

TROY TECHNICAL

SPACE INDUSTRY WEEKLY REPORT

October 17 - October 23, 2026 | Issue 2026-W42

**Mission evidence, launch economics, resilient
supply and regulatory access**

11

ANALYZED ARTICLES

10

PRIORITY THEMES

Issued 2026-10-23 | English edition | fixed approved cover artwork



Space Industry: the boundary moved from isolated claims to qualification evidence

11 English articles were reviewed independently from the Japanese edition. Ten themes are retained for management decisions.

SIGNAL 01 | COMPONENTS

NTT and JAXA: LEO Satellite MIMO and IoT Transmission Results

NTT and JAXA have successfully demonstrated that MIMO technology in low Earth orbit (LEO) satellites can more than double communication capacity compared to single-antenna systems.

SIGNAL 02 | SPACECRAFT

Mars Mission Readiness: Cardiovascular Adaptation in Astronauts

Research involving 13 astronauts indicates that the human heart can adapt to prolonged weightlessness and function under simulated Martian gravity.

SIGNAL 03 | LAUNCH

Planet Labs Pelican-12: Orbital AI and Relay Testing Roadmap

Planet Labs launched the Pelican-12 spacecraft via SpaceX's Bandwagon-5 mission on October 20, 2026, to test orbital AI and space-to-space data relays.

SIGNAL 04 | ON-ORBIT SERVICE

Loader Lunar Crane: COMOTI and Initium Space Cargo Specs

The Romanian research institute COMOTI and Initium Space have developed Loader, a specialized lunar crane capable of moving up to 1000 kg of cargo.

DECISION

Focus this week's management attention on mission evidence, launch economics, resilient supply and regulatory access. Move only when the linked evidence can be reproduced under your own operating conditions.

THREE MANAGEMENT MOVES

1. Buyers: separate announced missions from funded, licensed, launched and operational capability.
2. Suppliers: qualify components and services against mission environment, traceability and cadence.
3. Executives: track funding, licensing, launch date, on-orbit performance, capacity and insurance.

EVIDENCE DISCIPLINE

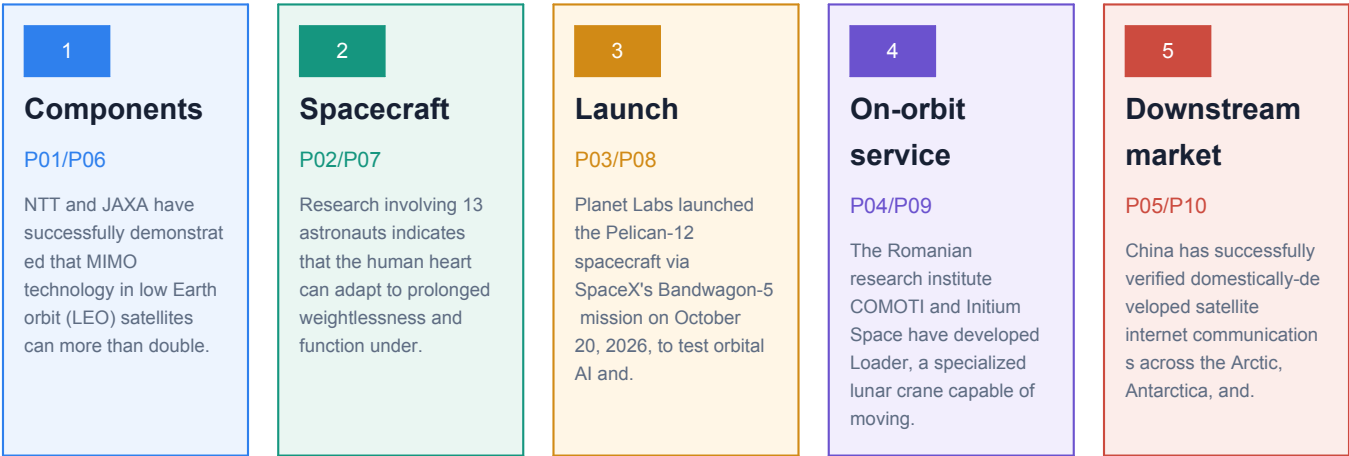
FACT states what the collected English source reports. BUSINESS READ and ACTION are editorial interpretations. UNKNOWN lists information that the source file does not establish. A linked article is not treated as independent confirmation of every claim.

