audacity Zero	2018 Dec 3 1834:05	AUDACY	US	574	591	97.77	In Earth orbit
S43811	2018-099BF	NEXTSat 1	2018 Dec 3 1834:05	KAIST	KR	572	589	97.77	In Earth orbit
S43812	2018-099BG	BlackSky Global 2	2018 Dec 3 1834:05	BSKG	US	577	591	97.77	In Earth orbit
S43813	2018-099BH	BRIO	2018 Dec 3 1834:05	MYRI/SPQ	US	574	591	97.76	In Earth orbit
S43814	2018-099BJ	PW-Sat2	2018 Dec 3 1834:05	PWAR	PL	572	591	97.77	In Earth orbit
S43815	2018-099BK	FalconSat 6	2018 Dec 3 1834:05	USAF	US	572	592	97.77	In Earth orbit
S43816	2018-099BL	SpaceBEE 7	2018 Dec 3 1834:05	SWARM	US	573	589	97.76	In Earth orbit
S43817	2018-099BLM	SpaceBEE 5	2018 Dec 3 1834:05	SWARM	US	573	590	97.77	In Earth orbit
S43818	2018-099BN	SpaceBEE 6	2018 Dec 3 1834:05	SWARM	US	573	589	97.77	In Earth orbit
S43819	2018-099BP	eXCite	2018 Dec 3 1834:05	DARPA	US	569	588	97.77	In Earth orbit
S43820	2018-099BQ	SeaHawk 1	2018 Dec 3 1834:05	UNCW/MOOREF	US	573	587	97.77	In Earth orbit
S43821	2018-099BR	Flock 3s-2	2018 Dec 3 1834:05	PLABS	US	572	592	97.77	In Earth orbit
S43822	2018-099BS	VisionCube	2018 Dec 3 1834:05	KRAU	KR	573	589	97.77	In Earth orbit
A09257	2018-099C	Elysium Star 2	2018 Dec 3 1834:05	ELYS	US	573	589	97.77	Attached to Unknown de- ployer
S43823	2018-100A	Geo-Kompsat-2A	2018 Dec 4 2037:07	KARI	KR	35783	35788	0.05	In Earth orbit
S43824	2018-100B	GSAT-11	2018 Dec 4 2037:07	ISRO	IN	35775	35798	0.12	In Earth orbit
S43827	2018-101A	Dragon CRS-16	2018 Dec 5 1816:16	SPX	US	401	408	51.64	Landed
S44029	1998-067PV	CAT-2	2018 Dec 5 1816:16	APL	US	403	408	51.64	In Earth orbit
S44030	1998-067PW	Delphini 1	2018 Dec 5 1816:16	AARH	DK	402	408	51.64	In Earth orbit
S44031	1998-067PX	UNITE	2018 Dec 5 1816:16	USIN	US	403	407	51.64	In Earth orbit
S44032	1998-067PY	TechEdSat-8	2018 Dec 5 1816:16	ARC/SJSU	US	402	409	51.64	In Earth orbit
S44033	1998-067PZ	CAT-1	2018 Dec 5 1816:16	APL	US	402	409	51.64	In Earth orbit
S44041	2018-092C	Quantum Radar 1	2018 Dec 5 1816:16	HYPGG	US	455	459	51.64	In Earth orbit
S44042	2018-092D	Quantum Radar 2	2018 Dec 5 1816:16	HYPGG	US	457	457	51.64	In Earth orbit
S43831	2018-102A	Satdisat-5A	2018 Dec 7 0412:00	KACST	SA	533	551	97.63	In Earth orbit
S43832	2018-102B	TY/DF-1	2018 Dec 7 0412:00	CTYK/GUOX	CN	531	551	97.63	In Earth orbit
S43833	2018-102C	Satdisat-5B	2018 Dec 7 0412:00	KACST	SA	532	551	97.63	In Earth orbit
S43834	2018-102D	TFSTAR	2018 Dec 7 0412:00	UESTC/GUOX	CN	532	550	97.63	In Earth orbit
S43835	2018-102E	Xinjiang Jiaotong-01	2018 Dec 7 0412:00	CTYK	CN	531	550	97.63	In Earth orbit
S43836	2018-102F	Piao chong 1	2018 Dec 7 0412:00	JiUT/OFO	CN	531	550	97.63	In Earth orbit
S43837	2018-102G	Maowang Shouyinji Xing	2018 Dec 7 0412:00	MAOW	CN	530	549	97.63	In Earth orbit
S43838	2018-102H	Huami xing	2018 Dec 7 0412:00	HUAMI	CN	529	550	97.63	In Earth orbit
S43839	2018-102J	Piao chong 4	2018 Dec 7 0412:00	JiUT	CN	529	549	97.63	In Earth orbit
S43840	2018-102K	Likeda jiaoyu weixing	2018 Dec 7 0412:00	LIDA	CN	528	549	97.63	In Earth orbit
S43841	2018-102L	Tianmao guoji xing	2018 Dec 7 0412:00	ALIEX	CN	528	549	97.64	In Earth orbit
S43842	2018-102M	RE:X xing	2018 Dec 7 0412:00	JiUT/LUHAN	CN	528	549	97.64	In Earth orbit

Appendix 2b: Satellite payloads deployed in 2018 (Revised; Status end 2019)

CATID	LAUNCH ID	Name	Deploy date UTC	Owner	Country	Perigee	Apogee	Inc	Status
S43098	2018-001A	USA 280	2018 Jan 8 0112:00	NROCC	US	1000	1000	50.00	Reentered Att to Falcon 9-048 Stage 2
S43099	2018-002A	GaoJing yi hao 03 xing	2018 Jan 9 0336:00	BHSJ	CN	517	536	97.58	In Earth orbit
S43100	2018-002B	GaoJing yi hao 04 xing	2018 Jan 9 0336:00	BHSJ	CN	515	535	97.58	In Earth orbit
S43107	2018-003A	Beidou DW 26	2018 Jan 12 0303:00	CNSA	CN	21514	21541	55.03	In Earth orbit
S43108	2018-003B	Beidou DW 27	2018 Jan 12 0303:00	CNSA	CN	21516	21539	55.02	In Earth orbit
S43111	2018-004A	Cartosat-2 Series Satellite	2018 Jan 12 0415:00	ISRO	IN	495	510	97.56	In Earth orbit
S43113	2018-004C	LEO Vantage 1	2018 Jan 12 0416:00	ICEANL	CA	494	506	97.56	In Earth orbit
S43114	2018-004D	ICEYE-X1	2018 Jan 12 0416:00	ICEYE	FI	494	506	97.56	In Earth orbit
S43115	2018-004E	VividX2	2018 Jan 12 0418:00	EARI/UKSPOC	UK	493	505	97.56	In Earth orbit
S43116	2018-004F	INS-1C	2018 Jan 12 0418:00	ISRO	IN	495	508	97.56	In Earth orbit
S43118	2018-004H	Landmapper-BC 3	2018 Jan 12 0420:00	ADIG	US	496	502	97.55	In Earth orbit
S43119	2018-004J	Flock 3p-3	2018 Jan 12 0420:00	PLABS	US	495	501	97.56	In Earth orbit
S43120	2018-004K	Flock 3p-2	2018 Jan 12 0420:00	PLABS	US	493	504	97.56	In Earth orbit
S43121	2018-004L	Flock 3p-1	2018 Jan 12 0420:00	PLABS	US	493	504	97.56	In Earth orbit
S43122	2018-004M	Flock 3p-4	2018 Jan 12 0420:00	PLABS	US	492	504	97.55	In Earth orbit
S43123	2018-004N	Lemur-2-McCafferty	2018 Jan 12 0420:00	SPIRE	US	493	504	97.56	In Earth orbit
S43124	2018-004P	Lemur-2-PeterWebster	2018 Jan 12 0420:00	SPIRE	US	493	504	97.56	In Earth orbit
S43125	2018-004Q	Lemur-2-BrownCov	2018 Jan 12 0420:00	SPIRE	US	493	504	97.56	In Earth orbit
S43126	2018-004R	Lemur-2-DaveWilson	2018 Jan 12 0420:00	SPIRE	US	495	502	97.56	In Earth orbit
S43127	2018-004S	DemoSat-2	2018 Jan 12 0420:00	ASTRAN	US	494	505	97.56	In Earth orbit
S43128	2018-004T	Microsat-TD	2018 Jan 12 0544:00	ISRO	IN	327	368	97.22	In Earth orbit
S43130	2018-004V	Arkyd-6A	2018 Jan 12 0420:00	PLRES	US	493	505	97.56	In Earth orbit
S43131	2018-004W	MicroMAS-2A	2018 Jan 12 0420:00	MITLL	US	493	505	97.56	In Earth orbit
S43132	2018-004X	PICSAAT	2018 Jan 12 0416:00	OPM	F	494	505	97.56	In Earth orbit
S43133	2018-004Y	Papillon	2018 Jan 12 0420:00	CNU	KR	493	506	97.55	In Earth orbit
S43134	2018-004Z	KHUSAT-3	2018 Jan 12 0420:00	KHUS	KR	493	506	97.56	In Earth orbit
S43135	2018-004A	KAUSAT-5	2018 Jan 12 0420:00	KRAU	KR	493	506	97.56	In Earth orbit
S43136	2018-004B	TOM	2018 Jan 12 0420:00	YONS	KR	494	510	97.42	In Earth orbit
S43137	2018-004C	AMSAT AO-92	2018 Jan 12 0420:00	AMNA	US	494	507	97.56	In Earth orbit
S43138	2018-004D	STEP Cube Lab	2018 Jan 12 0420:00	HOSU	KR	492	506	97.56	In Earth orbit
S43139	2018-004E	SpaceBEE 4	2018 Jan 12 0420:00	SWARM	US	493	505	97.56	In Earth orbit
S43140	2018-004F	SpaceBEE 3	2018 Jan 12 0420:00	SWARM	US	493	505	97.56	In Earth orbit
S43141	2018-004G	SpaceBEE 2	2018 Jan 12 0420:00	SWARM	US	493	505	97.56	In Earth orbit
S43142	2018-004H	SpaceBEE 1	2018 Jan 12 0420:00	SWARM	US	493	505	97.56	In Earth orbit
S43143	2018-004J	CICERO-7	2018 Jan 12 0420:00	GEOOPT	US	493	504	97.56	In Earth orbit
S43144	2018-004K	GEOSTARE	2018 Jan 12 0420:00	LNLI/TYVAK	US	493	504	97.56	In Earth orbit
A09102	2018-004G	JERRY	2018 Jan 12 0420:00	YONS	KR	494	510	97.42	Attached to TOM
S43145	2018-005A	USA 281	2018 Jan 12 2331:00	NROCC	US	1047	1057	106.00	In Earth orbit
S43146	2018-006A	Ludi Kancha Weixing san hao	2018 Jan 13 0720:00	GCDX?	CN	488	503	97.34	In Earth orbit
S43152	2018-007A	ASNARO-2	2018 Jan 17 2158:00	USEF?	J	493	505	97.38	In Earth orbit
S43155	2018-008A	Huan xiangjian xinqiu hao	2018 Jan 19 0425:00	CTYK	CN	527	547	97.55	In Earth orbit
S43156	2018-008B	Hua'an hao Enlai xing	2018 Jan 19 0425:00	HQZS	CN	529	547	97.54	In Earth orbit
S43157	2018-008C	KIPP	2018 Jan 19 0425:00	KEPLER	CA	528	547	97.54	In Earth orbit
S43158	2018-008D	Quan Tu Tong 1	2018 Jan 19 0425:00	QTT	CA	528	546	97.54	In Earth orbit
S43159	2018-008E	Dqing-1	2018 Jan 19 0425:00	CGSTZ/CGSTL	CN	523	547	97.54	In Earth orbit
S43160	2018-008F	Jilin-1 Lingye-2	2018 Jan 19 0425:00	CGSTL	CN	527	546	97.54	In Earth orbit
S43162	2018-009A	SBIRS GEO-3	2018 Jan 20 0130:00	AFSPC	US	35758	35815	6.33	In Earth orbit
S43163	2018-010A	Dove Pioneer	2018 Jan 21 0151:00	PLABS	US	288	533	82.93	Reentered
S43165	2018-010C	Lemur-2-Marshall	2018 Jan 21 0151:00	SPIRE	US	494	534	82.93	In Earth orbit
S43167	2018-010E	Lemur-2-Talhamm-ATC	2018 Jan 21 0151:00	SPIRE	US	492	532	82.93	In Earth orbit
S43168	2018-010F	Humantity Star	2018 Jan 21 0151:00	RLABN	NZ	295	530	82.92	Reentered
S43169	2018-011A	Weina-1 01 weixing	2018 Jan 25 0552:00	WEINA	CN	594	601	35.00	In Earth orbit
S43170	2018-011B	Yaogan 30 hao 04 zu 01 xing	2018 Jan 25 0552:00	ZZB	CN	591	601	34.99	In Earth orbit
S43171	2018-011C	Yaogan 30 hao 04 zu 02 xing	2018 Jan 25 0552:00	ZZB	CN	591	601	34.99	In Earth orbit
S43172	2018-011D	Yaogan 30 hao 04 zu 03 xing	2018 Jan 25 0552:00	ZZB	CN	591	602	34.99	In Earth orbit
S43174	2018-012A	AI Yah 3	2018 Jan 25 2255:00	YAHBR	BR	30077	42365	2.71	In Earth orbit
S43175	2018-012B	SES-14	2018 Jan 25 2247:00	SESSL	UK	9001	53246	13.09	Sold from SESSL to SESBR
S43178	2018-013A	GovSat-1	2018 Jan 31 2157:00	LUXG	L	35772	35801	0.02	In Earth orbit
S43180	2018-014A	Kanopus-V No. 3	2018 Feb 1 0306:00	VNIEM	RU	505	510	97.47	In Earth orbit

S43181	2018-014B	Kanopus-V No. 4	2018 Feb 1 0312:00	VNIEM	RU	500	509	97.47	In Earth orbit
S43182	2018-014C	Lemur-2-Jin-Luen	2018 Feb 1 0437:00	SPIRE	US	571	589	97.73	In Earth orbit
S43183	2018-014D	Lemur-2-UramChanSol	2018 Feb 1 0437:00	SPIRE	US	571	589	97.73	In Earth orbit
S43184	2018-014E	Lemur-2-Kadi	2018 Feb 1 0433:00	SPIRE	US	571	588	97.73	In Earth orbit
S43185	2018-014F	Lemur-2-TheNickMolo	2018 Feb 1 0437:00	SPIRE	US	571	588	97.73	In Earth orbit
S43186	2018-014G	S-NET D	2018 Feb 1 0433:00	TUB	D	572	588	97.73	In Earth orbit
S43187	2018-014H	S-NET B	2018 Feb 1 0433:00	TUB	D	571	588	97.73	In Earth orbit
S43188	2018-014J	S-NET A	2018 Feb 1 0433:00	TUB	D	571	588	97.73	In Earth orbit
S43189	2018-014K	S-NET C	2018 Feb 1 0433:00	TUB	D	571	588	97.73	In Earth orbit
A09123	2018-014L	D-Star One v1.1 Phoenix	2018 Feb 1 0450:00	GOS	D	571	588	97.73	Reentered Att to Fregat No. 122-03
S43192	2018-015A	FengMaNiu 1	2018 Feb 2 0800:00	LINK	CN	440	508	97.22	In Earth orbit
S43194	2018-015C	Zhang Heng 1	2018 Feb 2 0759:00	CAS	CN	488	509	97.34	In Earth orbit
S43195	2018-015D	Ada	2018 Feb 2 0800:00	URUGUS	UY	493	503	97.21	In Earth orbit
S43196	2018-015E	GOMX-4B	2018 Feb 2 0800:00	GOMSP/ESA	DK	483	506	97.33	In Earth orbit
S43197	2018-015F	Ulloriaq	2018 Feb 2 0800:00	FMI	DK	486	508	97.33	In Earth orbit
S43199	2018-015H	Shaonian Xing	2018 Feb 2 0800:00	SHAOX	CN	483	507	97.33	In Earth orbit
S43204	2018-015K	Maryam	2018 Feb 2 0800:00	URUGUS	UY	487	508	97.33	In Earth orbit
S43201	2018-016A	Tasuki	2018 Feb 3 0510:00	TOK	J	187	2008	30.90	Reentered
S43205	2018-017A	Testa Roadster	2018 Feb 6 2053:00	SFX	US	180	6939	29.02	Deep Space Att to Falcon Heavy-001 Stage 2
S43207	2018-018A	Beidou DW 28	2018 Feb 12 0848:00	CNSA	CN	21505	21550	54.99	In Earth orbit
S43208	2018-018B	Beidou DW 29	2018 Feb 12 0848:00	CNSA	CN	21501	21554	54.99	In Earth orbit
S43211	2018-019A	Progress MS-08	2018 Feb 13 0822:00	RKKE	RU	318	324	51.64	Deorbited
S43597	1998-067P-J	Tanyusha YuZGU No. 3	2018 Aug 15 1651:00	YUZGU	RU	402	405	51.64	In Earth orbit
S43598	1998-067P-K	Tanyusha YuZGU No. 4	2018 Aug 15 1656:00	YUZGU	RU	400	408	51.64	In Earth orbit
S43215	2018-020A	Paz	2018 Feb 22 1426:00	HISD	E	503	518	97.46	In Earth orbit
S43216	2018-020B	Tintin A	2018 Feb 22 1500:00	SFXS	US	500	517	97.46	In Earth orbit
S43217	2018-020C	Tintin B	2018 Feb 22 1500:00	SFXS	US	499	516	97.46	In Earth orbit
S43223	2018-021A	JSE kougaku 6 grouki	2018 Feb 27 0454:00	SJICE	J	485	499	97.21	In Earth orbit
S43226	2018-022A	GOES 17	2018 Mar 2 0134:00	NOAA	US	35779	35794	0.05	In Earth orbit
S43228	2018-023A	Hispasat 30W-6	2018 Mar 6 0605:00	HISP	E	35774	35798	0.05	In Earth orbit
S43229	2018-023B	PODSAT	2018 Mar 6 0605:00	DARPA	US	180	22166	27.07	In Earth orbit
S43231	2018-024A	O3b FM15	2018 Mar 9 1932:00	O3B	UK	8061	8069	0.05	In Earth orbit
S43232	2018-024B	O3b FM16	2018 Mar 9 1911:00	O3B	UK	8061	8069	0.05	In Earth orbit
S43233	2018-024C	O3b FM14	2018 Mar 9 1932:00	O3B	UK	8062	8069	0.05	In Earth orbit
S43234	2018-024D	O3b FM13	2018 Mar 9 1911:00	O3B	UK	8062	8069	0.05	In Earth orbit
S43236	2018-025A	Ludi Kancha Weixing si hao	2018 Mar 17 0720:00	GCDX?	CN	489	502	97.33	In Earth orbit
S43238	2018-026A	Soyuz MS-08	2018 Mar 21 1753:00	RKKE	RU	311	320	51.64	Landed
S43241	2018-027A	GSAT-6A	2018 Mar 29 1143:00	ISRO	IN	25977	36370	3.20	In Earth orbit
S43243	2018-028A	Kosmos-2525	2018 Mar 29 1748:00	MORF	RU	315	318	96.64	In Earth orbit
S43245	2018-029A	Beidou DW 30	2018 Mar 29 2142:00	CNSA	CN	21523	21532	55.05	In Earth orbit
S43246	2018-029B	Beidou DW 31	2018 Mar 29 2142:00	CNSA	CN	21512	21543	55.04	In Earth orbit
S43249	2018-030A	Iridium Next SV144	2018 Mar 30 1510:00	IRID	US	606	625	86.68	In Earth orbit
S43250	2018-030B	Iridium Next SV149	2018 Mar 30 1511:00	IRID	US	608	626	86.68	In Earth orbit
S43251	2018-030C	Iridium Next SV157	2018 Mar 30 1514:00	IRID	US	607	626	86.68	In Earth orbit
S43252	2018-030D	Iridium Next SV140	2018 Mar 30 1516:00	IRID	US	607	626	86.68	In Earth orbit
S43253	2018-030E	Iridium Next SV145	2018 Mar 30 1517:00	IRID	US	607	626	86.68	In Earth orbit
S43254	2018-030F	Iridium Next SV146	2018 Mar 30 1519:00	IRID	US	608	627	86.68	In Earth orbit
S43255	2018-030G	Iridium Next SV148	2018 Mar 30 1521:00	IRID	US	606	625	86.68	In Earth orbit
S43256	2018-030H	Iridium Next SV142	2018 Mar 30 1522:00	IRID	US	608	626	86.68	In Earth orbit
S43257	2018-030J	Iridium Next SV150	2018 Mar 30 1524:00	IRID	US	606	626	86.68	In Earth orbit
S43258	2018-030K	Iridium Next SV143	2018 Mar 30 1526:00	IRID	US	608	626	86.68	In Earth orbit
S43259	2018-031A	Gao Fen 1 02 xing	2018 Mar 31 0344:00	CNSAS	CN	638	642	98.04	In Earth orbit
S43260	2018-031B	Gao Fen 1 03 xing	2018 Mar 31 0344:00	CNSAS	CN	638	641	98.04	In Earth orbit
S43262	2018-031D	Gao Fen 1 04 xing	2018 Mar 31 0344:00	CNSAS	CN	638	642	98.04	In Earth orbit
S43267	2018-032A	Dragon CRS-14	2018 Apr 2 2040:00	SFX	US	391	396	51.64	Landed
S43466	1998-067N-P	UBAKUSAT	2018 May 11 1040:00	ITU/IR	TR	402	402	51.64	In Earth orbit
S43467	1998-067N-Q	IKUNS-PF	2018 May 11 1030:00	NAHR	KE	396	408	51.66	In Earth orbit
S43468	1998-067N-R	Batsu-CS1	2018 May 11 1030:00	ACAE/ITCR	CR	400	407	51.64	In Earth orbit
S43510	1998-067N-T	RemoveDebris	2018 Jun 20 1135:00	SSTL	UK	401	407	51.64	In Earth orbit
S43621	1998-067P-M	DebrisSat-1/Net	2018 Sep 16 2306:00	SSTL	UK	398	405	51.65	Reentered
S43680	1998-067P-R	DebrisSat-2	2018 Oct 28 0615:00	SSTL	UK	398	403	51.64	In Earth orbit
S43271	2018-033A	Kirameki 1	2018 Apr 5 2203:00	DSNC	J	35772	35800	0.02	In Earth orbit
S43272	2018-033B	Hylas 4	2018 Apr 5 2207:00	AVANTI	UK	35778	35796	0.02	In Earth orbit
S43275	2018-034A	Yaogan 31 hao 01 zu 01 xing	2018 Apr 10 0448:00	ZZB	CN	1086	1099	63.41	In Earth orbit

