

# Space Activities in 2018

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## Preface

In this paper I present some statistics characterizing astronomical activity in calendar year 2018. 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 <http://planet4589.org/space/papers/space14.pdf> (This paper may be found as space18.pdf at the same location).

## Orbital Launch Attempts

During 2018 there were 114 orbital launch attempts, with 112 reaching orbit.

Table 1: Orbital Launch Attempts						
	2009-2013 Average	2014	2015	2016	2017	2018
USA	19.0	24	20	22	30	34
Russia	30.2	32	26	17	19	17
China	14.8	16	19	22	18	39
Europe		11	12	11	11	11
<i>Japan</i>		4	4	4	7	6
<i>India</i>		4	5	7	5	7
<i>Israel</i>		1	0	1	0	0
<i>N Korea</i>		0	0	1	0	0
<i>S Korea</i>		0	0	0	0	0
<i>Iran</i>		0	1	0	1	0
Other		9	10	13	13	13
Total	79.0	92	87	85	91	114

The Arianespace-managed Soyuz launches from French Guiana are counted as European. Electron is licensed in the USA but launched from New Zealand territory.

Two launches failed to reach orbit (one Chinese, one Russian).

## Launch failures

During the year there were 2 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 2018. However, on one launch the payload did not separate from its launch vehicle and was deorbited with it; this is not counted against the launch vehicle because the payload separation system was provided by the payload owner.

On one launch, Ariane VA241, the vehicle entered orbit at the correct altitude but entirely the wrong inclination - I believe the first time this has happened. The payloads were able to use their own fuel to reach their target orbit, and by the rules set out in JSR 669, I score the launch as a success with a rating for statistical purposes of 65% instead of 100%.

In recent years the cubesat market has led to middle-layer companies such as ISIS B.V., ECM, Nanoracks, Spaceflight Industries, etc., which integrate cubesats into dispensers, and act as customers to the launch vehicle provider. When a payload fails to eject from the dispenser, as sometimes happens, this is not counted as a launch vehicle failure but a payload failure, even though it may feel like a launch failure to the cubesat end user customer.

Table 2: 2018 orbital launch failures and partial failures

Designation	Date	LV State	LV	Payload	Type of failure	Launch Score
2018-001	Jan 8	USA	Falcon 9	USA 280 (ZUMA)	Payload sep failure	1.00
2018-012	Jan 25	France	Ariane 5ECA	SES-14/Al Yah 3	Wrong trajectory	0.65
2018-F01	Oct 11	Russia	Soyuz-FG	Soyuz MS-10	Stage 1 separation	0.00
2018-F02	Oct 27	China	Zhuque-1	Weilai	Stage 3 attitude loss	0.00

## Commercial Launches

Of the 114 orbital launch attempts, 39 were carried out by governments; 24 by commercial companies under contract to their host governments, and 28 for commercial customers, including foreign governments.

Table 3: Commercial versus government launches			
Launch provider	Launches	Type	Customers
US Launch providers			
ULA/Boeing Delta 4	2	CSP	US Gov
ULA/LM Atlas 5	5	CSP	6 US Gov
ULA/Boeing Delta 2	1	CSP	1 US Gov
SpaceX Falcon 9	20	FCS	4 US Gov, 16 Comm
SpaceX Falcon Heavy	1	FCS	1 Comm Test
Orbital Antares	2	FCS	2 US Gov
Rocket Labs Electron	3	FC	2 Comm
European Launch providers			
Arianespace Vega	2	FC?	1 Eur gov, 1 comm./foreign
Arianespace Ariane 5	6	FC	2 Eur gov, 4 comm./for.
Arianespace Soyuz	3	FC	1 Eur gov, 2 comm.
Russian Launch providers			
Khrunichev Proton	2	GOV	2 Ru gov
Eurockot Rokot	1	FC	1 comm
Khrunichev Rokot	1	GOV	1 Ru gov
Roskosmos Soyuz	9	GOV	9 Ru.gov (civil)
VVKO Soyuz	4	GOV	4 Ru.gov (military)
Chinese Launch providers			
CALT CZ-2C	6	GOV	Chinese gov
CALT CZ-3A/B/C	14	GOV	13 Chinese gov, 1 commercial
CALT CZ-5	0	GOV	Chinese gov
CALT CZ-6/7	0	GOV	Chinese gov
CALT CZ-2F	0	GOV	Chinese gov
CALT CZ-11	3	GOV	3 commercial
SBA CZ-2D/4B/4C	14	GOV	12 Chinese gov, 2 commercial
EXPACE KZ-1A	1	CO?	Comm
LANDSPACE ZQ-1	1	CO	Comm
Other Launch providers			
MHI H-IIA/B	4	CSP	6 Japan gov
ISAS SS-520	1	GOV	1 Univ. payload
JAXA Epsilon	1	GOV	1 Japan gov
ISRO/Antrix PSLV/GSLV	6	GOV	5 Indian gov, 1 commercial
ISRO/Antrix GSLV3	1	GOV	1 Indian gov
IRSA Simorgh	0	GOV	0 Iranian gov
ISA Shaviyt	0	GOV	0 Israeli gov
NADA Kwangmyongsong	0	GOV	0 North Korean gov

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

## Satellite Launch Statistics

2013 and 2014 saw a dramatic increase in the numbers of satellites deployed, thanks to the launch of several clusters of cubesats. The record 461 satellites launched in 2018 include 190 with masses above 100 kg.

The 461 satellites listed in Appendix 2 include two Chinese payloads (SPP/DSB-01 and an unknown payload) which have apparently not been tracked by the US (Chinese satellite registration filings with the UN are highly incomplete, so don't help here.) as well as 3 payloads which failed to separate from the upper stage (the combined satellite/upper stage is considered a valid satellite for my purposes; these were Zuma, D-Star Phoenix, and ENOCH) and 3 which were never intended to separate from the upper stage (Tesla Roadster, Tangguo Guan, NABEO). Failures to reach orbit are not included here.

The list also includes 11 satellites which are expected to separate from a parent spacecraft in future (Mio, attached to BepiColombo MPO; CANYVAL/JERRY, attached to CANYVAL/TOM; SeeMe, attached to EXCITE-PTB1; and MySat, CHEFSAT, Kicksat-2, CATSAT 1/2, UNITE, TES-8, and Delphini 1, aboard ISS awaiting deployment). Excluding these 11 gives 450 satellites placed separately in orbit.

Finally, the number of tracked objects associated with the SSO-A launch in Dec 2018 is two less than the expected number; ICE-CAP and one other payload may not actually have been launched.

	2012	2013	2014	2015	2016	2017	2018
USA	35	85	110	112	94	278	205
Russia	22	29	34	27	15	24	23
China	25	18	26	44	40	36	97
Other	50	75	86	53	72	103	136
Total	132	207	256	236	221	441	461

## Satellite ownership by country

Let us break this down by class for 2018 (first the launch powers, then other countries). In 2018 the satellites launched were owned by 43x countries and 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: 2018 payloads launched, by owner country and class

	A Academic/ NonProfit	B Business/ Commercial	C Civil	D Defense	Total Number	Total Mass (tonne)
<b>USA</b>	31	129	14	31	205	123
<b>China</b>	3	35	21	38	97	59
<b>Russia</b>	4	0	10	9	23	62
ESA/EU/EUM	0	0	9	0	9	14
AT Austria	0	0	0	0	0	0
B Belgium	0	0	0	0	0	0
CH Switzerland	0	1	0	0	1	0
D Germany	2	7	1	0	10	0
DK Denmark	1	0	1	1	3	0
E Spain	2	2	0	1	5	7
F France	1	0	0	1	2	4
FI Finland	1	3	0	0	4	0
GR Greece	0	0	0	0	0	0
I Italy	0	1	0	0	1	0
L Luxembourg	0	1	0	0	1	4
N Norway	0	0	0	0	0	0
NL Netherlands	0	2	0	0	2	0
S Sweden	0	0	0	0	0	0
UK	0	13	1	0	14	18
<b>Europe (W)</b>	7	30	12	3	52	47
<b>Japan</b>	5	2	4	3	14	27
<b>India</b>	1	0	7	2	10	16
BG Bulgaria	1	0	0	0	1	0
BY Belarus	1	0	0	0	1	0
CZ Czechia	0	1	0	0	1	0
LT Lithuania	0	0	0	0	0	0
LV Latvia	0	0	0	0	0	0
PL Poland	1	0	0	0	1	0
UA Ukraine	0	0	0	0	0	0
SK Slovakia	0	0	0	0	0	0
<i>Subtotal OTHER: Europe (E)</i>	3	1	0	0	4	0
AO Angola	0	0	0	0	0	0
DZ Algeria	0	0	0	0	0	0
GH Ghana	0	0	0	0	0	0
KE Kenya	1	0	0	0	1	0
MA Morocco	0	0	0	1	1	1
NG Nigeria	0	0	0	0	0	0
ZA South Africa	1	0	0	0	1	0
<i>Subtotal OTHER: Africa</i>	2	0	0	1	3	1
(continued)						

Table 5: (continued)

	A Academic/ NonProfit	B Business/ Commercial	C Civil	D Defense	Total Number	Total Mass (tonne)
AR Argentina	0	1	0	0	1	3
BR Brazil	0	1	0	0	1	0
CL Chile	0	0	0	0	0	0
CO Colombia	0	0	0	1	1	0
CR Costa Rica	1	0	0	0	1	0
MX Mexico	0	0	0	0	0	0
PE Peru	0	0	0	0	0	0
UY Uruguay	0	2	0	0	2	0
VE Venezuela	0	0	0	0	0	0
<i>Subtotal OTHER: Latin America</i>	1	4	0	1	6	3
IL Israel	0	0	0	0	0	0
JO Jordan	1	0	0	0	1	0
PK Pakistan	0	0	2	0	2	1
QA Qatar	0	1	0	0	1	5
SA Saudi Arabia	0	0	2	0	2	1
TR Turkey	1	0	0	0	1	0
UAE United Arab Em.	1	1	1	0	2	5
<i>Subtotal OTHER: Mideast</i>	3	2	5	0	10	11
AZ Azerbaijan	0	0	1	0	1	3
BD Bangladesh	1	0	0	0	1	0
BT Bhutan	0	0	1	0	1	0
ID Indonesia	0	1	0	0	1	6
KP N Korea	0	0	0	0	0	0
KR S Korea	9	0	3	0	12	4
KZ Kazakhstan	1	1	1	0	3	0
MN Mongolia	0	0	0	0	0	0
MY Malaysia	1	1	0	0	2	0
PH Phillipines	0	0	2	0	2	0
SG Singapore	1	0	0	0	1	0
T Thailand	1	0	0	0	1	0
TW Taiwan	0	0	0	0	0	0
<i>Subtotal OTHER: Asia (other)</i>	14	3	8	0	25	13
CA Canada	0	5	0	0	5	14
AU Australia	0	5	0	1	6	0
NZ New Zealand	0	1	0	0	1	0
<i>Subtotal OTHER: Can/Australasia</i>	0	11	0	1	12	14
<b>Other</b>	23	21	13	3	60	47
<b>Total</b>	74	217	81	89	461	382

## 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 190 satellites launched in 2018 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 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: 2018 payloads by manufacturer country - 100 kg and up only									
	HSF	Comms	Imaging	Nav	SIGINT	Surv.	Sci	Tech	Total
USA	5	38	5	1	0	3	4	6	62
China	0	3	20	18	8	0	4	5	58
Europe	0	8	8	4	0	0	6	2	28
Russia	6	5	5	2	1	0	0	0	19
India	0	4	2	1	0	0	0	1	8
Japan	1	2	3	0	0	0	2	0	8
S Korea	0	0	1	0	0	0	1	0	2
Saudi Arabia	0	0	0	0	0	0	0	2	2
Argentina	0	0	1	0	0	0	0	0	1
UAE	0	0	1	0	0	0	0	0	1
Pakistan	0	0	1	0	0	0	0	0	1
Total	12	60	47	26	9	3	17	16	190



## Scientific Space Programs

2018 saw the launch of several important missions to study the Earth. In LEO, the US-German GRACE-FO followon mission replaced the original GRACE pair to measure the time-variable gravity field. ESA's Aeolus-ADM mission measures wind profiles. Japan's IBUKI-2 measures CO<sub>2</sub> and methane.