Five numbers or evidence anchors that require conditions

1000 kg A03	SOURCE-BOUND CONDITION The Romanian research institute COMOTI and Initium Space have developed Loader, a specialized lunar crane capable of moving up to 1000 kg of cargo.
P02 A02	SOURCE-BOUND CONDITION Research involving 13 astronauts indicates that the human heart can adapt to prolonged weightlessness and function under simulated Martian gravity.
P03 A07	SOURCE-BOUND CONDITION Planet Labs launched the Pelican-12 spacecraft via SpaceX's Bandwagon-5 mission on October 20, 2026, to test orbital AI and space-to-space data relays.
P04 A03	SOURCE-BOUND CONDITION The Romanian research institute COMOTI and Initium Space have developed Loader, a specialized lunar crane capable of moving up to 1000 kg of cargo.
P05 A09	SOURCE-BOUND CONDITION China has successfully verified domestically-developed satellite internet communications across the Arctic, Antarctica, and the Qinghai-Xizang Plateau.
HOW TO USE THESE NUMBERS Each value is shown with the condition stated in the collected English article. Do not compare values across different test methods, device sizes, operating temperatures or commercial stages without normalizing those conditions.	

Where the value chain moved

Each stage combines one leading theme and one supporting theme. The report treats handoffs as evidence transfers, not decorative arrows.



EVIDENCE REQUIRED AT EACH HANDOFF

Components to Spacecraft	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck funding, licensing, launch date, on-orbit performance, capacity and insurance.
Spacecraft to Launch	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck funding, licensing, launch date, on-orbit performance, capacity and insurance.
Launch to On-orbit service	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck funding, licensing, launch date, on-orbit performance, capacity and insurance.
On-orbit service to Downstream market	Transfer test conditions, acceptance criteria, failure data, owner and decision date. Recheck funding, licensing, launch date, on-orbit performance, capacity and insurance.

COMMON CONTROL POINT

No theme moves to a commercial commitment until a named owner has reproduced the relevant evidence and documented funding, licensing, launch date, on-orbit performance, capacity and insurance.

Priority map: maturity and next decision locus



REPRODUCIBLE POSITIONING RULE
Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. The vertical bands classify the next decision locus: Tech / process, System / adoption, or Business / rules (including supply systems). Article-title cues take precedence; the overview is used only when the title is silent. These are categories, not impact ranks. Bubble diameter reflects the editorial score.

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P01

NTT and JAXA: LEO Satellite MIMO and IoT Transmission Results

A05 | Components | Product adoption

Date not stated

FACT

NTT and JAXA have successfully demonstrated that MIMO technology in low Earth orbit (LEO) satellites can more than double communication capacity compared to single-antenna systems. The experiment also established a method for LEO satellites to collect data from large-scale IoT devices located in areas without terrestrial coverage.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P01.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 21/25 | MATURITY 4/5 | DECISION LOCUS: BUSINESS / RULES

P02

Mars Mission Readiness: Cardiovascular Adaptation in Astronauts

A02 | Spacecraft | Research

Date not stated

FACT

Research involving 13 astronauts indicates that the human heart can adapt to prolonged weightlessness and function under simulated Martian gravity. The study highlights that intensive daily exercise is critical for maintaining cardiovascular health during long-duration spaceflight. These findings suggest that humans can endure the journey to Mars and perform work on its surface.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P02.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 20/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P03

Planet Labs Pelican-12: Orbital AI and Relay Testing Roadmap

A07 | Launch | Pilot

Date not stated

FACT

Planet Labs launched the Pelican-12 spacecraft via SpaceX's Bandwagon-5 mission on October 20, 2026, to test orbital AI and space-to-space data relays. The satellite integrates NVIDIA Jetson modules for edge computing and an experimental communication package for SES Space & Defense, marking a transition toward high-volume constellation replenishment.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P03.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 20/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

