



Orbital Debris

Quarterly News

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PROJECT REVIEW

MACS HTV-X3 Technology Demonstration Mission Preparation

NASA AND JAXA MACS TEAM

Millimeter-sized orbital debris (OD) represents the highest mission-ending penetration risk to spacecraft operating in low Earth orbit (LEO). This is the result of detailed orbital debris impact risk assessments for many NASA missions and was a conclusion from a NASA Engineering and Safety Center panel study [1]. When a small, millimeter-sized OD hits a critical system of a spacecraft, such as the fuel tank or battery, the outcome may not be the catastrophic destruction of the vehicle, but the impact can be severe enough to penetrate the fuel tank, damage the battery, or disrupt other critical systems resulting in the early termination of the mission.

Since the OD population closely follows a power-law size distribution, there is far more millimeter-sized debris (on the order of 100 million) than large, trackable objects (approximately 50,000) in the environment. Therefore, the likelihood of non-catastrophic but mission-ending damage to critical systems caused by millimeter-sized OD is orders of magnitude greater than the likelihood of an accidental collision with a large, trackable object. In addition, a disabled vehicle is a sitting duck in the environment. Sooner or later, it could collide with other objects to create even more debris to further pollute the environment. Therefore, addressing risk from millimeter-sized OD is necessary for the safe operations

of space missions and directly supports limiting the generation of new debris to preserve the environment.

Despite the importance of characterizing risk from millimeter-sized OD, there is a lack of direct measurement data on such small debris at altitudes from 600 km to 1000 km where hundreds of regular spacecraft, including about 20 from NASA, operate. Sizes at these altitudes are not detectable by ground-based sensors, so characterization depends on *in situ* sensors. Direct measurement data is needed for reliable OD impact risk assessments to support the development and implementation of cost-effective protective measures for safe mission operation.

To address the critical data gap with millimeter-sized OD above 600 km altitude, the NASA Orbital Debris Program Office (ODPO) has investigated various small OD *in situ* measurement technologies and combinations of technologies, such as aerogel, acoustic sensors, resistive grids, and others since 2002. The most advanced concept is the Multi-layer Acoustic & Conductive-grid Sensor (MACS), which includes a key component from JAXA, a conductive-grid thin film Space Debris Monitor (SDM). The ODPO has collaborated with JAXA, under several agency agreements, to develop, test, and optimize the design of MACS for *in situ* measurements of millimeter-sized OD since 2017.



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MACS Demonstration

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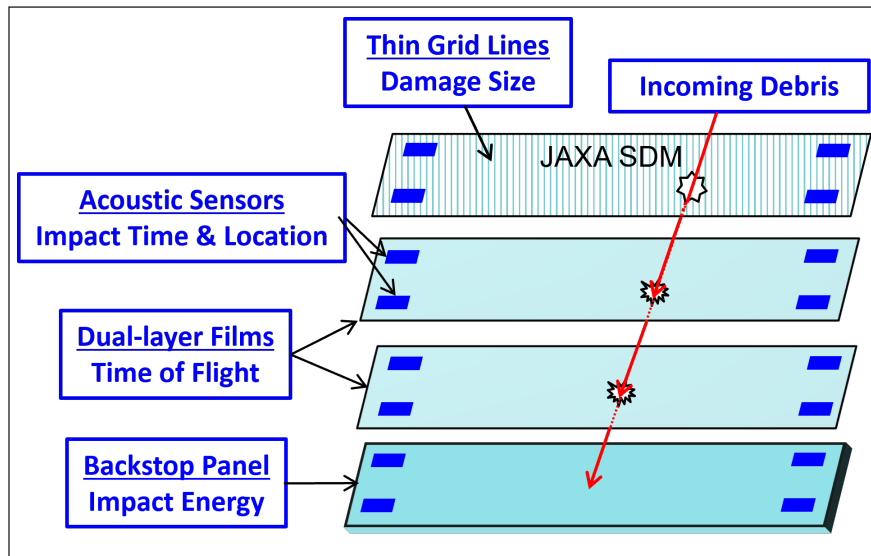


Figure 1. Illustration of MACS impact detection principles.

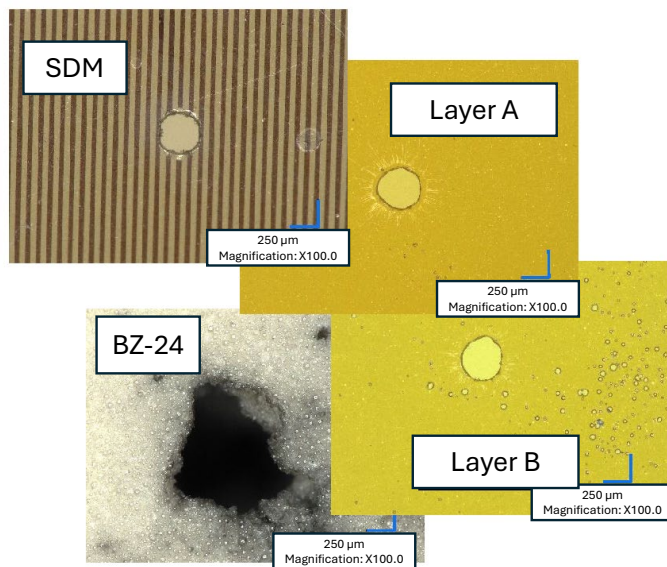


Figure 2. Impact features on the 4 layers of the MACS prototype unit from one of the hypervelocity impact tests at WSTF (HITF23124, MACS148, 2023)

MACS is a four-layer sensing system as illustrated in Fig. 1. The first layer is JAXA's SDM, which is a flight-demonstrated and patented technology specifically designed to measure the sizes of impacting debris [2]. The second and the third layers are identical polyimide films, and the last layer is a low-density syntactic foam panel. Multiple acoustic sensors specifically selected for small OD impact measurements are attached to each layer to collect data on impact time and location [3]. The acoustic sensors on the backstop foam panel are also used to determine impact kinetic energy from the amplitudes of the acoustic signals. The impact time and location data from different layers are combined to

calculate impact speed and direction. Mass and material density of the impacting debris can then be calculated from its size, speed, and impact kinetic energy.

A simple detection of “something” is insufficient for meaningful improvements to OD modeling and risk assessments. In search of more specific measurement data, the 2022 U.S. National Orbital Debris Implementation Plan calls for the following to improve characterization of small debris in LEO: “Investigate technology development and mission opportunities for in-situ measurement sensors to identify, develop, and mature in-situ measurement technologies; leverage researched technologies; and encourage the development of novel concepts capable of collecting similar types of data, including size, mass, material density, speed, and direction, on the millimeter-sized orbital debris. Identify mission opportunities to deploy sensors to collect statistically meaningful data on the millimeter-sized orbital debris between 600 km and 1000

km altitudes [4].” The innovative design of MACS, with a unique combination of SDM, acoustic sensors, multi-layer thin films, and backstop foam panel, allows it to collect the necessary measurement data to meet this objective.

As the ODPO and the JAXA SDM team matured the MACS design, an opportunity for a technology demonstration of MACS on a future H-II Transfer Vehicle (HTV-X3) flight was identified in 2022 and confirmed in 2023. The MACS technology demonstration on HTV-X3 is sponsored by the NASA Office of Safety and Mission Assurance (OSMA) via its funding of the ODPO, the Heliophysics Division (HPD) of the NASA Science Mission Directorate (SMD), the ISS Program, and JAXA (SDM and HTV-X3). The nominal mission profile of HTV-X3's technology demonstration phase, after it leaves the ISS, is up to an altitude of 450 km with a duration of up to 6 months. This mission profile provides a great opportunity to fully mature the MACS Technology Readiness Level (TRL) and demonstrate its ability to collect important measurement data on millimeter-sized OD.

A 14-week hypervelocity impact test campaign consisting of 168 shots was conducted at NASA White Sands Test Facility (WSTF) between 2021 and 2023 to evaluate the MACS configuration and simulate MMOD impacts. The testing on the MACS prototype focused on assessing layer-to-layer separation distances and measuring acoustic responses across a range of projectile material densities and sizes. Projectiles made of low-, medium-, and high-density materials were used for the tests. They included polymethyl methacrylate (1.2 g/cm³), glass (2.45 g/cm³), aluminum (2.80 g/cm³), aluminum oxide (3.95 g/cm³), titanium (4.45 g/cm³), stainless steel (7.67 g/cm³), and copper (8.96 g/cm³). Sizes of the projectile ranged from 0.2 mm to 1.76 mm in diameter. The impact speeds ranged from 5.27 km/s to 7.19 km/s. Most of the impacts

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MACS Demonstration

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were normal to the surface, but some were oblique, 15 degrees to normal. SDM and acoustic sensor data were recorded for all test shots. A visual inspection of each layer was conducted inside the target chamber after each shot. At the conclusion of each test series, the MACS prototype unit was shipped back to the ODPO at Johnson Space Center for detailed photo documentation of impact features. Fig. 2 shows the damage holes on the four layers from the impact of a 0.3 mm-diameter stainless steel projectile at 7 km/s.