One major astronomy mission was launched: TESS, the Transiting Exoplanet Survey Satellite, just as the Kepler mission reached the end of its life.

2018 stood out as an exceptional year for planetary exploration. The asteroid sample return missions Hayabusa-2 and Osiris-ReX reached their targets Ryugu and Bennu. As the year ended, New Horizons was on final approach to the Kuiper Belt Object 2014 MU69.

Several new important missions were launched: Parker Solar Probe to go close to the Sun; Insight which landed a seismometer on Mars; the MARCO-A/B flyby probes which relayed data from Insight during its descent; Bepi-Colombo on its way to Mercury; and Chang'e-4, which was preparing for a lunar farside landing as the year closed. China also launched the Queqiao communications satellite to the Earth-Moon L2 point to relay Chang'e-4 communications.

## Military Space Activities

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

### Military R&D

SpaceX launched Northrop Grumman's Zuma mission in January; Zuma was a secret payload for an unidentified US government agency. The payload adapter failed to operate and the payload reentered along with the upper stage when the latter was deorbited shortly after launch. Meanwhile, the X-37 mission 5 continued in orbit throughout the year.

The CBAS/EAGLE launch placed a set of research satellites in near-geostationary orbits. EAGLE released at least three small satellites for various secret experiments.

### Space surveillance

A new US GEO infrared missile warning satellite, SBIRS GEO-3, was launched.

### Reconnaissance and Signals Intelligence

On Mar 29 Russia launched the first EMKA small imaging satellite (Kosmos-2525) to a 316 x 319 km orbit. Its orbit was allowed to decay until October when, at 270 km, regular reboosts began. At the end of the year its orbit was 270 x 275 km.

Russia also launched a LEO signals intelligence satellite, Lotos-S1 No. 804 (Kosmos-2528) to a 900 km orbit.

China launched the third and fourth LKW low orbit imaging satellites and eight small LEO military satellites (the YG-30 04 zu, YG-31 01 zu, YG-32 01 zu clusters) which may be for signals intelligence.

The US launched a TOPAZ radar imaging satellite to an 1100 km retrograde orbit.

High resolution optical imaging satellites were launched by Japan, Morocco, and France. Spain and Japan launched radar spy satellites.

## Orbital Debris and Orbital Decay

At the end of 2018 there were 18995 cataloged objects in orbit or beyond and the total known mass in orbit increased to 9341 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 maneuvers, and the uncertainty in the total number of active satellites is probably of order 10%.

Table 7: Debris in orbit 2014-2018

	Debris 2014		Debris 2015		Debris 2016		Debris 2017		Debris 2018	
	Number	Mass (t)	Number	Mass(t)	Number	Mass(t)	Number	Mass(t)	Number	Mass(t)
Active Payloads	1302	1591	1427	1698	1548	1801	1905	1929	2187	2010
Dead Payloads	2523	3385	2543	3486	2572	3600	2607	3717	2648	3810
Rocket bodies	1680	2913	1718	3019	1752	3102	1780	3203	1844	3357
Operational debris	1626	148	1616	155	1620	159	1627	164	1720	163
PRC ASAT/FY-1C debris	2939	-	2870	-	2849	-	2838	-	2828	-
Strela/Iridium debris	1595	-	1485	-	1440	-	1420	-	1399	-
Other fragment debris	5609	-	6226	-	6257	-	6232	-	6368	-
Spurious catalog entry	1	-	1	-	1	-	1	-	1	-
Total cataloged	17275	8038	17886	8360	18039	8663	18411	9013	18995	9341

## **Disposal of launch vehicle upper stages**

This is a new section for this year's edition. For the 112 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'.

Table 8: Launches by orbit and launch-associated Earth orbit debris, 2018

Launch vehicle	Total launches	Launches with up- per stage disposal	Stages left in Earth orbit	Other LV debris
(a) SSO				
SpaceX Falcon 9	3	3	0	0
Arianespace Vega	2	2	0	0
Arianespace Soyuz-ST	2	2	0	0
Eurockot Rokot	1	0	1	0
Roskosmos Soyuz	2	2	0	5
VVKO Soyuz	1	0	1	0
CALT CZ-2C	2	0	2	0
CALT CZ-2C/YZ-1S	1	1	0	0
CALT CZ-11	3	0	3	0
SAST CZ-2D	7	7	0	28
SAST CZ-4B/4C	4	0	4	6
EXPACE KZ-1A	1	0	1	0
MHI H-IIA	3	0	3	7
JAXA Epsilon	1	0	2	0
ISRO PSLV	3	0	3	1
Total SSO	37	17	20	52
(b) ISS				
SpaceX Falcon 9	3	3	0	1
Orbital Antares	2	0	2	0
Roskosmos Soyuz	6	0	6	0
MHI H-IIB	1	1	0	0
Total ISS	12	4	8	1
(c) Other LEO				
ULA/Boeing Delta 4	1	1	0	0
ULA/Boeing Delta 2	1	1	0	0
SpaceX Falcon 9	4	4	0	1
Rocket Labs Electron	3	1?	5	1
Krunichev Rokot	1	0	1	1
VVKO Soyuz	1	0	1	0
CALT CZ-2C	2	0	2	1
SAST CZ-2D/YZ-3	1	(1)	1	0
SAST CZ-4B/4C	1	0	1	4
ISAS SS-520	1	0	1	0
Total Other LEO	16	8	11	8

Table 8 (cont):				
Launch vehicle	Total launches	Launches with up- per stage disposal	Stages left in Earth orbit	Other LV debris
(d) GTO				
ULA/LM Atlas 5	3	0	3	0
SpaceX Falcon 9	8	0	8	0
Arianespace Ariane 5	4	0	4	4
CALT CZ-3A/3A/3C	5	0	5	0
ISRO PSLV/GSLV Mk II	3	0	3	0
ISRO GSLV Mk III	1	0	1	0
Total GTO	24	0	24	4
(e) GEO Direct				
ULA/LM Atlas 5	1	0	1	1
Khrunichev Proton	2	0	2	2
Total GEO direct	3	0	3	3
(f) 12-hour MEO				
Arianespace Ariane 5	1	0	1	0
VVKO Soyuz/Fregat	2	0	2	0
CALT CZ-3B/YZ-1	8	0	16	0
Total 12-hour MEO	11	0	19	0
(f) Deep space and escape				
ULA/Boeing Delta 4	1	1	0	0
ULA/LM Atlas 5	1	1	0	0
SpaceX Falcon 9	1	0	1	0
SpaceX Falcon Heavy	1	1	0	0
Arianespace Ariane 5	1	1	0	0
CALT CZ-3B	1	0	1	0
SAST CZ-4C	1	0	1	0
Total Deep	7	4	2	0
(f) Other high orbit				
SpaceX Falcon 9	1	0	1	0
Arianespace Soyuz-ST	1	0	1	0
Total Other High	2	0	2	0
Total Overall				
Total Overall	112	33	89	68

## Obituaries

Table 9 gives statistics on reentries in 2018, not including deliberate deorbit and landing. (Acknowledgements to Collin Krum for the revised section name).

Table 9: Uncontrolled Reentries 2018		
	Number	Mass (t)
Active Payloads	82	20.7
Dead Payloads	15	14.8
Rocket bodies	28	49.2
Operational debris	38	6.0
PRC ASAT/FY-1C debris	10	-
Strela/Iridium debris	17	-
Other fragment debris	22	-

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

## Controlled deorbits and landings

The reentry of the Tiangong-1 spacelab on Apr 1 gained a lot of media attention, emphasizing the fact that the uncontrolled reentry of massive payloads is now rather rare, in contrast to the 1970s and 1980s when much more massive satellites were allowed to reenter by design.

41 first-generation Iridium satellites, each with a mass around 560 kg, had their orbits lowered to ensure rapid decay but uncontrolled reentry during 2018. 10 had reentered previously; 44 of the satellites remained in orbit at the beginning of 2019.

In addition to natural reentries, there were 7 controlled landings and 4 controlled deorbitings of spacecraft during 2017, representing the safe removal of around 96 tonnes from the orbital environment. 4 Russian Soyuz ships landed in Kazakhstan (I do not include the suborbital abort of Soyuz MS-10 here) and four Dragon spacecraft splashed down in the Pacific near California.

Four ISS cargo ships (one Cygnus, one HTV and two Progress) were deorbited; three were sent down over the South Pacific east of New Zealand, but the HTV was deorbited near Japan and ejected a recoverable capsule during descent.

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

In addition, 30 rocket stages were deorbited after only one or two Earth orbits (1 Centaur, 1 Delta 2, 1 Delta 4, 11 Falcon 9, 2 Vega AVUM, 4 Fregat, 1 H-2B, 6 Chinese CZ-2D, two Yuanzheng stages, and (possibly) an Electron kick stage) Only six of these were assigned catalog numbers. A further 17 rocket stages were inserted into slightly suborbital trajectories that ensured controlled disposal without the need for a deorbit burn (Ariane EPC, Vega Z9A, Proton stage 3, PSLV stage 3, some Soyuz-2 stage 3, and the second stage of the CZ-2C/YZ-1S launch).

Table 10: Most massive reentries, 2018

COSPAR	Spacecraft	Date	Mass/kg	Location	Coords	Type
2017-076D	Zenit 2SB80.5 Stage 2	2018 Jan 27 2332	8300	Peru	74W 9S	Reentry
2011-053A	Tiangong 1	2018 Apr 2 0016	7500	Pacific	164W 14S	Reentry
2017-013B	GSLV-3-D1 Stage 2	2018 Feb 8	3300?	Unknown		Reentry
2017-067B	Falcon 9-045 Stage 2	2018 Oct 27 1610	3000?	Pacific		Reentry
1995-074A	Rossi XTE	2018 Apr 30 1445?	2955	Colombia/Panama?		Reentry
2017-078B	CZ-3B Y40 Stage 3	2018 Mar 10 0530	2500?	Pacific	64W 24S?	Reentry
2015-041B	GSLV-D6 CUS	2018 Mar 2 2030?	2500?	Unknown		Reentry
Landings and deorbites, 2018						
2017-080A	Dragon CRS-13	2018 Jan 13 1537	4690?	Pacific	123W 30N	Splashdown
2017-054A	Soyuz MS-06	2018 Feb 28 0231	2876	Kazakhstan	70E 47N	Landing
2018-032A	Dragon CRS-14	2018 May 5 1900?	4700?	Pacific	123W 30N	Splashdown
2017-081A	Soyuz MS-07	2018 Jun 3 1239	2900?	Kazakhstan	70E 47N	Landing
2018-055A	Dragon CRS-15	2018 Aug 3 2217?	4700?	Pacific	28N 119W 28N	Splashdown
2018-026A	Soyuz MS-08	2018 Oct 4 1145	2903	Kazakhstan		Landing
2018-073	HSRC	2018 Nov 10 2206	180	Pacific	155E 21N	Splashdown
2018-051A	Soyuz MS-09	2018 Dec 20 0502	2903	Kazakhstan		Landing
2017-065A	Progress MS-07	2018 Apr 26 0451	6200?	Pacific		Deorbit
2018-046A	SS J.R. Thompson	2018 Jul 30 2117	6500?	Pacific		Deorbit
2018-019A	Progress MS-08	2018 Aug 30 0207	6200?	Pacific	136W 41S	Deorbit
2018-073A	Konoutori 7	2018 Nov 10 2138?	12000?	Pacific	155E 21N	Deorbit