P04

Loader Lunar Crane: COMOTI and Initium Space Cargo Specs

A03 | On-orbit service | Pilot

Date not stated

FACT

The Romanian research institute COMOTI and Initium Space have developed Loader, a specialized lunar crane capable of moving up to 1000 kg of cargo. The system allows the European Space Agency's Argonaut landers to place heavy equipment up to six metres from the landing site, enabling uninterrupted measurements for sensitive instruments.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P04.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 20/25 | MATURITY 2/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P05

China Satellite Internet: Coverage Expansion to Polar Regions

A09 | Downstream market | Pilot

Date not stated

FACT

China has successfully verified domestically-developed satellite internet communications across the Arctic, Antarctica, and the Qinghai-Xizang Plateau. This achievement effectively closes the remaining communications coverage gaps globally.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P05.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 19/25 | MATURITY 2/5 | DECISION LOCUS: TECH / PROCESS

P06

JAXA MMX Mission: H3 Rocket Launch and Phobos Sample Timeline

A01 | Components | Research

Date not stated

FACT

JAXA has successfully launched the Martian Moons eXploration (MMX) probe using the No. 10 H3 rocket. The mission aims to return sand samples from Phobos to Earth by 2031, marking the first round-trip voyage to the Martian system.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P06.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P07

Ohara Optical Glass: MMX Mars Moon Mission Adopters and Specs

A04 | Spacecraft | Research

Date not stated

FACT

Ohara's optical glass has been integrated into JAXA's Martian Moons eXploration (MMX) mission for high-precision imaging and mineral analysis. The materials are utilized in the OROCHI wide-angle spectrograph and the RAX Raman spectrometer to ensure performance in harsh radiation environments.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P07.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: SYSTEM / ADOPTION

P08

STMicroelectronics RHFLVDS42: QML-V Quad LVDS Receiver Specs

A11 | Launch | Research

Date not stated

FACT

STMicroelectronics has introduced the RHFLVDS42, a QML-V qualified quad low-voltage differential signaling (LVDS) receiver designed for aerospace applications. The device supports data exchange speeds up to 600Mbps and offers high radiation resistance and ESD immunity. This expansion of the space-grade portfolio provides a robust communication component compatible with both legacy CMOS and modern power supply norms.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P08.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 19/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

FACT is source-bound. BUSINESS READ, ACTION and UNKNOWN are explicit editorial layers.

P09

Orion Heat Shield: Artemis II Performance and Trajectory Analysis

A06 | On-orbit service | Research

Date not stated

FACT

NASA's post-flight analysis of the Artemis II mission confirms that the Orion spacecraft's heat shield performed as expected, with char loss reduced by a factor of ten compared to Artemis I. This validation proves the effectiveness of trajectory modifications and provides critical data for the upcoming Artemis III mission.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P09.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 18/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

P10

Ariane 6 Block 2: Airbus ships lightweight Vulcain Aft Bay

A08 | Downstream market | Research

Date not stated

FACT

Airbus Netherlands has delivered the first lightweight Vulcain Aft Bay (Flight Model 16) for the Ariane 6 Block 2 upgrade, reducing the structure's mass by 880 kilograms. This modification, combined with more powerful P160C boosters, is intended to improve the rocket's performance and competitiveness.

WHY IT MATTERS

The decision relevance is mission evidence, launch economics, resilient supply and regulatory access. The signal should be tested at the application and operating-system level, not accepted from a headline alone.

BUSINESS READ

For operating companies, compare the reported change with current qualification, sourcing and product-roadmap assumptions. For suppliers, qualify components and services against mission environment, traceability and cadence.

ACTION

Within 30 days, separate announced missions from funded, licensed, launched and operational capability; record the evidence and owner against P10.

UNKNOWN

Still unproven or incompletely stated: funding, licensing, launch date, on-orbit performance, capacity and insurance.