The 14 hypervelocity impact test series and the lessons learned significantly improved the TRL of the MACS prototype unit. Additional component-level environmental tests were also conducted to further increase the TRL of MACS. Those tests included random vibration, thermal vacuum, atomic oxygen, and shock tests on the MACS components.

After a successful Preliminary Design Review in May 2024, the focus of the MACS team turned to the design, testing, evaluation, and building of a MACS Engineering Development Unit (EDU), which was completed in September 2025 (Fig. 3). The EDU has an effective detection area of 0.34 m². The MACS team used the EDU for a series of component-level critical design assessments (CDAs) over the next six months, including a joint ethernet test where HTV-X emulator hardware (computers, ethernet converters, and others) was connected to the EDU for end-to-end command and data transfer tests. The conclusion of the CDAs, which was equivalent to a critical design review, in March 2026 marked another major milestone for the preparation of the HTV-X3 mission.

The MACS team is currently focusing on building the flight unit, conducting more testing and evaluations, including joint electronic and mechanical tests with JAXA, in preparation for the delivery of the MACS flight unit to JAXA in June 2027. The launch of HTV-X3 is tentatively scheduled for September 2027. A successful MACS technology demonstration on HTV-X3 will pave the way for NASA and

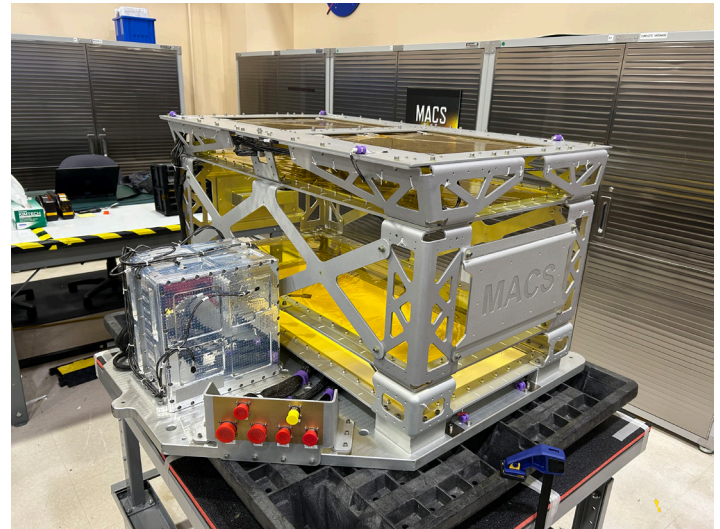


Figure 3. MACS EDU with its electronic box mounted on an interface plate.

JAXA to pursue a mission to address the critical millimeter-sized OD data gap above 600 km altitude in the near future.

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HUSIR and Goldstone Measurements of the Orbital Debris Environment: 2024-2025

J. MURRAY AND A. MANIS

Ground-based radar measurements are the primary source of data on small debris in low Earth orbit (LEO) used by the NASA Orbital Debris Program Office (ODPO) to build and validate statistical models of the orbital debris (OD) environment. The Haystack Ultrawideband Satellite Imaging Radar (HUSIR), operated by the Massachusetts Institute of Technology's Lincoln Laboratory (MIT/LL), is the primary radar sensor used by the ODPO and provides data on debris with sizes down to approximately 5 to 7 mm at altitudes less than 1000 km and 2 to 3 cm throughout LEO. The Goldstone Orbital Debris Radar (Goldstone), operated by NASA's Jet Propulsion Laboratory

(JPL), extends this coverage down to approximately 2 to 3 mm below 1000 km altitude. This project review presents a summary of HUSIR and Goldstone detections during calendar year (CY) 2024-2025. Detailed reports on these datasets are in work.

For statistical sampling of the OD environment, HUSIR and Goldstone operate in a beam park or staring mode and detect debris that pass through the radar beam. HUSIR is a monostatic system and typically operates in 3 pointing geometries: 75° elevation, due East (75E); 20° elevation, due South (20S); and 10° elevation, due South (10S). Most of the data is collected at the 75E pointing. Goldstone is a bistatic radar, and for beam park

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Radar Measurements

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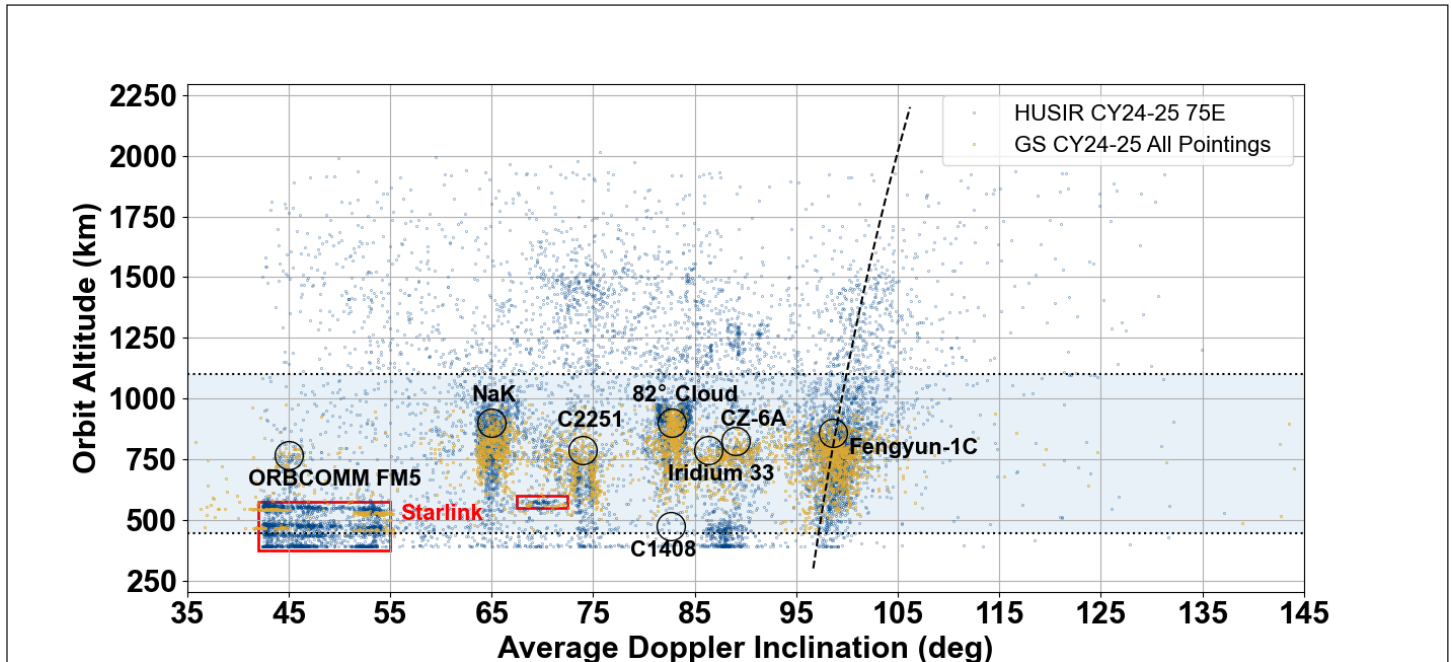


Figure 1. Orbit altitude versus average Doppler inclination for HUSIR and Goldstone 75E detections in CY2024-2025. The combined altitude coverage of all Goldstone pointings is indicated by the shaded region between the horizontal black dotted lines. The sun-synchronous condition, assuming a circular orbit, is indicated by the dashed black line.

observations, the transmitter is pointed at a fixed azimuth and elevation while the receiver is pointed to intersect the transmitter beam at a targeted slant range. During 2024 and 2025, the Deep Space Station (DSS)-14 antenna was used as the transmitter, with DSS-25 and DSS-26 used as receivers. In 2020, the ODPO began using targeted pointings “A,” “B,” “C,” and “D” to cover altitudes of interest between 700 km and 1000 km [1, 2]. In 2024, 4 additional pointings, “W,” “X,” “Y,” and “Z,” were added to target lower altitudes, down to approximately 420 km.

In 2025, pointing X, covering altitudes from 500 km to 584 km, was discontinued for regular use. This pointing was chosen to target the altitudes of operational Starlink spacecraft to identify potential populations of small debris at these altitudes; however, due to issues with saturation of the receiver by large objects for Goldstone’s OD data collections, operational spacecraft alias as small objects and are indistinguishable from OD detections. SpaceX has begun to lower the operational altitude of their 43° and 53° inclination spacecraft, which may provide an opportunity to revisit pointing X to identify millimeter-sized debris before they decay out of orbit. This identification would help constrain the small debris population for OD environment models.