Table 10 (continued): Deorbited soon after launch, 2018

COSPAR	Spacecraft	Date	Mass/kg	Location	Coords	Type
2018-001	Falcon 9-048 Stage 2	2018 Jan 8 0330?	Indian O.		Deorbit (with ZUMA payload)	
2018-005	Delta 379	2018 Jan 13 0033?	Southern O.		Deorbit	
2018-006	CZ-2D Stage 2	2018 Jan 13 0754?	Antarctic?		Deorbit	
2018-009	Centaur AV-076	2018 Jan 20 1013		169W 10N?	Deorbit	
2018-014	Fregat No. 122-03	2018 Feb 1 0217	Indian O.		Deorbit	
2018-015	CZ-2D Y13 Stage 2	2018 Feb 2 0836?	Antarctic?		Deorbit	
2018-020D	Falcon 9-050 Stage 2	2018 Feb 22 1730?	Pacific		Deorbit	
2018-025	CZ-2D Y50 Stage 2	2018 Mar 17 0754?	Antarctic?		Deorbit	
2018-030	Falcon 9-052 Stage 2	2018 Mar 30 1610?			Deorbit	
2018-032	Falcon 9-053 Stage 2	2018 Apr 2	S. Ocean		Deorbit	
2018-047	Falcon 9-056 Stage 2	2018 May 22 2143?	S of S Africa		Deorbit	
2018-048	CZ-2 Stage 2	2018 Jun 2 0501?			Deorbit	
2018-055	Falcon 9-058 Stage 2	2018 Jun 29 1615?		55W 32N?	Deorbit	
2018-061	Falcon 9-060 Stage 2	2018 Jul 25			Deorbit	
2018-066	Vega AVUM VV12	2018 Aug 22 2343?		Indian O.		Deorbit
2018-070	Delta 381	2018 Sep 15 1512			Deorbit	
2018-073	H-2B F7 Stage 2	2018 Sep 22 1932?			Deorbit	
2018-076	Falcon 9-063 Stage 2	2018 Oct 8 0413?		152W 11N	Deorbit	
2018-077	Yuanzheng-1S Y1	2018 Oct 9 0340?	IO/South.O?		Deorbit	
2018-087	Fregat-M No. 133-14	2018 Nov 7 0318?		91E 6S	Deorbit	
2018-094	CZ-2D Stage 2	2018 Nov 20 0027?	Antarctic		Deorbit	
2018-095	Vega AVUM VV13	2018 Nov 21 0409?	Indian O.	90E 10S?	Deorbit	
2018-099	Falcon 9-065 Stage 2	2018 Dec 3			Deorbit	
2018-101	Falcon 9-066 Stage 2	2018 Dec 5 1915?			125E 45S?	Deorbit
2018-102	CZ-2D Stage 2	2018 Dec 7 0500?	Antarctic		Deorbit	
2018-104	Electron 3 Kck Stage	2018 Dec 16 0815?	S of NZ?		Deorbit (unconfirmed)	
2018-106	Fregat-M No. 133-10	2018 Dec 19			Deorbit	
2018-109	Falcon 9-067 Stage 2	2018 Dec 23 2021?		0W 24S?	Deorbit	
2018-111	Fregat No. 122-?	2018 Dec 27 0725		120W 6N?	Deorbit	
2018-112	Yuanzheng-3 Y1	2018 Dec 29 1130?			Deorbit	

## Retirements in the GEO belt

During 2018, 14 satellites were retired from GEO. The recommended graveyard orbit begins at an altitude of 36086 km, 300 km above GEO. 3 satellites were raised less than the recommended amount. In addition, HellasSat-2 and AfricaSat-2 are somewhat above the GEO belt, but may just be relocating rather than retired despite their advanced age. Asiasat 4 and Astra 1H, noted in the 2017 report as possibly retired, were in fact still active at the end of 2018. Zhongxing-20 and Zhongxing-22A, not mentioned in the 2017 report, appear to have retired in December 2017. ZX-22A's orbits was not raised to graveyard altitude (only 24 x 70 km above GEO).

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

ID	Satellite	Retired	Height above GEO in Jan 2019 km x km
2003-020A	HellasSat-2	2018 Dec 24?	91 x 151
1996-063B	Africasat 2	2018 Jul 17?	160 x 186
2017-086A	Angosat	2018 Jan 16	182 x 233
1995-016A	Star One B2	2018 Jul 3	269 x 315
1998-006A	Star One B3	2018 Aug 15	280 x 318
1998-014A	NSS 806	2018 Oct 8	323 x 355
1998-033A	Zhongxing 5A	2018 Jun 22	341 x 383
2000-012A	Superbird B2	2018 Jun 12	355 x 451
1995-073A	Echostar 1	2018 Jan 6	362 x 397
2000-019A	EUTELSAT 16C	2018 Feb 8	364 x 385
2003-043A	EUTELSAT 31A	2018 Jan 16	372 x 417
1998-063A	Afristar	2018 Jan 5	327 x 389
2000-038A	Echostar 6	2018 May 25	396 x 446
2002-040A	EUTELSAT 59A	2018 Nov 12	535 x 593
2002-043A	Kalpana 1	2018 Jul 25	545 x 558
2000-046B	Nilesat 102	2018 Jun 24	624 x 651

## Debris events

There were 7 significant breakups during 2018. In addition, in September asteroid observers detected a number of high-area-to-mass objects (possibly insulation blankets) in orbits around 4000 x 80000 km with inclinations ranging from 10 to 50 degrees. It is unclear whether these reflect a recent breakup or just improvements in the ability to detect them.

Table 12: Breakups and debris events 2018

Date	Object	Orbit km x km x deg	Notes
2018 Feb 12	43089 Fregat-SBB 2006	272 x 4059 x 50.4	SBB propellant tank (from the 2017 Angosat launch); disintegrated
2018 Feb 28	03692 Transtage 17	35846 x 37254 x 6.3	Upper stage from the Feb 1969 Tacsat-1 launch; suffered a partial breakup in synchronous orbit. 18 of the fragments have been cataloged.
2018 May 22	36407 DM-2 116L SOZ-2	602 x 18926 x 65.1	49th SOZ aux motor breakup
2018 Aug 17	39411 CZ-4C Y14 Stage 3	991 x 1201 x 100.5	Upper stage, launched Yaogan 19 in 2013
2018 Aug 24	28920 DM-2 106L SOZ-2	552 x 18933 x 65.3	50th SOZ aux motor breakup
2018 Aug 30	40209 Centaur AV-049	8203 x 35180 x 22.2	Upper stage of NEMESIS 2
2018 Dec 22	25417 Orbcomm FM16	817 x 825 x 45.0	Payload

## 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, Brian Weeden, Jeffrey Lewis, Laura Grego, David Todd, Igor Lissov, David Wright, Phillip Clark, Rui Barbosa and posters on the forums at [nasaspaceflight.com](http://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: 2018 Orbital Launch Attempts

LAUNCH ID	Launch date UTC	Launch vehicle	LV Flight ID	Site	Agency
2018-001	2018 Jan 8 0100	Falcon 9	048/B1043	CC LC40	SPX
2018-002	2018 Jan 9 0324:33	Chang Zheng 2D	Y40	TYSC LC9	SAST
2018-003	2018 Jan 11 2318:04	Chang Zheng 3B/YZ-1	Y45	XSC LC3	CALT
2018-004	2018 Jan 12 0359	PSLV-XL	PSLV-C40	SHAR FLP	ISRO
2018-005	2018 Jan 12 2211	Delta 4M+(5,2)	D4-36 (379)	VS SLC6	ULAB
2018-006	2018 Jan 13 0710	Chang Zheng 2D	Y49	JQ Pad 603	SAST
2018-007	2018 Jan 17 2106:11	Epsilon	E-3	USC EP	JAXA
2018-008	2018 Jan 19 0412:50	Chang Zheng 11	Y3	JQ SLS-E	CALT
2018-009	2018 Jan 20 0048:00	Atlas V 411	AV-076	CC SLC41	ULAL
2018-010	2018 Jan 21 0143	Electron	2	MAHIA LC1	RLABU
2018-011	2018 Jan 25 0539:05	Chang Zheng 2C	Y36	XSC LC3	CALT
2018-012	2018 Jan 25 2220	Ariane 5ECA	VA241 (5101)	CSG ELA3	AE
2018-013	2018 Jan 31 2125	Falcon 9	049/B1032.2	CC LC40	SPX
2018-014	2018 Feb 1 0207:18	Soyuz-2-1A	N 15000-002/133-12	VOST PUIS	FKA
2018-015	2018 Feb 2 0751:04	Chang Zheng 2D	Y13	JQ Pad 603	SAST
2018-016	2018 Feb 3 0503	SS-520	SS-520-5	USC K	JAXA
2018-017	2018 Feb 6 2045	Falcon Heavy	001	KSC LC39A	SPX
2018-018	2018 Feb 12 0503:04	Chang Zheng 3B/YZ-1	Y47	XSC LC2	CALT
2018-019	2018 Feb 13 0813:33	Soyuz-2-1A	U 15000-030	GIK-5 LC31	FKA
2018-020	2018 Feb 22 1417	Falcon 9	050/B1038.2	VS SLC4E	SPX
2018-021	2018 Feb 27 0434	H-IIA 202	H-IIA-38	TNSC Y	MHI
2018-022	2018 Mar 1 2202:00	Atlas V 541	AV-077	CC SLC41	ULAL
2018-023	2018 Mar 6 0533	Falcon 9	051/B1044	CC LC40	SPX
2018-024	2018 Mar 9 1710:06	Soyuz-ST-B	R 15000-013/133-06	CSG EL5	AE
2018-025	2018 Mar 17 0710:04	Chang Zheng 2D	Y50	JQ Pad 603	SAST
2018-026	2018 Mar 21 1744:23	Soyuz-FG	N 15000-066	GIK-5 LC1	FKA
2018-027	2018 Mar 29 1126:00	GSLV Mk II	GSLV-F08	SHAR SLP	ISRO
2018-028	2018 Mar 29 1738:42	Soyuz-2-1V	780-72- 005	GIK-1 LC43/4	VVKO
2018-029	2018 Mar 29 1756:04	Chang Zheng 3B/YZ-1	Y48	XSC LC2	CALT
2018-030	2018 Mar 30 1413:51	Falcon 9	052/B1041.2	VS SLC4E	SPX
2018-031	2018 Mar 31 0322:08	Chang Zheng 4C	Y26	TYSC LC9	SAST
2018-032	2018 Apr 2 2030:38	Falcon 9	053/B1039.2	CC LC40	SPX
2018-033	2018 Apr 5 2134:07	Ariane 5ECA	VA242 (5102)	CSG ELA3	AE
2018-034	2018 Apr 10 0425:03	Chang Zheng 4C	Y25	JQ Pad 603	SAST
2018-035	2018 Apr 11 2234:00	PSLV-XL	PSLV-C41	SHAR FLP	ISRO
2018-036	2018 Apr 14 2313:00	Atlas V 551	AV-079	CC SLC41	ULAL
2018-037	2018 Apr 18 2212	Proton-M/Briz-M	535-467/88535?	GIK-5 LC81/24	KHRU
2018-038	2018 Apr 18 2251:30	Falcon 9	054/B1045	CC LC40	SPX
2018-039	2018 Apr 25 1757:51	Rokot	-	GIK-1 LC133/3	EUROK
2018-040	2018 Apr 26 0442	Chang Zheng 11	Y4	JQ SLS-E	CALT
2018-041	2018 May 3 1606:05	Chang Zheng 3B	Y55	XSC LC2?	CALT
2018-042	2018 May 5 1105:01	Atlas V 401	AV-078	VS SLC3E	ULAL
2018-043	2018 May 8 1828:40	Chang Zheng 4C	Y20	TYSC LC9	SAST
2018-044	2018 May 11 2014	Falcon 9	055/B1046	KSC LC39A	SPX
2018-045	2018 May 20 2128:50	Chang Zheng 4C	Y27	XSC LC3	SAST
2018-046	2018 May 21 0844:06	Antares 230	8	MARS Pad 0A	OSC
2018-047	2018 May 22 1947:58	Falcon 9	056/B1043.2	VS SLC4E	SPX
2018-048	2018 Jun 2 0413:04	Chang Zheng 2D	Y20	JQ Pad 603	SAST
2018-049	2018 Jun 4 0445	Falcon 9	057/B1040.2	CC LC40	SPX
2018-050	2018 Jun 5 1307:04	Chang Zheng 3A	Y25	XSC LC2	CALT
2018-051	2018 Jun 6 1112:39	Soyuz-FG	U 15000-064	GIK-5 LC1	FKA
2018-052	2018 Jun 12 0420:00	H-IIA 202	H-IIA-39	TNSC Y	MHI
2018-053	2018 Jun 16 2146:28	Soyuz-2-1B	L 15000-020/112-06	GIK-1 LC43/4	VVKO
2018-054	2018 Jun 27 0330:06	Chang Zheng 2C	Y44	XSC LC2	CALT
2018-055	2018 Jun 29 0942:42	Falcon 9	058/B1045.2	CC LC40	SPX
2018-056	2018 Jul 9 0356:14	Chang Zheng 2C	Y3	JQ Pad 603	CALT
2018-057	2018 Jul 9 2058:04	Chang Zheng 3A	Y47	XSC LC2?	CALT
2018-058	2018 Jul 9 2151:34	Soyuz-2-1A	N 15000-033	GIK-5 LC31	FKA
2018-059	2018 Jul 22 0550	Falcon 9	059/B1047	CC LC40	SPX
2018-060	2018 Jul 25 1125:08	Ariane 5ES	VA244 (596)	CSG ELA3	AE
2018-061	2018 Jul 25 1139:26	Falcon 9	060/B1048	VS SLC4E	SPX
2018-062	2018 Jul 29 0148:05	Chang Zheng 3B/YZ-1	Y49	XSC LC3	CALT
2018-063	2018 Jul 31 0300:04	Chang Zheng 4B	Y37	TYSC LC9	SAST
2018-064	2018 Aug 7 0518	Falcon 9	061/B1046.2	CC LC40	SPX
2018-065	2018 Aug 12 0731	Delta 4H/Star 48BV	D4-37 (380)	CC SLC37B	ULAB
2018-066	2018 Aug 22 2120:09	Vega	VV12	CSG ZLV	AE
2018-067	2018 Aug 24 2352:04	Chang Zheng 3B/YZ-1	Y50	XSC LC3	CALT
2018-068	2018 Sep 7 0315:05	Chang Zheng 2C	Y39	TYSC LC9?	CALT
2018-069	2018 Sep 10 0445	Falcon 9	062/B1049	CC LC40	SPX
2018-070	2018 Sep 12 1302	Delta 7420-10C	D381	V SLC2W	ULAB
2018-071	2018 Sep 16 1638	PSLV	PSLV-C42	SHAR FLP	ISRO
2018-072	2018 Sep 19 1407:04	Chang Zheng 3B/YZ-1	Y51	XSC LC2	CALT
2018-073	2018 Sep 22 1752:27	H-IIB	H-IIB-F7	TNSC Y2	MHI
2018-074	2018 Sep 25 2238	Ariane 5ECA	VA243 (5103)	CSG ELA3	AE
2018-075	2018 Sep 29 0413:30	Kuaizhou-1A	Y8	JQ SLS-E	EXPAC
2018-076	2018 Oct 8 0221:28	Falcon 9	063/B1048.2	VS SLC4E	SPX
2018-077	2018 Oct 8 0243:03	Chang Zheng 2C/YZ-1S	Y38	JQ Pad 603	CALT
2018-F01	2018 Oct 11 0840:15	Soyuz-FG	U 15000-062	GIK-5 LC1	FKA
2018-078	2018 Oct 15 0423:04	Chang Zheng 3B/YZ-1	Y52?	XSC LC3	CALT
2018-079	2018 Oct 17 0415	Atlas V 551	AV-073	CC SLC41	ULAL
2018-080	2018 Oct 20 0145:28	Ariane 5ECA	VA245 (5105)	CSG ELA3	AE
2018-081	2018 Oct 24 2257	Chang Zheng 4B	Y36	TYSC LC9	SAST
2018-082	2018 Oct 25 0015	Soyuz-2-1B	780-31- 216	GIK-1 LC43/4	VVKO
2018-F02	2018 Oct 27 0800	Zhuque-1	-	JQ SLS-E?	LANDSP
2018-083	2018 Oct 29 0043:14	Chang Zheng 2C	Y22	JQ Pad 603	CALT
2018-084	2018 Oct 29 0408	H-IIA 202	H-IIA-40	TNSC Y	MHI
2018-085	2018 Nov 1 1557:04	Chang Zheng 3B	Y41	XSC LC2	CALT