S43276	2018-034B	Yaogan 31 hao 01 zu 02 xing	2018 Apr 10 0450:00	ZZB	CN	1088	1099	63.41	In Earth orbit
S43277	2018-034C	Yaogan 31 hao 01 zu 03 xing	2018 Apr 10 0450:00	ZZB	CN	1087	1099	63.41	In Earth orbit
S43278	2018-034E	Weina-1 02 weixing	2018 Apr 10 0451:00	WEINA	CN	1085	1098	63.41	In Earth orbit
S43286	2018-035A	IRNSS-R1H	2018 Apr 11 2253:00	ISRO	IN	35702	35868	28.63	In Earth orbit
S43339	2018-036A	CBAS-SATCOM	2018 Apr 15 0500:00	AFSMC	US	35740	35834	0.01	In Earth orbit
S43340	2018-036B	EAGLE	2018 Apr 15 0502:00	AFRL	US	35587	35618	0.03	In Earth orbit
S43445	2018-036E	USA 285	2018 Apr 26 0000:00	AFRL	US	35573	35633	0.07	In Earth orbit
S43446	2018-036F	USA 286	2018 Apr 26 0000:00	AFRL	US	35288	35288	0.06	In Earth orbit
S43465	2018-036G	MYGROFT	2018 May 12 0000:00	AFRL	US	35288	35288	0.06	In Earth orbit
S43432	2018-037A	Kosmos-2526	2018 Apr 19 0714:00	KVR/VOENT	RU	35668	35669	0.05	In Earth orbit
S43435	2018-038A	TESS	2018 Apr 18 2341:00	GSFC	US	258	268488	29.59	Deep Space
S43437	2018-039A	Sentinel-3B	2018 Apr 25 1917:00	COPERN/ESA	L-EU	802	815	98.62	In Earth orbit
S43439	2018-040A	Qingke da 1	2018 Apr 26 0454:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S43440	2018-040B	OVS-2	2018 Apr 26 0454:00	ZHUORB	CN	494	512	97.40	In Earth orbit
S43441	2018-040C	OHS-1 02 xing	2018 Apr 26 0454:00	ZHUORB	CN	493	511	97.40	In Earth orbit
S43442	2018-040D	Guiyang-1	2018 Apr 26 0454:00	ZHUORB	CN	493	512	97.40	In Earth orbit
S43443	2018-040E	OHS-1 04 xing	2018 Apr 26 0454:00	ZHUORB	CN	491	511	97.40	In Earth orbit
S43450	2018-041A	Anstar 6C	2018 May 3 1632:00	APT	HK	35779	35793	0.05	In Earth orbit
S43457	2018-042A	Mars InSight Lander	2018 May 5 1238:00	NASA/JPL	US	115	-110126	63.54	Deep Space
S43458	2018-042B	MarCO-A	2018 May 5 1238:00	NASA/JPL	US	115	-110126	63.54	Deep Space
S43459	2018-042C	MarCO-B	2018 May 5 1239:00	NASA/JPL	US	115	-110126	63.54	Deep Space
S43461	2018-043A	Gao Fen 5	2018 May 8 1850:00	GWHYZ	CN	677	695	98.12	In Earth orbit
S43463	2018-044A	Bangabandhu 1	2018 May 11 2047:00	BGSL	BD	35776	35797	0.03	In Earth orbit
S43470	2018-045A	Quejiao	2018 May 20 2154:00	CASC	CN	394	383109	27.50	Deep Space
S43471	2018-045B	Longjiang 1	2018 May 20 2155:00	CASC/HARB	CN	200	384347	28.50	Deep Space
S43472	2018-045C	Longjiang 2	2018 May 20 2155:00	CASC/HARB	CN	200	384347	28.50	Deep Space
S43474	2018-046A	SS J.R. Thompson	2018 May 21 0853:00	OSU	US	400	406	51.64	Deorbited
S43475	1998-067NU	CubeRR1	2018 Jul 13 1235:00	OSU	US	399	407	51.64	In Earth orbit
S43546	1998-067NV	TEMPEST-D	2018 Jul 13 1235:00	CSU/JPL	US	399	407	51.64	In Earth orbit
S43547	1998-067NW	RainCube	2018 Jul 13 0805:00	JPL	US	399	407	51.64	In Earth orbit
S43548	1998-067NX	HaloSat	2018 Jul 13 0805:00	ULA	US	399	407	51.64	In Earth orbit
S43549	1998-067NY	Radix	2018 Jul 13 0905:00	ANSP	US	400	406	51.64	In Earth orbit
S43550	1998-067NZ	Endurosat One	2018 Jul 13 1420:00	ENDUR	BGN	400	405	51.64	In Earth orbit
S43551	1998-067PA	Equisat	2018 Jul 13 1420:00	BROWN	US	398	407	51.64	In Earth orbit
S43552	1998-067PB	MemSat	2018 Jul 13 1420:00	ROWAN	US	400	406	51.64	In Earth orbit
S43553	1998-067PC	RadSat-g	2018 Jul 13 1420:00	MSU	US	398	407	51.64	In Earth orbit
S43554	2018-046C	Aerocube 12A	2018 Jul 16 0000:00	AERO	US	477	488	51.64	In Earth orbit
S43556	2018-046D	Aerocube 12B	2018 Jul 16 0000:00	AERO	US	476	488	51.64	In Earth orbit
S43557	2018-046E	Lemur-2-Vu	2018 Jul 16 0000:00	SPIRE	US	477	487	51.64	In Earth orbit
S43558	2018-046F	Lemur-2-Alexander	2018 Jul 16 0000:00	SPIRE	US	477	487	51.64	In Earth orbit
S43559	2018-046G	Lemur-2-Yuasa	2018 Jul 15 0000:00	SPIRE	US	477	488	51.64	In Earth orbit
S43560	2018-046H	Lemur-2-TomHenderson	2018 Jul 15 0000:00	SPIRE	US	477	488	51.64	In Earth orbit
S43561	2018-047A	GRACE-FO 1	2018 May 22 1959:00	JPL/GFZ	US	485	504	88.99	In Earth orbit
S43476	2018-047A	GRACE-FO 2	2018 May 22 1959:00	JPL/GFZ	US	484	504	88.99	In Earth orbit
S43477	2018-047B	Iridium Next SV161	2018 May 22 2053:00	IRID	US	489	714	86.71	In Earth orbit
S43478	2018-047C	Iridium Next SV152	2018 May 22 2054:00	IRID	US	489	710	86.72	In Earth orbit
S43479	2018-047D	Iridium Next SV147	2018 May 22 2056:00	IRID	US	489	714	86.71	In Earth orbit
S43480	2018-047E	Iridium Next SV147	2018 May 22 2056:00	IRID	US	488	718	86.71	In Earth orbit
S43481	2018-047F	Iridium Next SV110	2018 May 22 2100:00	IRID	US	491	715	86.71	In Earth orbit
S43482	2018-047G	Iridium Next SV162	2018 May 22 2100:00	IRID	US	491	715	86.71	In Earth orbit
S43484	2018-048A	Gao Fen 6	2018 Jun 2 0422:00	CNSAS	CN	634	647	98.05	In Earth orbit
S43485	2018-048B	Luojia-1 KSW 01 xing	2018 Jun 2 0422:00	WUHAN	CN	634	647	98.05	In Earth orbit
S43488	2018-049A	SES-12	2018 Jun 4 0517:00	SESSL	UK	8447	66120	10.03	In Earth orbit
S43491	2018-050A	Feng Yun 2H	2018 Jun 5 1330:00	NSMC	CN	35767	35803	2.22	In Earth orbit
S43493	2018-051A	Soyuz MS-09	2018 Jun 6 1121:00	RKKE	RU	273	275	51.64	Landed
S43495	2018-052A	ISE reda-6 gouki	2018 Jun 12 0440:00	CSICE	J	500	501	97.38	In Earth orbit
S43508	2018-053A	Kosmos-2527	2018 Jun 17 0118:00	KVR/IAAC	RU	19122	19153	64.83	In Earth orbit
S43518	2018-054A	Xin jishu shiyuan A xing	2018 Jun 27 0342:00	ZZB	CN	477	486	35.00	In Earth orbit
S43519	2018-054B	Xin jishu shiyuan B xing	2018 Jun 27 0342:00	ZZB	CN	477	486	35.00	In Earth orbit
S43522	2018-055A	Dragon CRS-15	2018 Jun 29 0952:00	SFX	US	391	396	51.64	Landed
S43529	2018-055B	UjTMSAT-1	2018 Aug 10 0945:00	UJTM	MY	398	408	51.64	In Earth orbit
S43589	1998-067PD	Maya-1	2018 Aug 10 0945:00	DOST	PH	396	408	51.65	In Earth orbit
S43590	1998-067PE	Bhutan-1	2018 Aug 10 0945:00	BTDITT	BT	398	408	51.64	In Earth orbit
S43591	1998-067PF	PRSS-1	2018 Jul 9 0442:00	SUPA	PK	584	624	98.05	In Earth orbit
S43529	2018-056A	PakTES-1a	2018 Jul 9 0444:00	SUPA	PK	598	624	98.05	In Earth orbit
S43530	2018-056B	Beidou DW 32	2018 Jul 9 2112:00	CNSA	CN	35695	35877	55.05	In Earth orbit
S43539	2018-057A	Progress MS-09	2018 Jul 9 2200:00	RKKE	RU	367	404	51.65	Deorbited
S43537	2018-058A	Progress MS-09	2018 Jul 9 2200:00	RKKE	RU	367	404	51.65	Deorbited

S43595	1998-067PG	SiriusSat-1	2018 Aug 15 16:43:00	SIROTS	RU	401	407	51.64	In Earth orbit
S43596	1998-067PH	SiriusSat-2	2018 Aug 15 16:45:00	SIROTS	RU	401	408	51.64	In Earth orbit
S43597	2018-059A	Telstar 19 Vantage	2018 Jul 22 06:22:00	TSKY	CA	35771	35799	0.01	In Earth orbit
S43598	2018-060A	GalileoSat-25	2018 Jul 25 15:01:00	GSAEU	I-EU	22971	22982	56.37	In Earth orbit
S43599	2018-060B	GalileoSat-26	2018 Jul 25 15:21:00	GSAEU	I-EU	23019	23050	56.38	In Earth orbit
S43600	2018-060C	GalileoSat-23	2018 Jul 25 15:01:00	GSAEU	I-EU	23230	23252	56.38	In Earth orbit
S43601	2018-060D	GalileoSat-24	2018 Jul 25 15:21:00	GSAEU	I-EU	23087	23151	56.36	In Earth orbit
S43602	2018-061A	Iridium Next SV160	2018 Jul 25 12:50:00	IRID	US	609	624	86.68	In Earth orbit
S43603	2018-061B	Iridium Next SV166	2018 Jul 25 12:49:00	IRID	US	609	623	86.67	In Earth orbit
S43604	2018-061C	Iridium Next SV158	2018 Jul 25 12:47:00	IRID	US	609	623	86.67	In Earth orbit
S43605	2018-061D	Iridium Next SV165	2018 Jul 25 12:46:00	IRID	US	609	623	86.67	In Earth orbit
S43606	2018-061E	Iridium Next SV155	2018 Jul 25 12:44:00	IRID	US	608	623	86.67	In Earth orbit
S43607	2018-061F	Iridium Next SV154	2018 Jul 25 12:42:00	IRID	US	608	623	86.68	In Earth orbit
S43608	2018-061G	Iridium Next SV163	2018 Jul 25 12:41:00	IRID	US	607	623	86.68	In Earth orbit
S43609	2018-061H	Iridium Next SV156	2018 Jul 25 12:39:00	IRID	US	607	623	86.68	In Earth orbit
S43610	2018-061I	Iridium Next SV164	2018 Jul 25 12:37:00	IRID	US	607	623	86.67	In Earth orbit
S43611	2018-061J	Iridium Next SV164	2018 Jul 25 12:37:00	IRID	US	607	623	86.67	In Earth orbit
S43612	2018-061K	Iridium Next SV159	2018 Jul 25 12:36:00	IRID	US	607	622	86.67	In Earth orbit
S43613	2018-062A	Beidou DW 33	2018 Jul 29 05:35:00	CNSA	CN	21509	21546	54.95	In Earth orbit
S43614	2018-062B	Beidou DW 34	2018 Jul 29 05:35:00	CNSA	CN	21515	21540	54.95	In Earth orbit
S43615	2018-063A	Gao Fen 11	2018 Jul 31 03:14:00	ZZB	CN	241	689	97.43	In Earth orbit
S43616	2018-064A	Merah Putih	2018 Aug 7 05:49:00	TELK	ID	35781	35793	0.02	In Earth orbit
S43617	2018-065A	Parker Solar Probe	2018 Aug 12 08:14:00	GSFC	US	617	-18602	32.95	Deep Space
S43618	2018-065A	Aeolus	2018 Aug 22 22:14:00	ESA	I-ESA	314	317	96.73	In Earth orbit
S43619	2018-066A	Beidou DW 35	2018 Aug 25 03:39:00	CNSA	CN	21512	21543	54.99	In Earth orbit
S43620	2018-067A	Beidou DW 36	2018 Aug 25 03:39:00	CNSA	CN	21517	21538	54.99	In Earth orbit
S43621	2018-067B	Beidou DW 36	2018 Aug 25 03:39:00	CNSA	CN	21517	21538	54.99	In Earth orbit
S43622	2018-068A	Hai Yang 1C	2018 Sep 7 03:28:00	GYZ/CASC	CN	769	786	98.60	In Earth orbit
S43623	2018-068A	Telstar 18 Vantage	2018 Sep 10 05:17:00	TSKY	CA	35778	35792	0.04	In Earth orbit
S43624	2018-069A	ICESAT 2	2018 Sep 15 13:54:00	GSFC	US	455	468	93.02	In Earth orbit
S43625	2018-070A	SurfSat	2018 Sep 15 14:21:00	UCF	US	443	468	93.04	In Earth orbit
S43626	2018-070B	CP7	2018 Sep 15 14:21:00	CALP	US	447	466	93.03	In Earth orbit
S43627	2018-070C	ELFIN-STAR	2018 Sep 15 14:20:00	UCLA	US	449	465	93.02	In Earth orbit
S43628	2018-070D	ELFIN	2018 Sep 15 14:20:00	UCLA	US	443	469	93.04	In Earth orbit
S43629	2018-071A	SI-4	2018 Sep 16 16:55:00	SSTL	UK	574	591	97.82	In Earth orbit
S43630	2018-071B	NovaSAR-S	2018 Sep 16 16:55:00	SSTL	UK	574	592	97.82	In Earth orbit
S43631	2018-072A	Beidou DW 37	2018 Sep 19 17:54:00	CNSA	CN	21514	21541	54.98	In Earth orbit
S43632	2018-072B	Beidou DW 38	2018 Sep 19 17:54:00	CNSA	CN	21514	21540	54.98	In Earth orbit
S43633	2018-073A	Komoteori 7 gouki	2018 Sep 22 18:07:00	JAXA	J	276	302	51.64	Deorbited
S43634	1998-067PN	SPATIUM-1	2018 Oct 6 08:00:00	NTU	SG	400	406	51.64	In Earth orbit
S43635	1998-067PP	RSP-00	2018 Oct 6 08:00:00	RSP	J	400	406	51.64	In Earth orbit
S43636	1998-067PQ	Tenryu	2018 Oct 6 08:00:00	SHIZ	J	401	406	51.64	In Earth orbit
S43637	2018-074A	Azerspace-2	2018 Sep 25 23:20:00	AZER	AZ	19523	39918	1.28	In Earth orbit
S43638	2018-074B	Horizons 3e	2018 Sep 25 23:06:00	HORZ	US	35780	35792	0.05	In Earth orbit
S43639	2018-075A	Xiangjikai 1	2018 Sep 29 04:30:00	CENZI	CN	695	709	98.22	In Earth orbit
S43640	2018-076A	SAOCOM 1A	2018 Oct 8 02:34:00	CONAE	AR	615	634	97.90	In Earth orbit
S43641	2018-077A	Yaogan 32 hao 01 zu 01 xing	2018 Oct 9 02:56:00	ZZB	CN	689	704	98.27	In Earth orbit
S43642	2018-077B	Yaogan 32 hao 01 zu 02 xing	2018 Oct 9 02:56:00	ZZB	CN	689	704	98.27	In Earth orbit
S43643	2018-078A	Beidou DW 39	2018 Oct 15 08:10:00	CNSA	CN	681	698	98.28	In Earth orbit
S43644	2018-078B	Beidou DW 40	2018 Oct 15 08:10:00	CNSA	CN	21509	21545	55.02	In Earth orbit
S43645	2018-078B	Beidou DW 40	2018 Oct 15 08:10:00	CNSA	CN	21535	21783	55.01	In Earth orbit
S43646	2018-079A	AEHF SV-4	2018 Oct 17 07:47:00	AFMCSW	US	23513	35840	7.27	In Earth orbit
S43647	2018-080A	BepiColombo MPO	2018 Oct 20 02:11:00	ESA	I-ESA	170	-78605	5.50	Deep Space Att to Bepi-Colombo MTM
A09204	2018-080C	Mio	2018 Oct 20 02:11:00	JAXA	J	170	-78605	5.50	Deep Space Att to Bepi-Colombo MOSIF
S43655	2018-081A	Hai Yang 2 02 xing	2018 Oct 24 23:17:00	GYZ/CASC	CN	949	957	99.35	In Earth orbit
S43656	2018-081B	Tangguo Guan	2018 Oct 25 01:50:00	ALIEX	CN	640	940	99.45	Attached to CZ-4B Y36 Stage 3
A09210	2018-081	SPP/DSB-01	2018 Oct 24 23:07:00	CASC	CN	919	939	99.33	In Earth orbit
S43657	2018-082A	Kosmos-2528	2018 Oct 25 00:25:00	KVR	RU	244	900	67.14	In Earth orbit
S43658	2018-083A	Zhongfa Haiyang Weixing	2018 Oct 29 00:53:00	GZZB/CNES	CN	509	523	97.53	In Earth orbit
S43659	2018-083B	Xinghe	2018 Oct 29 00:55:00	GUOX/CTYK	CN	505	523	97.54	In Earth orbit
S43660	2018-083C	Xiaoxiang-1 02 xing	2018 Oct 29 00:55:00	LFLT	CN	509	522	97.52	In Earth orbit
S43661	2018-083D	Zhaojin-1	2018 Oct 29 00:55:00	TSHUA	CN	507	523	97.52	In Earth orbit
S43662	2018-083E	Tianqi-1	2018 Oct 29 00:55:00	BSUBJ	BY	509	524	97.53	In Earth orbit
S43663	2018-083G	Changsha gaoxin	2018 Oct 29 00:55:00	GUOG	CN	510	522	97.52	In Earth orbit
S43664	2018-083H	Unknown Chinese payload	2018 Oct 29 00:55:00	CTYK	CN	510	522	97.54	In Earth orbit
A09212	2018-083J	Unknown Chinese payload	2018 Oct 29 00:55:00	CAST	CN	510	522	97.54	In Earth orbit

S43672	2018-084B	Ibuki 2	2018 Oct 29 04:24:00	JAXA	J	585	599	97.85	In Earth orbit
S43676	2018-084F	KhalifaSat	2018 Oct 29 04:32:00	EIAST	U/AE	597	616	97.85	In Earth orbit
S43677	2018-084G	Ten-Koh	2018 Oct 29 04:41:00	KYUT	J	595	614	97.85	In Earth orbit
S43678	2018-084H	Philippines-OSCAR-101	2018 Oct 29 04:51:00	DOST/UPD	PH	595	616	97.84	In Earth orbit
S43679	2018-084J	Aoi	2018 Oct 29 04:56:00	SHIZ	J	591	612	97.83	In Earth orbit
S43681	2018-084K	AUTCube-2	2018 Oct 29 04:59:00	AUT	J	586	608	97.83	In Earth orbit
S43683	2018-085A	Beidou DW 41	2018 Nov 1 16:21:00	CNSA	CN	35783	35794	3.07	In Earth orbit
S43687	2018-086A	Kosmos-2529	2018 Nov 3 23:50:00	KVR/JACG	RU	19145	19209	64.82	In Earth orbit
S43689	2018-087A	METOP C	2018 Nov 7 01:48:00	EMET	I-EUM	806	807	98.74	In Earth orbit
S43690	2018-088A	CICERO-10	2018 Nov 11 04:44:00	GEOPT	US	490	515	85.04	In Earth orbit
S43692	2018-088C	NABEO 'Pride of Bavaria'	2018 Nov 11 05:34:00	HPS	D	496	512	85.03	Attached to Electron 3
S43693	2018-088D	IRVINE01	2018 Nov 11 04:43:00	IPSF	US	496	517	85.03	Kick Stage
S43694	2018-088E	Proxima I	2018 Nov 11 04:44:00	FLPET	AU	491	517	85.03	In Earth orbit
S43695	2018-088F	Lemur-2-Zupanski	2018 Nov 11 04:43:00	SPiRE	US	499	517	85.04	In Earth orbit
S43696	2018-088G	Proxima II	2018 Nov 11 04:44:00	FLPET	AU	490	514	85.03	In Earth orbit
S43697	2018-088H	Lemur-2-Chanusiak	2018 Nov 11 04:43:00	SPiRE	US	497	518	85.03	In Earth orbit
S43698	2018-089A	GSAT-29	2018 Nov 14 11:54:00	ISRO	IN	35846	36125	0.06	In Earth orbit
S43700	2018-090A	Es'hailSat-2	2018 Nov 15 21:18:00	ESHAIL	QA	35766	35808	0.07	In Earth orbit
S43702	2018-091A	Progress MS-10	2018 Nov 16 18:22:00	RKKE	RU	251	267	51.64	Deorbited
S43704	2018-092A	SS John Young	2018 Nov 17 09:10:00	OSC	US	401	408	51.64	Deorbited
S43706	2018-093A	Beidou DW 42	2018 Nov 18 21:54:00	CNSA	CN	21523	22194	54.99	In Earth orbit
S43707	2018-093B	Beidou DW 43	2018 Nov 18 21:54:00	CNSA	CN	21532	22072	55.00	In Earth orbit
S43710	2018-094A	Tianzhi-1	2018 Nov 19 23:52:00	ISCAS	CN	488	504	97.41	In Earth orbit
S43711	2018-094B	Shiyan 6	2018 Nov 19 23:52:00	CNSA	CN	487	504	97.41	In Earth orbit
S43712	2018-094C	Tianping-1A	2018 Nov 19 23:52:00	GUOX?	CN	486	504	97.41	In Earth orbit
S43713	2018-094D	Jiading-1	2018 Nov 19 23:52:00	SPCOK	CN	488	503	97.41	In Earth orbit
S43714	2018-094E	Tianping-1B	2018 Nov 19 23:52:00	GUOX?	CN	489	503	97.41	In Earth orbit
S43717	2018-095A	Mohammed VI-B	2018 Nov 21 02:38:00	RMAF	MA	600	606	97.95	In Earth orbit
S43719	2018-096A	HySIS	2018 Nov 29 04:45:00	ISRO	IN	628	647	97.97	In Earth orbit
S43720	2018-096B	HSAT-1	2018 Nov 29 06:18:00	HARR	US	476	499	97.48	In Earth orbit
S43721	2018-096C	FACSAT	2018 Nov 29 06:18:00	EMAVI	CO	476	499	97.48	In Earth orbit
S43722	2018-096D	Centauri 2	2018 Nov 29 06:18:00	FLPET	AU	476	499	97.47	In Earth orbit
S43723	2018-096E	Flock 3r-10	2018 Nov 29 06:18:00	PLABS	US	476	499	97.49	In Earth orbit
S43724	2018-096F	Flock 3r-12	2018 Nov 29 06:18:00	PLABS	US	474	499	97.49	In Earth orbit
S43725	2018-096G	Flock 3r-11	2018 Nov 29 06:18:00	PLABS	US	475	498	97.49	In Earth orbit
S43726	2018-096H	Flock 3r-5	2018 Nov 29 06:18:00	PLABS	US	468	499	97.48	In Earth orbit
S43727	2018-096I	Flock 3r-8	2018 Nov 29 06:18:00	PLABS	US	475	500	97.49	In Earth orbit
S43728	2018-096K	3Cat-1	2018 Nov 29 06:18:00	UPC	E	470	499	97.48	In Earth orbit
S43729	2018-096L	CASE	2018 Nov 29 06:18:00	KEPLER	CA	476	499	97.48	In Earth orbit
S43730	2018-096M	Global-1	2018 Nov 29 06:20:00	BSKG	US	478	499	97.48	In Earth orbit
S43731	2018-096N	Lemur-2-Orzulak	2018 Nov 29 06:18:00	SPiRE	US	475	499	97.49	In Earth orbit
S43732	2018-096P	Lemur-2-Kobyszcze	2018 Nov 29 06:18:00	SPiRE	US	471	500	97.49	In Earth orbit
S43733	2018-096Q	Flock 3r-4	2018 Nov 29 06:18:00	PLABS	US	471	499	97.48	In Earth orbit
S43734	2018-096R	Flock 3r-3	2018 Nov 29 06:18:00	PLABS	US	469	500	97.49	In Earth orbit
S43735	2018-096S	Flock 3r-16	2018 Nov 29 06:18:00	PLABS	US	471	499	97.48	In Earth orbit
S43736	2018-096T	Flock 3r-15	2018 Nov 29 06:18:00	PLABS	US	472	499	97.48	In Earth orbit
S43737	2018-096U	CICERO-8	2018 Nov 29 06:18:00	PLABS	US	477	499	97.49	In Earth orbit
S43738	2018-096V	InnoSAT-2	2018 Nov 29 06:18:00	GEOPT	MY	474	500	97.50	In Earth orbit
S43740	2018-096X	Flock 3r-9	2018 Nov 29 06:18:00	PLABS	US	476	499	97.49	In Earth orbit
S43741	2018-096Y	Flock 3r-6	2018 Nov 29 06:18:00	PLABS	US	466	498	97.48	In Earth orbit
S43742	2018-096Z	Flock 3r-7	2018 Nov 29 06:18:00	PLABS	US	470	499	97.49	In Earth orbit
S43743	2018-096AA	Reaktor Hello World	2018 Nov 29 06:18:00	REAKT	FI	476	498	97.50	In Earth orbit
S43744	2018-096AB	Hiber 1	2018 Nov 29 06:18:00	HIBER	NL	476	500	97.48	In Earth orbit
S43745	2018-096AC	Lemur-2-Duly	2018 Nov 29 06:18:00	SPiRE	US	471	499	97.49	In Earth orbit
S43746	2018-096AD	Lemur-2-Vladimir	2018 Nov 29 06:18:00	SPiRE	US	473	499	97.48	In Earth orbit
S43747	2018-096AE	Flock 3r-1	2018 Nov 29 06:18:00	PLABS	US	471	499	97.49	In Earth orbit
S43748	2018-096AF	Flock 3r-2	2018 Nov 29 06:18:00	PLABS	US	470	500	97.50	In Earth orbit
S43749	2018-096AG	Flock 3r-14	2018 Nov 29 06:18:00	PLABS	US	471	500	97.49	In Earth orbit
S43750	2018-096AH	Flock 3r-13	2018 Nov 29 06:18:00	PLABS	US	472	499	97.49	In Earth orbit
S43751	2018-097A	Kosmos-2530	2018 Nov 30 04:10:00	KVR	RU	1482	1506	82.51	In Earth orbit
S43752	2018-097B	Kosmos-2531	2018 Nov 30 04:10:00	KVR	RU	1484	1508	82.51	In Earth orbit
S43753	2018-097C	Kosmos-2532	2018 Nov 30 04:10:00	KVR	RU	1485	1508	82.51	In Earth orbit
S43756	2018-098A	Soyuz MS-11	2018 Dec 3 11:40:00	RKKE	RU	193	226	51.63	Landed
S43758	2018-099A	MinXSS 2	2018 Dec 3 21:28:00	CLASP	US	573	588	97.77	In Earth orbit
S43759	2018-099B	SIRION Pathfinder 2	2018 Dec 3 23:00:00	SIRION/HELW	AU	574	592	97.76	In Earth orbit