When operating in beam park mode, an object’s path through the beam is short, and obtaining full orbital information with sufficient accuracy to construct precise orbits is not possible. However, by applying a circular orbit assumption, the measured range and range-rate (Doppler velocity) can be converted to orbit altitude and Doppler inclination. The orbit altitude versus average Doppler inclination from HUSIR and Goldstone detections in CY2024 and CY2025 are shown in Figure 1. For Goldstone, only

detections that fell within the main beam overlap of a given pointing are included, and such detections from all pointings are combined.

Debris families are evident in this view and are similar for both datasets. Notable on-orbit fragmentation events are also highlighted in Figure 1 with black circles. The circles are centered on the altitude and inclination of the parent body at the time of the event. Additionally, red rectangles outline detections associated with the Starlink satellite constellation. Most span approximately 43° – 53° inclination with additional orbits around 70° inclination starting to become evident. Additional groupings correspond to the sodium-potassium (NaK) coolant droplet family near 65° and a grouping near 900 to 1100 km altitude, 82° inclination, that has been identified in previous years and may correspond to a low-velocity shedding event [3].

Beginning in mid-2024, a new grouping below 500 km altitude and near 88° inclination was identified in the HUSIR data that has persisted through 2025. There are no identified fragmentation events corresponding to the timing and location of this new cloud. Since it appears to be persistent, it is possible that the source mechanism is a low-velocity shedding event. Potential sources are under investigation.

In August 2024, a breakup of a CZ-6A upper stage occurred near 800 km altitude, 89° inclination (ODQN vol. 28, issue 4, pp. 1-2). A cloud in this region is newly evident in the 2025 data. Data collections near the time of the event are still under investigation to determine if debris from this event can be further isolated and characterized.

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Radar Measurements

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An object's measured radar cross section (RCS) is converted to a size using the NASA size estimation model (SEM), which relates RCS to an object's physical size based on laboratory RCS measurements [4, 5]. Figure 2 compares the cumulative flux versus SEM size from HUSIR and Goldstone in 2024 and 2025. Since HUSIR's monostatic configuration covers a large range of LEO altitudes while Goldstone's bistatic pointings provide coverage of specific altitudes where the transmitter and receiver beams overlap, comparisons between HUSIR and Goldstone are made within the altitude range of Goldstone's main beam overlap for each pointing separately. Figure 2 presents such a comparison for an altitude range of 561.5 km to 664.5 km, corresponding to the main beam overlap of Goldstone's pointing Y. The flux is defined as the cumulative count rate for each sensor within the specified altitude range, divided by the total lateral beam surface area between the minimum and maximum altitude defining that range. As noted above, Goldstone is affected by saturation issues in the receiver at larger sizes, thus an upper size limit of 1 cm is imposed for data from both sensors.

Goldstone's sensitivity to smaller sizes compared to HUSIR is evident, with Goldstone extending the size coverage from HUSIR down to approximately 2 to 3 mm at these altitudes. The distributions from the two sensors overlap within their respective uncertainties. The larger uncertainties for the Goldstone data are due to fewer hours of data collected as compared to HUSIR. A qualitative difference exists in the roll-off regions between the two sensors and is the result of the bistatic nature of Goldstone. A quick roll-off is evident in the HUSIR data near the smallest sizes this sensor can each detect due to probability of detection dropping off rapidly. Goldstone exhibits a less-steep roll-off related to peak sensitivity occurring at the beam intersection altitude and gradually decreasing at altitudes above and below.

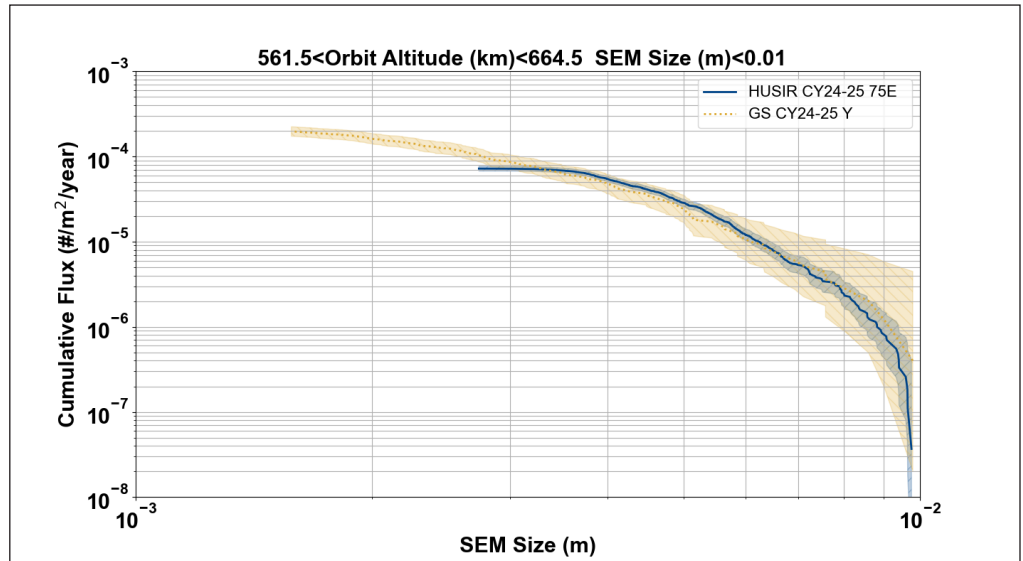


Figure 2. Cumulative flux versus SEM size comparison for HUSIR and Goldstone in CY2024-25, limited to the main beam overlap of Goldstone's pointing Y. The shaded regions represent the 2σ uncertainty bounds.

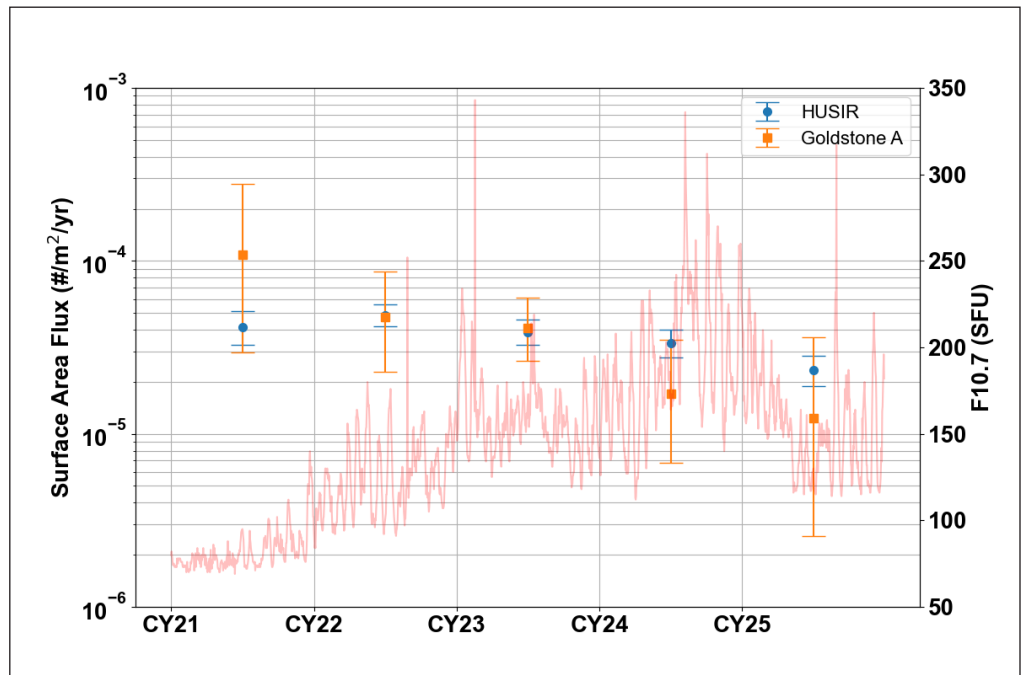


Figure 3. Surface area flux from 700 to 750 km altitude for HUSIR and Goldstone data from CY2021 to CY2025 limited to sizes between 6 mm and 1 cm. The error bars represent the 2σ uncertainty bounds. Secondary vertical axis shows the measured F10.7 Solar Flux index.

To understand how the OD environment is changing, it is necessary to compare measurements over time. As an example, Figure 3 shows the surface area flux measured by HUSIR 75E and Goldstone pointing A from CY21 to CY25 from 700 km to

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Radar Measurements

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750 km altitude. Data have been limited to sizes detectable by both sensors; 6 mm to 1 cm. The HUSIR and Goldstone datasets agree to within relative uncertainties, although with some Goldstone years having rather large confidence intervals due to a low number of observation hours. Data from both sensors show a mild decreasing trend in flux potentially associated with increased solar activity in the rising portion of Solar Cycle 25. A secondary vertical axis in Figure 3 shows the measured F10.7 index in Solar Flux Units (SFU) from January 2021 to December 2025. While a cyclical decrease associated with solar activity may be present at these altitudes, other altitude and inclination regions, particularly heavily trafficked ones, have measured statistically significant increases over time as well.