2018-086	2018 Nov 3 2017:53	Soyuz-2-1B	L 15000-036/112-08	GIK-1 LC43/4	VVKO
2018-087	2018 Nov 7 0047:28	Soyuz-ST-B	U 15000-014/133-14	CSG ELS	AE
2018-088	2018 Nov 11 0350	Electron	3	MAHIA LC1	RLABU
2018-089	2018 Nov 14 1138	GSLV Mk III	D2	SHAR SLP	ISRO
2018-090	2018 Nov 15 2046	Falcon 9	064/B1047.2	KSC LC39A	SPX
2018-091	2018 Nov 16 1814:08	Soyuz-FG	15000-068	GIK-5 LC1	FKA
2018-092	2018 Nov 17 0901:23	Antares 230	9	MARS Pad 0A	NGIS
2018-093	2018 Nov 18 1807:04	Chang Zheng 3B/YZ-1	Y53?	XSC LC3	CALT
2018-094	2018 Nov 19 2340:04	Chang Zheng 2D	Y28	JQ Pad 603	SAST
2018-095	2018 Nov 21 0142:31	Vega	VV13	CSG ZLV	AE
2018-096	2018 Nov 29 0427:30	PSLV	PSLV-C43	SHAR FLP	ISRO
2018-097	2018 Nov 30 0227	Rokot	-	GIK-1 LC133/3	KVR
2018-098	2018 Dec 3 1131:52	Soyuz-FG	N 15000-067	GIK-5 LC1	FKA
2018-099	2018 Dec 3 1834:05	Falcon 9	065/B1046.3	VS SLC4E	SPX
2018-100	2018 Dec 4 2037:07	Ariane 5ECA	VA246 (5104a?)	CSG ELA3	AE
2018-101	2018 Dec 5 1816:16	Falcon 9	066/B1050	CC LC40	SPX
2018-102	2018 Dec 7 0412	Chang Zheng 2D	Y38	JQ Pad 603	SAST
2018-103	2018 Dec 7 1823	Chang Zheng 3B	Y30	XSC LC2	CALT
2018-104	2018 Dec 16 0633	Electron	4	MAHIA LC1	RLABU
2018-105	2018 Dec 19 1040	GSLV Mk II	GSLV-F11	SHAR SLP	ISRO
2018-106	2018 Dec 19 1637:14	Soyuz-ST-A	U 15000-009/133-10	CSG ELS	AE
2018-107	2018 Dec 21 0020	Proton-M/Briz-M	535-47?/88536?	GIK-5 LC81/24	KHRU
2018-108	2018 Dec 21 2351	Chang Zheng 11	Y5	JQ SLS-E	CALT
2018-109	2018 Dec 23 1351	Falcon 9	067/B1054	CC LC40	SPX
2018-110	2018 Dec 24 1653:04	Chang Zheng 3C	Y17	XSC	CALT
2018-111	2018 Dec 27 0207:18	Soyuz-2-1A	Ya15000-003/133-13?	VOST PU1S	FKA
2018-112	2018 Dec 29 0800:05	Chang Zheng 2D/YZ-3	Y1?	JQ Pad 603	SAST

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 2: Satellite payloads launched in 2018