S43760	2018-099C	S50-A LFF	2018 Dec 3 1917:00	SFLIN	US	573	590	97.77	In Earth orbit
S43761	2018-099D	WeissSat 1	2018 Dec 3 2313:00	WEISS	US	573	590	97.77	In Earth orbit
S43762	2018-099E	STPSat 5	2018 Dec 3 2300:00	SFP	US	573	591	97.77	In Earth orbit
S43763	2018-099F	S50-A UFF	2018 Dec 3 1847:00	SFLIN	US	573	589	97.77	In Earth orbit
S43764	2018-099G	Kodiak	2018 Dec 3 2300:00	USCG/DHSST	US	575	591	97.77	In Earth orbit
S43765	2018-099H	Hawk A	2018 Dec 3 2300:00	HE360	US	577	590	97.77	In Earth orbit
S43766	2018-099I	SPAWAR-CAL-O	2018 Dec 3 2300:00	SPAWAR	US	573	591	97.77	In Earth orbit
S43767	2018-099K	Landmapper-BC4	2018 Dec 3 2300:00	ADIG	US	575	590	97.77	In Earth orbit
S43768	2018-099L	AISTECHSAT 2	2018 Dec 3 2300:00	AISTS	E	574	592	97.77	In Earth orbit
S43769	2018-099M	Flock 3s-1	2018 Dec 3 2300:00	PLABS	US	574	592	97.77	In Earth orbit
S43770	2018-099N	AMSAT-OSCAR-95	2018 Dec 3 2300:00	AMNA	US	574	591	97.77	In Earth orbit
S43771	2018-099P	Orbital Reflector	2018 Dec 3 2300:00	NVART	US	573	588	97.77	In Earth orbit
S43772	2018-099Q	RANGE B	2018 Dec 3 2300:00	GH	US	572	590	97.77	In Earth orbit
S43773	2018-099R	RANGE A	2018 Dec 3 2300:00	GH	US	574	588	97.77	In Earth orbit
S43774	2018-099S	Hiber 2	2018 Dec 3 2300:00	HIBER	NL	575	591	97.77	In Earth orbit
S43775	2018-099T	Vusat-OSCAR-96	2018 Dec 3 2300:00	EXSEED	IN	572	589	97.77	In Earth orbit
S43776	2018-099U	SPAWAR-CAL-R	2018 Dec 3 2300:00	SPAWAR	US	573	591	97.77	In Earth orbit
S43777	2018-099V	ENOH	2018 Dec 3 2300:00	LACMA	US	577	590	97.77	In Earth orbit
S43778	2018-099W	SPAWAR-CAL-OR	2018 Dec 3 2300:00	SPAWAR	US	573	591	97.77	In Earth orbit
S43779	2018-099X	RAAF MI	2018 Dec 3 2300:00	RAAF	AU	572	588	97.76	In Earth orbit
S43780	2018-099Y	MOVE-Ha	2018 Dec 3 2300:00	TUM	D	573	590	97.76	In Earth orbit
S43781	2018-099Z	VESTA	2018 Dec 3 2300:00	HONEYA/UKSA	UK	573	592	97.77	In Earth orbit
S43782	2018-099AA	SNUSAT 2	2018 Dec 3 2300:00	SNU	KR	572	588	97.76	In Earth orbit
S43783	2018-099AB	KazSTSAT	2018 Dec 3 2300:00	GHALAM	KZ	573	589	97.77	In Earth orbit
S43784	2018-099AC	SNUGLITE	2018 Dec 3 2300:00	SNU	KR	572	591	97.77	In Earth orbit
S43785	2018-099AD	OrbWeaver 2	2018 Dec 3 2300:00	DARPA	US	572	587	97.76	In Earth orbit
S43786	2018-099AE	ITASAT-1	2018 Dec 3 2300:00	ITA	BZ	573	592	97.77	In Earth orbit
S43787	2018-099AF	KazSciSat 1	2018 Dec 3 2300:00	GHALAM	KZ	572	589	97.77	In Earth orbit
S43788	2018-099AG	Flock 3s-3	2018 Dec 3 2300:00	PLABS	US	573	590	97.76	In Earth orbit
S43789	2018-099AH	IRVINE02	2018 Dec 3 2300:00	IPSF	US	572	591	97.77	In Earth orbit
S43790	2018-099AJ	Eaglet 1	2018 Dec 3 2300:00	OHBI	I	573	591	97.77	In Earth orbit
S43791	2018-099AK	Denhali	2018 Dec 3 2300:00	CAPSP	US	573	591	97.77	In Earth orbit
S43792	2018-099AL	ESEO	2018 Dec 3 2047:00	ESA	I-ESA	572	589	97.77	In Earth orbit
S43793	2018-099AM	CSIM-FD	2018 Dec 3 2300:00	CLASP	US	573	590	97.77	In Earth orbit
S43794	2018-099AN	Hawk B	2018 Dec 3 2300:00	HE360	US	577	590	97.77	In Earth orbit
S43795	2018-099AP	OrbWeaver 1	2018 Dec 3 2300:00	DARPA	US	572	587	97.77	In Earth orbit
S43796	2018-099AQ	THEA	2018 Dec 3 2300:00	AJUNS/SPQ	US	571	589	97.77	In Earth orbit
S43797	2018-099AR	SkySat C12	2018 Dec 3 2300:00	PLABST	US	572	588	97.77	In Earth orbit
S43798	2018-099AS	Astrocatt-0.1	2018 Dec 3 2300:00	ACAST	CH	574	592	97.77	In Earth orbit
S43799	2018-099AT	Hawk C	2018 Dec 3 2300:00	HE360	US	574	590	97.77	In Earth orbit
S43800	2018-099AU	ICEYE-X2	2018 Dec 3 2300:00	ICEYE	FI	570	588	97.77	In Earth orbit
S43801	2018-099AV	K2SAT	2018 Dec 3 2300:00	KAIST/KAFA	KR	571	591	97.77	In Earth orbit
S43802	2018-099AW	SkySat C13	2018 Dec 3 2300:00	PLABST	US	573	590	97.77	In Earth orbit
S43803	2018-099AX	Jordan-OSCAR-97	2018 Dec 3 2300:00	JUST	JO	573	590	97.77	In Earth orbit
S43804	2018-099AY	Suomi-100	2018 Dec 3 2300:00	AALTO	FI	573	589	97.77	In Earth orbit
S43805	2018-099AZ	Al-Farabi 2	2018 Dec 3 2300:00	KAZNU	KZ	573	589	97.77	In Earth orbit
S43806	2018-099BA	KNACKSAT	2018 Dec 3 2300:00	KMUTNB	T	573	589	97.77	In Earth orbit
S43807	2018-099BB	Eur-CROPS	2018 Dec 3 1905:00	DLR	D	574	591	97.77	In Earth orbit
S43808	2018-099BC	Yukon	2018 Dec 3 2300:00	USCG/DHSST	US	573	591	97.77	In Earth orbit
S43809	2018-099BD	Centauri 1	2018 Dec 3 2300:00	FLEET	AU	573	591	97.77	In Earth orbit
S43810	2018-099BE	Audacy Zero	2018 Dec 3 2300:00	AUDACY	US	574	591	97.77	In Earth orbit
S43811	2018-099BF	NEXTSat 1	2018 Dec 3 2300:00	KAIST	KR	572	589	97.77	In Earth orbit
S43812	2018-099BG	BlackSky Global 2	2018 Dec 3 2300:00	BKG	US	577	591	97.77	In Earth orbit
S43813	2018-099BH	BRIO	2018 Dec 3 2300:00	MYRI/SPQ	US	574	591	97.76	In Earth orbit
S43814	2018-099BJ	PW-Sat2	2018 Dec 3 2300:00	PWAR	PL	572	591	97.77	In Earth orbit
S43815	2018-099BK	FalconSat 6	2018 Dec 3 2300:00	USAF	US	572	592	97.77	In Earth orbit
S43816	2018-099BL	SpaceBEE 7	2018 Dec 3 2300:00	SWARM	US	573	589	97.76	In Earth orbit
S43817	2018-099BM	SpaceBEE 5	2018 Dec 3 2300:00	SWARM	US	573	590	97.77	In Earth orbit
S43818	2018-099BN	SpaceBEE 6	2018 Dec 3 2300:00	SWARM	US	573	589	97.77	In Earth orbit
S43819	2018-099BO	eXCITE	2018 Dec 3 1900:00	DARPA	US	569	588	97.77	In Earth orbit
S43820	2018-099BP	SeaHawk 1	2018 Dec 3 2300:00	UNCW/MOOREF	US	573	587	97.77	In Earth orbit
S43821	2018-099BR	Flock 3s-2	2018 Dec 3 2300:00	PLABS	US	572	592	97.77	In Earth orbit
S43822	2018-099BS	VisionCube	2018 Dec 3 2300:00	KRAU	KR	573	589	97.77	In Earth orbit
A09257	2018-099C	Elystium Star 2	2018 Dec 3 2300:00	ELYS	US	573	589	97.77	Attached to Unknown de- player
S43823	2018-100A	Geo-Kompsat-2A	2018 Dec 4 2110:00	KARI	KR	35783	35788	0.05	In Earth orbit

S43824	2018-100B	CSAT-1I	2018 Dec 4 21:06:00	ISRO	IN	35775	35798	0.12	In Earth orbit
S43827	2018-101A	Dragon CRS-16	2018 Dec 5 18:26:00	SPX	US	401	408	51.64	Landed
S43831	2018-102A	Saudisat-5A	2018 Dec 7 04:22:00	KACST	SA	533	551	97.63	In Earth orbit
S43832	2018-102B	TY/DF-1	2018 Dec 7 04:22:00	CTYK/GUOX	CN	531	551	97.63	In Earth orbit
S43833	2018-102C	Saudisat-5B	2018 Dec 7 04:22:00	KACST	SA	532	551	97.63	In Earth orbit
S43834	2018-102D	TFSTAR	2018 Dec 7 04:22:00	UFSTC/GUOX	CN	532	550	97.63	In Earth orbit
S43835	2018-102E	Xinjiang Jiaotong-01	2018 Dec 7 04:22:00	CTYK	CN	531	550	97.63	In Earth orbit
S43836	2018-102F	Piao chong 1	2018 Dec 7 04:22:00	JiUT/OFO	CN	530	550	97.63	In Earth orbit
S43837	2018-102G	MaoWang Shouyinjji Xing	2018 Dec 7 04:22:00	MAOW	CN	530	549	97.63	In Earth orbit
S43838	2018-102H	Huami xing	2018 Dec 7 04:22:00	HUAMI	CN	529	550	97.63	In Earth orbit
S43839	2018-102I	Piao chong 4	2018 Dec 7 04:22:00	JiUT	CN	529	549	97.64	In Earth orbit
S43840	2018-102K	Likeda jiaoyu weixing	2018 Dec 7 04:22:00	LIDA	CN	528	549	97.63	In Earth orbit
S43841	2018-102L	Tianmao guoji xing	2018 Dec 7 04:22:00	ALIEX	CN	528	549	97.64	In Earth orbit
S43842	2018-102M	RE:X xing	2018 Dec 7 04:22:00	JiUT/LUHAN	CN	528	549	97.64	In Earth orbit
S43845	2018-103A	Chang'e-4	2018 Dec 7 18:43:00	CASC	CN	-1416	423507	29.45	Deep Space
S43849	2018-104A	TOMSAT R3	2018 Dec 16 07:26:00	AERO	US	492	512	85.04	In Earth orbit
S43850	2018-104B	Shields	2018 Dec 16 07:26:00	LARCN	US	494	514	85.03	In Earth orbit
S43852	2018-104D	STF-1	2018 Dec 16 07:26:00	GSFC/WVU	US	494	513	85.03	In Earth orbit
S43853	2018-104E	CeREs	2018 Dec 16 07:26:00	GSFC	US	494	511	85.04	In Earth orbit
S43854	2018-104F	Rsat	2018 Dec 16 07:26:00	USNA	US	492	519	85.03	In Earth orbit
S43855	2018-104G	CHOMP TT	2018 Dec 16 07:26:00	UFL	US	491	511	85.03	In Earth orbit
S43856	2018-104H	ISX	2018 Dec 16 07:26:00	CALP	US	489	510	85.03	In Earth orbit
S43857	2018-104J	DaVinci	2018 Dec 16 07:26:00	LCFE/NISCA	US	489	511	85.03	In Earth orbit
S43858	2018-104K	CubeSail USat	2018 Dec 16 07:26:00	UIUC/CATHU	US	494	512	85.04	In Earth orbit
S43859	2018-104L	AIBUS	2018 Dec 16 07:26:00	GRC	US	494	512	85.04	In Earth orbit
S43860	2018-104M	Goergen	2018 Dec 16 07:26:00	DARPA	US	495	511	85.04	In Earth orbit
S43861	2018-104N	TOMSAT Eagle Scout	2018 Dec 16 07:26:00	AERO	US	489	511	85.03	In Earth orbit
S43862	2018-104P	NMTSAT	2018 Dec 16 07:26:00	NMTECH	US	489	510	85.04	In Earth orbit
S43864	2018-105A	CSAT-7A	2018 Dec 19 10:49:00	ISRO	IN	35553	42013	0.16	In Earth orbit
S43866	2018-106A	CSO-1	2018 Dec 19 17:38:00	DGA/CNES	F	800	800	98.60	In Earth orbit
S43867	2018-107A	Kosmos-2633	2018 Dec 21 09:22:00	KVR/VOENT	RU	35420	35797	0.17	In Earth orbit
S43871	2018-108A	Hongyunn Gongcheng JYW	2018 Dec 22 00:05:00	CASC	CN	1061	1077	99.92	In Earth orbit
S43873	2018-109A	GPS III SV01	2018 Dec 23 15:47:00	USAF	US	20171	20189	54.93	In Earth orbit
S43874	2018-110A	Tongxin Jishu Shiyuan 3	2018 Dec 25 17:18:00	CASC	CN	35778	35793	0.11	In Earth orbit
S43917	2018-110C	TJJS-3 substatellite	2018 Dec 31 00:00:00	CASC	CN	35787	35863	0.10	In Earth orbit
S43876	2018-111A	Kanopus-V No. 5	2018 Dec 27 03:06:00	VNIEM	RU	503	511	97.47	In Earth orbit
S43877	2018-111B	Kanopus-V No. 6	2018 Dec 27 03:12:00	VNIEM	RU	503	511	97.47	In Earth orbit
S43879	2018-111D	iSat	2018 Dec 27 04:30:00	ISKY	CZ	478	586	97.72	In Earth orbit
S43880	2018-111E	UWE-4	2018 Dec 27 04:30:00	WURZ	D	571	585	97.72	In Earth orbit
S43881	2018-111F	D-Star ONE Sparrow	2018 Dec 27 04:30:00	GOS	D	571	588	97.72	In Earth orbit
S43882	2018-111G	Lemur-2-ChristinaHolt	2018 Dec 27 04:30:00	SPiRE	US	570	585	97.73	In Earth orbit
S43883	2018-111H	Lemur-2-TinyKev	2018 Dec 27 04:30:00	SPiRE	US	569	584	97.73	In Earth orbit
S43884	2018-111J	Lemur-2-RemyColton	2018 Dec 27 04:30:00	SPiRE	US	570	585	97.72	In Earth orbit
S43885	2018-111K	Lemur-2-Gustavo	2018 Dec 27 04:30:00	SPiRE	US	570	585	97.73	In Earth orbit
S43886	2018-111L	Lemur-2-Zo	2018 Dec 27 04:30:00	SPiRE	US	569	585	97.73	In Earth orbit
S43887	2018-111M	Lemur-2-NatalieMurray	2018 Dec 27 04:30:00	SPiRE	US	570	586	97.72	In Earth orbit
S43888	2018-111N	Lemur-2-SarahBettyBoo	2018 Dec 27 04:30:00	SPiRE	US	569	584	97.73	In Earth orbit
S43889	2018-111P	Lemur-2-DaisyHarper	2018 Dec 27 04:30:00	SPiRE	US	569	587	97.73	In Earth orbit
S43890	2018-111Q	GRUS 1A	2018 Dec 27 04:30:00	AXEL	J	570	583	97.72	In Earth orbit
S43892	2018-111S	Flock 3k-3	2018 Dec 27 06:25:00	PLABS	US	479	511	97.30	In Earth orbit
S43893	2018-111T	Flock 3k-4	2018 Dec 27 06:25:00	PLABS	US	479	511	97.30	In Earth orbit
S43894	2018-111U	Flock 3k-1	2018 Dec 27 06:25:00	PLABS	US	480	511	97.30	In Earth orbit
S43895	2018-111V	Flock 3k-2	2018 Dec 27 06:25:00	PLABS	US	479	511	97.30	In Earth orbit
S43896	2018-111W	Flock 3k-6	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43899	2018-111Z	Flock 3k-5	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43901	2018-111AB	Flock 3k-8	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43902	2018-111AC	Flock 3k-7	2018 Dec 27 06:25:00	PLABS	US	480	510	97.30	In Earth orbit
S43903	2018-111AD	Flock 3k-12	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43904	2018-111AE	Flock 3k-11	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43905	2018-111AF	Flock 3k-10	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43906	2018-111AG	Flock 3k-9	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43907	2018-111AH	ZACUBE-2	2018 Dec 27 06:25:00	CPUT	ZA	480	508	97.30	In Earth orbit
S43908	2018-111AJ	Lume-1	2018 Dec 27 06:25:00	VIGO	E	480	514	97.30	In Earth orbit
S43909	2018-111A	Yunhai-2 01 xing	2018 Dec 29 11:00:00	CASC	CN	516	524	50.01	In Earth orbit
S43910	2018-111B	Yunhai-2 02 xing	2018 Dec 29 09:30:00	CASC	CN	514	524	50.01	In Earth orbit
S43911	2018-111C	Yunhai-2 03 xing	2018 Dec 29 09:30:00	CASC	CN	514	524	50.01	In Earth orbit

S43912	2018-112D	Yunhai-2 04 xing	2018 Dec 29 0930:00	CASC	CN	1088	1097	50.01	In Earth orbit
S43913	2018-112E	Yunhai-2 05 xing	2018 Dec 29 1100:00	CASC	CN	1090	1098	50.01	In Earth orbit
S43914	2018-112F	Chongqing	2018 Dec 29 0930:00	DFHYT	CN	1090	1098	50.01	In Earth orbit
S43915	2018-112G	Yunhai-2 06 xing	2018 Dec 29 1100:00	CASC	CN	1092	1099	50.01	In Earth orbit
Pay/loads not included in annual statistics									
A09191	2018-073	HSRC	2018 Nov 10 2124:00	JAXA	J	-55	380	51.64	Landed
A09198	1998-067	STARS-Me HT	2018 Oct 6 0800:00	SHIZ	J	401	406	51.64	Attached to Tenryu
A09199	1998-067	STARS-Me Climber	2018 Oct 6 0800:00	SHIZ	J	401	406	51.64	Attached to Tenryu
A09236	2018-103	Yutu-2	2018 Dec 7 1843:00	CASC	CN	-1416	423508	29.45	Deep Space Att Chang'e-4
A09243	2018-104E	CubeSail LSat	2018 Dec 16 0000:00	UIUC/CATHU	US	494	513	85.03	Attached to CubeSail USat

Appendix 2c: Satellite payloads launched in 2019

CATID	LAUNCH ID	Name	Launch date UTC	Owner	Country	Perigee	Apogee	Inc	Status
S43920	2019-001A	Zhongxing 2D	2019 Jan 10 17:11:04	ZZB	CN	35780	35780	0.06	In Earth orbit
S43921	2019-002A	Iridium Next SV180	2019 Jan 11 15:31:33	IRID	US	611	626	86.68	In Earth orbit
S43922	2019-002B	Iridium Next SV176	2019 Jan 11 15:31:33	IRID	US	611	626	86.68	In Earth orbit
S43923	2019-002C	Iridium Next SV168	2019 Jan 11 15:31:33	IRID	US	608	626	86.68	In Earth orbit
S43924	2019-002D	Iridium Next SV173	2019 Jan 11 15:31:33	IRID	US	608	626	86.68	In Earth orbit
S43925	2019-002E	Iridium Next SV169	2019 Jan 11 15:31:33	IRID	US	609	626	86.68	In Earth orbit
S43926	2019-002F	Iridium Next SV172	2019 Jan 11 15:31:33	IRID	US	608	626	86.68	In Earth orbit
S43927	2019-002G	Iridium Next SV175	2019 Jan 11 15:31:33	IRID	US	611	625	86.68	In Earth orbit
S43928	2019-002H	Iridium Next SV171	2019 Jan 11 15:31:33	IRID	US	609	626	86.68	In Earth orbit
S43929	2019-002I	Iridium Next SV170	2019 Jan 11 15:31:33	IRID	US	610	626	86.68	In Earth orbit
S43930	2019-002J	Iridium Next SV167	2019 Jan 11 15:31:33	IRID	US	612	626	86.68	In Earth orbit
S43931	2019-003A	RAPIS-1	2019 Jan 18 00:50:20	JAXA	J	498	510	97.30	In Earth orbit
S43932	2019-003B	Fuji-OSCAR-98	2019 Jan 18 00:50:20	TIT	J	488	512	97.30	In Earth orbit
S43933	2019-003C	RiseSat	2019 Jan 18 00:50:20	TOHO	J	490	513	97.30	In Earth orbit
S43934	2019-003D	MicroDragon	2019 Jan 18 00:50:20	VNSC	VN	490	511	97.30	In Earth orbit
S43935	2019-003E	Fuji-OSCAR-99	2019 Jan 18 00:50:20	NIHON	J	480	512	97.30	In Earth orbit
S43936	2019-003F	ALE-1	2019 Jan 18 00:50:20	ALE	J	479	512	97.31	In Earth orbit
S43937	2019-003G	Aoba-VELOX IV	2019 Jan 18 00:50:20	KYUT	J	481	513	97.31	In Earth orbit
S43938	2019-003H	USA 290	2019 Jan 19 19:10:00	NROC	US	395	419	73.57	In Earth orbit
S43939	2019-004A	Lingque 1 A xing	2019 Jan 21 05:42:21	LINGZ	CN	516	539	97.51	In Earth orbit
S43940	2019-005A	Jilin Lineco 1	2019 Jan 21 05:42:21	CGSTL	CN	521	539	97.51	In Earth orbit
S43941	2019-005B	Qingfeng Zhi Xing	2019 Jan 21 05:42:21	CGSTL	CN	523	539	97.51	In Earth orbit
S43942	2019-005C	Wenchang Chaosuan 1	2019 Jan 21 05:42:21	HTYK/QTD	CN	521	539	97.51	In Earth orbit
S43943	2019-005D	Microsat-R	2019 Jan 24 18:07:00	DRDO	IN	268	289	96.60	Reentered
S43944	2019-006A	KalamSat	2019 Jan 24 18:07:00	SKI	IN	446	451	98.80	Attached to PSLV-C44 PS4
S43945	2019-006B	SGS-1	2019 Feb 5 21:01:07	KACST/HELARS	SA	13009	35545	1.34	In Earth orbit
S44035	2019-007A	GSAT-31	2019 Feb 5 21:01:07	ISRO	IN	35667	35776	0.15	In Earth orbit
S44036	2019-007B	MirSat A	2019 Feb 21 16:47:14	NARSS	EG	652	656	98.02	In Earth orbit
S44037	2019-008A	Nusantara Satu	2019 Feb 22 01:45:00	PSN	ID	28894	68865	3.00	In Earth orbit
S44038	2019-009A	B'reshit	2019 Feb 22 01:45:00	SPAIL	IL	668	690	27.01	Deep Space
S44039	2019-009B	S5	2019 Feb 22 01:45:00	AFRL	US	36043	36054	0.08	In Earth orbit
S44040	2019-009D	NanugSat	2019 Feb 27 21:37:00	ONEWEB	UK	987	1009	87.76	In Earth orbit
S44041	2019-010A	ChusigSat	2019 Feb 27 21:37:00	ONEWEB	UK	988	1010	87.77	In Earth orbit
S44042	2019-010B	IcyerekezoSat	2019 Feb 27 21:37:00	ONEWEB	UK	987	1007	87.77	In Earth orbit
S44043	2019-010C	ChinghizSat	2019 Feb 27 21:37:00	ONEWEB	UK	987	1007	87.77	In Earth orbit
S44044	2019-010D	SherpaSat	2019 Feb 27 21:37:00	ONEWEB	UK	985	1010	87.76	In Earth orbit
S44045	2019-010E	LempiraSat	2019 Feb 27 21:37:00	ONEWEB	UK	988	1004	87.77	In Earth orbit
S44046	2019-010F	Crew Dragon DM-1	2019 Mar 2 07:49:00	SPX	US	224	369	51.64	Landed
S44063	2019-011A	Zhongxing 6C	2019 Mar 9 16:28:04	ZZB	CN	35771	35801	0.12	In Earth orbit
S44067	2019-012A	Soyuz MS-12	2019 Mar 14 19:14:09	RKKE	RU	245	299	51.64	Landed
S44069	2019-013A	WGS SV-10	2019 Mar 16 02:26:00	USAF	US	22416	45382	1.05	In Earth orbit
S44071	2019-014A	PRISMA	2019 Mar 22 01:50:35	ASI	I	616	619	97.90	In Earth orbit
S44072	2019-015A	R3D2	2019 Mar 28 23:27:00	DARPA	US	422	437	39.52	In Earth orbit
S44073	2019-016A	Tian Lian 2-01	2019 Mar 31 15:51:04	ZZB	CN	193	35812	27.13	In Earth orbit
S44076	2019-017A	EMISAT	2019 Apr 1 03:57:00	ISRO	IN	735	759	98.39	In Earth orbit
S44078	2019-018A	Flock 4a-1	2019 Apr 1 03:57:00	PLABS	US	494	510	97.47	In Earth orbit
S44079	2019-018B	Flock 4a-2	2019 Apr 1 03:57:00	PLABS	US	494	510	97.47	In Earth orbit
S44080	2019-018C	Flock 4a-3	2019 Apr 1 03:57:00	PLABS	US	494	510	97.47	In Earth orbit
S44081	2019-018D	Flock 4a-4	2019 Apr 1 03:57:00	PLABS	US	493	510	97.47	In Earth orbit
S44082	2019-018E	Astrocast 0.2	2019 Apr 1 03:57:00	ACAST	CH	493	510	97.48	In Earth orbit
S44083	2019-018F	Lemur-2-JohanLoran	2019 Apr 1 03:57:00	SPIRE	US	493	510	97.47	In Earth orbit
S44084	2019-018G	Lemur-2-Beaudacious	2019 Apr 1 03:57:00	SPIRE	US	493	510	97.47	In Earth orbit
S44085	2019-018H	Lemur-2-Elham	2019 Apr 1 03:57:00	SPIRE	US	493	510	97.47	In Earth orbit
S44086	2019-018J	Lemur-2-Victor-Andrew	2019 Apr 1 03:57:00	SPIRE	US	493	509	97.47	In Earth orbit
S44087	2019-018K	Flock 4a-17	2019 Apr 1 03:57:00	PLABS	US	492	509	97.47	In Earth orbit
S44088	2019-018L	Flock 4a-18	2019 Apr 1 03:57:00	PLABS	US	492	509	97.47	In Earth orbit
S44089	2019-018M	Flock 4a-19	2019 Apr 1 03:57:00	PLABS	US	492	509	97.47	In Earth orbit
S44090	2019-018N	Flock 4a-20	2019 Apr 1 03:57:00	PLABS	US	492	509	97.47	In Earth orbit
S44091	2019-018P	Flock 4a-8	2019 Apr 1 03:57:00	PLABS	US	493	507	97.47	In Earth orbit
S44092	2019-018Q	Flock 4a-7	2019 Apr 1 03:57:00	PLABS	US	493	507	97.47	In Earth orbit
S44093	2019-018R	Flock 4a-6	2019 Apr 1 03:57:00	PLABS	US	493	507	97.47	In Earth orbit
S44094	2019-018S	Flock 4a-6	2019 Apr 1 03:57:00	PLABS	US	493	507	97.47	In Earth orbit