In addition to breakups, several other notable events occurred during CY 2024-2025. In November 2024, the ODPO coordinated with MIT/LL to use HUSIR for a special 24-hour beam park observation campaign for the Inter-Agency Space Debris Coordination Committee (IADC). A total of 20.54 hours were collected and retained during this campaign using the 75E pointing. These were aggregated with the background 2024 75E data. In September 2025, Goldstone's DSS-14 antenna experienced an over-rotation event taking the antenna offline for emergency maintenance. As a result, a limited number of hours of data were collected with Goldstone in 2025. The ODPO is evaluating new transmit/receive configurations to be used until DSS-14 returns to operation after repairs as well as previously planned engineering upgrades.

Regular radar measurements are essential for capturing year-to-year trends in the overall OD environment as well as the dynamic effects of individual breakup events. They can also provide evidence of new debris-generating events that prompt further investigation, as with the newly identified cloud below 500 km altitude and near 88° inclination. HUSIR and Goldstone continue to provide complementary data that enable a more robust characterization of the sub-centimeter LEO OD environment for updating the ODPO's OD models.

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Debris Assessment Software 3.2.7 Release

The NASA Orbital Debris Program Office has released version 3.2.7 of the Debris Assessment Software (DAS), replacing the prior February 2024 release of DAS 3.2.6. The updated version provides data that can verify compliance of a spacecraft, upper stage, and/or payload with NASA's requirements for limiting debris generation, spacecraft vulnerability, post-mission disposal, and reentry safety.

This release incorporates two new elements of note: 1) a new Python API for scripting certain DAS Fortran routines and 2) a new enhancement factor for Requirement 4.5-1 (large object collision probability) assessment. This enhancement factor incorporates the interaction between impactors and satellites when computing collisional cross-sectional area. Finally, a new ORDEM database was implemented, allowing users to reuse previous ORDEM simulations, improving runtime for Requirement 4.5-1 and 4.5-2 assessments.

Users who have already completed the software request process for earlier versions of DAS 3.x do not need to reapply for DAS 3.2.7. Simply go to your existing account on the NASA Software portal and download the latest installer. Due to file size limits, the installer has been split into several .zip archive files: the main installer and five separate files containing debris environment data. Users must download the main installer (which includes the debris environment for years 2016 to 2030) and additional environment files required to assess mission years beyond 2030.

Approval for DAS is on a per project basis; approval encompasses activities and personnel working within the project scope identified in the application. For new users, DAS is available for download, pending an approved application submission, via the NASA Software Catalog. To begin the process, click on the Request Software button at <https://software.nasa.gov/software/MSC-26690-1>.

MEETING REPORTS

20-22 January 2026: NASA Aerospace Battery Workshop, Houston, TX, USA

Due to a lapse in NASA funding, the 2025 NASA Aerospace Battery Workshop was rescheduled to 20-22 January 2026. The event was held at NASA's Johnson Space Center. The global battery engineering community was represented by many participants from academia, industry, and government.

This year's workshop included 33 presentations covering topics such as cell testing and quality control, passive propagation resistance, designs for harsh operating conditions, and the effects of specific component materials on cell safety and performance.

One particular presentation related to debris mitigation covered reliability and lessons learned from testing and flight experience.

The NASA Aerospace Battery Workshop continues to provide a valuable opportunity for representatives from industry, academia, and government to assemble and discuss modeling capabilities, the state of battery design and performance, and future trends and expectations. Presentations from this and past workshops are available at <https://www.nasa.gov/batteryworkshop>.

2-13 February 2026: UN Committee on the Peaceful Uses of Outer Space (COPUOS) Scientific and Technical Subcommittee (STSC) Meeting, Vienna, Austria

The 63rd session of the Scientific and Technical Subcommittee (STSC) of the United Nations (UN) Committee on the Peaceful Uses of Outer Space (COPUOS) took place at the Vienna International Center in Vienna on 2-13 February 2026. As with past STSC sessions, space debris was an official agenda item. Many Member States continued to express concerns about the orbital debris problem and emphasize the need for the global space community to more closely adhere to the COPUOS Space Debris Mitigation Guidelines and the Guidelines for the Long-term Sustainability of Outer Space Activities to mitigate risk from orbital debris for the safe operation of current and future missions in the near-Earth space environment. Notable debris-related informal consultations and working group meetings during the session included the

Working Group on the Long-term Sustainability of Outer Space Activities, the Expert Group on Space Situational Awareness, and the Action Team on Lunar Activities Consultation.

More than 10 technical presentations were delivered under the space debris agenda item during the session, including major orbital debris related activities in France, Germany, Japan, the United States, Europe, and others. The Inter-Agency Space Debris Coordination Committee (IADC) also delivered an overview of its recent accomplishments. Members from Germany, Japan, South Korea, the United States, and the United Kingdom organized a side event on "Lunar Debris and Disposal - What is the issue and why does it matter?" during the session promoting the importance of orbital debris mitigation in cislunar space, including orbits around the Moon.

24-26 March 2026: Spacecraft Anomalies and Failures Workshop, Greenbelt, Maryland, USA

The Spacecraft Anomalies and Failures (SCAF) Workshop 2026 was held 24-26 March 2026. The SCAF Workshop is an annual event organized by the NASA Engineering and Safety Center's (NESC) Space Environments Technical Discipline Team in collaboration with the National Reconnaissance Office (NRO). NASA hosted the public session at Goddard Space Flight Center (GSFC) in Greenbelt, MD.

SCAF is focused on case studies of anomalies and failures, improvements in space system anomaly and failure attribution,

and discussion of methodologies used to refine and document best practices for root cause determination in anomaly and failure investigations. The goal of the workshop is to bring together civil, military, industry, and academia personnel who do not regularly interact and who have common interests in space system anomalies and failures. Speakers presented case studies from human spaceflight, robotic spacecraft, anomaly investigation tools, and space environment updates, including an update on the current orbital debris environment. ♦

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UPCOMING MEETINGS

1-9 August 2026: Committee on Space Research (COSPAR) 2026, Florence, Italy

The 46th Scientific Assembly of the Committee on Space Research (COSPAR) will convene in Florence, Italy exclusively in person. All cross-sectoral events are designed to promote dialogue on the responsible use of space for the benefit of humanity and the Earth. The abstract submission period closed on 20 February 2026. Please see the assembly website at: <https://www.cospar2026.org/>.

13-26 August 2026: 40th Small Satellite Conference, Salt Lake City, Utah, USA

The 40th annual Small Satellite Conference will be centered around the theme of "The clouds above the clouds: Celebrating 40 years of collaboration." This conference will highlight the technologies and people driving constellation success as the field moved from a few dedicated pioneers to a community of collaborators working on complex systems of hundreds and thousands of satellites. The goal is to celebrate the collaboration and vision of industry professionals over the last 40 years and shape the future of small satellites. The call for abstracts ended on 5 February 2026. Conference information is available at <https://smallsat.org/>.

15-18 September 2026: 27th Advanced Maui Optical and Space Surveillance Technologies Conference (AMOS), Maui, Hawaii, USA