CATID	LAUNCH ID	Name	Deploy date UTC	Owner	Country	Perigee	Apogee	Inc	Status
S43098	2018-001A	USA 280	2018 Jan 8 01:12:00	NRO	US	1000	1000	50.00	Reentered Att to Falcon 9-048 Stage 2
S43099	2018-002A	GaoJing yi hao 03 xing	2018 Jan 9 03:36:00	BHSJ	CN	517	536	97.58	In Earth orbit
S43100	2018-002B	GaoJing yi hao 04 xing	2018 Jan 9 03:36:00	BHSJ	CN	515	535	97.58	In Earth orbit
S43107	2018-003A	Beidou DW 26	2018 Jan 12 03:03:00	CNSA	CN	21514	21541	55.03	In Earth orbit
S43108	2018-003B	Beidou DW 27	2018 Jan 12 03:03:00	CNSA	CN	21516	21539	55.02	In Earth orbit
S43111	2018-004A	Cartosat-2 Series Satellite	2018 Jan 12 04:15:00	ISRO	IN	495	510	97.56	In Earth orbit
S43113	2018-004C	LEO Vantage 1	2018 Jan 12 04:16:00	TCANL	CA	494	506	97.56	In Earth orbit
S43114	2018-004D	ICEYE-X1	2018 Jan 12 04:16:00	ICEYE	FI	494	506	97.56	In Earth orbit
S43115	2018-004E	VividX2	2018 Jan 12 04:18:00	EARI/UKSPOC	UK	493	505	97.56	In Earth orbit
S43116	2018-004F	INS-1C	2018 Jan 12 04:18:00	ISRO	IN	495	508	97.56	In Earth orbit
S43118	2018-004H	Landmapper-BC 3	2018 Jan 12 04:20:00	ADIG	US	496	502	97.55	In Earth orbit
S43119	2018-004J	Flock 3p*-3	2018 Jan 12 04:20:00	PLABS	US	495	501	97.56	In Earth orbit
S43120	2018-004K	Flock 3p*-2	2018 Jan 12 04:20:00	PLABS	US	493	504	97.56	In Earth orbit
S43121	2018-004L	Flock 3p*-1	2018 Jan 12 04:20:00	PLABS	US	493	504	97.56	In Earth orbit
S43122	2018-004M	Flock 3p*-4	2018 Jan 12 04:20:00	PLABS	US	492	504	97.55	In Earth orbit
S43123	2018-004N	Lemur-2-McCafferty	2018 Jan 12 04:20:00	SPIRE	US	493	504	97.56	In Earth orbit
S43124	2018-004P	Lemur-2-PeterWebster	2018 Jan 12 04:20:00	SPIRE	US	493	504	97.56	In Earth orbit
S43125	2018-004Q	Lemur-2-BrownCow	2018 Jan 12 04:20:00	SPIRE	US	493	504	97.56	In Earth orbit
S43126	2018-004R	Lemur-2-DaveWilson	2018 Jan 12 04:20:00	SPIRE	US	495	502	97.56	In Earth orbit
S43127	2018-004S	DemoSat-2	2018 Jan 12 04:20:00	ASTRAN	US	494	505	97.56	In Earth orbit
S43128	2018-004T	Microsat-TD	2018 Jan 12 05:44:00	ISRO	IN	327	368	97.22	In Earth orbit
S43130	2018-004V	Arkyd-6A	2018 Jan 12 04:20:00	PLRES	US	493	505	97.56	In Earth orbit
S43131	2018-004W	MicroMAS-2A	2018 Jan 12 04:20:00	MITLL	US	493	505	97.56	In Earth orbit
S43132	2018-004X	PICSAT	2018 Jan 12 04:16:00	OPM	F	494	505	97.56	In Earth orbit
S43133	2018-004Y	Papillon	2018 Jan 12 04:20:00	CNU	KR	493	506	97.55	In Earth orbit
S43134	2018-004Z	KHUSAT-3	2018 Jan 12 04:20:00	KHUS	KR	493	506	97.56	In Earth orbit
S43135	2018-004AA	KAUSAT-5	2018 Jan 12 04:20:00	KRAU	KR	493	506	97.56	In Earth orbit
S43136	2018-004AB	TOM	2018 Jan 12 04:20:00	YONS	KR	494	510	97.42	In Earth orbit
S43137	2018-004AC	AMSAT AO-92	2018 Jan 12 04:20:00	AMNA	US	494	507	97.56	In Earth orbit
S43138	2018-004AD	STEP Cube Lab	2018 Jan 12 04:20:00	CHOSU	KR	492	506	97.56	In Earth orbit
S43139	2018-004AE	SpaceBEE 4	2018 Jan 12 04:20:00	SWARM	US	493	505	97.56	In Earth orbit
S43140	2018-004AF	SpaceBEE 3	2018 Jan 12 04:20:00	SWARM	US	493	505	97.56	In Earth orbit
S43141	2018-004AG	SpaceBEE 2	2018 Jan 12 04:20:00	SWARM	US	493	505	97.56	In Earth orbit
S43142	2018-004AH	SpaceBEE 1	2018 Jan 12 04:20:00	SWARM	US	493	505	97.56	In Earth orbit
S43143	2018-004AJ	CICERO-7	2018 Jan 12 04:20:00	GEOOPT	US	493	504	97.56	In Earth orbit
S43144	2018-004AK	TYVAK-61c	2018 Jan 12 04:20:00	TYVAK/LLNL	US	493	504	97.56	In Earth orbit
A09102	2018-004G	JERRY	2018 Jan 12 04:20:00	YONS	KR	494	510	97.42	Attached to TOM?
S43145	2018-005A	USA 281	2018 Jan 12 23:31:00	NRO	US	1047	1057	106.00	In Earth orbit
S43146	2018-006A	Ludi Kancha Weixing san hao	2018 Jan 13 07:20:00	GCDX?	CN	488	503	97.34	In Earth orbit
S43152	2018-007A	ASNARO-2	2018 Jan 17 21:58:00	USEF	J	493	505	97.38	In Earth orbit
S43155	2018-008A	Hunan xiangjian xinqu hao	2018 Jan 19 04:25:00	CTYK	CN	527	547	97.55	In Earth orbit
S43156	2018-008B	Huai'an hao Enhai xing	2018 Jan 19 04:25:00	HQZS	CN	529	547	97.54	In Earth orbit
S43157	2018-008C	KIPP	2018 Jan 19 04:25:00	KEPLER	CA	528	547	97.54	In Earth orbit
S43158	2018-008D	Quan Tu Tong 1	2018 Jan 19 04:25:00	QTT	CA	528	546	97.54	In Earth orbit
S43159	2018-008E	Deqing-1	2018 Jan 19 04:25:00	CGSTZ/CGSTL	CN	523	546	97.54	In Earth orbit
S43160	2018-008F	Jilin-1 Shipin 8	2018 Jan 19 04:25:00	CGSTL	CN	527	547	97.54	In Earth orbit
S43162	2018-009A	SBIRS GEO-3	2018 Jan 20 01:30:00	AFSPC	US	35758	35815	6.33	In Earth orbit
S43163	2018-010A	Dove Pioneer	2018 Jan 21 01:51:00	PLABS	US	288	533	82.93	In Earth orbit
S43165	2018-010C	Lemur-2-Marshall	2018 Jan 21 01:51:00	SPIRE	US	494	534	82.93	In Earth orbit
S43167	2018-010E	Lemur-2-Talhamm-ATC	2018 Jan 21 01:51:00	SPIRE	US	492	532	82.93	In Earth orbit
S43168	2018-010F	Humanity Star	2018 Jan 21 01:51:00	RLABN	NZ	295	530	82.92	Reentered
S43169	2018-011A	Weina-1 01 weixing	2018 Jan 25 05:52:00	WEINA	CN	594	601	35.00	In Earth orbit
S43170	2018-011B	Yaogan 30 hao 04 zu 01 xing	2018 Jan 25 05:52:00	ZZB	CN	591	601	34.99	In Earth orbit
S43171	2018-011C	Yaogan 30 hao 04 zu 02 xing	2018 Jan 25 05:52:00	ZZB	CN	591	601	34.99	In Earth orbit
S43172	2018-011D	Yaogan 30 hao 04 zu 03 xing	2018 Jan 25 05:52:00	ZZB	CN	591	602	34.99	In Earth orbit
S43174	2018-012A	AI Yah 3	2018 Jan 25 22:55:00	ALYAH	UAE	30077	42365	2.71	In Earth orbit
S43175	2018-012B	SES-14	2018 Jan 25 22:47:00	SESSL	UK	9001	53246	13.09	In Earth orbit
S43178	2018-013A	GovSat-1	2018 Jan 31 21:57:00	LUXG	L	35772	35801	0.02	In Earth orbit
S43180	2018-014A	Kanopus-V No. 3	2018 Feb 1 03:06:00	VNIEM	RU	505	510	97.47	In Earth orbit
S43181	2018-014B	Kanopus-V No. 4	2018 Feb 1 03:12:00	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	US	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	Ullorlaq	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	Marvam	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	Tesla Roadster	2018 Feb 6 2053:00	SPX	US	180	6939	29.02	Deep Space Attached 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
S43595	1998-067PG	Tanyusha YuZGU No. 3	2018 Aug 15 1643:00	YUZGU	RU	402	405	51.64	In Earth orbit
S43596	1998-067PH	Tanyusha YuZGU No. 4	2018 Aug 15 1645:00	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	SPX	US	500	517	97.46	In Earth orbit
S43217	2018-020C	Tintin B	2018 Feb 22 1500:00	SPX	US	499	516	97.46	In Earth orbit
S43223	2018-021A	JSE kougaku 6 gouki	2018 Feb 27 0454:00	CSICE	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 0650:00	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 Kanacha 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	SPX	US	391	396	51.64	Landed
S43466	1998-067NP	UBAKUSAT	2018 May 11 1040:00	ITU/FR	TR	402	402	51.64	In Earth orbit
S43467	1998-067NQ	IKUNUS-PF	2018 May 11 1030:00	NAIR	KE	396	408	51.66	In Earth orbit
S43468	1998-067NR	Batsu-C51	2018 May 11 1030:00	ACAE/ITCR	CR	400	402	51.64	In Earth orbit
S43510	1998-067NT	RemoveDebris	2018 Jun 20 1135:00	SSTL	UK	407	51.64	In Earth orbit	
S43621	1998-067PM	DebrisSat-1/Net	2018 Sep 16 2306:00	SSTL	UK	398	405	51.65	In Earth orbit
S43680	1998-067PR	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	35772	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
S43279	2018-034E	Weina-1 02 weixing	2018 Apr 10 0451:00	WEINA	CN	1085	1098	63.41	In Earth orbit
S43286	2018-035A	IRNSS-R11	2018 Apr 11 2253:00	ISRO	IN	35702	35868	28.63	In Earth orbit
S43339	2018-036A	USA 283	2018 Apr 15 0500:00	AFSMC	US	35740	35834	0.01	In Earth orbit
S43340	2018-036B	USA 284	2018 Apr 15 0502:00	AFRL	US	35587	35618	0.06	In Earth orbit
S43445	2018-036E	USA 285	2018 Apr 26 0000:00	AFRL	US	35288	35288	0.06	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	USA 287	2018 May 12 0000:00	AFRL	US	35573	35633	0.07	In Earth orbit
S43432	2018-037A	Kosmos-2526	2018 Apr 19 0714:00	KVR/VOENT	RU	35568	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	LEU	802	815	98.62	In Earth orbit
S43439	2018-040A	Qinghedao 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	Apstar 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	BSCSL	BD	35776	35797	0.03	In Earth orbit
S43470	2018-045A	Queqiao	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	OSC	US	402	407	51.65	Deorbited
S43546	1998-067NU	CubeRR1	2018 Jul 13 1235:00	OSU	US	399	407	51.64	In Earth orbit
S43547	1998-067NV	TEMPEST-D	2018 Jul 13 1235:00	CSU/JPL	US	399	407	51.63	In Earth orbit
S43548	1998-067NW	RainCube	2018 Jul 13 0805:00	JPL	US	399	407	51.64	In Earth orbit
S43549	1998-067NX	HaleSat	2018 Jul 13 0805:00	UIA	US	399	407	51.64	In Earth orbit
S43550	1998-067NY	Radix	2018 Jul 13 0905:00	ANSP	US	400	406	51.64	In Earth orbit
S43551	1998-067NZ	Endurosat One	2018 Jul 13 1420:00	ENDUR	BGN	400	405	51.64	In Earth orbit
S43552	1998-067PA	Equisat	2018 Jul 13 1420:00	BROWN	US	398	407	51.64	In Earth orbit
S43553	1998-067PB	MemSat	2018 Jul 13 1420:00	ROWAN	US	400	406	51.64	In Earth orbit
S43554	1998-067PC	RadSat-g	2018 Jul 13 1420:00	MSU	US	398	407	51.64	In Earth orbit
S43556	2018-046C	Aerocube 12A	2018 Jul 16 0000:00	AERO	US	477	488	51.64	In Earth orbit
S43557	2018-046D	Aerocube 12B	2018 Jul 16 0000:00	AERO	US	476	488	51.64	In Earth orbit
S43558	2018-046E	Lemur-2-Vu	2018 Jul 16 0000:00	SPIRE	US	477	487	51.64	In Earth orbit
S43559	2018-046F	Lemur-2-Alexander	2018 Jul 16 0000:00	SPIRE	US	477	487	51.64	In Earth orbit
S43560	2018-046G	Lemur-2-Yuasa	2018 Jul 15 0000:00	SPIRE	US	477	488	51.64	In Earth orbit
S43561	2018-046H	Lemur-2-TomHenderson	2018 Jul 15 0000:00	SPIRE	US	477	488	51.64	In Earth orbit
S43476	2018-047A	GRACE-FO 1	2018 May 22 1959:00	JPL/GFZ	US	485	504	88.99	In Earth orbit
S43477	2018-047B	GRACE-FO 2	2018 May 22 1959:00	JPL/GFZ	US	484	504	88.99	In Earth orbit
S43478	2018-047C	Iridium Next SV161	2018 May 22 2053:00	IRID	US	489	714	86.71	In Earth orbit
S43479	2018-047D	Iridium Next SV152	2018 May 22 2054:00	IRID	US	493	710	86.72	In Earth orbit
S43480	2018-047E	Iridium Next SV147	2018 May 22 2056:00	IRID	US	489	714	86.71	In Earth orbit
S43481	2018-047F	Iridium Next SV110	2018 May 22 2058:00	IRID	US	488	718	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	JSE 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/IACC	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	SPX	US	391	396	51.64	Landed
S43529	1998-067PD	Utmsat-1	2018 Aug 10 0945:00	UITM	MY	398	408	51.64	In Earth orbit
S43591	1998-067PE	Maya-1	2018 Aug 10 0945:00	DOST	PH	396	408	51.65	In Earth orbit
S43591	1998-067PF	Bhutan-1	2018 Aug 10 0945:00	BTDT/T	BT	398	408	51.64	In Earth orbit
S43529	2018-056A	PRSS-1	2018 Jul 9 0442:00	SUPA	PK	588	624	98.05	In Earth orbit
S43530	2018-056B	PakTES-1a	2018 Jul 9 0444:00	SUPA	PK	594	628	98.05	In Earth orbit
S43539	2018-057A	Beidou DW 32	2018 Jul 9 2112:00	CNSA	CN	35695	35877	55.05	In Earth orbit
S43537	2018-058A	Progress MS-09	2018 Jul 9 2200:00	RKKE	RU	367	404	51.65	Attached to Pirs
S43597	1998-067PJ	SiriusSat-1	2018 Aug 15 1651:00	SIROTS	RU	401	407	51.64	In Earth orbit