EDITORIAL SCORE 18/25 | MATURITY 1/5 | DECISION LOCUS: TECH / PROCESS

Playbook and 0-5 year roadmap

STAKEHOLDER	NOW 0-30 DAYS	NEXT 1-12 MONTHS	LATER 1-5 YEARS
Operating companies	separate announced missions from funded, licensed, launched and operational capability	Run production-like qualification with explicit acceptance and stop criteria.	Build a portfolio and architecture that can absorb technology and supplier changes.
Materials, equipment and technology suppliers	qualify components and services against mission environment, traceability and cadence	Create shared reliability, process-window and failure-analysis data with customers.	Standardize interfaces, traceability, lifecycle support and recovery services.
Trading, investment and legal teams	Map funding, licensing, launch date, on-orbit performance, capacity and insurance.	Contract for capacity, quality, change notice, liability, alternatives and exit.	Diversify regional, technical and customer concentration risk.

ROADMAP

NOW 0-30 DAYS Evidence ledger Owner: Strategy + quality Deliverable: claim, source, condition, owner	NOW 0-30 DAYS Risk screen Owner: Procurement + legal Deliverable: unknowns, alternatives, stop	NEXT 1-12 MONTHS Joint qualification Owner: R&D + supplier Deliverable: process window and failure data
NEXT 1-12 MONTHS Commercial gate Owner: Business + finance Deliverable: unit economics and capacity	LATER 1-5 YEARS Platform strategy Owner: Executive team Deliverable: portfolio and interface roadmap	LATER 1-5 YEARS Service layer Owner: Operations + channel Deliverable: monitoring, maintenance and recovery

GO / NO-GO GATES

GATE	OWNER	REQUIRED EVIDENCE	NO-GO CONDITION
G1 Evidence	Quality	Source, test conditions and reproducibility	No traceable evidence
G2 Integration	R&D	Interface, process window and failure analysis	Cannot meet system conditions
G3 Commercial	Business	Capacity, total cost, contract and alternatives	Economics or supply cannot be supported
G4 Lifecycle	Operations	Monitoring, maintenance, change notice and exit	No accountable operating plan

ANALYZED ARTICLES | ITEMS 01-11

Every title and URL is displayed in full. URLs wrap without shortening and remain clickable. A verified-reference label means the translated HTML did not retain its original source URL.

ID	FULL ARTICLE TITLE	FULL SOURCE / VERIFIED REFERENCE URL - CLICKABLE
A01	JAXA MMX Mission: H3 Rocket Launch and Phobos Sample Timeline	http://www.nippon.com/en/news/yjj2026102000118/japan-successfully-launches-martian-moon-probe-on-landmark-mission.html
A02	Mars Mission Readiness: Cardiovascular Adaptation in Astronauts	https://sciencedaily.com/releases/2026/10/261020085016.htm
A03	Loader Lunar Crane: COMOTI and Initium Space Cargo Specs	https://www.esa.int/ESA_Multimedia/Images/2026/10/Moon_crane_to_take_a_load_off_lunar_landers
A04	Ohara Optical Glass: MMX Mars Moon Mission Adopters and Specs	https://sora.info/space/20261021-ohara-mmx.html
A05	NTT and JAXA: LEO Satellite MIMO and IoT Transmission Results	https://www.watch.impress.co.jp/docs/news/2150343.html
A06	Orion Heat Shield: Artemis II Performance and Trajectory Analysis	https://nasa.gov/missions/artemis/artemis-2/rigorous-analysis-confirms-nasas-artemis-ii-heat-shield-performance
A07	Planet Labs Pelican-12: Orbital AI and Relay Testing Roadmap	https://satnews.com/2026/10/20/planet-labs-launches-pelican-12-aboard-space-cex-bandwagon-5-to-test-orbital-ai-and-satellite-relays/
A08	Ariane 6 Block 2: Airbus ships lightweight Vulcain Aft Bay	https://europeanspaceflight.com/airbus-ships-first-lightweight-vulcain-aft-bay-for-ariane-6-block-2/
A09	China Satellite Internet: Coverage Expansion to Polar Regions	https://news.cgtn.com/news/2026-10-19/Satellite-internet-links-Arctic-Antarctica-Qinghai-Xizang-Plateau-1RmP7JZfXO0/p.html
A10	SpaceBlast TENEDGE: Specs and Roadmap for Space-Based AI Edge Computing	https://www.itmedia.co.jp/news/article/2610/22/2000002510/
A11	STMicroelectronics RHFLVDS42: QML-V Quad LVDS Receiver Specs	https://www.laserfocusworld.com/directory/laser-sources/laser-semiconductor/press-release/55412965/stmicroelectronics-stmicroelectronics-expands-space-grade-portfolio-with-qml-v-qualified-quad-lvds-receiver