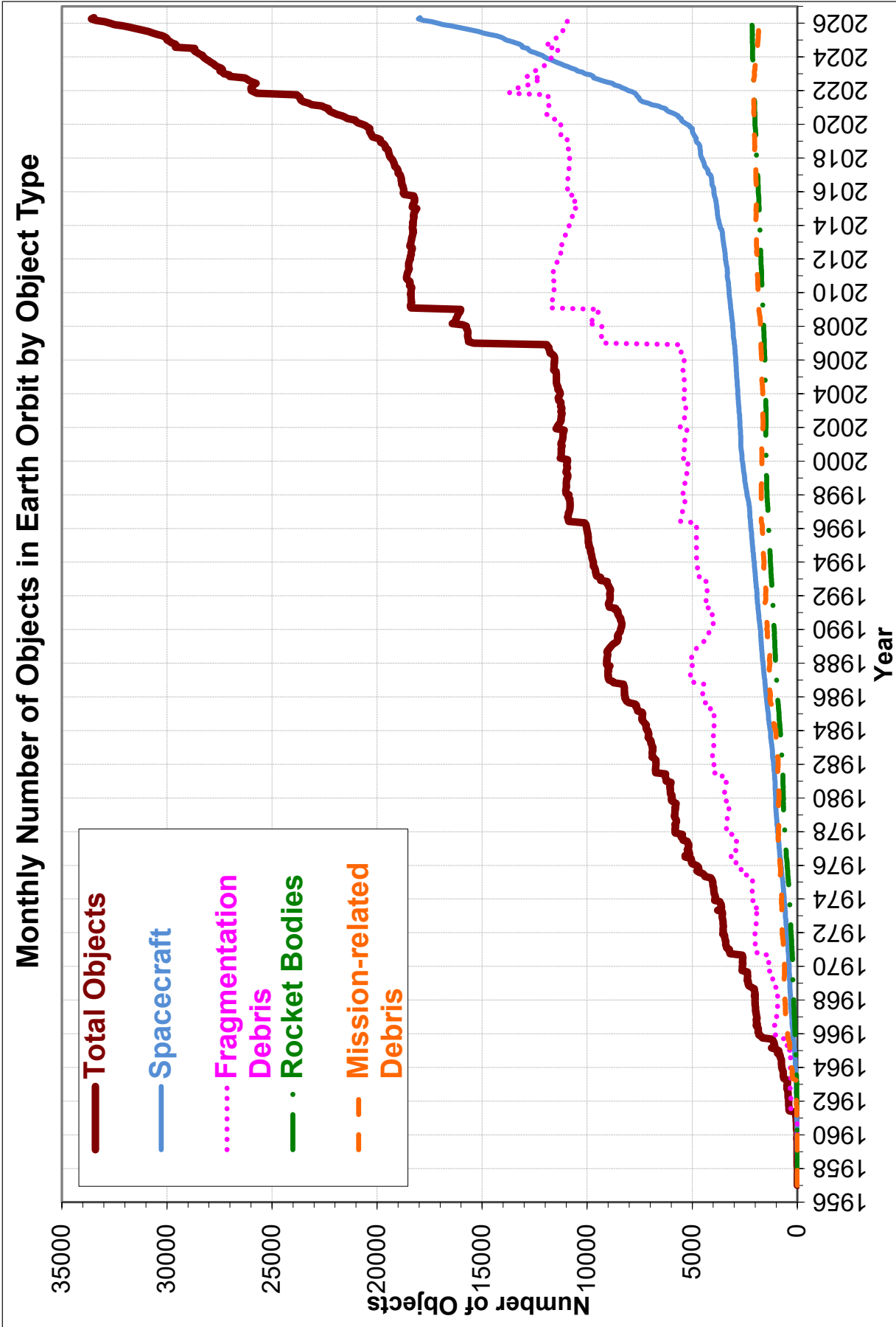
The technical program of the 27th Advanced Maui Optical and Space Surveillance Technologies Conference (AMOS) will focus on space domain awareness. The technical sessions will include papers and posters on topics such as space debris; space domain awareness (SDA); AI and machine learning; SDA systems and instrumentation; astrodynamics; satellite characterization; and debris removal, among others. The call for papers closed on 2 March 2026. All presenters must present their work in-person, but virtual attendance options are available for non-presenters and selected virtual poster presenters. Additional information about the conference is available at <https://amostech.com/>.

5-9 October 2026: 77th International Astronautical Congress (IAC), Antalya, Türkiye

The 77th International Astronautical Congress (IAC) will be hosted by the Turkish Space Agency (TUA) in Antalya, Türkiye, with a theme of "Gateway to the sky," from 5 to 9 October 2026. The International Academy of Astronautics (IAA) Space Debris Committee will again organize the Space Debris Symposium during the IAC. The technical sessions will address topics in the categories of science and exploration; applications and operations; technology; infrastructure; and space and society. The abstract submission deadline was 28 February 2026. Additional details for the 77th IAC can be found at: <https://www.iac2026.org/>.

1-6 November 2026: 18th Hypervelocity Impact Symposium (HVIS), Monterey, California, USA

The Hypervelocity Impact Symposium (HVIS) is a biennial event organized by the Hypervelocity Impact Society that serves as the principal forum for the discussion, interchange, and presentation of the physics of high- and hypervelocity impact and related technical areas. Orbital debris-related topics for this event will include: fracture and fragmentation; launchers and diagnostics; armor/anti-armor and ballistic technology; high-velocity penetration mechanics and target response; material response; spacecraft/meteoroid and debris shielding and failure analysis; hypervelocity phenomenology studies; and theoretical applied mechanics relevant to hypervelocity impact. This year's symposium will again feature a special session on hypervelocity phenomena related to planetary protection. The abstract submission deadline passed on 10 April 2026. Additional information for the 18th Symposium is available at <https://www.hvis.org/>. ♦



Monthly Number of Cataloged Objects in Earth Orbit by Object Type as of 3 May 2026. This chart displays a summary of all objects in Earth orbit officially cataloged by the U.S. Space Surveillance Network. "Fragmentation debris" includes satellite breakup debris and anomalous event debris, while "mission-related debris" includes all objects dispensed, separated, or released as part of the planned mission.

INTERNATIONAL SPACE MISSIONS

1 May 2025 – 30 April 2026

Intl.* Designator	Spacecraft	Country/ Organization	Perigee Alt. (KM)	Apogee Alt.(KM)	Inc. (DEG)	Addl. SC	Earth Orbital R/B	Other Cat. Debris
1998-067	ISS dispensed objects	Various	414	424	51.6	21	0	1
2025-091A	STARLINK-33932	US	482	484	43.0	27	0	0
2025-092A	STARLINK-33909	US	482	484	43	28	0	0
2025-093A	STARLINK-34018	US	482	484	43	27	0	0
2025-094A	STARLINK-33863	US	570	574	70	25	0	0
2025-095A	STARLINK-34116	US	482	484	43.0	27	0	0
2025-096A	YAOGAN-40 02A	PRC	850	852	86	2	2	1
2025-097A	TJS-19	PRC	35784	35789	3.4	0	2	0
2025-098A	STARLINK-34012	US	569	575	70.0	25	0	0
2025-099A	STARLINK-34159	US	482	484	43.0	27	0	0
2025-100A	OBJECT A	PRC	482	520	97.4	11	0	0
2025-101A	STARLINK-33871	US	483	483	43.0	27	0	0
2025-102A	STARLINK-34051	US	572	573	70.0	25	0	0
2025-103A	OBJECT A	PRC	507	509	97.4	5	1	0
2025-104A	QPS-SAR-10 WADATSUMI-I	JPN	555	570	42.0	0	2	0
2025-105A	TIANQI 16	PRC	888	905	45.0	3	0	0
2025-106A	CHINASAT 3B	PRC	35778	35795	0.0	0	1	0
2025-107A	STARLINK-11741	US	355	358	43.0	22	0	0
2025-108A	OBJECT A	PRC	516	521	97.5	5	1	0
2025-109A	COSMOS 2588	CIS	472	489	73.0	0	0	0
2025-110A	STARLINK-34178	US	474	476	53.2	26	0	0
2025-111A	STARLINK-11727	US	355	358	43.0	22	0	0
2025-112A	STARLINK-34314	US	549	550	97.5	23	0	0
2025-113A	STARLINK-34177	US	469	472	53.2	26	0	0
2025-114A	TIANWEN-2	PRC		HELIOCENTRIC		0	1	0
2025-115A	SJ-26	PRC	482	510	97.5	0	1	1
2025-116A	NAVSTAR 84 (USA 545)	US	20159	20208	55.2	0	0	0
2025-117A	STARLINK-33966	US	474	476	53.2	26	0	0
2025-118B	GLOBAL-32	US	439	456	59.0	0	2	0
2025-119A	STARLINK-11686	US	356	357	43.0	22	0	0
2025-120A	STARLINK-34329	US	439	441	53.2	26	0	0
2025-121A	HULIANWANG DIGUI-30	PRC	1167	1169	86.5	4	1	0
2025-122A	SIRIUS XM-10	US	35777	35796	0.0	0	0	0
2025-123A	STARLINK-34448	US	569	575	70.0	25	0	0
2025-124A	STARLINK-11736	US	353	359	43.0	22	0	0
2025-125A	QPS-SAR-11 YAMATSUMI	JPN	556	571	42.0	0	2	1
2025-126A	STARLINK-33977	US	570	574	70.0	25	0	0
2025-127A	STARLINK-11732	US	355	358	43.0	22	0	0
2025-128A	ZHANGHENG 1-02	PRC	495	511	97.4	0	0	0
2025-129A	STARLINK-34419	US	570	574	70.0	25	0	0
2025-130A	STARLINK-34465	US	475	476	53.2	27	0	0
2025-131A	COSMOS 2589	CIS	35782	35791	0.0	1	1	1
2025-132A	CHINASAT-9C	PRC	35774	35800	0.1	0	1	0
2025-133A	STARLINK-34493	US	474	476	53.2	26	0	0
2025-134A	KUIPER-00039	US	629	630	51.9	26	0	0
2025-135A	GOOD ANCESTOR KILAKILA	SLB	493	498	97.5	67	0	0
2025-136A	AXIOM-4	US	432	437	51.6	0	0	0
2025-137A	STARLINK-34280	US	475	476	53.2	26	0	0
2025-138A	HAWK-12C	US	504	521	97.4	3	2	0
2025-139A	STARLINK-34464	US	462	463	53.2	26	0	0
2025-140A	LYRA-4	AUS	645	662	96.0	0	2	0
2025-141A	GOSAT-GW	JPN	668	670	98.1	0	1	0
2025-142A	STARLINK-34497	US	570	574	70.0	25	0	0
2025-143A	MTG-S1	US	35779	35793	0.6	0	0	0
2025-144A	STARLINK-34393	US	474	476	53.2	26	0	0
2025-145A	SHIYAN 28B-01(SY-28B 01)	PRC	791	796	11.0	0	1	1
2025-146A	PROGRESS MS-31	CIS	417	426	51.6	0	1	0
2025-147A	STARLINK-33965	US	462	463	53.2	27	0	0
2025-148A	DROR-1	ISRA	35772	35801	0.1	0	1	0
2025-149A	TIANZHOU-9	PRC	374	381	41.5	0	1	2
2025-150A	STARLINK-34629	US	570	574	70.0	25	0	0
2025-151A	KUIPER-00069	US	629	630	51.9	23	0	0
2025-152A	STARLINK-34723	US	548	551	97.5	23	0	0
2025-153A	O3B MPOWER F09	SES	8058	8074	0.1	1	1	0
2025-154B	TRACERS 1	US	583	592	97.7	6	0	0
2025-154C	EPIC ATHENA	US	580	591	97.7			
2025-154E	TRACERS 2	US	584	591	97.7			
2025-154F	PEXT	US	502	508	97.4			
2025-154G	REAL	US	472	474	97.4			
2025-155A	IONOSFERA-M 03	CIS	819	821	98.6	19	0	0
2025-156A	CARB	FR	642	666	98.0	3	0	0
2025-156B	CO3D3	FR	505	506	97.4			
2025-157A	STARLINK-34647	US	475	476	53.2	27	0	0
2025-158A	STARLINK-34705	US	548	551	97.5	23	0	0
2025-159A	HULIANWANG DIGUI-35	PRC	1166	1169	86.5	4	1	0