T00035	2019-022AQ	AC-10a Probe 21	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00036	2019-022AR	AC-10a Probe 22	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00037	2019-022AS	AC-10a Probe 23	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00038	2019-022AT	AC-10a Probe 24	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00039	2019-022AU	AC-10a Probe 25	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00040	2019-022AV	AC-10a Probe 26	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00041	2019-022AW	AC-10a Probe 27	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00042	2019-022AX	AC-10a Probe 28	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
T00043	2019-022AY	AC-10a Probe 29	2019 Apr 17 2046:07	AERO	US	0	0	0.00	Attached to Dougsat
S44204	2019-023A	Beidou DW 44	2019 Apr 20 1441:03	CNSA	35714	35850	54.98	In Earth orbit	
S44205	2019-024A	Tianhui-2 01 zu 01 xing	2019 Apr 29 2252:05	GCDX	500	517	97.45	In Earth orbit	
S44208	2019-024B	Tianhui-2 01 zu 02 xing	2019 Apr 29 2252:05	GCDX	504	518	97.45	In Earth orbit	
S44222	2019-025A	Dragon CRS-17	2019 May 4 0648:58	SPX	378	383	51.64	Landed	
S44364	1998-067QJ	PINOT	2019 May 4 0648:58	DARPA	407	418	51.64	In Earth orbit	
S44225	2019-026A	AFOTEC-1	2019 May 5 0600:00	US	407	418	51.64	In Earth orbit	
S44226	2019-026B	SPARC-1	2019 May 5 0600:00	US	493	511	40.01	In Earth orbit	
S44229	2019-026E	Harbinger	2019 May 5 0600:00	AFRL/FMV	498	511	40.02	In Earth orbit	
T00044	2019-026F	ODE Cal Sphere 1	2019 May 5 0600:00	USAF	498	510	40.02	In Earth orbit	
T00045	2019-026G	ODE Cal Sphere 2	2019 May 5 0600:00	USAF	0	0	0.00	Attached to AFOTEC-1	
S44231	2019-027A	Beidou DW 45	2019 May 17 1548:05	CNSA	0	0	0.00	Attached to AFOTEC-1	
S44233	2019-028A	RISAT-2B	2019 May 22 0000:00	ISRO	35774	35799	1.74	In Earth orbit	
S44235	2019-029A	Starlink 31	2019 May 24 0230:00	SPXS	550	557	37.00	In Earth orbit	
S44236	2019-029B	Starlink 22	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44237	2019-029C	Starlink 23	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44238	2019-029D	Starlink 24	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44239	2019-029E	Starlink 25	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44240	2019-029F	Starlink 26	2019 May 24 0230:00	SPXS	450	454	53.00	In Earth orbit	
S44241	2019-029G	Starlink 27	2019 May 24 0230:00	SPXS	442	445	53.00	In Earth orbit	
S44242	2019-029H	Starlink 28	2019 May 24 0230:00	SPXS	449	454	52.99	In Earth orbit	
S44243	2019-029I	Starlink 29	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44244	2019-029K	Starlink 30	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44245	2019-029L	Starlink 21	2019 May 24 0230:00	SPXS	435	442	53.00	In Earth orbit	
S44246	2019-029M	Starlink 46	2019 May 24 0230:00	SPXS	448	452	53.00	In Earth orbit	
S44247	2019-029N	Starlink 33	2019 May 24 0230:00	SPXS	441	443	53.00	In Earth orbit	
S44248	2019-029P	Starlink 34	2019 May 24 0230:00	SPXS	434	442	53.00	In Earth orbit	
S44249	2019-029Q	Starlink 61	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44250	2019-029R	Starlink 36	2019 May 24 0230:00	SPXS	434	442	53.00	In Earth orbit	
S44251	2019-029S	Starlink 37	2019 May 24 0230:00	SPXS	437	442	53.00	In Earth orbit	
S44252	2019-029T	Starlink 71	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44253	2019-029U	Starlink 39	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44254	2019-029V	Starlink 32	2019 May 24 0230:00	SPXS	448	453	53.00	In Earth orbit	
S44255	2019-029W	Starlink 66	2019 May 24 0230:00	SPXS	441	443	53.00	In Earth orbit	
S44256	2019-029X	Starlink 42	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44257	2019-029Y	Starlink 43	2019 May 24 0230:00	SPXS	434	442	53.00	In Earth orbit	
S44258	2019-029Z	Starlink 40	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44259	2019-029AA	Starlink 52	2019 May 24 0230:00	SPXS	438	442	53.00	In Earth orbit	
S44260	2019-029AB	Starlink 45	2019 May 24 0230:00	SPXS	441	443	53.00	In Earth orbit	
S44261	2019-029AC	Starlink 44	2019 May 24 0230:00	SPXS	448	453	53.00	In Earth orbit	
S44262	2019-029AD	Starlink 49	2019 May 24 0230:00	SPXS	441	443	53.00	In Earth orbit	
S44263	2019-029AE	Starlink 72	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44264	2019-029AF	Starlink 35	2019 May 24 0230:00	SPXS	450	454	53.00	In Earth orbit	
S44265	2019-029AG	Starlink 63	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44266	2019-029AH	Starlink 54	2019 May 24 0230:00	SPXS	434	442	53.00	In Earth orbit	
S44267	2019-029AJ	Starlink 69	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44268	2019-029AK	Starlink 55	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44269	2019-029AL	Starlink 57	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44270	2019-029AM	Starlink 58	2019 May 24 0230:00	SPXS	434	442	53.00	In Earth orbit	
S44271	2019-029AN	Starlink 59	2019 May 24 0230:00	SPXS	446	446	53.01	In Earth orbit	
S44272	2019-029AP	Starlink 51	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44273	2019-029AQ	Starlink 60	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44274	2019-029AR	Starlink 62	2019 May 24 0230:00	SPXS	433	442	53.00	In Earth orbit	
S44275	2019-029AS	Starlink 64	2019 May 24 0230:00	SPXS	436	442	53.00	In Earth orbit	
S44276	2019-029AT	Starlink 65	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44277	2019-029AU	Starlink 41	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	
S44278	2019-029AV	Starlink 67	2019 May 24 0230:00	SPXS	442	442	53.00	In Earth orbit	
S44279	2019-029AW	Starlink 68	2019 May 24 0230:00	SPXS	433	441	53.00	In Earth orbit	

S44280	2019-029AX	Starlink 38	2019 May 24 02:30:00	SPXS	US	433	441	53.00	In Earth orbit
S44281	2019-029AY	Starlink 70	2019 May 24 02:30:00	SPXS	US	433	441	53.00	In Earth orbit
S44282	2019-029AZ	Starlink 80	2019 May 24 02:30:00	SPXS	US	433	441	53.00	In Earth orbit
S44283	2019-029BA	Starlink 56	2019 May 24 02:30:00	SPXS	US	433	441	53.00	In Earth orbit
S44284	2019-029BB	Starlink 73	2019 May 24 02:30:00	SPXS	US	450	453	53.00	In Earth orbit
S44285	2019-029BC	Starlink 50	2019 May 24 02:30:00	SPXS	US	433	442	53.00	In Earth orbit
S44286	2019-029BD	Starlink 75	2019 May 24 02:30:00	SPXS	US	433	442	53.00	In Earth orbit
S44287	2019-029BE	Starlink 76	2019 May 24 02:30:00	SPXS	US	444	448	53.00	In Earth orbit
S44288	2019-029BF	Starlink 79	2019 May 24 02:30:00	SPXS	US	433	442	53.00	In Earth orbit
S44289	2019-029BG	Starlink 48	2019 May 24 02:30:00	SPXS	US	442	443	53.00	In Earth orbit
S44290	2019-029BH	Starlink 78	2019 May 24 02:30:00	SPXS	US	450	453	53.00	In Earth orbit
S44291	2019-029BJ	Starlink 77	2019 May 24 02:30:00	SPXS	US	449	453	53.00	In Earth orbit
S44292	2019-029BK	Starlink 81	2019 May 24 02:30:00	SPXS	US	451	454	53.00	In Earth orbit
S44293	2019-029BL	Starlink 74	2019 May 24 02:30:00	SPXS	US	448	452	52.99	In Earth orbit
S44294	2019-029BM	Starlink 53	2019 May 24 02:30:00	SPXS	US	449	452	53.00	In Earth orbit
S44299	2019-030A	Kosmos-2534	2019 May 27 06:23:00	KVR/IACG	RU	19096	19163	64.76	In Earth orbit
S44307	2019-031A	Yamal-601	2019 May 30 17:42:00	GAZS	RU	35777	35795	0.02	In Earth orbit
S44310	2019-032A	Tianxiang 1	2019 Jun 5 04:06:00	DKJ	CN	551	575	44.98	In Earth orbit
S44311	2019-032B	Xiaoxiang-1 04 xing	2019 Jun 5 04:06:00	CTYK	CN	556	575	44.99	In Earth orbit
S44312	2019-032C	Bufeng yi hao A xing	2019 Jun 5 04:06:00	CAST	CN	555	575	45.00	In Earth orbit
S44313	2019-032D	Tao Kingzhi Jiaoyu 1	2019 Jun 5 04:06:00	TZJ/GUOG	CN	557	576	44.99	In Earth orbit
S44314	2019-032E	Bufeng yi hao B xing	2019 Jun 5 04:06:00	CAST	CN	554	576	44.99	In Earth orbit
S44315	2019-032F	Jilin-1 GaoFen 03A	2019 Jun 5 04:06:00	CGSTL	CN	555	575	44.98	In Earth orbit
S44316	2019-032G	Tianxiang 2	2019 Jun 5 04:06:00	DKJ	CN	557	575	44.99	In Earth orbit
S44322	2019-033A	RCM 1	2019 Jun 12 14:17:00	CSA	CA	584	604	97.77	In Earth orbit
S44323	2019-033B	RCM 3	2019 Jun 12 14:17:00	CSA	CA	584	603	97.77	In Earth orbit
S44324	2019-033C	RCM 2	2019 Jun 12 14:17:00	CSA	CA	584	603	97.77	In Earth orbit
S44333	2019-034A	T-16	2019 Jun 20 21:43:00	ATT	US	35712	35732	0.02	In Earth orbit
S44334	2019-034B	Eutelsat 7C	2019 Jun 20 21:43:00	EUTSA	F	11267	48750	2.57	In Earth orbit
S44337	2019-035A	Beidou DW 46	2019 Jun 24 18:09:00	CNSA	CN	35733	35835	55.06	In Earth orbit
S44339	2019-036A	Prox-1	2019 Jun 25 06:30:00	GIT	US	705	725	24.00	In Earth orbit
S44340	2019-036B	NPSAT-1	2019 Jun 25 06:30:00	USNPS	US	710	721	24.00	In Earth orbit
S44341	2019-036C	OTB/Celestis	2019 Jun 25 06:30:00	GACO	US	706	723	24.00	In Earth orbit
S44342	2019-036D	GPIM	2019 Jun 25 06:30:00	MSFC	US	701	729	23.98	In Earth orbit
S44343	2019-036E	COSMIC 2-3	2019 Jun 25 06:30:00	NSFO	TW	708	724	24.00	In Earth orbit
S44344	2019-036F	DSX	2019 Jun 25 06:30:00	AFRL	US	5999	12039	42.20	In Earth orbit
S44346	2019-036H	TEPCE 1	2019 Jun 25 06:30:00	NRL	US	297	848	28.53	In Earth orbit
S44347	2019-036J	FalconSat-7	2019 Jun 25 06:30:00	USAF	US	306	851	28.52	In Earth orbit
S44348	2019-036K	Oculus-ASR	2019 Jun 25 06:30:00	MTU	US	306	853	28.53	In Earth orbit
S44349	2019-036L	COSMIC 2-1	2019 Jun 25 06:30:00	NSFO	TW	709	721	24.00	In Earth orbit
S44350	2019-036M	COSMIC 2-4	2019 Jun 25 06:30:00	NSFO	TW	710	724	23.99	In Earth orbit
S44351	2019-036N	COSMIC 2-2	2019 Jun 25 06:30:00	NSFO	TW	710	724	24.00	In Earth orbit
S44352	2019-036P	ARMADILLO	2019 Jun 25 06:30:00	UT	US	305	851	28.54	In Earth orbit
S44353	2019-036Q	COSMIC 2-6	2019 Jun 25 06:30:00	NSFO	TW	708	724	23.99	In Earth orbit
S44354	2019-036R	Navy-OSCAR-104	2019 Jun 25 06:30:00	USNA	US	306	849	28.53	In Earth orbit
S44355	2019-036S	Navy-OSCAR-103	2019 Jun 25 06:30:00	USNA	US	300	846	28.52	In Earth orbit
S44356	2019-036T	E-TBEX A	2019 Jun 25 06:30:00	UMI/SRII	US	298	846	28.51	In Earth orbit
S44358	2019-036V	COSMIC 2-5	2019 Jun 25 06:30:00	NSFO	TW	709	724	24.00	In Earth orbit
S44359	2019-036W	E-TBEX B	2019 Jun 25 06:30:00	UMI/SRII	US	305	847	28.53	In Earth orbit
S44360	2019-036X	LEO	2019 Jun 25 06:30:00	CALP	US	301	846	28.52	In Earth orbit
S44361	2019-036Y	StangSat	2019 Jun 25 06:30:00	MHS	US	302	847	28.53	In Earth orbit
S44375	2019-036Z	Prometheus Mass Model	2019 Jun 25 06:30:00	SOCOM	US	305	845	28.52	In Earth orbit
S44386	2019-036AB	Prometheus 2.6	2019 Jun 25 06:30:00	SOCOM	US	300	847	28.53	In Earth orbit
S44420	2019-036AC	LightSail-2	2019 Jun 25 06:30:00	TFS	US	709	725	24.00	In Earth orbit
S44365	2019-037A	PAINANI-1	2019 Jun 29 04:30:00	SEDENA	MX	447	460	45.01	In Earth orbit
S44366	2019-037B	Prometheus 2.9	2019 Jun 29 04:30:00	SOCOM	US	437	460	45.01	In Earth orbit
S44367	2019-037C	BlackSky Global 3	2019 Jun 29 04:30:00	BSKG	US	450	461	45.01	In Earth orbit
S44369	2019-037E	ACRU X 1	2019 Jun 29 04:30:00	MELB	US	439	460	45.01	In Earth orbit
S44370	2019-037F	SpaceBEE 9	2019 Jun 29 04:30:00	SWARM	US	446	460	45.01	In Earth orbit
S44371	2019-037G	SpaceBEE 8	2019 Jun 29 04:30:00	SWARM	US	447	460	45.01	In Earth orbit
S44374	2019-037K	Prometheus 2.7	2019 Jun 29 04:30:00	SOCOM	US	437	460	45.01	In Earth orbit
S44387	2019-038A	Meteor-M No. 2-2	2019 Jul 5 05:41:46	RGMS/VNIEMR	RU	812	815	98.57	In Earth orbit
S44388	2019-038B	MTCube	2019 Jul 5 05:41:46	MONTP2	F	515	546	97.49	In Earth orbit
S44389	2019-038C	ICEYE-X5	2019 Jul 5 05:41:46	ICEYE	FI	564	591	97.68	In Earth orbit
S44390	2019-038D	ICEYE-X4	2019 Jul 5 05:41:46	ICEYE	FI	564	594	97.68	In Earth orbit
S44391	2019-038E	NLSat-1	2019 Jul 5 05:41:46	NSLC	IL	515	543	97.49	In Earth orbit

S44392	2019-038G	VDNKh-80	2019 Jul 5 0541:46	VDNKH	RU	514	546	97.49	In Earth orbit
S44393	2019-038H	LightSat	2019 Jul 5 0541:46	GOS	D	514	548	97.49	In Earth orbit
S44394	2019-038J	AmGU 1	2019 Jul 5 0541:46	AMGU	EC	514	548	97.49	In Earth orbit
S44395	2019-038K	Ecuador-UTE	2019 Jul 5 0541:46	UTE	EC	501	563	97.50	In Earth orbit
S44396	2019-038L	Lemur-2-Lillylo	2019 Jul 5 0541:46	SPiRE	US	514	548	97.49	In Earth orbit
S44397	2019-038M	Keit	2019 Jul 5 0541:46	TTU	EE	514	546	97.49	In Earth orbit
S44398	2019-038N	MOVE-Iib	2019 Jul 5 0541:46	TUM	D	512	550	97.49	In Earth orbit
S44399	2019-038P	DoT-1	2019 Jul 5 0541:46	SSTL	UK	564	591	97.68	In Earth orbit
S44400	2019-038Q	SONATE	2019 Jul 5 0541:46	WURZ	US	514	547	97.49	In Earth orbit
S44401	2019-038R	SEAM 2.0	2019 Jul 5 0541:46	KTH	S	516	544	97.49	In Earth orbit
S44402	2019-038S	Lemur-2-Wanli	2019 Jul 5 0541:46	SPiRE	US	513	547	97.49	In Earth orbit
S44403	2019-038T	Lemur-2-Morag	2019 Jul 5 0541:46	SPiRE	US	516	545	97.49	In Earth orbit
S44404	2019-038AE	Sokrat	2019 Jul 5 0541:46	MGU	RU	515	546	97.49	In Earth orbit
S44405	2019-038V	Lemur-2-DustInTheWind	2019 Jul 5 0541:46	SPiRE	RU	515	546	97.49	In Earth orbit
S44406	2019-038W	Lucky-7	2019 Jul 5 0541:46	SKYFOX	CZ	515	545	97.48	In Earth orbit
S44407	2019-038X	Lemur-2-Alex-Maddy	2019 Jul 5 0541:46	SPiRE	US	514	547	97.49	In Earth orbit
S44408	2019-038Y	El Camino Real	2019 Jul 5 0541:46	MOMENT	US	515	543	97.49	In Earth orbit
S44409	2019-038Z	Lemur-2-EJatta	2019 Jul 5 0541:46	SPiRE	US	515	546	97.49	In Earth orbit
S44410	2019-038AA	EXOCONNECT	2019 Jul 5 0541:46	GOS	D	514	548	97.49	In Earth orbit
S44411	2019-038AB	Lemur-2-GregRobinson	2019 Jul 5 0541:46	SPiRE	US	515	543	97.49	In Earth orbit
S44412	2019-038AC	BEESAT 9	2019 Jul 5 0541:46	TUB	D	514	547	97.49	In Earth orbit
S44413	2019-038AD	Lemur-2-Yndrd	2019 Jul 5 0541:46	SPiRE	US	515	544	97.49	In Earth orbit
S44414	2019-038U	CarbonNIX	2019 Jul 5 0541:46	EXOL	D	564	591	97.68	In Earth orbit
S44419	2019-038F	JAISAT 1	2019 Jul 5 0541:46	RAST	T	514	548	97.49	In Earth orbit
A09475	2019-038AF	BEESAT 10	2019 Jul 5 0541:46	TUB	D	514	547	97.49	In Earth orbit
A09476	2019-038AG	BEESAT 11	2019 Jul 5 0541:46	TUB	D	514	547	97.49	In Earth orbit
A09477	2019-038AH	BEESAT 12	2019 Jul 5 0541:46	TUB	D	514	547	97.49	In Earth orbit
A09478	2019-038AJ	BEESAT 13	2019 Jul 5 0541:46	TUB	D	514	547	97.49	In Earth orbit
S44421	2019-039A	Kosmos-2535	2019 Jul 10 1714:00	TSVVS	RU	610	621	97.88	In Earth orbit
S44422	2019-039B	Kosmos-2537	2019 Jul 10 1714:00	TSKHM	RU	611	623	97.88	In Earth orbit
S44423	2019-039C	Kosmos-2538	2019 Jul 10 1714:00	PVO?	RU	616	623	97.88	In Earth orbit
S44424	2019-039D	Kosmos-2536	2019 Jul 10 1714:00	TSKHM	RU	610	622	97.87	In Earth orbit
S44432	2019-040A	Spektr-RG	2019 Jul 13 1230:57	RKA	RU	531	1332588	51.92	Deep Space
S44437	2019-041A	Soyuz MS-13	2019 Jul 20 1628:20	RKKE	RU	409	418	51.64	Attached to Polish Deep Space
S44441	2019-042A	Chandrayaan-2	2019 Jul 22 0913:00	ISRO	IN	201	71729	21.59	Deep Space
A09453	2019-042	Vikram	2019 Jul 22 0913:00	ISRO	IN	266	407970	21.70	Deep Space Att to GSLV-3
A09454	2019-042	Pragyan	2019 Jul 22 0913:00	ISRO	IN	266	407970	21.70	MI Stage 2 Deep Space Att to GSLV-3
S44443	2019-043A	Bei Ligong 1 hao	2019 Jul 25 0500:00	CAMSAT	CN	275	292	42.73	MI Stage 2 Reentered
A09471	2019-043B	Qiqiu Weixing	2019 Jul 25 0500:00	HKKGF	CN	275	292	42.73	Reentered
S44415	2019-022E	NARSScub-2	2019 Jul 25 2201:56	NARSS	EG	469	485	51.64	In Earth orbit
S44416	2019-022F	Quantum Radar 3	2019 Jul 25 2201:56	HYPFG	US	469	485	51.64	In Earth orbit
S44417	2019-022G	RFTSat	2019 Jul 25 2201:56	NWNAZ	US	469	485	51.64	In Earth orbit
S44418	2019-022H	ORCA	2019 Jul 25 2201:56	DARPA/HYPGG	US	469	485	51.64	In Earth orbit
S44448	2019-044A	Dragon CRS-18	2019 Jul 25 2201:56	SPX	US	203	373	51.64	Landed
A09460	2019-044	IDA-3	2019 Jul 25 2201:56	JSC	US	409	418	51.64	Attached to PMA-3
S44449	2019-045A	Yaogan 30 hao 05 zu 01 xing	2019 Jul 26 0357:00	ZZB	CN	589	604	35.00	In Earth orbit
S44450	2019-045B	Yaogan 30 hao 05 zu 02 xing	2019 Jul 26 0357:00	ZZB	CN	588	605	34.99	In Earth orbit
S44451	2019-045C	Yaogan 30 hao 05 zu 03 xing	2019 Jul 26 0357:00	ZZB	CN	587	604	34.99	In Earth orbit
S44453	2019-046A	Meridian-M No. 18L	2019 Jul 30 0557:00	KVR	RU	1000	39352	62.78	In Earth orbit
S44455	2019-047A	Progress MS-12	2019 Jul 31 1210:46	RKKE	RU	409	417	51.64	Deorbited
S44457	2019-048A	Kosmos-2539	2019 Aug 5 2156:00	KVR/VOENT	RU	35779	35791	0.01	In Earth orbit
S44475	2019-049A	EDRS C	2019 Aug 6 1930:07	ESA	I-ESA	35783	35788	0.07	In Earth orbit
S44476	2019-049B	Intelsat IS-39	2019 Aug 6 1930:07	INTELU	US	35778	35793	0.06	In Earth orbit
S44479	2019-050A	Amos 17	2019 Aug 6 2323:00	IAIS	IL	35778	35792	0.13	In Earth orbit
S44481	2019-051A	AEHF SV-5	2019 Aug 8 1013:00	AFMCSW	US	27167	34805	7.84	In Earth orbit
S44482	2019-051B	TDO	2019 Aug 8 1013:00	AFSMC	US	208	35264	26.17	In Earth orbit
S44486	2019-052A	Qiancheng-01	2019 Aug 17 0411:00	QIANG	CN	531	559	97.61	In Earth orbit
S44487	2019-052B	Tianqi-2	2019 Aug 17 0411:00	GUOG	CN	529	558	97.61	In Earth orbit
S44488	2019-052C	Xingshidai-5	2019 Aug 17 0411:00	GUOX	CN	529	560	97.61	In Earth orbit
S44493	2019-053A	Zhongxing 18	2019 Aug 19 1203:00	ZZB	CN	237	35761	28.48	In Earth orbit
S44495	2019-054A	BRO-ONE	2019 Aug 19 1212:00	UNSEEN	F	536	550	45.01	In Earth orbit
S44497	2019-054C	Pearl White 1	2019 Aug 19 1212:00	AFSPC	US	533	550	45.01	In Earth orbit
S44498	2019-054D	Pearl White 2	2019 Aug 19 1212:00	AFSPC	US	532	549	45.01	In Earth orbit
S44499	2019-054E	BlackSky Global 4	2019 Aug 19 1212:00	BSKG	US	538	550	45.01	In Earth orbit