SpaceIndustry — Selected Articles

Date: 2026-10-25

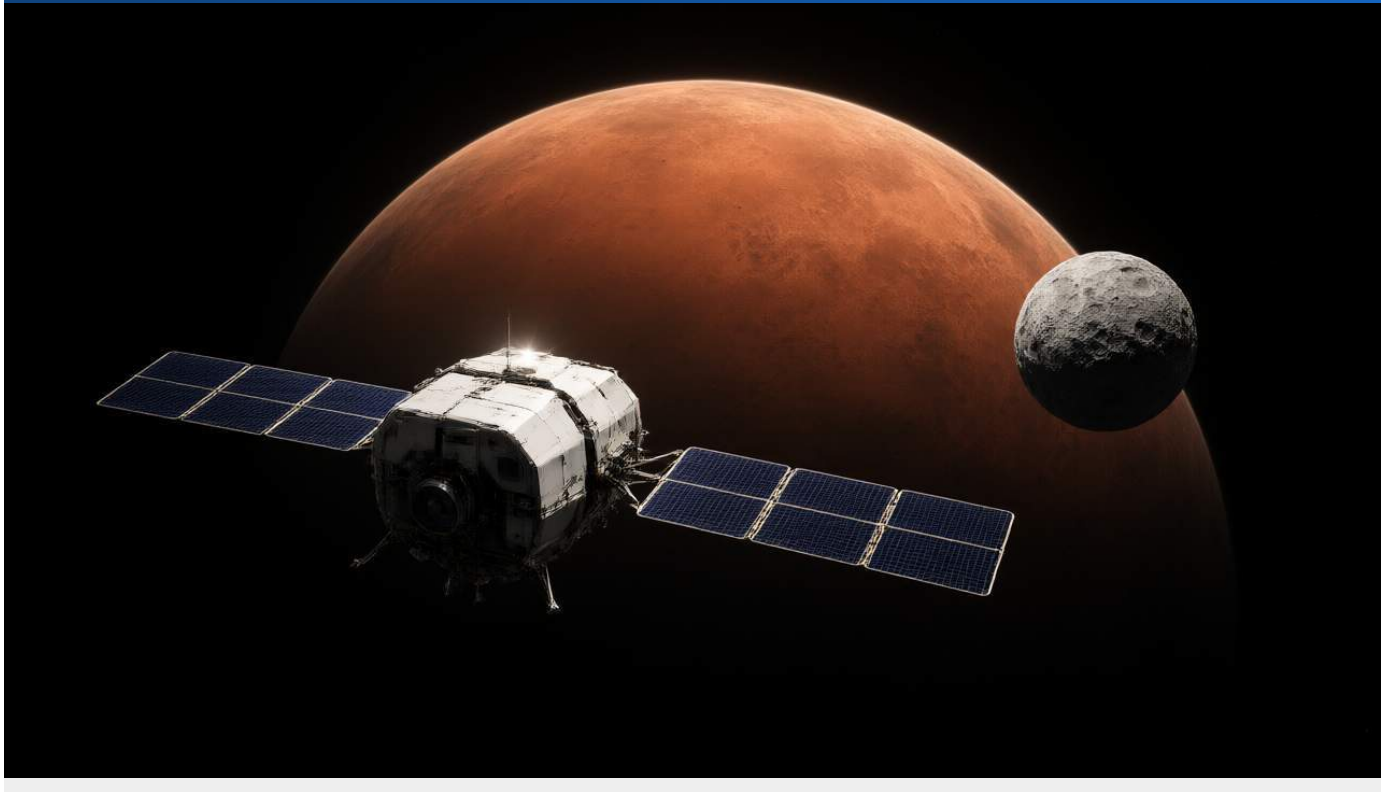
Articles: 11

Table of Contents

- #01 JAXA MMX Mission: H3 Rocket Launch and Phobos Sample Timeline
- #02 Mars Mission Readiness: Cardiovascular Adaptation in Astronauts
- #03 Loader Lunar Crane: COMOTI and Initium Space Cargo Specs
- #04 Ohara Optical Glass: MMX Mars Moon Mission Adopters and Specs
- #05 NTT and JAXA: LEO Satellite MIMO and IoT Transmission Results
- #06 Orion Heat Shield: Artemis II Performance and Trajectory Analysis
- #07 Planet Labs Pelican-12: Orbital AI and Relay Testing Roadmap
- #08 Ariane 6 Block 2: Airbus ships lightweight Vulcain Aft Bay
- #09 China Satellite Internet: Coverage Expansion to Polar Regions
- #10 SpaceBlast TENEDGE: Specs and Roadmap for Space-Based AI Edge Computing
- #11 STMicroelectronics RHFLVDS42: QML-V Quad LVDS Receiver Specs

#01 JAXA MMX Mission: H3 Rocket Launch and Phobos Sample Timeline

Published October 20, 2026 Nippon.com (時事通信) Japan



OVERVIEW

JAXA has successfully launched the Martian Moons eXploration (MMX) probe using the No. 10 H3 rocket. The mission aims to return sand samples from Phobos to Earth by 2031, marking the first round-trip voyage to the Martian system.

Key Findings

The Japan Aerospace Exploration Agency (JAXA) successfully deployed the Martian Moons eXploration (MMX) probe on Tuesday, October 20, 2026. The mission was initiated via the No. 10 H3 rocket, which lifted off from the Tanegashima Space Center in Kagoshima Prefecture at 4:41 a.m. The rocket placed the MMX into its planned orbit approximately 1 hour and 11 minutes after launch.

Technical Details

The launch marks a significant milestone for the H3 rocket's reliability. Following three consecutive successful launches, the H3 rocket's success rate has now reached 80 pct. Yasuhiro Kawakatsu, professor at JAXA's Institute of Space and Astronautical Science and MMX mission leader, confirmed that the probe is currently in a stable condition.

Background & Context