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2025-160A	ENSHI XIDA SHANQUAN	PRC	444	453	97.4	0	1	0
2025-161A	STARLINK-34617	US	474	476	53.2	27	0	0
2025-162A	HULIANWANG DIGUI-40	PRC	1149	1150	50.0	8	1	0
2025-163A	NISAR	IND	749	751	98.4	0	1	0
2025-164A	PRSC-S1	PRC	545	551	41.1	0	0	0
2025-165A	STARLINK-34788	US	548	551	97.5	19	0	0
2025-165V	USA 549	US	447	449	97.6			
2025-166A	DRAGON ENDEAVOUR 6	US	414	429	51.6	0	0	0
2025-167A	STARLINK-34771	US	474	476	53.2	27	0	0
2025-168A	HULIANWANG DIGUI-49	PRC	1143	1156	50.0	8	1	0
2025-169A	QPS-SAR-12 KUSHINADA-I	JPN	560	571	42.0	0	2	0
2025-170A	GEESAT 4-01	PRC	610	624	50.0	10	1	1
2025-171A	KUIPER-00081	US	629	630	51.9	23	0	0
2025-172A	METOP SG-A	ESA	819	821	98.7	0	0	0
2025-173A	NTS-3	US	35638	35653	2.9	1	1	1
2025-173B	USA 554	US	36124	36183	3.4			
2025-174A	HULIANWANG DIGUI-58	PRC	1166	1169	86.5	9	0	0
2025-175A	STARLINK-34956	US	547	552	97.5	23	0	0
2025-176A	STARLINK-34981	US	474	476	53.2	27	0	0
2025-177A	OBJECT A	PRC	791	796	11.0	0	1	0
2025-178A	HULIANWANG DIGUI-68	PRC	1167	1169	86.5	4	1	0
2025-179A	STARLINK-34842	US	548	551	97.5	23	0	0
2025-180A	OBJECT A	PRC	491	510	97.5	4	1	0
2025-181A	BION-M 02	CIS	1555	2450	88.3	0	1	0
2025-182A	COSMOS 2591	CIS	283	286	96.6	3	0	0
2025-183A	USA 555	US		NO ELEMES. AVAILABLE		0	0	0
2025-183B	LIMASAT	US	318	319	49.5			
2025-184A	STARLINK-34922	US	548	551	97.5	23	0	0
2025-185A	DRESDEN	RWA	624	644	98.0	0	2	0
2025-185B	FOURIER	RWA	623	644	98.0			
2025-185C	STARK	RWA	619	637	98.0			
2025-185E	BASIL	RWA	623	644	98.0			
2025-185F	DOJO	RWA	623	644	98.0			
2025-186A	DRAGON CRS-33	US	416	427	51.6	0	0	0
2025-187A	HULIANWANG DIGUI-73	PRC	1149	1150	50.0	8	1	0
2025-188C	NAOS	LUXE	449	451	97.2	7	0	0
2025-189A	STARLINK-34899	US	470	471	53.2	27	0	0
2025-190A	STARLINK-34244	US	472	476	53.2	27	0	0
2025-191A	STARLINK-34985	US	547	552	97.5	23	0	0
2025-192A	STARLINK-35031	US	462	464	53.2	27	0	0
2025-193A	OFEQ 19	ISRA		NO ELEMES. AVAILABLE		0	1	0
2025-194A	STARLINK-35142	US	547	552	97.5	23	0	0
2025-195A	STARLINK-34784	US	470	472	53.2	27	0	0
2025-196A	SHIYAN 29	PRC	35745	35829	28.8	0	1	0
2025-197A	OBJECT-A	PRC	526	545	97.4			
2025-197B	OBJECT-B	PRC	480	524	97.6			
2025-197C	OBJECT-C	PRC	483	504	97.4			
2025-197D	OBJECT-D	PRC	476	496	97.4			
2025-198A	STARLINK-35226	US	462	464	53.2	27	0	0
2025-199A	OBJECT A	PRC	794	813	86.0			
2025-199B	OBJECT B	PRC	850	852	86.0			
2025-199C	OBJECT C	PRC	850	852	86.0			
2025-199D	OBJECT D	PRC	850	852	86.0			
2025-199E	OBJECT E	PRC	793	809	86.0			
2025-199F	OBJECT F	PRC	632	726	86.0			
2025-200A	STARLINK-35112	US	549	550	97.5	23	0	0
2025-201A	GEESAT 5-01	PRC	614	619	50.0	10	1	1
2025-202A	YAOGAN 45	PRC	7486	7507	20.0	0	1	0
2025-203A	PRAETORIAN SDA_602	US	945	952	81.3	20	0	0
2025-204A	PROGRESS MS-32	CIS	416	425	51.6	0	1	0
2025-205A	PSN N5	INDO	35783	35790	0.1	0	0	0
2025-206A	COSMOS 2596	CIS	18820	19155	64.7	0	1	0
2025-206B	COSMOS 2595 (GLONASS)	CIS	19101	19159	64.7			
2025-207A	STARLINK-35267	US	549	550	97.5	23	0	0
2025-208A	CYGNUS NG-23	US	412	422	51.6	0	0	0
2025-209A	HJS-7A	PRC	1103	1105	50.0	3	1	0
2025-210A	STARLINK-35247	US	474	476	53.2	27	0	0
2025-211A	STARLINK-35328	US	549	550	97.5	23	0	0
2025-212A	STARLINK-35189	US	474	476	53.2	27	0	0
2025-213A	USA 558	US	575	579	70.0	7	0	0
2025-214A	SHIKONGXING 01	PRC	581	599	50.0	10	0	0
2025-214B	GEESAT 6-01	PRC	611	628	50.0			
2025-215A	IMAP	US		SUN-EARTH L1		0	0	0
2025-215B	SWFO	US		SUN-EARTH L1				
2025-215C	CARRUTHERS	US		SUN-EARTH L1				
2025-216A	STARLINK-34086	US	474	476	53.2	27	0	0