S44504	2019-055A	Soyuz MS-14	2019 Aug 22 0338:31	RKKE	RU	412	420	51.64	Landed
S44506	2019-056A	GPS III SV02	2019 Aug 22 1306:00	AFSMC	US	20184	20193	55.04	In Earth orbit
S44517	2019-057A	Geo-IK-2 No. 13L	2019 Aug 22 1400:00	TSVS	RU	945	958	99.27	In Earth orbit
S44519	2019-058A	Xiaoxiang-1.07 xing	2019 Aug 30 2341:00	CTYK	CN	592	607	97.79	In Earth orbit
S44520	2019-058B	Taichi-1	2019 Aug 30 2341:00	CNSSC	CN	592	609	97.79	In Earth orbit
S44528	2019-059A	Zi Yuan 1-02D	2019 Sep 12 0326:00	CZSWYZ	CN	748	758	98.58	In Earth orbit
S44529	2019-059B	Jingshi 1	2019 Sep 12 0326:00	BNU	CN	732	750	98.58	In Earth orbit
S44530	2019-059C	Jimuzuo maxing	2019 Sep 12 0326:00	ASES	CN	731	750	98.59	In Earth orbit
S44534	2019-060A	OVS-3	2019 Sep 19 0642:00	ZHUORB	CN	494	512	97.40	In Earth orbit
S44536	2019-060C	Feitian Maotai	2019 Sep 19 0642:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S44537	2019-060D	GaoMi-1	2019 Sep 19 0642:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S44538	2019-060E	GuoyuanV9	2019 Sep 19 0642:00	ZHUORB	CN	492	512	97.40	In Earth orbit
S44539	2019-060F	Xihaiyan 1	2019 Sep 19 0642:00	ZHUORB	CN	491	511	97.40	In Earth orbit
S44542	2019-061A	Beidou DW 47	2019 Sep 22 2110:04	CNSA	CN	21546	222108	55.00	In Earth orbit
S44543	2019-061B	Beidou DW 48	2019 Sep 22 2110:04	CNSA	CN	21508	21547	55.00	In Earth orbit
S44546	2019-062A	Komotori 8 gouki	2019 Sep 24 1605:05	JAXA	J	350	364	51.65	Deorbited
S44790	1998-067QV	RWASAT-1	2019 Sep 24 1605:05	TOK/RWMTI	J	411	417	51.64	In Earth orbit
S44791	1998-067QW	AQT-D	2019 Sep 24 1605:05	SPABD/TOK	J	411	417	51.64	In Earth orbit
S44792	1998-067QX	NARScube-1	2019 Sep 24 1605:05	EGYSA	EG	413	416	51.64	In Earth orbit
S44547	2019-063A	Yunhai 1-02	2019 Sep 25 0954:34	SAST	CN	767	780	98.59	In Earth orbit
S44550	2019-064A	Soyuz MS-15	2019 Sep 25 1357:43	RKKE	RU	338	376	51.66	Attached to Zvezda
S44552	2019-065A	Kosmos-2541	2019 Sep 26 0746:00	KVR	RU	1615	38737	63.83	In Earth orbit
S44622	2019-066A	Gao Fen 10	2019 Oct 4 1851:05	CNSA	CN	611	622	97.78	In Earth orbit
S44624	2019-067A	Eutelsat 5WB	2019 Oct 9 1017:56	EUTSA	F	30375	64848	3.36	In Earth orbit
S44625	2019-067B	MEV-1	2019 Oct 9 1017:56	NGSD	US	11981	64871	13.35	In Earth orbit
S44628	2019-068A	ICON	2019 Oct 11 0200:00	GSFC	US	579	601	27.00	In Earth orbit
S44634	2019-069A	Pallsade	2019 Oct 17 0122:00	ADIG	US	1207	1224	87.90	In Earth orbit
S44637	2019-070A	Tongxin Jishu Shiyuan 4	2019 Oct 17 1521:04	CASC	CN	35774	35800	0.09	In Earth orbit
S44701	2019-071A	S.S. Alan Bean	2019 Nov 2 1359:47	OSC	US	380	416	51.64	Attached to Unity
T00047	2019-071	Orbital Factory 2	2019 Nov 2 1359:47	UTEF	US	0	0	0.00	Attached to NRCSD No. 17
T00048	2019-071	Argus-02	2019 Nov 2 1359:47	SLU	US	0	0	0.00	Attached to NRCSD No. 17
T00049	2019-071	SOCRATES	2019 Nov 2 1359:47	UMN	US	0	0	0.00	Attached to NRCSD No. 17
T00050	2019-071	RadSat-U	2019 Nov 2 1359:47	MSU	US	0	0	0.00	Attached to NRCSD No. 17
T00051	2019-071	Phoenix	2019 Nov 2 1359:47	ASU	US	0	0	0.00	Attached to NRCSD No. 17
T00052	2019-071	HARP	2019 Nov 2 1359:47	UMBC	US	0	0	0.00	Attached to NRCSD No. 17
T00053	2019-071	HuskySat-1	2019 Nov 2 1359:47	UWA	US	0	0	0.00	Attached to NRCSD-E
T00054	2019-071	SwampSat-2	2019 Nov 2 1359:47	UFL	US	0	0	0.00	Attached to NRCSD-E
T00055	2019-071	Aerocube 14A	2019 Nov 2 1359:47	AERO	US	0	0	0.00	Attached to NRCSD-E
T00056	2019-071	Aerocube 14B	2019 Nov 2 1359:47	AERO	US	0	0	0.00	Attached to NRCSD-E
T00057	2019-071	Aerocube 15A	2019 Nov 2 1359:47	AERO	US	0	0	0.00	Attached to NRCSD-E
T00058	2019-071	Aerocube 15B	2019 Nov 2 1359:47	AERO	US	0	0	0.00	Attached to NRCSD-E
S44703	2019-072A	Gao Fen 7	2019 Nov 3 0322:00	GCDX	CN	487	506	97.49	In Earth orbit
S44704	2019-072B	Sudan Kexue Shiyuan W.	2019 Nov 3 0322:00	ISRA/DFHS	SD	485	505	97.49	In Earth orbit
S44705	2019-072C	Huangpu 1	2019 Nov 3 0322:00	DAWAN/LIZH	CN	485	504	97.49	In Earth orbit
S44706	2019-072D	Tianyi 15	2019 Nov 3 0322:00	CTYK	CN	484	505	97.49	In Earth orbit
S44709	2019-073A	Beidou DW 49	2019 Nov 4 1743:04	CNSA	CN	35674	35886	58.70	In Earth orbit
S44713	2019-074A	Starlink 1007	2019 Nov 11 1456:00	SPXS	US	298	300	53.01	In Earth orbit
S44714	2019-074B	Starlink 1008	2019 Nov 11 1456:00	SPXS	US	296	302	53.01	In Earth orbit
S44715	2019-074C	Starlink 1009	2019 Nov 11 1456:00	SPXS	US	291	307	53.01	In Earth orbit
S44716	2019-074D	Starlink 1010	2019 Nov 11 1456:00	SPXS	US	297	300	53.01	In Earth orbit
S44717	2019-074E	Starlink 1011	2019 Nov 11 1456:00	SPXS	US	297	304	53.01	In Earth orbit
S44718	2019-074F	Starlink 1012	2019 Nov 11 1456:00	SPXS	US	296	301	53.01	In Earth orbit
S44719	2019-074G	Starlink 1013	2019 Nov 11 1456:00	SPXS	US	296	301	53.01	In Earth orbit
S44720	2019-074H	Starlink 1014	2019 Nov 11 1456:00	SPXS	US	295	303	53.01	In Earth orbit

S44721	2019-074J	Starlink 1015	2019 Nov 11 1456:00	SPXS	US	296	302	53.01	In Earth orbit
S44722	2019-074K	Starlink 1016	2019 Nov 11 1456:00	SPXS	US	295	302	53.01	In Earth orbit
S44723	2019-074L	Starlink 1017	2019 Nov 11 1456:00	SPXS	US	296	301	53.01	In Earth orbit
S44724	2019-074M	Starlink 1018	2019 Nov 11 1456:00	SPXS	US	294	301	53.01	In Earth orbit
S44725	2019-074N	Starlink 1020	2019 Nov 11 1456:00	SPXS	US	297	303	53.01	In Earth orbit
S44726	2019-074P	Starlink 1021	2019 Nov 11 1456:00	SPXS	US	296	301	53.01	In Earth orbit
S44727	2019-074Q	Starlink 1022	2019 Nov 11 1456:00	SPXS	US	295	299	53.01	In Earth orbit
S44728	2019-074R	Starlink 1023	2019 Nov 11 1456:00	SPXS	US	297	301	53.01	In Earth orbit
S44729	2019-074S	Starlink 1024	2019 Nov 11 1456:00	SPXS	US	298	302	53.01	In Earth orbit
S44730	2019-074T	Starlink 1025	2019 Nov 11 1456:00	SPXS	US	298	300	53.00	In Earth orbit
S44731	2019-074U	Starlink 1026	2019 Nov 11 1456:00	SPXS	US	296	301	53.01	In Earth orbit
S44732	2019-074V	Starlink 1027	2019 Nov 11 1456:00	SPXS	US	293	304	53.01	In Earth orbit
S44733	2019-074W	Starlink 1028	2019 Nov 11 1456:00	SPXS	US	296	301	53.01	In Earth orbit
S44734	2019-074X	Starlink 1029	2019 Nov 11 1456:00	SPXS	US	299	301	53.01	In Earth orbit
S44735	2019-074Y	Starlink 1030	2019 Nov 11 1456:00	SPXS	US	297	302	53.01	In Earth orbit
S44736	2019-074Z	Starlink 1031	2019 Nov 11 1456:00	SPXS	US	299	301	53.01	In Earth orbit
S44737	2019-074AA	Starlink 1032	2019 Nov 11 1456:00	SPXS	US	296	304	53.01	In Earth orbit
S44738	2019-074AB	Starlink 1033	2019 Nov 11 1456:00	SPXS	US	297	303	53.01	In Earth orbit
S44739	2019-074AC	Starlink 1034	2019 Nov 11 1456:00	SPXS	US	298	302	53.01	In Earth orbit
S44740	2019-074AD	Starlink 1035	2019 Nov 11 1456:00	SPXS	US	299	301	53.01	In Earth orbit
S44741	2019-074AE	Starlink 1036	2019 Nov 11 1456:00	SPXS	US	300	301	53.00	In Earth orbit
S44742	2019-074AF	Starlink 1037	2019 Nov 11 1456:00	SPXS	US	297	302	53.01	In Earth orbit
S44743	2019-074AG	Starlink 1038	2019 Nov 11 1456:00	SPXS	US	299	304	53.01	In Earth orbit
S44744	2019-074AH	Starlink 1039	2019 Nov 11 1456:00	SPXS	US	298	303	53.01	In Earth orbit
S44745	2019-074AJ	Starlink 1040	2019 Nov 11 1456:00	SPXS	US	276	288	53.01	In Earth orbit
S44746	2019-074AK	Starlink 1041	2019 Nov 11 1456:00	SPXS	US	299	304	53.01	In Earth orbit
S44747	2019-074AL	Starlink 1042	2019 Nov 11 1456:00	SPXS	US	295	300	53.01	In Earth orbit
S44748	2019-074AM	Starlink 1043	2019 Nov 11 1456:00	SPXS	US	298	302	53.00	In Earth orbit
S44749	2019-074AN	Starlink 1044	2019 Nov 11 1456:00	SPXS	US	283	296	53.00	In Earth orbit
S44750	2019-074AP	Starlink 1045	2019 Nov 11 1456:00	SPXS	US	298	303	53.01	In Earth orbit
S44751	2019-074AQ	Starlink 1046	2019 Nov 11 1456:00	SPXS	US	299	304	53.01	In Earth orbit
S44752	2019-074AR	Starlink 1047	2019 Nov 11 1456:00	SPXS	US	297	304	53.01	In Earth orbit
S44753	2019-074AS	Starlink 1048	2019 Nov 11 1456:00	SPXS	US	294	304	53.01	In Earth orbit
S44754	2019-074AT	Starlink 1049	2019 Nov 11 1456:00	SPXS	US	298	301	53.01	In Earth orbit
S44755	2019-074AU	Starlink 1050	2019 Nov 11 1456:00	SPXS	US	294	299	53.01	In Earth orbit
S44756	2019-074AV	Starlink 1051	2019 Nov 11 1456:00	SPXS	US	298	300	53.00	In Earth orbit
S44757	2019-074AW	Starlink 1052	2019 Nov 11 1456:00	SPXS	US	299	301	53.00	In Earth orbit
S44758	2019-074AX	Starlink 1053	2019 Nov 11 1456:00	SPXS	US	295	302	53.01	In Earth orbit
S44759	2019-074AY	Starlink 1054	2019 Nov 11 1456:00	SPXS	US	295	301	53.01	In Earth orbit
S44760	2019-074AZ	Starlink 1055	2019 Nov 11 1456:00	SPXS	US	294	299	53.01	In Earth orbit
S44761	2019-074BA	Starlink 1056	2019 Nov 11 1456:00	SPXS	US	295	300	53.01	In Earth orbit
S44762	2019-074BB	Starlink 1057	2019 Nov 11 1456:00	SPXS	US	297	298	53.01	In Earth orbit
S44763	2019-074BC	Starlink 1058	2019 Nov 11 1456:00	SPXS	US	293	306	53.01	In Earth orbit
S44764	2019-074BD	Starlink 1059	2019 Nov 11 1456:00	SPXS	US	297	302	53.01	In Earth orbit
S44765	2019-074BE	Starlink 1060	2019 Nov 11 1456:00	SPXS	US	297	302	53.01	In Earth orbit
S44766	2019-074BF	Starlink 1061	2019 Nov 11 1456:00	SPXS	US	298	300	53.00	In Earth orbit
S44767	2019-074BG	Starlink 1062	2019 Nov 11 1456:00	SPXS	US	296	300	53.01	In Earth orbit
S44768	2019-074BH	Starlink 1063	2019 Nov 11 1456:00	SPXS	US	297	301	53.00	In Earth orbit
S44769	2019-074BJ	Starlink 1064	2019 Nov 11 1456:00	SPXS	US	297	305	53.01	In Earth orbit
S44770	2019-074BK	Starlink 1065	2019 Nov 11 1456:00	SPXS	US	299	301	53.00	In Earth orbit
S44771	2019-074BL	Starlink 1067	2019 Nov 11 1456:00	SPXS	US	296	302	53.01	In Earth orbit
S44772	2019-074BM	Starlink 1068	2019 Nov 11 1456:00	SPXS	US	297	302	53.01	In Earth orbit
S44773	2019-0775A	Jilin-1 Gaofen 02A	2019 Nov 13 0340:00	CGSTL	CN	531	546	97.54	In Earth orbit
S44779	2019-076A	Ningxia-1 01 xing	2019 Nov 13 0635:00	NINGX/CASC	CN	887	898	45.01	In Earth orbit
S44780	2019-076B	Ningxia-1 02 xing	2019 Nov 13 0635:00	NINGX/CASC	CN	886	898	45.01	In Earth orbit
S44781	2019-076C	Ningxia-1 03 xing	2019 Nov 13 0635:00	NINGX/CASC	CN	886	898	45.01	In Earth orbit
S44782	2019-076D	Ningxia-1 04 xing	2019 Nov 13 0635:00	NINGX/CASC	CN	884	898	45.01	In Earth orbit
S44783	2019-076E	Ningxia-1 05 xing	2019 Nov 13 0635:00	NINGX/CASC	CN	884	897	45.01	In Earth orbit
S44785	2019-077A	KL-Alpha-A	2019 Nov 17 1000:00	KLEO	D	1044	1057	88.91	In Earth orbit
S44786	2019-077B	KL-Alpha-B	2019 Nov 17 1000:00	KLEO	D	1045	1431	88.91	In Earth orbit
S44793	2019-078A	Beidou DW 50	2019 Nov 23 0055:00	CNSA	CN	21542	22194	54.99	In Earth orbit
S44794	2019-078B	Beidou DW 51	2019 Nov 23 0055:00	CNSA	CN	21537	22192	54.99	In Earth orbit
S44797	2019-079A	Kosmos-2542	2019 Nov 25 1752:00	TSVS	RU	368	857	97.90	In Earth orbit
S44835	2019-079D	Kosmos-2543	2019 Nov 25 1752:00	TSKHM	RU	367	857	97.90	In Earth orbit
S44800	2019-080A	Tiba 1	2019 Nov 26 2123:00	EGYSA	EG	35732	35790	0.07	In Earth orbit
S44801	2019-080B	Inmarsat GX5	2019 Nov 26 2123:00	INMRL	UK	35672	35686	0.08	In Earth orbit

S44804	2019-081A	Cartosat-3	2019 Nov 27 03:58:00	ISRO	IN	500	519	97.53	In Earth orbit
S44806	2019-081C	Meshbed	2019 Nov 27 03:58:00	ANSP	US	499	517	97.52	In Earth orbit
S44807	2019-081D	Flock 4p-9	2019 Nov 27 03:58:00	PLABS	US	499	517	97.52	In Earth orbit
S44808	2019-081E	Flock 4p-10	2019 Nov 27 03:58:00	PLABS	US	499	516	97.52	In Earth orbit
S44809	2019-081F	Flock 4p-11	2019 Nov 27 03:58:00	PLABS	US	499	516	97.52	In Earth orbit
S44810	2019-081G	Flock 4p-12	2019 Nov 27 03:58:00	PLABS	US	499	516	97.52	In Earth orbit
S44811	2019-081H	Flock 4p-4	2019 Nov 27 03:58:00	PLABS	US	499	515	97.52	In Earth orbit
S44812	2019-081J	Flock 4p-3	2019 Nov 27 03:58:00	PLABS	US	499	515	97.52	In Earth orbit
S44813	2019-081K	Flock 4p-2	2019 Nov 27 03:58:00	PLABS	US	507	522	97.52	In Earth orbit
S44814	2019-081L	Flock 4p-1	2019 Nov 27 03:58:00	PLABS	US	498	514	97.52	In Earth orbit
S44815	2019-081M	Flock 4p-8	2019 Nov 27 03:58:00	PLABS	US	499	516	97.52	In Earth orbit
S44816	2019-081N	Flock 4p-7	2019 Nov 27 03:58:00	PLABS	US	499	514	97.52	In Earth orbit
S44817	2019-081P	Flock 4p-6	2019 Nov 27 03:58:00	PLABS	US	499	513	97.52	In Earth orbit
S44818	2019-081Q	Flock 4p-5	2019 Nov 27 03:58:00	PLABS	US	499	513	97.52	In Earth orbit
S44819	2019-082A	Gao Fen 12	2019 Nov 27 23:52:00	ZZB	CN	612	616	97.93	In Earth orbit
S44821	2019-083A	Dragon CRS-19	2019 Dec 5 17:29:24	SPX	US	200	379	51.65	Attached to Harmony
T00001	1998-067	CIRiS	2019 Dec 5 17:29:24	USU	US	0	0	0.00	Attached to NRCSD No. 18
T00002	1998-067	CryoCube 1	2019 Dec 5 17:29:24	KSC	US	0	0	0.00	Attached to NRCSD No. 18
T00003	1998-067	QARMAN	2019 Dec 5 17:29:24	VKI	B	0	0	0.00	Attached to NRCSD No. 18
T00004	1998-067	SORTIE	2019 Dec 5 17:29:24	ASTRA	US	0	0	0.00	Attached to NRCSD No. 18
T00005	1998-067	AztechSat 1	2019 Dec 5 17:29:24	UPAEP	MX	0	0	0.00	Attached to NRCSD No. 18
T00006	1998-067	EdgeCube	2019 Dec 5 17:29:24	SOSU	US	0	0	0.00	Attached to NRCSD No. 18
T00007	1998-067	MakerSat-1	2019 Dec 5 17:29:24	NWNAZ	US	0	0	0.00	Attached to NRCSD No. 18
S44824	2019-084A	ALE-2	2019 Dec 6 08:18:00	ALE	J	397	414	97.01	In Earth orbit
S44827	2019-084D	NOOR 1A	2019 Dec 6 08:18:00	STARA	US	348	403	97.00	In Earth orbit
S44828	2019-084E	NOOR 1B	2019 Dec 6 08:18:00	STARA	US	348	403	97.00	In Earth orbit
S44829	2019-084F	Fossasat-1	2019 Dec 6 08:18:00	FOSSA	E	349	399	97.01	In Earth orbit
S44830	2019-084H	ATL-1	2019 Dec 6 08:18:00	ATLH	HU	347	400	97.00	In Earth orbit
S44831	2019-084G	TRSI-Sat	2019 Dec 6 08:18:00	TRSI	D	347	401	97.00	In Earth orbit
S44832	2019-084J	BME	2019 Dec 6 08:18:00	BME	HU	347	401	97.00	In Earth orbit
S44833	2019-085A	SMOG-P	2019 Dec 6 09:34:11	RKKE	RU	312	328	51.64	Attached to Pirs
S44836	2019-086A	Jilin-1 Gaofen 02B	2019 Dec 7 02:55:46	CGSTL	CN	186	755	97.52	In Earth orbit
S44838	2019-087A	HEAD-2A	2019 Dec 7 08:52:00	HEAD	CN	495	511	97.37	In Earth orbit
S44839	2019-087B	HEAD-2B	2019 Dec 7 08:52:00	HEAD	CN	495	511	97.36	In Earth orbit
S44840	2019-087C	Tianqi-4A	2019 Dec 7 08:52:00	GUOG	CN	495	509	97.38	In Earth orbit
S44841	2019-087D	Tianqi-4B	2019 Dec 7 08:52:00	GUOG	CN	495	508	97.37	In Earth orbit
S44842	2019-087E	Tianyi-16	2019 Dec 7 08:52:00	CTYK	CN	494	509	97.36	In Earth orbit
S44843	2019-087F	Tianyi-17	2019 Dec 7 08:52:00	CTYK	CN	494	509	97.37	In Earth orbit
S44850	2019-088A	Kosmos-2544	2019 Dec 11 08:54:00	KVR/IACG	RU	18982	19143	64.77	In Earth orbit
S44852	2019-089A	RISAT-2BR1	2019 Dec 11 09:55:00	ISRO	IN	563	573	36.96	In Earth orbit
S44853	2019-089B	Izanagi	2019 Dec 11 09:55:00	QPS	J	564	574	36.97	In Earth orbit
S44854	2019-089C	Duchifat-3	2019 Dec 11 09:55:00	HSCIL	IL	567	577	36.96	In Earth orbit
S44855	2019-089D	Tyvak-0129	2019 Dec 11 09:55:00	TYVAK	US	566	575	36.97	In Earth orbit
S44856	2019-089E	NANOVA	2019 Dec 11 09:55:00	ELBIT	IL	563	576	36.97	In Earth orbit
S44857	2019-089F	HOPSAT	2019 Dec 11 09:55:00	HERA	US	568	578	36.97	In Earth orbit
S44858	2019-089G	Lemur-2	2019 Dec 11 09:55:00	SPIRE	US	568	579	36.96	In Earth orbit
S44859	2019-089H	Lemur-2	2019 Dec 11 09:55:00	SPIRE	US	568	576	36.97	In Earth orbit
S44860	2019-089J	Lemur-2	2019 Dec 11 09:55:00	SPIRE	US	566	576	36.97	In Earth orbit
S44861	2019-089K	Lemur-2	2019 Dec 11 09:55:00	SPIRE	US	566	576	36.97	In Earth orbit
S44864	2019-089Q	Beidou DW 52	2019 Dec 16 07:22:00	CNSA	CN	21521	21876	55.02	In Earth orbit
S44865	2019-090B	Beidou DW 53	2019 Dec 16 07:22:00	CNSA	CN	21532	22193	55.02	In Earth orbit
S44868	2019-091A	JCSAT 18/Kacific 1	2019 Dec 17 00:10:00	SKPJ/KACBS	J	273	20322	26.91	In Earth orbit
S44873	2019-092A	CSG 1	2019 Dec 18 08:54:00	ASI/MDDI	I	621	622	97.82	In Earth orbit
S44874	2019-092B	CHEOPS	2019 Dec 18 08:54:00	ESA	I-ESA	697	708	98.23	In Earth orbit
S44876	2019-092D	ANGELS	2019 Dec 18 08:54:00	CNES	F	509	524	97.45	In Earth orbit
S44877	2019-092E	EyeSat	2019 Dec 18 08:54:00	CNES	F	507	524	97.45	In Earth orbit
S44878	2019-092F	OPS-SAT	2019 Dec 18 08:54:00	ESA	I-ESA	511	529	97.46	In Earth orbit
S44879	2019-093A	CBERS 4A	2019 Dec 20 03:22:29	ZZWYZ/INPE	CN	615	635	97.98	In Earth orbit
S44880	2019-093B	ETRSS-1	2019 Dec 20 03:22:29	ESSTI	ET	615	634	97.98	In Earth orbit