S43598	1998-067PK	SiriusSat-2	2018 Aug 15 1656:00	SIROTS	RU	401	408	51.64	In Earth orbit
S43562	2018-059A	Telstar 19 Vantage	2018 Jul 22 0622:00	TSKY	CA	35771	35799	0.01	In Earth orbit
S43564	2018-060A	GalileoSat-25	2018 Jul 25 1501:00	GSAEU	I-EU	22971	22982	56.37	In Earth orbit
S43565	2018-060B	GalileoSat-26	2018 Jul 25 1521:00	GSAEU	I-EU	23019	23050	56.37	In Earth orbit
S43566	2018-060C	GalileoSat-23	2018 Jul 25 1521:00	GSAEU	I-EU	23230	23252	56.38	In Earth orbit
S43567	2018-060D	GalileoSat-24	2018 Jul 25 1521:00	GSAEU	I-EU	23087	23151	56.38	In Earth orbit
S43569	2018-061A	Iridium Next SV160	2018 Jul 25 1250:00	IRID	US	609	624	86.68	In Earth orbit
S43570	2018-061B	Iridium Next SV166	2018 Jul 25 1249:00	IRID	US	609	623	86.67	In Earth orbit
S43571	2018-061C	Iridium Next SV158	2018 Jul 25 1247:00	IRID	US	609	623	86.67	In Earth orbit
S43572	2018-061D	Iridium Next SV165	2018 Jul 25 1246:00	IRID	US	609	623	86.67	In Earth orbit
S43573	2018-061E	Iridium Next SV155	2018 Jul 25 1244:00	IRID	US	608	623	86.67	In Earth orbit
S43574	2018-061F	Iridium Next SV154	2018 Jul 25 1242:00	IRID	US	608	623	86.68	In Earth orbit
S43575	2018-061G	Iridium Next SV163	2018 Jul 25 1241:00	IRID	US	607	623	86.68	In Earth orbit
S43576	2018-061H	Iridium Next SV156	2018 Jul 25 1239:00	IRID	US	607	623	86.68	In Earth orbit
S43577	2018-061J	Iridium Next SV164	2018 Jul 25 1237:00	IRID	US	607	622	86.67	In Earth orbit
S43578	2018-061K	Iridium Next SV159	2018 Jul 25 1236:00	IRID	US	607	622	86.67	In Earth orbit
S43581	2018-062A	Beidou DW 33	2018 Jul 29 0535:00	CNSA	CN	21509	21546	54.95	In Earth orbit
S43582	2018-062B	Beidou DW 34	2018 Jul 29 0535:00	CNSA	CN	21515	21540	54.95	In Earth orbit
S43585	2018-063A	Gao Fen 11	2018 Jul 31 0314:00	ZZB	CN	241	689	97.43	In Earth orbit
S43587	2018-064A	Merah Putih	2018 Aug 7 0549:00	TELK	ID	35781	35793	0.02	In Earth orbit
S43592	2018-065A	Parker Solar Probe	2018 Aug 12 0814:00	GSFC	US	617	-18602	32.95	Deep Space
S43600	2018-066A	Aeolus	2018 Aug 22 2214:00	ESA	I-ESA	314	317	96.73	In Earth orbit
S43602	2018-067A	Beidou DW 35	2018 Aug 25 0339:00	CNSA	CN	21512	21543	54.99	In Earth orbit
S43603	2018-067B	Beidou DW 36	2018 Aug 25 0339:00	CNSA	CN	21517	21538	54.99	In Earth orbit
S43609	2018-068A	Hai Yang 1C	2018 Sep 7 0328:00	GYZ/CASC	CN	769	786	98.60	In Earth orbit
S43611	2018-069A	Telstar 18 Vantage	2018 Sep 10 0517:00	TSKY	CA	35778	35792	0.04	In Earth orbit
S43613	2018-070A	ICESAT 2	2018 Sep 15 1354:00	GSFC	US	455	468	93.02	In Earth orbit
S43614	2018-070B	SurfSat	2018 Sep 15 1421:00	UCF	US	443	468	93.04	In Earth orbit
S43615	2018-070C	CP7	2018 Sep 15 1421:00	CALP	US	447	466	93.02	In Earth orbit
S43616	2018-070D	ELFIN-STAR	2018 Sep 15 1420:00	UCLA	US	449	465	93.02	In Earth orbit
S43617	2018-070E	ELFIN	2018 Sep 15 1418:00	UCLA	US	443	469	93.04	In Earth orbit
S43618	2018-071A	SI-4	2018 Sep 16 1655:00	SSTL	UK	574	591	97.82	In Earth orbit
S43619	2018-071B	NovaSAR-S	2018 Sep 16 1655:00	SSTL	UK	574	592	97.82	In Earth orbit
S43622	2018-072A	Beidou DW 37	2018 Sep 19 1754:00	CNSA	CN	21514	21541	54.98	In Earth orbit
S43623	2018-072B	Beidou DW 38	2018 Sep 19 1754:00	CNSA	CN	21514	21540	54.98	In Earth orbit
S43630	2018-073A	Konnotori 7 gounki	2018 Sep 22 1807:00	JAXA	J	276	302	51.64	Deorbited
S43638	1998-067PN	SPATIUM-1	2018 Oct 6 0800:00	NTU	SG	400	406	51.64	In Earth orbit
S43639	1998-067PP	RSP-00	2018 Oct 6 0800:00	RSP	J	400	406	51.64	In Earth orbit
S43640	1998-067PQ	Temryu	2018 Oct 6 0800:00	SHIZ	J	401	406	51.64	In Earth orbit
S43632	2018-074A	Azerspace-2	2018 Sep 25 2320:00	AZER	AZ	19523	39918	1.28	In Earth orbit
S43633	2018-074B	Horizons 3e	2018 Sep 25 2306:00	HORZ	US	35780	35792	0.05	In Earth orbit
S43636	2018-075A	Xiangrikui 1	2018 Sep 29 0430:00	GENTI	CN	695	709	98.22	In Earth orbit
S43641	2018-076A	SAOCOM 1A	2018 Oct 8 0234:00	CONAE	AR	615	634	97.90	In Earth orbit
S43642	2018-077A	Yaogan 32 hao 01 zu 01 xing	2018 Oct 9 0256:00	ZZB	CN	689	704	98.27	In Earth orbit
S43643	2018-077B	Yaogan 32 hao 01 zu 02 xing	2018 Oct 9 0258:00	ZZB	CN	681	698	98.28	In Earth orbit
S43647	2018-078A	Beidou DW 39	2018 Oct 15 0810:00	CNSA	CN	21509	21545	55.02	In Earth orbit
S43648	2018-078B	Beidou DW 40	2018 Oct 15 0810:00	CNSA	CN	21535	21783	55.01	In Earth orbit
S43651	2018-079A	USA 288	2018 Oct 17 0747:00	AFMCSW	US	23513	35840	7.27	In Earth orbit
S43653	2018-080A	BepiColombo MPO	2018 Oct 20 0211:00	ESA	I-ESA	170	-78605	5.50	Deep Space Attached to BepiColombo MTM
A09204	2018-080C	Mio	2018 Oct 20 0211:00	JAXA	J	170	-78605	5.50	Deep Space Attached to BepiColombo MOSIP
S43655	2018-081A	Hai Yang 2 02 xing	2018 Oct 24 2317:00	GYZ/CASC	CN	949	957	99.35	In Earth orbit
S43656	2018-081B	Tangguo Guan	2018 Oct 25 0150:00	ALIEX	CN	640	940	99.45	Attached to CZ-4B Y36 Stage 3
A09210	2018-081	SPP/DSB-01	2018 Oct 24 2307:00	CASC	CN	919	939	99.33	In Earth orbit
S43657	2018-082A	Kosmos-2528	2018 Oct 25 0025:00	KVR	RU	244	900	67.14	In Earth orbit
S43662	2018-083A	Zhongfa Haiyang Weixing	2018 Oct 29 0053:00	GUOZ/CNES	CN	509	523	97.53	In Earth orbit
S43663	2018-083B	Xinghe	2018 Oct 29 0055:00	GUOX/CTYK	CN	505	523	97.54	In Earth orbit
S43664	2018-083C	Xiaoxiang-1 02 xing	2018 Oct 29 0055:00	LFLT	CN	507	522	97.52	In Earth orbit
S43665	2018-083D	Zhaojin-1	2018 Oct 29 0055:00	TSHUA	CN	509	523	97.52	In Earth orbit
S43666	2018-083E	CubeBel-1	2018 Oct 29 0055:00	BSUBY	BY	509	524	97.53	In Earth orbit
S43668	2018-083G	Tianqi-1	2018 Oct 29 0055:00	GUOG	CN	510	522	97.52	In Earth orbit
S43669	2018-083H	Changsha gaoxin	2018 Oct 29 0055:00	CTYK	CN	510	522	97.54	In Earth orbit
A09212	2018-083J	Unknown Chinese payload	2018 Oct 29 0055:00	CASAT	CN	510	522	97.54	In Earth orbit
S43671	2018-084A	Ten-Koh	2018 Oct 29 0441:00	KYUT	J	595	614	97.85	In Earth orbit

SA3672	2018-084B	Ibuki 2	2018 Oct 29 0424:00	JAXA	J	585	599	97.85	In Earth orbit
S43676	2018-084F	KhalifaSat	2018 Oct 29 0432:00	EIAsT	UAE	597	616	97.85	In Earth orbit
S43678	2018-084H	Diwata-2B	2018 Oct 29 0451:00	DOST/UPD	PH	595	616	97.84	In Earth orbit
S43679	2018-084J	AUTCube-2	2018 Oct 29 0459:00	AUT	J	586	608	97.83	In Earth orbit
S43681	2018-084K	Aoi	2018 Oct 29 0456:00	SHIZ	J	591	612	97.83	In Earth orbit
S43683	2018-085A	Beidou DW 41	2018 Nov 1 1621:00	CNSA	CN	35783	35794	3.07	In Earth orbit
S43687	2018-086A	Kosmos-2529	2018 Nov 3 2350:00	KVR/IACG	RU	19145	19209	64.82	In Earth orbit
S43689	2018-087A	METOP C	2018 Nov 7 0148:00	EUMET	I-EUM	806	807	98.74	In Earth orbit
S43690	2018-088A	CICERO-10	2018 Nov 11 0444:00	GEOOPT	US	490	515	85.04	In Earth orbit
S43692	2018-088C	NABEO 'Pride of Bavaria'	2018 Nov 11 0534:00	HPS	D	496	512	85.03	Attached to Electron 3
S43693	2018-088D	IRVINE01	2018 Nov 11 0443:00	IPSF	US	496	517	85.03	Kick Stage
S43694	2018-088E	Proxima I	2018 Nov 11 0444:00	FLEET	AU	491	517	85.03	In Earth orbit
S43695	2018-088F	Lemur-2-Zupanski	2018 Nov 11 0443:00	SPIRE	US	499	517	85.04	In Earth orbit
S43696	2018-088G	Proxima II	2018 Nov 11 0444:00	FLEET	AU	490	514	85.03	In Earth orbit
S43697	2018-088H	Lemur-2-Chanusiak	2018 Nov 11 0443:00	SPIRE	US	497	518	85.03	In Earth orbit
S43698	2018-089A	GSAT-29	2018 Nov 14 1154:00	ISRO	IN	35846	36125	0.06	In Earth orbit
S43700	2018-090A	Es'hailSat-2	2018 Nov 15 2118:00	ESHAIL	QA	35766	35808	0.07	In Earth orbit
S43702	2018-091A	Progress MS-10	2018 Nov 16 1822:00	RKKE	RU	251	267	51.64	Attached to Zvezda
S43704	2018-092A	SS John Young	2018 Nov 17 0910:00	OSC	US	401	408	51.64	Attached to Unity
T00002	2018-092	MySat-1	2018 Nov 17 0000:00	MASDAR	UAE	573	590	97.77	In Earth orbit
T00003	2018-092	KickSat-2	2018 Nov 17 0000:00	ARC	US	573	590	97.77	In Earth orbit
T00004	2018-092	CHEFSat	2018 Nov 17 0000:00	NRL	US	573	590	97.77	In Earth orbit
S43706	2018-093A	Beidou DW 42	2018 Nov 18 2154:00	CNSA	CN	21523	22194	54.99	In Earth orbit
S43707	2018-093B	Beidou DW 43	2018 Nov 18 2154:00	CNSA	CN	21532	22072	55.00	In Earth orbit
S43710	2018-094A	Shiyan 6	2018 Nov 19 2352:00	CNSA	CN	487	504	97.41	In Earth orbit
S43711	2018-094B	Jiading-1	2018 Nov 19 2352:00	SPOCK	CN	488	503	97.41	In Earth orbit
S43712	2018-094C	Tianzhi-1	2018 Nov 19 2352:00	ISCAS	CN	489	504	97.41	In Earth orbit
S43713	2018-094D	Tianping-1A	2018 Nov 19 2352:00	GUOX?	CN	486	504	97.41	In Earth orbit
S43714	2018-094E	Tianping-1B	2018 Nov 19 2352:00	GUOX?	CN	488	503	97.41	In Earth orbit
S43717	2018-095A	Mohammed VI-B	2018 Nov 21 0238:00	RMAF	MA	600	606	97.95	In Earth orbit
S43719	2018-096A	HySIS	2018 Nov 29 0445:00	ISRO	IN	628	647	97.97	In Earth orbit
S43720	2018-096B	3Cat-1	2018 Nov 29 0618:00	UPC	E	470	499	97.48	In Earth orbit
S43721	2018-096C	FAGSAT	2018 Nov 29 0618:00	EMAVI	CO	476	499	97.48	In Earth orbit
S43722	2018-096D	Centauri 2	2018 Nov 29 0618:00	FLEET	AU	476	499	97.47	In Earth orbit
S43723	2018-096E	Flock 3r-10	2018 Nov 29 0618:00	PLABS	US	476	499	97.49	In Earth orbit
S43724	2018-096F	Flock 3r-12	2018 Nov 29 0618:00	PLABS	US	474	499	97.49	In Earth orbit
S43725	2018-096G	Flock 3r-11	2018 Nov 29 0618:00	PLABS	US	475	498	97.49	In Earth orbit
S43726	2018-096H	Flock 3r-5	2018 Nov 29 0618:00	PLABS	US	468	499	97.48	In Earth orbit
S43727	2018-096J	Flock 3r-8	2018 Nov 29 0618:00	PLABS	US	475	500	97.49	In Earth orbit
S43728	2018-096K	HSAT-1	2018 Nov 29 0618:00	HARR	US	476	499	97.48	In Earth orbit
S43729	2018-096L	CASE	2018 Nov 29 0618:00	KEPLER	CA	476	499	97.48	In Earth orbit
S43730	2018-096M	Global-1	2018 Nov 29 0620:00	BSKG	US	478	499	97.48	In Earth orbit
S43731	2018-096N	Lemur-2-Orzulak	2018 Nov 29 0618:00	SPIRE	US	475	499	97.49	In Earth orbit
S43732	2018-096P	Lemur-2-Kobyszcze	2018 Nov 29 0618:00	SPIRE	US	471	500	97.49	In Earth orbit
S43733	2018-096Q	Flock 3r-4	2018 Nov 29 0618:00	PLABS	US	471	499	97.48	In Earth orbit
S43734	2018-096R	Flock 3r-3	2018 Nov 29 0618:00	PLABS	US	471	499	97.48	In Earth orbit
S43735	2018-096S	Flock 3r-16	2018 Nov 29 0618:00	PLABS	US	469	500	97.49	In Earth orbit
S43736	2018-096T	Flock 3r-15	2018 Nov 29 0618:00	PLABS	US	471	499	97.49	In Earth orbit
S43737	2018-096U	CICERO-8	2018 Nov 29 0618:00	GEOOPT	US	472	499	97.48	In Earth orbit
S43738	2018-096V	InnoSAT-2	2018 Nov 29 0618:00	ATSB	MY	477	499	97.49	In Earth orbit
S43740	2018-096X	Flock 3r-9	2018 Nov 29 0618:00	PLABS	US	476	500	97.50	In Earth orbit
S43741	2018-096Y	Flock 3r-6	2018 Nov 29 0618:00	PLABS	US	474	499	97.49	In Earth orbit
S43742	2018-096Z	Flock 3r-7	2018 Nov 29 0618:00	PLABS	US	466	498	97.48	In Earth orbit
S43743	2018-096AA	Reaktor Hello World	2018 Nov 29 0618:00	REAKT	FI	476	498	97.50	In Earth orbit
S43744	2018-096AB	Hiber 1	2018 Nov 29 0618:00	HIBER	NL	476	500	97.48	In Earth orbit
S43745	2018-096AC	Lemur-2-Duly	2018 Nov 29 0618:00	SPIRE	US	471	499	97.49	In Earth orbit
S43746	2018-096AD	Lemur-2-Vladimir	2018 Nov 29 0618:00	SPIRE	US	473	499	97.48	In Earth orbit
S43747	2018-096AE	Flock 3r-1	2018 Nov 29 0618:00	PLABS	US	471	499	97.49	In Earth orbit
S43748	2018-096AF	Flock 3r-2	2018 Nov 29 0618:00	PLABS	US	471	499	97.50	In Earth orbit
S43749	2018-096AG	Flock 3r-14	2018 Nov 29 0618:00	PLABS	US	470	500	97.49	In Earth orbit
S43750	2018-096AH	Flock 3r-13	2018 Nov 29 0618:00	PLABS	US	472	499	97.49	In Earth orbit
S43751	2018-097A	Kosmos-2530	2018 Nov 30 0410:00	KVR	RU	1482	1506	82.51	In Earth orbit
S43752	2018-097B	Kosmos-2531	2018 Nov 30 0410:00	KVR	RU	1484	1508	82.51	In Earth orbit
S43753	2018-097C	Kosmos-2532	2018 Nov 30 0410:00	KVR	RU	1485	1508	82.51	In Earth orbit
S43756	2018-098A	Soyuz MS-11	2018 Dec 3 1140:00	RKKE	RU	193	226	51.63	Attached to Poisk