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2025-217A	KUIPER-00120	US	629	630	51.9	26	0	0
2025-218A	STARLINK-35330	US	548	551	97.5	23	0	0
2025-219A	OBJECT A	PRC	825	827	98.7	0	1	0
2025-220A	HULIANWANG DIGUI-82	PRC	1167	1169	86.5	4	1	0
2025-221A	STARLINK-35392	US	475	476	53.2	27	0	0
2025-222A	SHIYAN 30 01	PRC	591	594	35.0	1	1	0
2025-223A	STARLINK-35208	US	474	476	53.2	27	0	0
2025-224A	STARLINK-35270	US	462	464	53.2	27	0	0
2025-225A	STARLINK-35523	US	474	476	53.2	27	0	0
2025-226A	OBJECT A	PRC	510	527	97.6	0	1	0
2025-226B	OBJECT B	PRC	524	547	97.6			
2025-226C	OBJECT C	PRC	512	528	97.6			
2025-226D	OBJECT D	PRC	216	235	97.6			
2025-227A	OBJECT A	PRC	489	501	80.0			
2025-227B	OBJECT B	PRC	458	485	80.2			
2025-228A	KUIPER-00101	US	629	630	51.9	23	0	0
2025-229A	STRIX-5	JPN	529	580	41.9	0	2	0
2025-230A	SDA_1664	US	963	965	81.3	20	0	0
2025-231A	HULIANWANG DIGUI-87	PRC	1149	1150	50.0	9	1	0
2025-232A	STARLINK-34849	US	474	476	53.2	27	0	0
2025-233A	QIANFAN-91	PRC	1067	1070	89.0	17	1	0
2025-234A	OBJECT A	TBD	448	461	97.4	0	0	0
2025-234B	OBJECT B	TBD	497	511	97.5			
2025-234C	OBJECT C	TBD	485	504	97.4			
2025-234D	OBJECT D	TBD	498	503	97.4			
2025-234E	OBJECT E	TBD	280	293	97.4			
2025-235A	STARLINK-35552	US	462	463	53.2	27	0	0
2025-236A	STARLINK-35596	US	475	476	53.2	27	0	0
2025-237A	STARLINK-35496	US	474	476	53.2	27	0	0
2025-238A	TJS-20	PRC	35768	35805	5.6	0	1	0
2025-239A	SPAINSAT NG II	SPN	3874	69798	14.1	0	0	0
2025-240A	STARLINK-35318	US	452	472	53.2	27	0	0
2025-241A	HTV-X1	JPN	373	383	51.6	0	0	0
2025-241B	TEN-KOH 2	JPN	492	500	51.7			
2025-242A	OBJECT A	PRC	487	491	97.4	0	0	0
2025-242B	OBJECT B	PRC	345	444	97.4			
2025-243A	STARLINK-35352	US	475	476	53.2	27	0	0
2025-244A	STARLINK-35748	US	474	477	53.2	27	0	0
2025-245A	STARLINK-35537	US	470	472	53.2	28	0	0
2025-246A	SZ-21	PRC	385	399	41.5	0	1	1
2025-247A	STARLINK-35801	US	462	464	53.2	27	0	0
2025-248A	KORSAT-4	SKOR	570	572	45.4	17	0	0
2025-249B	CMS 03	IND	35775	35798	0.0	0	1	0
2025-250A	YAOGAN-46	PRC	7491	7502	20.1	0	1	0
2025-251A	SENTINEL-1D	ESA	695	697	98.2	0	0	0
2025-252A	QPS-SAR-14 YACHIHOKO-1	JPN	564	574	42.0	0	2	0
2025-253A	STARLINK-35442	US	483	484	43.0	28	0	0
2025-254A	STARLINK-35849	US	474	476	53.2	27	0	0
2025-255A	SHIYAN 32-01	PRC	409	424	53.0	0	0	1
2025-255C	SHIYAN 32-02	PRC	432	448	53.0			
2025-255D	SHIYAN 32-03	PRC	433	447	53.0			
2025-255E	OBJECT E	PRC	312	346	53.0			
2025-256A	OBJECT A	PRC	715	736	98.3	1	1	0
2025-257A	STARLINK-35139	US	462	463	53.2	28	0	0
2025-258A	HULIANWANG DIGUI-96	PRC	1149	1150	50.0	8	1	0
2025-259A	STARLINK-35617	US	483	484	43.0	28	0	0
2025-260A	ESCAPADE BLUE	US		EN ROUTE TO MARS		0	0	0
2025-260B	ESCAPADE GOLD	US		EN ROUTE TO MARS		0	0	0
2025-261A	VIASAT 3-F2	US	35777	35796	0.1	0	1	0
2025-262A	STARLINK-35643	US	482	484	43.0	28	0	0
2025-263A	STARLINK-34774	US	482	484	43.0	28	0	0
2025-264A	SENTINEL-6B	ESA	1332	1344	66.0	0	0	0
2025-265A	STARLINK-35924	US	482	484	43.0	28	0	0
2025-266A	SJ-30A	PRC	512	526	51.8	2	1	0
2025-267A	GLOBAL-33	US	452	465	42.0	0	2	0
2025-268A	STARLINK-35699	US	482	484	43.0	28	0	0
2025-269A	TJS-21	PRC	2052	38297	63.3	0	1	0
2025-270A	STARLINK-36076	US	483	483	43.0	28	0	0
2025-271A	STARLINK-35940	US	473	477	53.2	27	0	0
2025-272A	SZ-22	PRC	374	381	41.5	0	1	0
2025-273A	COSMOS 2597	CIS	1486	1503	82.5	2	0	0
2025-274A	BEE-1000	SKOR	580	599	97.8	12	1	0
2025-275A	SOYUZ MS-28	CIS	414	424	51.6	0	1	0
2025-276A	FORMOSAT-8A	TWN	555	569	97.7	123	0	0
2025-277A	SJ-28	PRC	35787	35790	4.7	0	1	0
2025-278A	STARLINK-35867	US	482	484	43.0	28	0	0

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2025-279A	KOMPSAT-7	ESA	558	568	97.7	0	0	0
2025-280A	STARLINK-35966	US	570	574	70.0	26	0	0
2025-281A	STARLINK-36091	US	482	484	43.0	28	0	0
2025-282A	ZQ-3 R/B	PRC	102	211	56.9	0	0	0
2025-283A	STARLINK-35866	US	474	476	53.2	27	0	0
2025-284A	OBJECT A	PRC	895	911	80.4	1	0	0
2025-285A	HULIANWANG DIGUI-105	PRC	1149	1150	50.0	8	1	0
2025-286A	STARLINK-35945	US	474	476	53.2	27	0	0
2025-287A	HULIANWANG DIGUI-114	PRC	1167	1169	86.5	4	1	0
2025-288A	STARLINK-35887	US	483	483	43.0	28	0	0
2025-289A	YAOGAN-47	PRC	494	497	97.5	0	1	0
2025-290A	TJS-22	PRC	35778	35795	1.6	0	1	0
2025-291A	USA 570	US	1010	1201	63.4	0	0	0
2025-292B	THE ARAB SATELLITE 813	PRC	537	559	97.6	8	1	0
2025-293A	STARLINK-35660	US	570	574	70.0	26	0	0
2025-294A	STARLINK-36138	US	482	484	43.0	28	0	0
2025-295A	HULIANWANG DIGUI-119	PRC	1149	1150	50.0	8	1	0
2025-296A	XIWANG-5 02	PRC	516	521	41.4	0	1	0
2025-296B	DEAR-5	PRC	501	527	41.4			
2025-297B	RAISE-4	JPN	531	549	97.5	0	2	0
2025-298A	STARLINK-36230	US	570	574	70.0	26	0	0
2025-299A	STARLINK-36255	US	482	484	43.0	28	0	0
2025-300A	ZY 3 04	PRC	496	507	97.5	0	1	0
2025-301A	KUIPER-00144	US	640	641	51.9	26	0	0
2025-302A	GALILEO 33 (138)	ESA	23216	23228	54.3	0	0	0
2025-302B	OBJECT B	ESA	22920	22953	54.3			
2025-302C	GALILEO 34 (139)	ESA	23211	23233	54.3			
2025-303A	STARLINK-35755	US	482	484	43.0	28	0	0
2025-304A	STARLINK-36182	US	570	574	70.0	26	0	0
2025-305A	DISKSAT C	US	535	544	45.0	3	2	0
2025-306A	TJS-23	PRC	35766	35806	5.7	0	1	0
2025-307A	QPS-SAR-15 SUKUNAMI-1	JPN	565	577	42.0	0	2	0
2025-308A	CZ-12A R/B	PRC	131	140	69.7	0	0	0
2025-309A	SPACEMOBILE-006	US	503	519	53.0	0	1	0
2025-310A	OBZOR-R 01	CIS	642	644	98.0	0	1	0
2025-311A	HULIANWANG DIGUI-128	PRC	1149	1150	50.0	8	1	0
2025-312A	FENGYUNG-4C	PRC	35783	35791	0.0	0	1	0
2025-313B	OBJECT B	TBD	441	855	97.5	52	1	0
2025-314A	TIANHUI 7	PRC	486	493	97.4	0	1	0
2025-315A	SJ-29A	PRC	35772	35798	3.3	0	1	0
2025-315C	SJ-29B	PRC	35755	35816	3.3			
2026-001A	COSMO-SKYMED-FM3	IT	622	623	97.9	0	0	0
2026-002A	STARLINK-36490	US	482	484	43.0	28	0	0
2026-003A	STARLINK-35343	US	482	484	43.0	28	0	0
2026-004B	OBJECT B	TBD	601	610	97.8	36	0	0
2026-004G	BLACKCAT	US	602	609	97.8			
2026-004Z	OBJECT Z	TBD	601	603	97.8			
2026-004AJ	PANDORA	US	602	607	97.8			
2026-005A	STARLINK-36484	US	481	485	43.0	28	0	0
2026-006A	YAOGAN-50	PRC	952	953	142.0	0	1	0
2026-007A	HULIANWANG DIGUI-137	PRC	1149	1150	50.0	8	1	0
2026-008A	STARLINK-36542	US	482	485	43.0	28	0	0
2026-009A	ALSAT 3A	ALG	488	505	97.5	0	1	3
2026-010A	TIANQI 37	PRC	888	905	45.0	3	0	0
2026-011A	USA 572	US	489	494	70.0	8	0	0
2026-012A	STARLINK-36551	US	482	484	43.0	28	0	0
2026-013A	HULIANWANG DIGUI-146	PRC	1149	1150	50.0	8	1	0
2026-014A	STARLINK-36587	US	455	458	97.3	24	0	0
2026-015A	MR-2	SPN	1060	1065	89.0	1	2	0
2026-016A	STARLINK-36621	US	465	466	97.3	24	0	0
2026-017A	NAVSTAR 85 (USA 581)	US	20120	20243	55.1	0	0	0
2026-018A	STARLINK-36641	US	465	466	97.3	24	0	0
2026-019A	NEONSAT-1A	SKOR	533	550	97.4	0	2	0
2026-020A	STARLINK-36548	US	482	484	43.0	28	0	0
2026-021A	OBJECT A	PRC	485	505	97.5	0	0	0
2026-021B	OBJECT B	PRC	388	591	97.6			
2026-022A	STARLINK-36719	US	465	467	97.3	24	1	0
2026-023A	COSMOS 2600	CIS	315	331	96.6	8	0	0
2026-024A	PRC TEST SPACECRAFT 4	PRC	588	596	50.0	0	1	5
2026-025A	STARLINK-36748	US	465	466	97.3	24	0	0
2026-026A	STARLINK-36772	US	465	467	97.3	23	0	0
2026-027A	OBJECT A	PRC	503	517	97.5	6	1	1
2026-028A	ELEKTRO-L 5	CIS	35782	35791	0.3	0	0	0
2026-028B	JAM-E JAM 1	IRAN	35784	35789	0.4			
2026-029A	USA 582	US		NO ELEMS. AVAILABLE		2	1	1
2026-030A	KUIPER-00159	US	450	457	51.9	31	0	0