S44881	2019-093C	Tianqin-1	2019 Dec 20 0322:29	ZHONG	CN	614	634	97.98	In Earth orbit
S44882	2019-093D	Shuntian	2019 Dec 20 0322:29	DEYA/NUDTC	CN	613	632	97.98	In Earth orbit
S44883	2019-093E	BDSAGR-1	2019 Dec 20 0322:29	BDSAGR/XZTIA	CN	613	634	97.98	In Earth orbit
S44884	2019-093F	Yuheng	2019 Dec 20 0322:29	DEYA/NUDTC	CN	614	635	97.98	In Earth orbit
S44885	2019-093G	FloripaSat	2019 Dec 20 0322:29	UFSC	BR	614	635	97.98	In Earth orbit
S44886	2019-093H	Yizheng 1	2019 Dec 20 0322:29	ZXKJ	CN	612	631	97.98	In Earth orbit
S44887	2019-093J	Xingshidai 8	2019 Dec 20 0322:29	GUOX	CN	612	631	97.98	In Earth orbit
S44900	2019-094A	Starliner OFT	2019 Dec 20 1136:43	BOKSC	US	182	220	51.59	Landed
S44903	2019-095A	Elektro-L No. 3	2019 Dec 24 1203:02	RGMS/NPOL	RU	35371	35571	0.57	In Earth orbit
S44905	2019-096A	Gonets-M No. 24	2019 Dec 26 2311:58	KVR	RU	1498	1505	82.52	In Earth orbit
S44906	2019-096B	Gonets-M No. 25	2019 Dec 26 2311:58	KVR	RU	1499	1507	82.53	In Earth orbit
S44907	2019-096C	Gonets-M No. 26	2019 Dec 26 2311:58	KVR	RU	1500	1508	82.52	In Earth orbit
S44908	2019-096D	Blits-M No. 1	2019 Dec 26 2311:58	NIIPP	RU	1498	1507	82.53	In Earth orbit
S44910	2019-097A	Shi Jian 20	2019 Dec 27 1245:00	CHISAE/CASST	CN	178	67674	19.40	In Earth orbit
Pay/loads not included in annual statistics									
A09405	2019-022	Kenobi	2019 Apr 17 2046:07	JSC	US	408	410	51.65	Reentered Att to NRCSD-
S44376	2019-036AA	Oculus-ASR Sphere 1	2019 Jun 25 0630:00	MTU	US	305	820	28.51	E NG-11 Reentered
T00010	2019-036AA	Oculus-ASR Sphere 2	2019 Jun 25 0630:00	MTU	US	0	0	0.00	Reentered
A09486	2019-036K	TEPCE 2	2019 Jun 25 0630:00	NRL	US	297	848	28.51	Attached to Oculus-ASR
A09463	2019-043	Xingshidai-6	2019 Jul 25 0500:00	GUOX	CN	275	292	42.73	Attached to STP-2 ESPA 3 Reentered Att to Shuang Quxian 1 St4
A09464	2019-043	Hecate-1	2019 Jul 25 0500:00	CCTV	CN	275	292	42.73	Reentered Att to Shuang Quxian 1 St4
A09465	2019-043	Cube-X1	2019 Jul 25 0500:00	XCK	CN	275	292	42.73	Reentered Att to Shuang Quxian 1 St4

Appendix 2d: Satellite payloads deployed in 2019

CATID	LAUNCH ID	Name	Deploy date UTC	Owner	Country	Perigee	Apogee	Inc	Status
S44044	2018-092E	CHEFSat 2	2019 Feb 13 12:00:00	NRL	US	454	470	51.64	In Earth orbit
S44045	2018-092F	MySat-1	2019 Feb 13 12:00:00	MASDAR	UAE	454	471	51.64	In Earth orbit
S44046	2018-092G	KickSat-2	2019 Feb 13 22:45:00	ARC	US	297	305	51.64	Reentered
A09283	2018-092H	Sprite (00,01)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09284	2018-092J	Sprite (02,03)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09285	2018-092K	Sprite (04,05)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09286	2018-092L	Sprite (06,07)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09287	2018-092M	Sprite (08,09)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09288	2018-092N	Sprite (10,11)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09289	2018-092P	Sprite (12,13)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09290	2018-092Q	Sprite (14,15)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09291	2018-092R	Sprite (16,17)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09292	2018-092S	Sprite (18,19)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09293	2018-092T	Sprite (20,21)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09294	2018-092U	Sprite (22,23)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09295	2018-092V	Sprite (24,25)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09296	2018-092W	Sprite (26,27)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09297	2018-092X	Sprite (28,29)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09298	2018-092Y	Sprite (30,31)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09299	2018-092Z	Sprite (32,33)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09300	2018-092AA	Sprite (34,35)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09301	2018-092AB	Sprite (36,37)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09302	2018-092AC	Sprite (38,39)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09303	2018-092AD	Sprite (40,41)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09304	2018-092AE	Sprite (42,43)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09305	2018-092AF	Sprite (44,45)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09306	2018-092AG	Sprite (46,47)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09307	2018-092AH	Sprite (48,49)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09308	2018-092AJ	Sprite (50,51)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09309	2018-092AK	Sprite (52,53)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09310	2018-092AL	Sprite (54,55)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09311	2018-092AM	Sprite (56,57)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09312	2018-092AN	Sprite (58,59)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09313	2018-092AP	Sprite (60,61)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09314	2018-092AQ	Sprite (62,63)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09315	2018-092AR	Sprite (64,65)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09316	2018-092AS	Sprite (66,67)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09317	2018-092AT	Sprite (68,69)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09318	2018-092AU	Sprite (70,71)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09319	2018-092AV	Sprite (72,73)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09320	2018-092AW	Sprite (74,75)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09321	2018-092AX	Sprite (76,77)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09322	2018-092AY	Sprite (78,79)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09323	2018-092AZ	Sprite (80,81)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09324	2018-092BA	Sprite (82,83)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09325	2018-092BB	Sprite (84,85)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09326	2018-092BC	Sprite (86,87)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09327	2018-092BD	Sprite (88,89)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09328	2018-092BE	Sprite (90,91)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09329	2018-092BF	Sprite (92,93)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09330	2018-092BG	Sprite (94,95)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09331	2018-092BH	Sprite (96,97)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09332	2018-092BJ	Sprite (98,99)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09333	2018-092BK	Sprite (100,101)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09334	2018-092BL	Sprite (102,103)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09335	2018-092BLM	Sprite (104,105)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09336	2018-092BN	Sprite (106,107)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09337	2018-092BP	Sprite (108,109)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09338	2018-092BQ	Sprite (110,111)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09339	2018-092BR	Sprite (112,113)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered
A09340	2018-092BS	Sprite (114,115)	2019 Mar 19 03:40:00	STAN/ARC	US	260	273	51.63	Reentered

A09341	2018-092BT	Sprite (116,117)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09342	2018-092BU	Sprite (118,119)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09343	2018-092BV	Sprite (120,121)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09344	2018-092BW	Sprite (122,123)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09345	2018-092BX	Sprite (124,125)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09346	2018-092BY	Sprite (126,127)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09347	2018-092BZ	Sprite (128,129)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09348	2018-092CA	Sprite (130,131)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09349	2018-092CB	Sprite (132,133)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09350	2018-092CC	Sprite (134,135)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09351	2018-092CD	Sprite (136,137)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09352	2018-092CE	Sprite (138,139)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09353	2018-092CF	Sprite (140,141)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09354	2018-092CG	Sprite (142,143)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09355	2018-092CH	Sprite (144,145)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09356	2018-092CJ	Sprite (146,147)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09357	2018-092CK	Sprite (148,149)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09358	2018-092CL	Sprite (150,151)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09359	2018-092CM	Sprite (152,153)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09360	2018-092CN	Sprite (154,155)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09361	2018-092CP	Sprite (156,157)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09362	2018-092CQ	Sprite (158,159)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09363	2018-092CR	Sprite (160,161)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09364	2018-092CS	Sprite (162,163)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09365	2018-092CT	Sprite (164,165)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09366	2018-092CU	Sprite (166,167)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09367	2018-092CV	Sprite (168,169)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09368	2018-092CW	Sprite (170,171)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09369	2018-092CX	Sprite (172,173)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09370	2018-092CY	Sprite (174,175)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09371	2018-092CZ	Sprite (176,177)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09372	2018-092DA	Sprite (178,179)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09373	2018-092DB	Sprite (180,181)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09374	2018-092DC	Sprite (182,183)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09375	2018-092DD	Sprite (184,185)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09376	2018-092DE	Sprite (186,187)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09377	2018-092DF	Sprite (188,189)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09378	2018-092DG	Sprite (190,191)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09379	2018-092DH	Sprite (192,193)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09380	2018-092DJ	Sprite (194,195)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09381	2018-092DK	Sprite (196,197)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09382	2018-092DL	Sprite (198,199)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09383	2018-092DM	Sprite (200,201)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09384	2018-092DN	Sprite (202,203)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09385	2018-092DP	Sprite (204,205)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09386	2018-092DQ	Sprite (206,207)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
A09435	2018-092DR	Sprite (208,209)	2019 Mar 19 03:40:00	STAN//ARC	US	260	273	51.63	Reentered
S44029	1998-067PY	CAT-2	2019 Jan 31 10:25:00	APL	US	403	408	51.64	In Earth orbit
S44030	1998-067PW	Delphini 1	2019 Jan 31 12:00:00	AARH	DK	402	408	51.64	In Earth orbit
S44031	1998-067PX	UNITE	2019 Jan 31 13:40:00	USIN	US	403	407	51.64	In Earth orbit
S44032	1998-067PY	TechEdSat-8	2019 Jan 31 16:45:00	ARC/SJSU	US	402	409	51.64	In Earth orbit
S44033	1998-067PZ	CAT-1	2019 Jan 31 10:25:00	APL	US	402	409	51.64	In Earth orbit
S44041	2018-092C	Quantum Radar 1	2019 Feb 9 00:00:00	HYPGG	US	455	459	51.64	In Earth orbit
S44042	2018-092D	Quantum Radar 2	2019 Feb 9 00:00:00	HYPGG	US	457	457	51.64	In Earth orbit
S43920	2019-001A	Zhongxing 2D	2019 Jan 10 17:36:00	ZZB	CN	35780	35795	0.06	In Earth orbit
S43922	2019-002A	Iridium Next SV180	2019 Jan 11 16:30:00	IRID	US	611	626	86.68	In Earth orbit
S43923	2019-002B	Iridium Next SV176	2019 Jan 11 16:30:00	IRID	US	611	626	86.68	In Earth orbit
S43924	2019-002C	Iridium Next SV168	2019 Jan 11 16:30:00	IRID	US	608	626	86.68	In Earth orbit
S43925	2019-002D	Iridium Next SV173	2019 Jan 11 16:30:00	IRID	US	608	626	86.68	In Earth orbit
S43926	2019-002E	Iridium Next SV169	2019 Jan 11 16:30:00	IRID	US	609	626	86.68	In Earth orbit
S43927	2019-002F	Iridium Next SV172	2019 Jan 11 16:30:00	IRID	US	608	626	86.68	In Earth orbit
S43928	2019-002G	Iridium Next SV175	2019 Jan 11 16:30:00	IRID	US	611	625	86.68	In Earth orbit
S43929	2019-002H	Iridium Next SV171	2019 Jan 11 16:30:00	IRID	US	609	626	86.68	In Earth orbit
S43930	2019-002J	Iridium Next SV170	2019 Jan 11 16:30:00	IRID	US	610	626	86.68	In Earth orbit
S43931	2019-002K	Iridium Next SV167	2019 Jan 11 16:30:00	IRID	US	612	626	86.68	In Earth orbit
S43932	2019-003A	RAPIS-1	2019 Jan 18 01:42:00	JAXA	J	498	510	97.30	In Earth orbit

S43933	2019-003B	Fuji-OSCAR-98	2019 Jan 18 01:57:00	TIT	J	488	512	97.30	In Earth orbit
S43934	2019-003C	RiseSat	2019 Jan 18 01:53:00	TOHO	J	490	513	97.30	In Earth orbit
S43935	2019-003D	MicroDragon	2019 Jan 18 01:55:00	VNSC	VN	490	511	97.30	In Earth orbit
S43937	2019-003F	Fuji-OSCAR-99	2019 Jan 18 01:58:00	NIHON	J	480	512	97.30	In Earth orbit
S43938	2019-003G	ALE-1	2019 Jan 18 02:00:00	ALE	J	479	513	97.31	In Earth orbit
S43940	2019-003J	Aoba-VELOX IV	2019 Jan 18 01:58:00	KYUT	J	481	512	97.31	In Earth orbit
S43941	2019-004A	USA 290	2019 Jan 19 04:28:00	NROC	US	395	419	73.57	In Earth orbit
S43942	2019-005A	Lingque 1 A xing	2019 Jan 21 05:49:00	LINGZ	CN	516	539	97.51	In Earth orbit
S43943	2019-005B	Jilin Lineco 1	2019 Jan 21 05:49:00	CGSTL	CN	521	539	97.51	In Earth orbit
S43944	2019-005C	Qingfeng Zhi Xing	2019 Jan 21 05:49:00	CTYK/QTD	CN	523	539	97.51	In Earth orbit
S43946	2019-005E	Wenchang Chaosuan 1	2019 Jan 21 05:49:00	HXKJ/CGSTL	CN	521	539	97.51	In Earth orbit
S43947	2019-006A	Microsat-R	2019 Jan 24 18:20:00	DRDO	IN	268	289	96.60	Reentered
S43948	2019-006B	KalamSat	2019 Jan 24 18:19:00	SKI	IN	446	451	98.80	Attached to PSLV-C44 PS4
S44034	2019-007A	SGS-1	2019 Feb 5 21:28:00	KACST/HELARS	SA	13009	35545	1.34	In Earth orbit
S44035	2019-007B	GSAT-31	2019 Feb 5 21:43:00	ISRO	IN	35667	35776	0.15	In Earth orbit
S44047	2019-008A	MisrSat A	2019 Feb 21 18:05:00	NARSS	EG	652	656	98.02	In Earth orbit
S44048	2019-009A	Nusantara Satu	2019 Feb 22 02:29:00	PSN	ID	28894	68865	3.00	In Earth orbit
S44049	2019-009B	B'reshit	2019 Feb 22 02:18:00	SPAIL	IL	668	69021	27.01	Deep Space
S44065	2019-009D	S5	2019 Mar 4 18:00:00	AFEL	US	36043	36054	0.08	In Earth orbit
S44057	2019-010A	NanuqSat	2019 Feb 27 22:59:00	ONEWEB	UK	987	1009	87.76	In Earth orbit
S44058	2019-010B	ChusigSat	2019 Feb 27 22:59:00	ONEWEB	UK	988	1010	87.77	In Earth orbit
S44059	2019-010C	IcyrekezoSat	2019 Feb 27 22:59:00	ONEWEB	UK	987	1007	87.77	In Earth orbit
S44060	2019-010D	ChingheziSat	2019 Feb 27 22:59:00	ONEWEB	UK	987	1008	87.77	In Earth orbit
S44061	2019-010E	SherpaSat	2019 Feb 27 22:40:00	ONEWEB	UK	985	1010	87.76	In Earth orbit
S44062	2019-010F	LempiraSat	2019 Feb 27 22:40:00	ONEWEB	UK	988	1004	87.77	In Earth orbit
S44063	2019-011A	Crew Dragon DM-1	2019 Mar 2 08:00:00	SPX	US	224	369	51.64	Landed
S44067	2019-012A	Zhongxing 6C	2019 Mar 9 16:53:00	ZZB	CN	35771	35801	0.12	In Earth orbit
S44069	2019-013A	Soyuz MS-12	2019 Mar 14 19:22:00	RKKE	RU	245	299	51.64	Landed
S44071	2019-014A	WGS SV-10	2019 Mar 16 01:02:00	USAF	US	22416	45382	1.05	In Earth orbit
S44072	2019-015A	PRISMA	2019 Mar 22 02:44:00	ASI	I	616	619	97.90	In Earth orbit
S44073	2019-016A	R3D2	2019 Mar 29 00:20:00	DARPA	US	422	437	39.52	In Earth orbit
S44076	2019-017A	Tian Lian 2-01	2019 Mar 31 16:16:00	ZZB	CN	193	35812	27.13	In Earth orbit
S44078	2019-018A	EMISAT	2019 Apr 1 04:14:00	ISRO	IN	735	759	98.39	In Earth orbit
S44079	2019-018B	Flock 4a-1	2019 Apr 1 05:50:00	PLABS	US	494	510	97.47	In Earth orbit
S44080	2019-018C	Flock 4a-2	2019 Apr 1 05:50:00	PLABS	US	494	510	97.47	In Earth orbit
S44081	2019-018D	Flock 4a-3	2019 Apr 1 05:50:00	PLABS	US	494	510	97.47	In Earth orbit
S44082	2019-018E	Flock 4a-4	2019 Apr 1 05:50:00	PLABS	US	493	510	97.47	In Earth orbit
S44083	2019-018F	Astrocast 0.2	2019 Apr 1 05:47:00	ACAST	CH	493	510	97.48	In Earth orbit
S44084	2019-018G	Lemur-2-JohanLoran	2019 Apr 1 05:52:00	SPIRE	US	493	510	97.47	In Earth orbit
S44085	2019-018H	Lemur-2-Beaudacious	2019 Apr 1 05:52:00	SPIRE	US	493	510	97.47	In Earth orbit
S44086	2019-018J	Lemur-2-Elham	2019 Apr 1 05:52:00	SPIRE	US	493	510	97.47	In Earth orbit
S44087	2019-018K	Lemur-2-Victor-Andrew	2019 Apr 1 05:52:00	SPIRE	US	493	509	97.47	In Earth orbit
S44088	2019-018L	Flock 4a-17	2019 Apr 1 05:50:00	PLABS	US	492	509	97.47	In Earth orbit
S44089	2019-018M	Flock 4a-18	2019 Apr 1 05:50:00	PLABS	US	492	509	97.47	In Earth orbit
S44090	2019-018N	Flock 4a-19	2019 Apr 1 05:50:00	PLABS	US	492	509	97.47	In Earth orbit
S44091	2019-018P	Flock 4a-20	2019 Apr 1 05:50:00	PLABS	US	492	509	97.47	In Earth orbit
S44092	2019-018Q	Flock 4a-8	2019 Apr 1 05:50:00	PLABS	US	493	507	97.47	In Earth orbit
S44093	2019-018R	Flock 4a-7	2019 Apr 1 05:50:00	PLABS	US	493	507	97.47	In Earth orbit
S44094	2019-018S	Flock 4a-6	2019 Apr 1 05:50:00	PLABS	US	493	507	97.47	In Earth orbit
S44095	2019-018T	Flock 4a-5	2019 Apr 1 05:50:00	PLABS	US	493	506	97.47	In Earth orbit
S44096	2019-018U	Flock 4a-11	2019 Apr 1 05:50:00	PLABS	US	493	506	97.47	In Earth orbit
S44097	2019-018V	Flock 4a-10	2019 Apr 1 05:50:00	PLABS	US	493	506	97.47	In Earth orbit
S44098	2019-018W	Flock 4a-9	2019 Apr 1 05:50:00	PLABS	US	492	506	97.47	In Earth orbit
S44099	2019-018X	Flock 4a-16	2019 Apr 1 05:50:00	PLABS	US	492	506	97.47	In Earth orbit
S44100	2019-018Y	Flock 4a-15	2019 Apr 1 05:50:00	PLABS	US	492	506	97.47	In Earth orbit
S44101	2019-018Z	Flock 4a-14	2019 Apr 1 05:50:00	PLABS	US	492	506	97.47	In Earth orbit
S44102	2019-018AA	Flock 4a-13	2019 Apr 1 05:50:00	PLABS	US	491	506	97.46	In Earth orbit
S44103	2019-018AB	Danu Pathfinder 1	2019 Apr 1 05:47:00	AISTS	E	490	506	97.47	In Earth orbit
S44104	2019-018AC	AISAT-1/APRS/ARIS	2019 Apr 1 04:13:00	ISRO	IN	434	515	97.52	Attached to PSLV-C45 PS4
S44105	2019-018AD	BlueWalker 1	2019 Apr 1 05:47:00	NANAV/ASTS	LT	435	519	97.52	In Earth orbit
S44108	2019-018AE	Flock 4a-12	2019 Apr 1 05:50:00	PLABS	US	493	506	97.46	In Earth orbit
S44109	2019-018AF	M6P	2019 Apr 1 05:47:00	NANAV	LT	434	514	97.53	In Earth orbit
S44110	2019-019A	Progress MS-11	2019 Apr 4 11:10:00	RKKE	RU	186	222	51.65	Deorbited
S44112	2019-020A	O3b FM20	2019 Apr 4 19:26:00	O3B	UK	7809	7839	0.04	In Earth orbit
S44113	2019-020B	O3b FM19	2019 Apr 4 19:26:00	O3B	UK	7818	7839	0.04	In Earth orbit
S44114	2019-020C	O3b FM17	2019 Apr 4 19:04:00	O3B	UK	7829	7839	0.04	In Earth orbit