S43758	2018-099A	MinXSS 2	2018 Dec 3 2128:00	US	CLASP	573	588	97.77	In Earth orbit
S43759	2018-099B	SIRION Pathfinder 2	2018 Dec 3 2300:00	AU	SIRION/HELW	574	592	97.76	In Earth orbit
S43761	2018-099D	DoD Cubesat 2A	2018 Dec 3 2300:00	US	AFRL?	573	591	97.77	In Earth orbit
S43762	2018-099E	STPSat 5	2018 Dec 3 2300:00	US	STP	573	591	97.77	In Earth orbit
S43764	2018-099G	Kodiak	2018 Dec 3 2300:00	US	USCG/DHSST	575	591	97.77	In Earth orbit
S43765	2018-099H	Hawk A	2018 Dec 3 2300:00	US	HE360	577	589	97.77	In Earth orbit
S43766	2018-099J	Elysiuim Star 2	2018 Dec 3 2300:00	US	ELYS	573	589	97.77	In Earth orbit
S43767	2018-099K	Landmapper-BC4	2018 Dec 3 2300:00	US	ADIG	575	590	97.77	In Earth orbit
S43768	2018-099L	AISTECHSAT 2	2018 Dec 3 2300:00	E	AISTS	574	592	97.77	In Earth orbit
S43769	2018-099M	Flock 3s-1	2018 Dec 3 2300:00	US	PLABS	574	592	97.77	In Earth orbit
S43770	2018-099N	AMSAT-OSCAR-95	2018 Dec 3 2300:00	US	AMNA	574	591	97.77	In Earth orbit
S43771	2018-099P	SeaHawk 1	2018 Dec 3 2300:00	US	UNCW/MOOREF	573	587	97.77	In Earth orbit
S43772	2018-099Q	RANGE A	2018 Dec 3 2300:00	US	GIT	574	588	97.77	In Earth orbit
S43773	2018-099R	RANGE B	2018 Dec 3 2300:00	US	GIT	574	590	97.77	In Earth orbit
S43774	2018-099S	Hiber 2	2018 Dec 3 2300:00	NL	HIBER	575	591	97.77	In Earth orbit
S43775	2018-099T	BRIO	2018 Dec 3 2300:00	US	MYRI/SPQ	574	591	97.76	In Earth orbit
S43776	2018-099U	DoD Cubesat 2B	2018 Dec 3 2300:00	US	AFRL?	572	591	97.76	In Earth orbit
S43777	2018-099V	VisionCube	2018 Dec 3 2300:00	KR	KRAU	573	589	97.77	In Earth orbit
S43778	2018-099W	IRVINE02	2018 Dec 3 2300:00	US	IPSF	572	591	97.77	In Earth orbit
S43779	2018-099X	RAAF M1	2018 Dec 3 2300:00	AU	RAAF	573	588	97.76	In Earth orbit
S43780	2018-099Y	MOVE 2	2018 Dec 3 2300:00	D	TUM	572	590	97.76	In Earth orbit
S43781	2018-099Z	VESTA	2018 Dec 3 2300:00	UK	HONEYA/UKSA	573	592	97.77	In Earth orbit
S43782	2018-099AA	SNUSAT 2	2018 Dec 3 2300:00	KR	SNU	572	588	97.76	In Earth orbit
S43783	2018-099AB	KazSTSat	2018 Dec 3 2300:00	KZ	GHALAM	573	589	97.77	In Earth orbit
S43784	2018-099AC	SNUGLITE	2018 Dec 3 2300:00	KR	SNU	572	591	97.77	In Earth orbit
S43785	2018-099AD	OrbWeaver 2	2018 Dec 3 2300:00	US	DARPA	572	587	97.76	In Earth orbit
S43786	2018-099AE	ITASAT-1	2018 Dec 3 2300:00	BR	ITA	573	592	97.77	In Earth orbit
S43787	2018-099AF	KazSciSat	2018 Dec 3 2300:00	KZ	GHALAM	572	589	97.77	In Earth orbit
S43788	2018-099AG	Flock 3s-3	2018 Dec 3 2300:00	US	PLABS	577	590	97.77	In Earth orbit
S43789	2018-099AH	K2SAT	2018 Dec 3 2300:00	KR	KAIST/KAPA	571	591	97.77	In Earth orbit
S43790	2018-099AJ	Eaglet 1	2018 Dec 3 2300:00	I	OHBI	573	591	97.77	In Earth orbit
S43791	2018-099AK	Denali	2018 Dec 3 2300:00	US	CAPSP	573	591	97.77	In Earth orbit
S43792	2018-099AL	ESEO	2018 Dec 3 2047:00	US	ESA	572	589	97.77	In Earth orbit
S43793	2018-099AM	CSIM-FD	2018 Dec 3 2300:00	US	CLASP	573	590	97.77	In Earth orbit
S43794	2018-099AN	Hawk B	2018 Dec 3 2300:00	US	HE360	577	590	97.77	In Earth orbit
S43795	2018-099AP	OrbWeaver 1	2018 Dec 3 2300:00	US	DARPA	572	587	97.77	In Earth orbit
S43796	2018-099AQ	THEA	2018 Dec 3 2300:00	US	AUNIS/SPQ	571	589	97.77	In Earth orbit
S43797	2018-099AR	SkySat C12	2018 Dec 3 2300:00	US	PLABST	572	588	97.77	In Earth orbit
S43798	2018-099AS	Astrocast-01	2018 Dec 3 2300:00	CH	ACAST	574	590	97.77	In Earth orbit
S43799	2018-099AT	Hawk C	2018 Dec 3 2300:00	US	HE360	574	592	97.77	In Earth orbit
S43800	2018-099AU	ICEYE-X2	2018 Dec 3 2300:00	FI	ICEYE	570	588	97.77	In Earth orbit
S43801	2018-099AV	DoD Cubesat 2C	2018 Dec 3 2300:00	US	AFRL?	575	589	97.77	In Earth orbit
S43802	2018-099AW	SkySat C13	2018 Dec 3 2300:00	US	PLABST	573	590	97.77	In Earth orbit
S43803	2018-099AX	JO-97	2018 Dec 3 2300:00	JO	JUST	573	590	97.77	In Earth orbit
S43804	2018-099AY	Suomi-100	2018 Dec 3 2300:00	FI	AALTO	573	589	97.77	In Earth orbit
S43805	2018-099AZ	Al-Parabi 2	2018 Dec 3 2300:00	KZ	KAZNU	573	589	97.77	In Earth orbit
S43806	2018-099BA	KNACKSAT	2018 Dec 3 2300:00	T	KMUTNB	573	589	97.77	In Earth orbit
S43807	2018-099BB	EurCROPIS	2018 Dec 3 1905:00	D	DLR	574	591	97.77	In Earth orbit
S43808	2018-099BC	Yukon	2018 Dec 3 2300:00	US	USCG/DHSST	573	591	97.77	In Earth orbit
S43809	2018-099BD	Centauri 1	2018 Dec 3 2300:00	AU	FLEET	573	591	97.77	In Earth orbit
S43810	2018-099BE	Adacny Zero	2018 Dec 3 2300:00	US	AUDACY	574	591	97.77	In Earth orbit
S43811	2018-099BF	NEXTSat 1	2018 Dec 3 2300:00	KR	KAIST	572	589	97.77	In Earth orbit
S43812	2018-099BG	BlackSky Global 2	2018 Dec 3 2300:00	US	BSKG	577	591	97.77	In Earth orbit
S43813	2018-099BH	Vusat-OSCAR-96	2018 Dec 3 2300:00	IN	EXSEED	572	589	97.77	In Earth orbit
S43814	2018-099BJ	PW-Sat2	2018 Dec 3 2300:00	PL	PWAR	572	591	97.77	In Earth orbit
S43815	2018-099BK	FalconSat 6	2018 Dec 3 2300:00	US	USAF	572	592	97.77	In Earth orbit
S43816	2018-099BL	SpaceBEE 7	2018 Dec 3 2300:00	US	SWARM	573	589	97.76	In Earth orbit
S43817	2018-099BM	SpaceBEE 5	2018 Dec 3 2300:00	US	SWARM	573	590	97.77	In Earth orbit
S43818	2018-099BN	SpaceBEE 6	2018 Dec 3 2300:00	US	SWARM	573	589	97.77	In Earth orbit
S43819	2018-099BP	eXCITE	2018 Dec 3 1900:00	US	DARPA	569	588	97.77	In Earth orbit
S43820	2018-099BQ	BlackHawk	2018 Dec 3 2300:00	US	VIA	572	591	97.77	In Earth orbit
S43821	2018-099BR	Flock 3s-2	2018 Dec 3 2300:00	US	PLABS	572	592	97.77	In Earth orbit
S43822	2018-099BS	Orbital Reflector	2018 Dec 3 2300:00	US	NVART	573	588	97.77	In Earth orbit
A09246	2018-099	ENOCH	2018 Dec 3 0000:00	US	LACMA	0	0	0.00	Attached to Unknown de- ployer
T00006	2018-099BU	WeissSat 1	2018 Dec 3 2313:00	US	WEISS	573	590	97.77	In Earth orbit