SATELLITE BOX SCORE

(as of 4 May 2026, cataloged by the
U.S. SPACE SURVEILLANCE NETWORK)

Country/ Organization	Spacecraft*	Spent R/B & Other Cat. Debris	Total
CHINA	1165	4468	5633
CIS	1615	4971	6586
ESA	113	18	131
FRANCE	129	520	649
INDIA	114	79	193
JAPAN	217	89	306
UK	725	1	726
USA	12881	4659	17540
OTHER	1230	104	1334
Total	18189	14909	33098

* active and defunct

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Intl. = International; SC = Spacecraft; Alt. = Altitude; Inc. = Inclination; Addl. = Additional; R/B = Rocket Bodies; Cat. = Cataloged

Notes: 1. **Orbital elements are as of data cut-off date 30 April 2026.** 2. Additional spacecraft on a single launch may have different orbital elements. 3. Additional uncatalogued objects may be associated with a single launch.

INTERNATIONAL SPACE MISSIONS

1 May 2025 – 30 April 2026

Intl.* Designator	Spacecraft	Country/ Organiza- tion	Perigee Alt. (KM)	Apogee Alt.(KM)	Inc. (DEG)	Addl. SC	Earth Orbital R/B	Other Cat. Debris
2026-031A	DRAGON FREEDOM 3	US	414	424	51.6	0	0	0
2026-032A	STARLINK-36800	US	464	467	97.3	23	0	0
2026-033A	STARLINK-36644	US	482	484	43.0	28	0	0
2026-034A	STARLINK-36840	US	475	476	53.2	28	0	0
2026-035A	STARLINK-36818	US	464	467	97.3	24	0	0
2026-036A	STARLINK-36814	US	482	484	43.0	27	0	0
2026-037A	STARLINK-36301	US	482	484	43.0	28	0	0
2026-038A	STARLINK-36912	US	465	466	97.3	24	0	0
2026-039A	STARLINK-36535	US	482	484	43.0	28	0	0
2026-040A	STARLINK-36335	US	465	466	97.3	24	0	0
2026-041A	STARLINK-36711	US	458	461	53.2	28	0	0
2026-043A	GLOBAL-34	US	467	474	42.0	0	2	0
2026-044A	STARLINK-37022	US	465	466	97.3	24	0	0
2026-045A	ECHOSTAR 25	US	35686	35699	0.0	0	0	0
2026-046A	ICOR SV	US	169	219	123.1	0	1	0
2026-047A	HULIANWANG DIGUI-155	PRC	1133	1136	50.0	8	1	0
2026-048A	SHIYAN 30-03	PRC	589	596	35.0	1	1	0
2026-049A	STARLINK-36604	US	448	450	97.3	24	0	0
2026-050A	STARLINK-36969	US	449	450	53.2	28	0	0
2026-051A	YAOGAN-50 02	PRC	952	953	142.0	0	1	0
2026-052B	YUXING-3 06	PRC	525	544	97.5	7	1	0
2026-053A	STARLINK-36986	US	464	467	97.3	24	0	0
2026-054A	STARLINK-37027	US	343	345	53.2	28	0	0
2026-055A	STARLINK-37162	US	439	441	53.2	28	0	0
2026-056A	STRIX-6	JPN	556	578	50.3	0	2	0
2026-057A	STARLINK-37107	US	343	346	97.3	24	0	0
2026-058A	PROGRESS MS-33	CIS	414	424	51.6	0	1	0
2026-059A	STARLINK-36987	US	475	476	53.2	28	0	0
2026-060A	CENTISPACE-2 S1	PRC	641	658	55.0	9	0	0
2026-061A	RASSVET-3 1	CIS	301	316	82.3	15	1	0
2026-062A	SUPERVIEW NEO-2 05	PRC	506	508	97.4	1	1	0
2026-063A	STARLINK-36296	US	331	335	97.3	24	0	0
2026-064A	SHIYAN-33	PRC	484	506	97.5	0	0	0
2026-065A	LPNTSAT-001	ESA	498	523	97.4	0	2	0
2026-065B	LPNTSAT-002	ESA	499	520	97.4	0	0	0
2026-066A	XINZHENGCHENG 02	PRC	584	622	85.0	0	1	0
2026-066C	XINZHENGCHENG 01	PRC	583	622	85.0	0	0	0
2026-066D	TIANSHI 01	PRC	584	621	85.0	0	0	0
2026-067A	OBJECT A	TBD	506	512	97.5	89	0	0
2026-068A	STARLINK-37262	US	327	329	53.2	28	0	0
2026-069A	ARTEMIS 2 (INTEGRITY)	US	275	8887	29.3	0	1	0
2026-069B	TACHELES	GER	149	70247	28.3	0	0	0
2026-069C	SWC-1	SAUD	475	70229	28.4	0	0	0
2026-069D	K-RADCUBE	SKOR	61	70276	28.3	0	0	0
2026-070A	STARLINK-37326	US	418	420	53.2	28	0	0
2026-071A	MERIDIAN 11	CIS	1050	39305	62.8	0	1	0
2026-072A	KUIPER-00131	US	560	571	51.9	28	0	0
2026-073A	STARLINK-37135	US	341	346	97.3	24	0	0
2026-074A	OBJECT A	US	482	509	60.0	5	0	0
2026-074D	STPSAT-7	US	479	507	60.0	0	0	0
2026-074E	OBJECT E	US	479	507	60.0	0	0	0
2026-074J	OBJECT J	US	477	508	60.0	0	0	0
2026-075A	QIANFAN-109	PRC	883	909	89.0	18	0	0
2026-076A	HULIANWANG DIGUI-164	PRC	1030	1033	86.5	4	1	0
2026-077A	STARLINK-37195	US	419	420	97.3	24	0	0
2026-078A	HJS-8A	PRC	1015	1017	86.5	0	1	1
2026-079A	CYGNUS NG-24	US	414	424	51.6	0	0	0
2026-080A	OBJECT A	PRC	532	549	97.7	7	0	0
2026-081A	STARLINK-37358	US	327	328	53.2	28	0	0
2026-082A	STARLINK-37242	US	327	329	97.3	24	0	0
2026-083B	COSMOS 2609	CIS	537	552	98.1	5	2	2
2026-084A	DAQI-2	PRC	700	702	98.3	0	1	0
2026-085A	AST BLUEBIRD 7	US	265	485	43.0	0	0	0
2026-086A	STARLINK-37168	US	344	344	97.3	24	0	0
2026-087A	NAVSTAR 86 (USA 585)	US	387	20201	55.0	0	0	0
2026-088D	ORIGAMISAT-2	JPN	532	553	97.5	7	2	0
2026-089A	STARLINK-37471	US	343	345	97.3	23	0	0
2026-090A	COSMOS 2615	CIS	318	337	96.7	3	0	0
2026-091A	HJS-9A	PRC	502	515	55.0	3	0	0
2026-092A	PRSC-E03	PRC	545	549	38.0	0	0	0
2026-093A	PROGRESS MS-34	CIS	414	424	51.6	0	1	0
2026-094A	STARLINK-37475	US	320	322	97.3	24	0	0
2026-095A	KUIPER-00299	US	450	463	51.9	28	0	0
2026-096A	VIASAT 3-F3	US	EN ROUTE TO GEO		0	1	0	0
2026-097A	STARLINK-37527	US	305	307	97.3	23	0	0
2026-098A	KUIPER-00370	US	457	477	51.9	31	0	0