S44115	2019-020D	O3b FM18	2019 Apr 4 1904:00	O3B	UK	7838	7840	0.04	In Earth orbit
S44186	2019-021A	Arabsat 6A	2019 Apr 11 2309:00	ARAB	SA	2400	90079	18.05	In Earth orbit
S44188	2019-022A	SS Roger Chaffee	2019 Apr 17 2055:00	OSC	US	400	403	51.63	Deorbited
S44329	1998-067QF	Raavana-1	2019 Jun 17 1015:00	ACCIMT	LK	405	416	51.64	In Earth orbit
S44330	1998-067QG	Uguisu	2019 Jun 17 1015:00	KYUT	J	405	416	51.64	In Earth orbit
S44331	1998-067QE	Nepalisat-1	2019 Jun 17 1015:00	NAST	NP	405	416	51.65	In Earth orbit
S44332	1998-067QH	SpooQy-1	2019 Jun 17 1020:00	NUS	SG	405	415	51.64	In Earth orbit
S44385	1998-067QK	IOD-1 GEMS	2019 Jul 3 1015:00	CATAP/OMSUK	UK	409	414	51.65	In Earth orbit
S44426	1998-067QL	Swiatowid	2019 Jul 3 1150:00	SATRV	PL	409	415	51.64	In Earth orbit
S44427	1998-067QM	KRAKsat	2019 Jul 3 1150:00	KRAK/AGHU	PL	408	413	51.64	In Earth orbit
S44428	1998-067QN	Aeternitas	2019 Jul 3 1450:00	ODU	US	409	415	51.64	In Earth orbit
S44429	1998-067QP	EntrySat	2019 Jul 3 1625:00	ISAE/ONERA	F	409	414	51.64	In Earth orbit
S44430	1998-067QQ	Ceres	2019 Jul 3 1450:00	VAP	US	409	413	51.64	In Earth orbit
S44431	1998-067QR	Libertas	2019 Jul 3 1450:00	UVA	US	409	413	51.64	In Earth orbit
S44484	2019-022C	Dougsat	2019 Aug 7 1300:00	AERO	US	471	484	51.64	In Earth orbit
S44485	2019-022D	Jimsat	2019 Aug 7 1300:00	AERO	US	469	481	51.65	In Earth orbit
S44516	2019-022J	Venturini	2019 Aug 29 0000:00	AERO	US	471	484	51.64	In Earth orbit
A09407	2019-022C	SASSI2	2019 Apr 17 2059:00	UIUC/PURDUE	US	201	291	51.65	Reentered
A09408	2019-022D	ThinSat-1A	2019 Apr 17 2059:00	VCSFA	US	201	291	51.65	Reentered
A09409	2019-022E	ThinSat-1B	2019 Apr 17 2059:00	VCSFA	US	201	291	51.65	Reentered
A09410	2019-022F	ThinSat-1C	2019 Apr 17 2059:00	VCSFA	US	201	291	51.65	Reentered
A09411	2019-022G	ThinSat-1D	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09412	2019-022H	ThinSat-1E	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09413	2019-022J	ThinSat-1F	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09414	2019-022K	ThinSat-1G	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09415	2019-022L	ThinSat-1H	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09416	2019-022M	ThinSat-1I	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09417	2019-022N	ThinSat-1J	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09418	2019-022P	ThinSat-1K	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
A09419	2019-022Q	ThinSat-1L	2019 Apr 17 2100:00	VCSFA	US	201	291	51.65	Reentered
S44204	2019-023A	Beidou DW 44	2019 Apr 20 1505:00	CNSA	CN	35714	35850	54.98	In Earth orbit
S44207	2019-024A	Tianhui-2 01 zu 01 xing	2019 Apr 29 2305:00	GCDX	CN	500	517	97.45	In Earth orbit
S44208	2019-024B	Tianhui-2 01 zu 02 xing	2019 Apr 29 2305:00	GCDX	CN	504	518	97.45	In Earth orbit
S44222	2019-025A	Dragon CRS-17	2019 May 4 0658:00	SPX	US	378	383	51.64	Landed
S44364	1998-067QJ	PINOT	2019 Jun 27 2005:00	DARPA	US	407	418	51.64	In Earth orbit
S44225	2019-026A	AFOTEC-1	2019 May 5 0654:00	AFOTD4/USAFA	US	498	511	40.01	In Earth orbit
S44226	2019-026B	SPARC-1	2019 May 5 0654:00	AFRL/FMV	US	493	511	40.02	In Earth orbit
S44229	2019-026E	Harbing	2019 May 5 0654:00	YORKSS/SMDC	US	498	510	40.02	In Earth orbit
S44231	2019-027A	Beidou DW 45	2019 May 17 1614:00	CNSA	CN	35774	35779	1.74	In Earth orbit
S44233	2019-028A	RISAT-2B	2019 May 22 0015:00	ISRO	IN	550	557	37.00	In Earth orbit
S44235	2019-029A	Starlink 31	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44236	2019-029B	Starlink 32	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44237	2019-029C	Starlink 23	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44238	2019-029D	Starlink 24	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44239	2019-029E	Starlink 25	2019 May 24 0332:00	SPXS	US	450	454	53.00	In Earth orbit
S44240	2019-029F	Starlink 26	2019 May 24 0332:00	SPXS	US	442	445	53.00	In Earth orbit
S44241	2019-029G	Starlink 27	2019 May 24 0332:00	SPXS	US	449	454	52.99	In Earth orbit
S44242	2019-029H	Starlink 28	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44243	2019-029J	Starlink 29	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44244	2019-029K	Starlink 30	2019 May 24 0332:00	SPXS	US	435	442	53.00	In Earth orbit
S44245	2019-029L	Starlink 21	2019 May 24 0332:00	SPXS	US	448	452	53.00	In Earth orbit
S44246	2019-029M	Starlink 46	2019 May 24 0332:00	SPXS	US	441	443	53.00	In Earth orbit
S44247	2019-029N	Starlink 33	2019 May 24 0332:00	SPXS	US	434	442	53.00	In Earth orbit
S44248	2019-029P	Starlink 34	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44249	2019-029Q	Starlink 61	2019 May 24 0332:00	SPXS	US	434	442	53.00	In Earth orbit
S44250	2019-029R	Starlink 36	2019 May 24 0332:00	SPXS	US	437	442	53.00	In Earth orbit
S44251	2019-029S	Starlink 37	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44252	2019-029T	Starlink 71	2019 May 24 0332:00	SPXS	US	443	445	53.00	In Earth orbit
S44253	2019-029U	Starlink 39	2019 May 24 0332:00	SPXS	US	438	442	53.00	In Earth orbit
S44254	2019-029V	Starlink 32	2019 May 24 0332:00	SPXS	US	441	443	53.00	In Earth orbit
S44255	2019-029W	Starlink 66	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44256	2019-029X	Starlink 42	2019 May 24 0332:00	SPXS	US	434	442	53.00	In Earth orbit
S44257	2019-029Y	Starlink 43	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44258	2019-029Z	Starlink 40	2019 May 24 0332:00	SPXS	US	438	442	53.00	In Earth orbit
S44259	2019-029AA	Starlink 52	2019 May 24 0332:00	SPXS	US	441	445	53.00	In Earth orbit
S44260	2019-029AB	Starlink 45	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit

S44261	2019-029AC	Starlink 44	2019 May 24 0332:00	SPXS	US	436	442	53.00	In Earth orbit
S44262	2019-029AD	Starlink 49	2019 May 24 0332:00	SPXS	US	450	454	53.00	In Earth orbit
S44263	2019-029AE	Starlink 72	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44264	2019-029AF	Starlink 35	2019 May 24 0332:00	SPXS	US	434	442	53.00	In Earth orbit
S44265	2019-029AG	Starlink 63	2019 May 24 0332:00	SPXS	US	446	451	53.01	In Earth orbit
S44266	2019-029AH	Starlink 54	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44267	2019-029AJ	Starlink 69	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44268	2019-029AK	Starlink 55	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44269	2019-029AL	Starlink 57	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44270	2019-029AM	Starlink 58	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44271	2019-029AN	Starlink 59	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44272	2019-029AP	Starlink 51	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44273	2019-029AQ	Starlink 60	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44274	2019-029AR	Starlink 62	2019 May 24 0332:00	SPXS	US	436	442	53.00	In Earth orbit
S44275	2019-029AS	Starlink 64	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44276	2019-029AT	Starlink 65	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44277	2019-029AU	Starlink 41	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44278	2019-029AV	Starlink 67	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44279	2019-029AW	Starlink 68	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44280	2019-029AX	Starlink 38	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44281	2019-029AY	Starlink 70	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44282	2019-029AZ	Starlink 80	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44283	2019-029BA	Starlink 56	2019 May 24 0332:00	SPXS	US	433	441	53.00	In Earth orbit
S44284	2019-029BB	Starlink 73	2019 May 24 0332:00	SPXS	US	450	453	53.00	In Earth orbit
S44285	2019-029BC	Starlink 50	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44286	2019-029BD	Starlink 75	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44287	2019-029BE	Starlink 76	2019 May 24 0332:00	SPXS	US	444	448	53.00	In Earth orbit
S44288	2019-029BF	Starlink 79	2019 May 24 0332:00	SPXS	US	433	442	53.00	In Earth orbit
S44289	2019-029BG	Starlink 48	2019 May 24 0332:00	SPXS	US	442	443	53.00	In Earth orbit
S44290	2019-029BH	Starlink 78	2019 May 24 0332:00	SPXS	US	450	453	53.00	In Earth orbit
S44291	2019-029BJ	Starlink 77	2019 May 24 0332:00	SPXS	US	449	453	53.00	In Earth orbit
S44292	2019-029BK	Starlink 81	2019 May 24 0332:00	SPXS	US	451	454	53.00	In Earth orbit
S44293	2019-029BL	Starlink 74	2019 May 24 0332:00	SPXS	US	448	452	52.99	In Earth orbit
S44294	2019-029BM	Starlink 53	2019 May 24 0332:00	SPXS	US	449	452	53.00	In Earth orbit
S44299	2019-030A	Kosmos-2534	2019 May 27 0955:00	KVR/IACG	RU	19096	19163	64.76	In Earth orbit
S44300	2019-031A	Yamal-601	2019 Jun 31 0253:00	GAZS	RU	35777	35795	0.02	In Earth orbit
S44310	2019-032A	Tianxiang 1	2019 Jun 5 0414:00	DKJ	CN	551	575	44.98	In Earth orbit
S44311	2019-032B	Xiaoxiang-1 04 xing	2019 Jun 5 0414:00	CTYK	CN	556	575	44.99	In Earth orbit
S44312	2019-032C	Bufeng yi hao A xing	2019 Jun 5 0414:00	CAST	CN	555	575	45.00	In Earth orbit
S44313	2019-032D	Tao Xingzhi Jiayou 1	2019 Jun 5 0414:00	TZJ/GUOG	CN	557	576	44.99	In Earth orbit
S44314	2019-032E	Bufeng yi hao B xing	2019 Jun 5 0414:00	CAST	CN	554	576	44.99	In Earth orbit
S44315	2019-032F	Jilin-1 GaoFen 03A	2019 Jun 5 0414:00	CGSTL	CN	555	575	44.98	In Earth orbit
S44316	2019-032G	Tianxiang 2	2019 Jun 5 0414:00	DKJ	CN	557	575	44.99	In Earth orbit
S44322	2019-033A	RCM 1	2019 Jun 12 1511:00	CSA	CA	584	604	97.77	In Earth orbit
S44323	2019-033B	RCM 3	2019 Jun 12 1515:00	CSA	CA	584	603	97.77	In Earth orbit
S44324	2019-033C	RCM 2	2019 Jun 12 1519:00	CSA	CA	584	603	97.77	In Earth orbit
S44333	2019-034A	T-16	2019 Jun 20 2210:00	ATT	US	35712	35732	0.02	In Earth orbit
S44334	2019-034B	Eutelsat 7C	2019 Jun 20 2216:00	EUTSA	F	11267	48750	2.57	In Earth orbit
S44337	2019-035A	Beidou DW 46	2019 Jun 24 1833:00	CNSA	CN	35733	35835	55.06	In Earth orbit
S44339	2019-036A	Prox-1	2019 Jun 25 0740:00	GIT	US	705	725	24.00	In Earth orbit
S44340	2019-036B	NPSAT-1	2019 Jun 25 0752:00	USNPS	US	710	721	24.00	In Earth orbit
S44341	2019-036C	OTB/Celestis	2019 Jun 25 0754:00	GACO	US	706	723	24.00	In Earth orbit
S44342	2019-036D	GPIM	2019 Jun 25 0757:00	MSFC	US	701	729	23.98	In Earth orbit
S44343	2019-036E	COSMIC 2-3	2019 Jun 25 0801:00	NSFO	TW	708	724	24.00	In Earth orbit
S44344	2019-036F	DSX	2019 Jun 25 1004:00	AFRL	US	5999	12039	42.20	In Earth orbit
S44346	2019-036H	TEPCE 1	2019 Jun 25 0649:00	NRL	US	297	848	28.53	In Earth orbit
S44347	2019-036J	FalconSat-7	2019 Jun 25 0654:00	USAF	US	306	851	28.52	In Earth orbit
S44348	2019-036K	Oculus-ASR	2019 Jun 25 0642:00	MTU	US	306	853	28.53	In Earth orbit
S44349	2019-036L	COSMIC 2-1	2019 Jun 25 0804:00	NSFO	TW	709	721	24.00	In Earth orbit
S44350	2019-036M	COSMIC 2-4	2019 Jun 25 0813:00	NSFO	TW	710	724	23.99	In Earth orbit
S44351	2019-036N	COSMIC 2-2	2019 Jun 25 0806:00	NSFO	TW	710	724	24.00	In Earth orbit
S44352	2019-036P	ARMADILLO	2019 Jun 25 0658:00	UT	US	305	851	28.54	In Earth orbit
S44353	2019-036Q	COSMIC 2-6	2019 Jun 25 0816:00	NSFO	TW	708	724	23.99	In Earth orbit
S44354	2019-036R	Navy-OSCAR-104	2019 Jun 25 0701:00	USNA	US	306	849	28.53	In Earth orbit
S44355	2019-036S	Navy-OSCAR-103	2019 Jun 25 0701:00	USNA	US	300	847	28.52	In Earth orbit
S44356	2019-036T	E-TBEX A	2019 Jun 25 0709:00	UMI/SRII	US	298	846	28.51	In Earth orbit

S44358	2019-036V	COSMIC 2-5	2019 Jun 25 0809:00	NSFO	TW	709	724	24.00	In Earth orbit
S44359	2019-036W	E-TBEx B	2019 Jun 25 0713:00	UMI/SRII	US	305	847	28.53	In Earth orbit
S44360	2019-036X	LEO	2019 Jun 25 0720:00	CALP	US	301	846	28.52	In Earth orbit
S44361	2019-036Y	StangSat	2019 Jun 25 0720:00	MHS	US	302	847	28.53	In Earth orbit
S44375	2019-036Z	Prometheus Mass Model	2019 Jun 25 0730:00	SOCOM	US	305	845	28.52	In Earth orbit
S44386	2019-036AB	Prometheus 2.6	2019 Jun 25 0703:00	SOCOM	US	300	847	28.53	In Earth orbit
S44420	2019-036AC	LightSail-2	2019 Jul 2 0749:00	TFS	US	709	725	24.00	In Earth orbit
S44365	2019-037A	PAINANI-1	2019 Jun 29 0523:00	SEDENA	MX	447	460	45.01	In Earth orbit
S44366	2019-037B	Prometheus 2.9	2019 Jun 29 0523:00	SOCOM	US	437	460	45.01	In Earth orbit
S44367	2019-037C	BlackSky Global 3	2019 Jun 29 0523:00	BSK	US	450	461	45.01	In Earth orbit
S44369	2019-037E	ACRUX 1	2019 Jun 29 0523:00	MELB	US	439	460	45.01	In Earth orbit
S44370	2019-037F	SpaceBEE 9	2019 Jun 29 0523:00	SWARM	US	446	460	45.01	In Earth orbit
S44371	2019-037G	SpaceBEE 8	2019 Jun 29 0523:00	SWARM	US	447	460	45.01	In Earth orbit
S44374	2019-037K	Prometheus 2.7	2019 Jun 29 0523:00	SOCOM	US	437	460	45.01	In Earth orbit
S44387	2019-038A	Meteor-M No. 2-2	2019 Jul 5 0641:00	RGMS/VNIEMR	RU	815	98.57	In Earth orbit	
S44388	2019-038B	MTCube	2019 Jul 5 1000:00	MONTP2	F	515	546	97.49	In Earth orbit
S44389	2019-038C	ICEYE-X5	2019 Jul 5 0800:00	ICEYE	FI	564	591	97.68	In Earth orbit
S44390	2019-038D	ICEYE-X4	2019 Jul 5 0800:00	ICEYE	FI	564	594	97.68	In Earth orbit
S44391	2019-038E	NLSat-1	2019 Jul 5 1000:00	NSLC	IL	515	543	97.49	In Earth orbit
S44392	2019-038G	VDNKH-80	2019 Jul 5 1000:00	VDNKH	RU	514	546	97.49	In Earth orbit
S44393	2019-038H	LightSat	2019 Jul 5 1000:00	GOS	D	514	548	97.49	In Earth orbit
S44394	2019-038J	AmGU 1	2019 Jul 5 1000:00	AMGU	RU	514	548	97.49	In Earth orbit
S44395	2019-038K	Ecuador-UTE	2019 Jul 5 1000:00	UTE	EC	501	563	97.50	In Earth orbit
S44396	2019-038L	Lennur-2-Lillylo	2019 Jul 5 1000:00	SPIRE	US	514	548	97.49	In Earth orbit
S44397	2019-038M	KoIt	2019 Jul 5 1000:00	TUU	US	515	546	97.49	In Earth orbit
S44398	2019-038N	MOVE-Ilb	2019 Jul 5 1000:00	TUM	EE	515	546	97.49	In Earth orbit
S44399	2019-038P	DoT-1	2019 Jul 5 0800:00	SSTL	UK	564	591	97.68	In Earth orbit
S44400	2019-038Q	SONATE	2019 Jul 5 1000:00	WURZ	D	514	547	97.49	In Earth orbit
S44401	2019-038R	SEAM 2.0	2019 Jul 5 1000:00	KTH	S	516	544	97.49	In Earth orbit
S44402	2019-038S	Lennur-2-Wanli	2019 Jul 5 1000:00	SPIRE	US	513	547	97.49	In Earth orbit
S44403	2019-038T	Lennur-2-Morag	2019 Jul 5 1000:00	SPIRE	US	516	545	97.49	In Earth orbit
S44404	2019-038AE	Sokrat	2019 Jul 5 1000:00	MGU	RU	515	546	97.49	In Earth orbit
S44405	2019-038A	Lennur-2-DustInTheWind	2019 Jul 5 1000:00	SPIRE	US	515	546	97.49	In Earth orbit
S44406	2019-038W	Lucky-7	2019 Jul 5 1000:00	SKYFOX	CZ	515	545	97.48	In Earth orbit
S44407	2019-038X	Lennur-2-Alex-Maddy	2019 Jul 5 1000:00	SPIRE	US	514	547	97.49	In Earth orbit
S44408	2019-038Y	El Camino Real	2019 Jul 5 1000:00	MOMENT	US	515	543	97.49	In Earth orbit
S44409	2019-038Z	Lennur-2-EJaffa	2019 Jul 5 1000:00	SPIRE	US	515	546	97.49	In Earth orbit
S44410	2019-038AA	EXOCONECT	2019 Jul 5 1000:00	GOS	D	514	548	97.49	In Earth orbit
S44411	2019-038AB	Lennur-2-GregRobinson	2019 Jul 5 1000:00	SPIRE	US	515	547	97.49	In Earth orbit
S44412	2019-038AC	BEESAT 9	2019 Jul 5 1006:00	TUB	D	514	547	97.49	In Earth orbit
S44413	2019-038AD	Lennur-2-Yndrd	2019 Jul 5 1000:00	SPIRE	US	515	544	97.49	In Earth orbit
S44414	2019-038U	CarbonIX	2019 Jul 5 0800:00	EXOL	D	564	591	97.68	In Earth orbit
S44419	2019-038F	JASAT 1	2019 Jul 5 1000:00	RAST	T	514	548	97.49	In Earth orbit
A09475	2019-038AF	BEESAT 10	2019 Jul 5 1006:00	TUB	D	514	547	97.49	In Earth orbit
A09476	2019-038AG	BEESAT 11	2019 Jul 5 1006:00	TUB	D	514	547	97.49	In Earth orbit
A09477	2019-038AH	BEESAT 12	2019 Jul 5 1006:00	TUB	D	514	547	97.49	In Earth orbit
A09478	2019-038AJ	BEESAT 13	2019 Jul 5 1006:00	TUB	D	514	547	97.49	In Earth orbit
S44421	2019-039A	Kosmos-2535	2019 Jul 10 1815:00	TSVS	RU	610	621	97.88	In Earth orbit
S44422	2019-039B	Kosmos-2537	2019 Jul 10 1815:00	TSKHM	RU	611	623	97.89	In Earth orbit
S44423	2019-039C	Kosmos-2538	2019 Jul 10 1815:00	PVO?	RU	616	623	97.88	In Earth orbit
S44424	2019-039D	Kosmos-2536	2019 Jul 10 1815:00	TSKHM	RU	610	622	97.87	In Earth orbit
S44432	2019-040A	Spektr-RG	2019 Jul 13 1430:00	RKA	RU	531	1332588	51.92	Deep Space
S44437	2019-041A	Soyuz MS-13	2019 Jul 20 1637:00	RKKE	RU	409	418	51.64	Attached to Poisk
S44441	2019-042A	Chandrayaan-2	2019 Jul 22 0930:00	ISRO	IN	201	71729	21.59	Deep Space
A09453	2019-042	Vikram	2019 Jul 22 0930:00	ISRO	IN	266	407970	21.70	Deep Space Att to GSLV-3
A09454	2019-042	Pragyan	2019 Jul 22 0930:00	ISRO	IN	266	407970	21.70	MI Stage 2
S44443	2019-043A	Bei Ligong 1 hao	2019 Jul 25 0514:00	CAMSAT	CN	275	292	42.73	Reentered
A09471	2019-043B	Qiqiu Weixing	2019 Jul 25 0514:00	HKGF	CN	275	292	42.73	Reentered
S44415	2019-022E	NARSScub-2	2019 Aug 7 0000:00	NARSS	EG	469	485	51.64	In Earth orbit
S44416	2019-022F	Quantum Radar 3	2019 Aug 7 0000:00	HYPCG	US	469	485	51.64	In Earth orbit
S44417	2019-022G	RFTSat	2019 Aug 7 0000:00	NWNZ	US	469	485	51.64	In Earth orbit
S44418	2019-022H	ORCA	2019 Aug 7 0000:00	DARPA/HYPGG	US	469	485	51.64	In Earth orbit
S44446	2019-044A	Dragon CRS-18	2019 Jul 25 2211:00	SFX	US	203	373	51.64	Landed
S44449	2019-045A	Yaogan 30 hao 05 zu 01 xing	2019 Jul 26 0409:00	ZZB	CN	589	604	35.00	In Earth orbit