T00008	2018-099BW	ICE-Cap	2018 Dec 3 1900:00	PEOSS	US	573	590	97.77	In Earth orbit
T00009	2018-099BX	SeeMe	2018 Dec 3 0000:00	DARPA/RAYMS	US	573	590	97.77	In Earth orbit
S43823	2018-100A	Geo-Kompsat-2A	2018 Dec 4 2100:00	KARI	KR	24057	35742	0.29	In Earth orbit
S43824	2018-100B	GSAT-11	2018 Dec 4 2106:00	ISRO	IN	35507	35842	0.08	In Earth orbit
S43827	2018-101A	Dragon CRS-16	2018 Dec 5 1826:00	SPX	US	401	408	51.64	Landed
T00007	2018-101	CATSat 1	2018 Dec 5 0000:00	APL	US	401	408	51.64	In Earth orbit
T00010	2018-101	UNITE	2018 Dec 5 0000:00	USIN	US	573	590	97.77	In Earth orbit
T00011	2018-101	CATSat 2	2018 Dec 5 0000:00	APL	US	573	590	97.77	In Earth orbit
T00012	1998-067	TechEdSat-8	2018 Dec 5 0000:00	ARC/SJSU	US	573	590	97.77	In Earth orbit
T00013	2018-101	Delphi 1	2018 Dec 5 0000:00	AARH	DK	573	590	97.77	In Earth orbit
S43831	2018-102A	Saudisat-5A	2018 Dec 7 0422:00	KACST	SA	533	551	97.63	In Earth orbit
S43832	2018-102B	Saudisat-5B	2018 Dec 7 0422:00	KACST	SA	532	551	97.63	In Earth orbit
S43833	2018-102C	TY/DF-1	2018 Dec 7 0422:00	CTYK	CN	531	551	97.63	In Earth orbit
S43834	2018-102D	TFFSTAR	2018 Dec 7 0422:00	UESTC/GUOX	CN	532	550	97.63	In Earth orbit
S43835	2018-102E	Xinjiang Jiaotong-01	2018 Dec 7 0422:00	CTYK	CN	531	550	97.63	In Earth orbit
S43836	2018-102F	Piao chong 1	2018 Dec 7 0422:00	JJUT/OFO	CN	531	550	97.63	In Earth orbit
S43837	2018-102G	Maowang Shouyinji Xing	2018 Dec 7 0422:00	MAOW	CN	549	549	97.63	In Earth orbit
S43838	2018-102H	Huami xing	2018 Dec 7 0422:00	HUAMI	CN	529	550	97.63	In Earth orbit
S43839	2018-102J	Piao chong 4	2018 Dec 7 0422:00	JJUT	CN	529	549	97.64	In Earth orbit
S43840	2018-102K	Likeda Jiaoyu weixing	2018 Dec 7 0422:00	LIDA	CN	528	549	97.63	In Earth orbit
S43841	2018-102L	Tianmao guoji xing	2018 Dec 7 0422:00	ALIEX	CN	528	549	97.64	In Earth orbit
S43842	2018-102M	RE:X xing	2018 Dec 7 0422:00	JJUT/LUHAN	CN	528	549	97.64	In Earth orbit
S43843	2018-102N	Chang'e-4	2018 Dec 7 1843:00	CASC	CN	423507	29.45	Deep Space	In Earth orbit
S43844	2018-103A	TOMSAT R3	2018 Dec 16 0726:00	AERO	US	492	512	85.04	In Earth orbit
S43849	2018-104A	Shields	2018 Dec 16 0726:00	LARCN	US	494	514	85.03	In Earth orbit
S43850	2018-104B	NMTSat	2018 Dec 16 0726:00	NMTECH	US	489	510	85.04	In Earth orbit
S43851	2018-104C	STP-1	2018 Dec 16 0726:00	GSFC/WVU	US	494	513	85.03	In Earth orbit
S43852	2018-104D	Da Vinci	2018 Dec 16 0726:00	LCFE/NISCA	US	489	511	85.03	In Earth orbit
S43853	2018-104E	Rsat	2018 Dec 16 0726:00	USNA	US	492	511	85.03	In Earth orbit
S43854	2018-104F	CHOMP/T	2018 Dec 16 0726:00	UFL	US	491	511	85.03	In Earth orbit
S43855	2018-104G	ISX	2018 Dec 16 0726:00	CALP	US	489	510	85.03	In Earth orbit
S43856	2018-104H	CeReS	2018 Dec 16 0726:00	GSFC	US	494	511	85.04	In Earth orbit
S43857	2018-104J	CubeSail USat	2018 Dec 16 0726:00	UIUC/CATHU	US	494	512	85.04	In Earth orbit
S43858	2018-104K	AIBUS	2018 Dec 16 0726:00	GRC	US	494	512	85.04	In Earth orbit
S43859	2018-104L	Goergen	2018 Dec 16 0726:00	DARPA	US	495	511	85.04	In Earth orbit
S43860	2018-104M	TOMSAT Eagle Scout	2018 Dec 16 0726:00	AERO	US	495	511	85.03	In Earth orbit
S43861	2018-104N	GSAT-7A	2018 Dec 19 1049:00	ISRO	IN	35553	42013	0.16	In Earth orbit
S43862	2018-106A	CSO-1	2018 Dec 19 1738:00	DGA/CNES	F	800	800	98.60	In Earth orbit
S43867	2018-107A	Kosmos-2533	2018 Dec 21 0922:00	KVR/VOENT	RU	35420	35797	0.17	In Earth orbit
S43871	2018-108A	Hongyuu Gongcheng JYW	2018 Dec 22 0005:00	CASIC	CN	1061	1077	99.92	In Earth orbit
S43873	2018-109A	GPS III-02	2018 Dec 23 1547:00	USAF	US	20171	20189	54.93	In Earth orbit
S43874	2018-110A	Tongxin Jishu Shiyuan 3	2018 Dec 25 1718:00	CASC	CN	35778	35793	0.11	In Earth orbit
S43917	2018-110C	TJS-3 subsatellite	2018 Dec 31 0000:00	CASC	CN	35787	35863	0.10	In Earth orbit
S43876	2018-111A	Kanopus-V No. 5	2018 Dec 27 0306:00	VNIEM	RU	503	511	97.47	In Earth orbit
S43877	2018-111B	Kanopus-V No. 6	2018 Dec 27 0312:00	VNIEM	RU	498	511	97.47	In Earth orbit
S43879	2018-111D	iSat	2018 Dec 27 0430:00	ISKY	CZ	571	586	97.72	In Earth orbit
S43880	2018-111E	UWE-4	2018 Dec 27 0430:00	WURZ	D	572	585	97.72	In Earth orbit
S43881	2018-111F	D-Star ONE Sparrow	2018 Dec 27 0430:00	GOS	D	571	588	97.72	In Earth orbit
S43882	2018-111G	Lemur-2-ChristinaHolt	2018 Dec 27 0430:00	SPIRE	US	570	585	97.73	In Earth orbit
S43883	2018-111H	Lemur-2-ThyKev	2018 Dec 27 0430:00	SPIRE	US	569	584	97.73	In Earth orbit
S43884	2018-111J	Lemur-2-RemyColton	2018 Dec 27 0430:00	SPIRE	US	570	585	97.72	In Earth orbit
S43885	2018-111K	Lemur-2-Gustavo	2018 Dec 27 0430:00	SPIRE	US	570	585	97.73	In Earth orbit
S43886	2018-111L	Lemur-2-Zo	2018 Dec 27 0430:00	SPIRE	US	569	585	97.73	In Earth orbit
S43887	2018-111M	Lemur-2-NatalieMurray	2018 Dec 27 0430:00	SPIRE	US	570	586	97.72	In Earth orbit
S43888	2018-111N	Lemur-2-SarahBettyBoo	2018 Dec 27 0430:00	SPIRE	US	569	584	97.73	In Earth orbit
S43889	2018-111P	Lemur-2-DaisyHarper	2018 Dec 27 0430:00	SPIRE	US	569	587	97.73	In Earth orbit
S43890	2018-111Q	GRUS 1	2018 Dec 27 0430:00	AXEL	J	570	583	97.72	In Earth orbit
S43891	2018-111R	ZACUBE-2	2018 Dec 27 0625:00	CPUT	ZA	480	508	97.30	In Earth orbit
S43892	2018-111S	Flock 3k-3	2018 Dec 27 0625:00	PLABS	US	479	511	97.30	In Earth orbit
S43893	2018-111T	Flock 3k-4	2018 Dec 27 0625:00	PLABS	US	479	511	97.30	In Earth orbit
S43894	2018-111U	Flock 3k-1	2018 Dec 27 0625:00	PLABS	US	480	511	97.30	In Earth orbit
S43895	2018-111V	Flock 3k-2	2018 Dec 27 0625:00	PLABS	US	479	511	97.30	In Earth orbit
S43896	2018-111W	Flock 3k-6	2018 Dec 27 0625:00	PLABS	US	480	509	97.30	In Earth orbit
S43899	2018-111Z	Flock 3k-5	2018 Dec 27 0625:00	PLABS	US	480	509	97.30	In Earth orbit
S43901	2018-111AB	Flock 3k-8	2018 Dec 27 0625:00	PLABS	US	480	509	97.30	In Earth orbit
S43902	2018-111AC	Flock 3k-7	2018 Dec 27 0625:00	PLABS	US	480	510	97.30	In Earth orbit

S43903	2018-1111AD	Flock 3k-12	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43904	2018-1111AE	Flock 3k-11	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43905	2018-1111AF	Flock 3k-10	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43906	2018-1111AG	Flock 3k-9	2018 Dec 27 06:25:00	PLABS	US	480	509	97.30	In Earth orbit
S43908	2018-1111AJ	Lume-1	2018 Dec 27 06:25:00	VIGO	E	480	514	97.30	In Earth orbit
S43909	2018-1112A	Yunhai-2 01 xing	2018 Dec 29 11:00:00	CASC	CN	516	524	50.01	In Earth orbit
S43910	2018-1112B	Yunhai-2 02 xing	2018 Dec 29 09:30:00	CASC	CN	514	524	50.01	In Earth orbit
S43911	2018-1112C	Yunhai-2 03 xing	2018 Dec 29 09:30:00	CASC	CN	512	524	50.01	In Earth orbit
S43912	2018-1112D	Yunhai-2 04 xing	2018 Dec 29 09:30:00	CASC	CN	1088	1097	50.01	In Earth orbit
S43913	2018-1112E	Yunhai-2 05 xing	2018 Dec 29 11:00:00	CASC	CN	1090	1098	50.01	In Earth orbit
S43914	2018-1112F	Chongqing	2018 Dec 29 09:30:00	DFHYT	CN	1090	1098	50.01	In Earth orbit
S43915	2018-1112G	Yunhai-2 06 xing	2018 Dec 29 11:00:00	CASC	CN	1092	1099	50.01	In Earth orbit
Payloads not included in annual statistics									
A09191	2018-073	HSRC	2018 Nov 10 21:24:00	JAXA	J	-55	380	51.64	Ejected during reentry
A09198	1998-067	STARS-Me Koki	2018 Oct 6 08:00:00	SHIZ	J	401	406	51.64	Attached to STARS-Me by tether
A09199	1998-067	STARS-Me Climber	2018 Oct 6 08:00:00	SHIZ	J	401	406	51.64	Attached to STARS-Me by tether
A09236	2018-103	Yutu-2	2018 Dec 7 18:43:00	CASC	CN	-1416	423508	29.45	Planetary surface rover
A09243	2018-104E	CubeSail LSat	2018 Dec 16 00:00:00	UIUC/CATHU	US	0	0	0.00	Attached to CubeSail USat by tether

Note: It appears that ENOCH was never deployed; it is nevertheless counted in the figure of 461 satellites given in the launch statistics section. It is still unclear how many satellites were actually deployed on the SSO-A launch.

*Notes:*

*Rev 1.1 - corrected typo.*

*Rev 1.2 - added discussion of Ariane launch anomaly.*

*Rev 1.3 - added note on Zhongxing GEO retirements in 2017.*