S44450	2019-045B	Yaogan 30 hao 05 zu 02 xing	2019 Jul 26 0409:00	ZZB	CN	588	605	34.99	In Earth orbit
S44451	2019-045C	Yaogan 30 hao 05 zu 03 xing	2019 Jul 26 0409:00	ZZB	CN	587	604	34.99	In Earth orbit
S44453	2019-046A	Meridian-M No. 18L	2019 Jul 30 1245:00	KVR	RU	1000	39352	62.78	In Earth orbit
S44455	2019-047A	Progress MS-12	2019 Jul 31 1218:00	RKKE	RU	409	417	51.64	Deorbited
S44457	2019-048A	Kosmos-2539	2019 Aug 6 0658:00	KVR/VOENT	RU	35779	35791	0.01	In Earth orbit
S44475	2019-049A	EDRS C	2019 Aug 6 2003:00	ESA	L-ESA	35783	35788	0.07	In Earth orbit
S44476	2019-049B	Intelsat IS-39	2019 Aug 6 1959:00	INTELU	US	35778	35793	0.06	In Earth orbit
S44479	2019-050A	Amos 17	2019 Aug 6 2354:00	IAIS	IL	35778	35792	0.13	In Earth orbit
S44481	2019-051A	AEHF SV-5	2019 Aug 8 1553:00	AFMCSW	US	27167	34805	7.84	In Earth orbit
S44482	2019-051B	TDO	2019 Aug 8 1042:00	AFSMC	US	208	35264	26.17	In Earth orbit
S44486	2019-052A	Qiancheng-01	2019 Aug 17 0421:00	QJANC	CN	531	559	97.61	In Earth orbit
S44487	2019-052B	Tianqi-2	2019 Aug 17 0421:00	GUOG	CN	529	558	97.61	In Earth orbit
S44488	2019-052C	Xingshidai-5	2019 Aug 17 0421:00	GUOX	CN	529	560	97.61	In Earth orbit
S44493	2019-053A	Zhongxing 18	2019 Aug 19 1228:00	ZZB	CN	237	35761	28.48	In Earth orbit
S44495	2019-054A	BRO-ONE	2019 Aug 19 1305:00	UNSEEN	F	536	550	45.01	In Earth orbit
S44497	2019-054C	Pearl White 1	2019 Aug 19 1305:00	AFSPC	US	533	550	45.01	In Earth orbit
S44498	2019-054D	Pearl White 2	2019 Aug 19 1305:00	AFSPC	US	532	549	45.01	In Earth orbit
S44499	2019-054E	BlackSky Global 4	2019 Aug 19 1305:00	BSKG	US	538	550	45.01	In Earth orbit
S44504	2019-055A	Soyuz MS-14	2019 Aug 22 0847:00	RKKE	RU	412	420	51.64	Landed
S44506	2019-056A	GPS III SV02	2019 Aug 22 1501:00	AFSMC	US	20184	20193	55.04	In Earth orbit
S44517	2019-057A	Geo-IK-2 No. 13L	2019 Aug 30 1536:00	TSVS	RU	945	958	99.27	In Earth orbit
S44519	2019-058A	Xiaoxiang-1 07 xing	2019 Aug 31 0013:00	CTYK	CN	592	607	97.79	In Earth orbit
S44520	2019-058B	Taichi-1	2019 Aug 31 0008:00	CNSSC	CN	592	609	97.79	In Earth orbit
S44528	2019-059A	Zi Yuan 1-02D	2019 Sep 12 0339:00	ZZWYZ	CN	748	758	98.58	In Earth orbit
S44529	2019-059B	Jingshi 1	2019 Sep 12 0339:00	BNU	CN	732	750	98.58	In Earth orbit
S44530	2019-059C	Jintuzuo naxing	2019 Sep 12 0339:00	ASES	CN	731	750	98.59	In Earth orbit
S44534	2019-060A	OVS-3	2019 Sep 19 0654:00	ZHUORB	CN	494	512	97.40	In Earth orbit
S44536	2019-060C	Feitian Maotai	2019 Sep 19 0654:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S44537	2019-060D	GaoMi-1	2019 Sep 19 0654:00	ZHUORB	CN	494	511	97.40	In Earth orbit
S44538	2019-060E	GuoyuanV9	2019 Sep 19 0654:00	ZHUORB	CN	492	512	97.40	In Earth orbit
S44539	2019-060F	Xihaian 1	2019 Sep 19 0654:00	ZHUORB	CN	491	511	97.40	In Earth orbit
S44542	2019-061A	Beidou DW 47	2019 Sep 23 0104:00	CNSA	CN	21546	22108	55.00	In Earth orbit
S44543	2019-061B	Beidou DW 48	2019 Sep 23 0104:00	CNSA	CN	21508	21547	55.00	In Earth orbit
S44546	2019-062A	Kounotori 8 gouki	2019 Sep 24 1620:00	JAXA	J	350	364	51.65	Deorbited
S44790	1998-067QV	RWASAT-1	2019 Nov 20 0850:00	TOK/RWMTI	J	411	417	51.64	In Earth orbit
S44791	1998-067QW	AQT-D	2019 Nov 20 0925:00	SPABD/TOK	J	411	417	51.64	In Earth orbit
S44792	1998-067QX	NARScube-1	2019 Nov 20 0910:00	EGYSA	EG	413	416	51.64	In Earth orbit
S44547	2019-063A	Yunhai 1-02	2019 Sep 25 0104:00	SAST	CN	767	780	98.59	In Earth orbit
S44550	2019-064A	Soyuz MS-15	2019 Sep 25 1356:00	RKKE	RU	338	376	51.66	Attached to Zvezda
S44552	2019-065A	Kosmos-2541	2019 Sep 26 1432:00	KVR	RU	1615	38737	63.83	In Earth orbit
S44622	2019-066A	Gao Fen 10	2019 Oct 4 1912:00	CNSA	CN	611	622	97.78	In Earth orbit
S44624	2019-067A	Eutelsat 5WB	2019 Oct 10 0153:00	EUTSA	F	30375	64848	3.36	In Earth orbit
S44625	2019-067B	MEV-1	2019 Oct 10 0212:00	NGISD	US	11981	64871	13.35	In Earth orbit
S44628	2019-068A	ICON	2019 Oct 11 0211:00	GSFC	US	579	601	27.00	In Earth orbit
S44634	2019-069A	Pallsade	2019 Oct 17 0233:00	ADIG	US	1207	1224	87.90	In Earth orbit
S44637	2019-070A	Tongxin Jishu Shiyuan 4	2019 Oct 17 1546:00	CASC	CN	35774	35800	0.09	In Earth orbit
S44701	2019-071A	S.S. Alan Bean	2019 Nov 2 1408:00	OSC	CN	380	416	51.64	Attached to Unity
S44703	2019-072A	Gao Fen 7	2019 Nov 3 0336:00	GCDX	CN	487	506	97.49	In Earth orbit
S44704	2019-072B	Sudan Kexue Shiyuan W.	2019 Nov 3 0336:00	ISRA/DFHS	SD	485	505	97.49	In Earth orbit
S44705	2019-072C	Huangpu 1	2019 Nov 3 0336:00	DAWAN/LIZH	CN	485	504	97.49	In Earth orbit
S44706	2019-072D	Tianyi 15	2019 Nov 3 0336:00	CTYK	CN	484	505	97.49	In Earth orbit
S44709	2019-073A	Beidou DW 49	2019 Nov 4 1848:00	CNSA	CN	35674	35886	58.70	In Earth orbit
S44713	2019-074A	Starlink 1007	2019 Nov 11 1557:00	SPXS	US	298	300	53.01	In Earth orbit
S44714	2019-074B	Starlink 1008	2019 Nov 11 1557:00	SPXS	US	296	302	53.01	In Earth orbit
S44715	2019-074C	Starlink 1009	2019 Nov 11 1557:00	SPXS	US	291	307	53.01	In Earth orbit
S44716	2019-074D	Starlink 1010	2019 Nov 11 1557:00	SPXS	US	297	300	53.01	In Earth orbit
S44717	2019-074E	Starlink 1011	2019 Nov 11 1557:00	SPXS	US	297	304	53.01	In Earth orbit
S44718	2019-074F	Starlink 1012	2019 Nov 11 1557:00	SPXS	US	296	301	53.01	In Earth orbit
S44719	2019-074G	Starlink 1013	2019 Nov 11 1557:00	SPXS	US	296	301	53.01	In Earth orbit
S44720	2019-074H	Starlink 1014	2019 Nov 11 1557:00	SPXS	US	295	303	53.01	In Earth orbit
S44721	2019-074J	Starlink 1015	2019 Nov 11 1557:00	SPXS	US	296	302	53.01	In Earth orbit
S44722	2019-074K	Starlink 1016	2019 Nov 11 1557:00	SPXS	US	295	302	53.01	In Earth orbit
S44723	2019-074L	Starlink 1017	2019 Nov 11 1557:00	SPXS	US	294	302	53.01	In Earth orbit
S44724	2019-074M	Starlink 1019	2019 Nov 11 1557:00	SPXS	US	294	301	53.01	In Earth orbit
S44725	2019-074N	Starlink 1020	2019 Nov 11 1557:00	SPXS	US	297	303	53.01	In Earth orbit
S44726	2019-074P	Starlink 1021	2019 Nov 11 1557:00	SPXS	US	296	301	53.01	In Earth orbit

S44727	2019-074Q	Starlink 1022	2019 Nov 11 1557:00	SPXS	US	295	299	53.01	In Earth orbit
S44728	2019-074R	Starlink 1023	2019 Nov 11 1557:00	SPXS	US	297	301	53.01	In Earth orbit
S44729	2019-074S	Starlink 1024	2019 Nov 11 1557:00	SPXS	US	298	300	53.01	In Earth orbit
S44730	2019-074T	Starlink 1025	2019 Nov 11 1557:00	SPXS	US	298	300	53.00	In Earth orbit
S44731	2019-074U	Starlink 1026	2019 Nov 11 1557:00	SPXS	US	296	301	53.01	In Earth orbit
S44732	2019-074V	Starlink 1027	2019 Nov 11 1557:00	SPXS	US	293	304	53.01	In Earth orbit
S44733	2019-074W	Starlink 1028	2019 Nov 11 1557:00	SPXS	US	296	301	53.01	In Earth orbit
S44734	2019-074X	Starlink 1029	2019 Nov 11 1557:00	SPXS	US	299	301	53.01	In Earth orbit
S44735	2019-074Y	Starlink 1030	2019 Nov 11 1557:00	SPXS	US	297	302	53.01	In Earth orbit
S44736	2019-074Z	Starlink 1031	2019 Nov 11 1557:00	SPXS	US	299	301	53.01	In Earth orbit
S44737	2019-074A	Starlink 1032	2019 Nov 11 1557:00	SPXS	US	296	304	53.01	In Earth orbit
S44738	2019-074AB	Starlink 1033	2019 Nov 11 1557:00	SPXS	US	297	303	53.01	In Earth orbit
S44739	2019-074AC	Starlink 1034	2019 Nov 11 1557:00	SPXS	US	298	302	53.01	In Earth orbit
S44740	2019-074AD	Starlink 1035	2019 Nov 11 1557:00	SPXS	US	299	301	53.01	In Earth orbit
S44741	2019-074AE	Starlink 1036	2019 Nov 11 1557:00	SPXS	US	300	301	53.00	In Earth orbit
S44742	2019-074AF	Starlink 1037	2019 Nov 11 1557:00	SPXS	US	297	302	53.01	In Earth orbit
S44743	2019-074AG	Starlink 1038	2019 Nov 11 1557:00	SPXS	US	299	304	53.01	In Earth orbit
S44744	2019-074AH	Starlink 1039	2019 Nov 11 1557:00	SPXS	US	301	303	53.01	In Earth orbit
S44745	2019-074AJ	Starlink 1040	2019 Nov 11 1557:00	SPXS	US	276	288	53.01	In Earth orbit
S44746	2019-074AK	Starlink 1041	2019 Nov 11 1557:00	SPXS	US	295	304	53.01	In Earth orbit
S44747	2019-074AL	Starlink 1042	2019 Nov 11 1557:00	SPXS	US	299	300	53.01	In Earth orbit
S44748	2019-074AM	Starlink 1043	2019 Nov 11 1557:00	SPXS	US	298	302	53.00	In Earth orbit
S44749	2019-074AN	Starlink 1044	2019 Nov 11 1557:00	SPXS	US	283	296	53.00	In Earth orbit
S44750	2019-074AP	Starlink 1045	2019 Nov 11 1557:00	SPXS	US	298	303	53.01	In Earth orbit
S44751	2019-074AQ	Starlink 1046	2019 Nov 11 1557:00	SPXS	US	299	304	53.01	In Earth orbit
S44752	2019-074AR	Starlink 1047	2019 Nov 11 1557:00	SPXS	US	297	304	53.01	In Earth orbit
S44753	2019-074AS	Starlink 1048	2019 Nov 11 1557:00	SPXS	US	294	304	53.01	In Earth orbit
S44754	2019-074AT	Starlink 1049	2019 Nov 11 1557:00	SPXS	US	298	301	53.01	In Earth orbit
S44755	2019-074AU	Starlink 1050	2019 Nov 11 1557:00	SPXS	US	294	299	53.01	In Earth orbit
S44756	2019-074AV	Starlink 1051	2019 Nov 11 1557:00	SPXS	US	298	300	53.00	In Earth orbit
S44757	2019-074AW	Starlink 1052	2019 Nov 11 1557:00	SPXS	US	299	301	53.00	In Earth orbit
S44758	2019-074AX	Starlink 1053	2019 Nov 11 1557:00	SPXS	US	295	302	53.01	In Earth orbit
S44759	2019-074AY	Starlink 1054	2019 Nov 11 1557:00	SPXS	US	295	301	53.01	In Earth orbit
S44760	2019-074AZ	Starlink 1055	2019 Nov 11 1557:00	SPXS	US	294	299	53.01	In Earth orbit
S44761	2019-074BA	Starlink 1056	2019 Nov 11 1557:00	SPXS	US	295	300	53.01	In Earth orbit
S44762	2019-074BB	Starlink 1057	2019 Nov 11 1557:00	SPXS	US	297	298	53.01	In Earth orbit
S44763	2019-074BC	Starlink 1058	2019 Nov 11 1557:00	SPXS	US	293	306	53.01	In Earth orbit
S44764	2019-074BD	Starlink 1059	2019 Nov 11 1557:00	SPXS	US	297	302	53.01	In Earth orbit
S44765	2019-074BE	Starlink 1060	2019 Nov 11 1557:00	SPXS	US	297	302	53.01	In Earth orbit
S44766	2019-074BF	Starlink 1061	2019 Nov 11 1557:00	SPXS	US	298	300	53.00	In Earth orbit
S44767	2019-074BG	Starlink 1062	2019 Nov 11 1557:00	SPXS	US	296	300	53.01	In Earth orbit
S44768	2019-074BH	Starlink 1063	2019 Nov 11 1557:00	SPXS	US	300	301	53.00	In Earth orbit
S44769	2019-074BJ	Starlink 1064	2019 Nov 11 1557:00	SPXS	US	297	305	53.01	In Earth orbit
S44770	2019-074BK	Starlink 1065	2019 Nov 11 1557:00	SPXS	US	299	301	53.00	In Earth orbit
S44771	2019-074BL	Starlink 1067	2019 Nov 11 1557:00	SPXS	US	296	302	53.01	In Earth orbit
S44772	2019-074BM	Starlink 1068	2019 Nov 11 1557:00	SPXS	US	297	302	53.01	In Earth orbit
S44777	2019-075A	Jilin-1 Gaofen 02A	2019 Nov 13 0357:00	CGSTL	CN	531	546	97.54	In Earth orbit
S44779	2019-076A	Ningxia-1 01 xing	2019 Nov 13 0647:00	NINGX/CASC	CN	887	898	45.01	In Earth orbit
S44780	2019-076B	Ningxia-1 02 xing	2019 Nov 13 0647:00	NINGX/CASC	CN	886	898	45.01	In Earth orbit
S44781	2019-076C	Ningxia-1 03 xing	2019 Nov 13 0647:00	NINGX/CASC	CN	886	898	45.00	In Earth orbit
S44782	2019-076D	Ningxia-1 04 xing	2019 Nov 13 0647:00	NINGX/CASC	CN	884	898	45.01	In Earth orbit
S44783	2019-076E	Ningxia-1 05 xing	2019 Nov 13 0647:00	NINGX/CASC	CN	884	897	45.01	In Earth orbit
S44785	2019-077A	KL-Alpha-A	2019 Nov 17 1018:00	KLEO	D	1044	1057	88.91	In Earth orbit
S44786	2019-077B	KL-Alpha-B	2019 Nov 17 1020:00	KLEO	D	1045	1431	88.91	In Earth orbit
S44793	2019-078A	Beidou DW 50	2019 Nov 23 0448:00	CNSA	CN	21542	22194	54.99	In Earth orbit
S44794	2019-078B	Beidou DW 51	2019 Nov 23 0448:00	CNSA	CN	21537	22192	54.99	In Earth orbit
S44797	2019-079A	Kosmos-2542	2019 Nov 25 2030:00	TSVS	RU	368	857	97.99	In Earth orbit
S44835	2019-079D	Kosmos-2543	2019 Dec 6 0800:00	TSKHM	EG	367	857	97.99	In Earth orbit
S44800	2019-080A	Tiba 1	2019 Nov 26 2150:00	EGYSA	EG	35732	35790	0.07	In Earth orbit
S44801	2019-080B	Inmarsat GX5	2019 Nov 26 2157:00	INMRL	UK	35672	35686	0.08	In Earth orbit
S44804	2019-081A	Cartosat-3	2019 Nov 27 0415:00	ISRO	IN	500	519	97.53	In Earth orbit
S44806	2019-081C	Meshbed	2019 Nov 27 0416:00	ANSP	US	499	517	97.52	In Earth orbit
S44807	2019-081D	Flock 4p-9	2019 Nov 27 0424:00	PLABS	US	499	516	97.52	In Earth orbit
S44808	2019-081E	Flock 4p-10	2019 Nov 27 0424:00	PLABS	US	499	516	97.52	In Earth orbit
S44809	2019-081F	Flock 4p-11	2019 Nov 27 0424:00	PLABS	US	499	516	97.52	In Earth orbit
S44810	2019-081G	Flock 4p-12	2019 Nov 27 0424:00	PLABS	US	499	516	97.52	In Earth orbit

S44811	2019-081H	Flock 4p-4	2019 Nov 27 04:21:00	PLABS	US	499	515	97.52	In Earth orbit
S44812	2019-081J	Flock 4p-3	2019 Nov 27 04:21:00	PLABS	US	499	515	97.52	In Earth orbit
S44813	2019-081K	Flock 4p-2	2019 Nov 27 04:21:00	PLABS	US	507	522	97.52	In Earth orbit
S44814	2019-081L	Flock 4p-1	2019 Nov 27 04:21:00	PLABS	US	498	516	97.52	In Earth orbit
S44815	2019-081M	Flock 4p-8	2019 Nov 27 04:23:00	PLABS	US	499	514	97.52	In Earth orbit
S44816	2019-081N	Flock 4p-7	2019 Nov 27 04:23:00	PLABS	US	499	514	97.52	In Earth orbit
S44817	2019-081P	Flock 4p-6	2019 Nov 27 04:23:00	PLABS	US	499	513	97.52	In Earth orbit
S44818	2019-081Q	Flock 4p-5	2019 Nov 27 04:23:00	PLABS	US	499	513	97.52	In Earth orbit
S44819	2019-082A	Gao Fen 12	2019 Nov 28 00:14:00	ZZB	CN	612	616	97.93	In Earth orbit
S44821	2019-083A	Dragon CRS-19	2019 Dec 5 17:39:00	SPX	CN	200	379	51.65	Attached to Harmony
S44824	2019-084A	ALJ-2	2019 Dec 6 09:14:00	ALE	J	397	414	97.01	In Earth orbit
S44827	2019-084D	NOOR 1A	2019 Dec 6 09:18:00	STARA	US	348	403	97.00	In Earth orbit
S44828	2019-084E	NOOR 1B	2019 Dec 6 09:18:00	STARA	US	348	403	97.00	In Earth orbit
S44829	2019-084F	Fossasat-1	2019 Dec 6 09:18:00	FOSSA	E	349	399	97.01	In Earth orbit
S44830	2019-084G	ATL-1	2019 Dec 6 09:18:00	ATLH	HU	347	400	97.00	In Earth orbit
S44831	2019-084H	TRSI-Sat	2019 Dec 6 09:18:00	TRSI	D	347	401	97.00	In Earth orbit
S44832	2019-084J	SMOG-P	2019 Dec 6 09:18:00	BME	HU	347	401	97.00	In Earth orbit
S44833	2019-085A	Progress MS-13	2019 Dec 6 09:43:00	RKKE	RU	312	328	51.64	Attached to Pirs
S44836	2019-086A	Jilin-1 Gaofen 02B	2019 Dec 7 03:13:00	CGSTL	CN	186	755	97.52	In Earth orbit
S44838	2019-087A	HEAD-2B	2019 Dec 7 09:09:00	HEAD	CN	495	511	97.37	In Earth orbit
S44839	2019-087B	HEAD-2A	2019 Dec 7 09:09:00	HEAD	CN	495	511	97.36	In Earth orbit
S44840	2019-087C	Tianqi-4A	2019 Dec 7 09:09:00	GUOG	CN	495	509	97.38	In Earth orbit
S44841	2019-087D	Tianqi-4B	2019 Dec 7 09:09:00	GUOG	CN	495	508	97.37	In Earth orbit
S44842	2019-087E	Tianyi-16	2019 Dec 7 09:09:00	C'YK	CN	494	509	97.36	In Earth orbit
S44843	2019-087F	Tianyi-17	2019 Dec 7 09:09:00	C'YK	CN	494	509	97.37	In Earth orbit
S44850	2019-088A	Kosmos-2544	2019 Dec 11 12:26:00	KVR/IACG	RU	18982	19143	64.77	In Earth orbit
S44852	2019-089A	RISAT-2BR1	2019 Dec 11 10:11:00	ISRO	IN	563	573	36.96	In Earth orbit
S44853	2019-089B	Izanagi	2019 Dec 11 10:12:00	QPS	J	564	574	36.97	In Earth orbit
S44854	2019-089C	Duchifat-3	2019 Dec 11 10:14:00	HSCIL	IL	567	577	36.96	In Earth orbit
S44855	2019-089D	Tyvak-0129	2019 Dec 11 10:13:00	TYVAK	US	566	575	36.97	In Earth orbit
S44856	2019-089E	NANOVA	2019 Dec 11 10:13:00	ELBIT	IL	563	576	36.97	In Earth orbit
S44857	2019-089F	IHOPSAT	2019 Dec 11 10:16:00	HERA	US	568	578	36.97	In Earth orbit
S44858	2019-089G	Lemur-2	2019 Dec 11 10:15:00	SPIRE	US	568	579	36.96	In Earth orbit
S44859	2019-089H	Lemur-2	2019 Dec 11 10:15:00	SPIRE	US	568	576	36.97	In Earth orbit
S44860	2019-089J	Lemur-2	2019 Dec 11 10:15:00	SPIRE	US	566	576	36.97	In Earth orbit
S44861	2019-089K	Lemur-2	2019 Dec 11 10:16:00	SPIRE	US	566	576	36.97	In Earth orbit
S44864	2019-090A	Beidou DW 52	2019 Dec 16 11:15:00	CNSA	CN	21521	21876	55.02	In Earth orbit
S44865	2019-090B	Beidou DW 53	2019 Dec 16 11:15:00	CNSA	CN	21532	22193	55.02	In Earth orbit
S44873	2019-092A	CSG 1	2019 Dec 18 09:17:00	ASI/MDDI	I	621	622	97.82	In Earth orbit
S44874	2019-092B	CHEOPS	2019 Dec 18 11:19:00	ESA	I-ESA	697	708	98.23	In Earth orbit
S44876	2019-092D	ANGELS	2019 Dec 18 13:07:00	CNES	F	509	524	97.45	In Earth orbit
S44877	2019-092E	EyeSat	2019 Dec 18 13:05:00	CNES	F	507	524	97.45	In Earth orbit
S44878	2019-092F	OPS-SAT	2019 Dec 18 13:05:00	ESA	I-ESA	511	529	97.46	In Earth orbit
S44879	2019-093A	CBERS 4A	2019 Dec 20 03:35:00	ZZWYZ/INPE	CN	615	635	97.98	In Earth orbit
S44880	2019-093B	ETRS-1	2019 Dec 20 03:37:00	ESSTI	ET	615	634	97.98	In Earth orbit
S44881	2019-093C	Tianqin-1	2019 Dec 20 03:36:00	ZHONG	CN	614	634	97.98	In Earth orbit
S44882	2019-093D	Shuntian	2019 Dec 20 03:37:00	DEYA/NUDTC	CN	613	632	97.98	In Earth orbit
S44883	2019-093E	BDSAGR-1	2019 Dec 20 03:37:00	BDSAGR/XZTIA	CN	613	634	97.98	In Earth orbit
S44884	2019-093F	Yuheng	2019 Dec 20 03:37:00	DEYA/NUDTC	CN	614	632	97.98	In Earth orbit
S44885	2019-093G	FloripaSat	2019 Dec 20 03:37:00	UFSC	BR	614	635	97.98	In Earth orbit
S44886	2019-093H	Yizheng 1	2019 Dec 20 03:37:00	ZXKJ	CN	612	631	97.98	In Earth orbit
S44887	2019-093J	Xingshidai 8	2019 Dec 20 03:37:00	GUOX	CN	612	631	97.98	In Earth orbit
S44900	2019-094A	Starliner OFT	2019 Dec 20 11:50:00	BOKSC	US	182	220	51.59	Landed
S44903	2019-095A	Elektro-L No. 3	2019 Dec 24 18:40:00	RGMS/NPOL	RU	35371	35571	0.57	In Earth orbit
S44905	2019-096A	Gonets-M No. 24	2019 Dec 26 00:00:00	KVR	RU	1498	1505	82.52	In Earth orbit
S44906	2019-096B	Gonets-M No. 25	2019 Dec 26 00:00:00	KVR	RU	1499	1507	82.53	In Earth orbit
S44907	2019-096C	Gonets-M No. 26	2019 Dec 26 00:00:00	KVR	RU	1500	1508	82.52	In Earth orbit
S44908	2019-096D	Blits-M No. 1	2019 Dec 26 00:00:00	NHP	RU	1498	1507	82.53	In Earth orbit
S44910	2019-097A	Shi Jian 20	2019 Dec 27 00:00:00	CHISAE/CAST	CN	178	67674	19.40	In Earth orbit
S44376	2019-036AA	Oculus-ASR Sphere 1	2019 Jul 1 00:00:00	MTU	US	305	820	28.51	Reentered
A09404	2018-099	SeeMe	2019 Feb 1 00:00:00	DARPA/RAYMS	US	572	591	97.75	Attached to eXCITE
A09405	2019-022	Kenobi	2019 Apr 17 00:00:00	JSC	US	408	410	51.65	Reentered Att to NRCSD-ENG-11
A09486	2019-036K	TEPCE 2	2019 Jun 25 00:00:00	NRL	US	297	848	28.51	Attached to TEPCE 1, did not deploy?

A09463	2019-043	Xingshidai-6	2019 Jul 25 00:00:00	GUOX	CN	275	292	42.73	Reentered Att to Shuang Quxian 1 St4
A09464	2019-043	Hecate-1	2019 Jul 25 00:00:00	CCTV	CN	275	292	42.73	Reentered Att to Shuang Quxian 1 St4
A09465	2019-043	Cube-X1	2019 Jul 25 00:00:00	XCK	CN	275	292	42.73	Reentered Att to Shuang Quxian 1 St4
A09460	2019-044	IDA-3	2019 Aug 21 15:00:00	JSC	US	409	418	51.64	Attached to PMA-3