The MMX mission is designed as a sample-return operation. The probe is slated to land on Phobos, a Martian moon, to collect sand samples. The mission architecture includes a return journey to Earth, with the arrival scheduled for 2031. Makoto Arita, manager of JAXA's H3 project team, noted that the H3 rocket has effectively opened the first chapter of this mission.

Significance & Outlook

If the mission achieves its objectives, it will represent the world's first sample return mission from a Martian moon and the first round-trip voyage to the Martian system. The data and physical samples recovered are expected to provide critical insights into:

- The origins of Mars and its moons.
- The origin of life on Earth.

Collected: October 24, 2026 | Automated Research System (AI)

#02 Mars Mission Readiness: Cardiovascular Adaptation in Astronauts

Published October 21, 2026 ScienceDaily (Northwestern University) USA



OVERVIEW

Research involving 13 astronauts indicates that the human heart can adapt to prolonged weightlessness and function under simulated Martian gravity. The study highlights that intensive daily exercise is critical for maintaining cardiovascular health during long-duration spaceflight. These findings suggest that humans can endure the journey to Mars and perform work on its surface.

Key Findings

Astronauts showed no significant signs of cardiovascular strain when exposed to simulated Martian gravity after returning to Earth from six-month missions aboard the International Space Station. While initial spaceflight caused declines in heart performance, the cardiovascular system gradually adapted over time, with metrics returning to levels near those recorded before launch.

Technical Details

Researchers from Northwestern Medicine, UT Southwestern, and UT Houston utilized echocardiograms to monitor heart structure and pumping efficiency. The study tracked two primary metrics: cardiac filling (the volume of blood entering the heart between beats) and stroke volume (the amount of blood pumped out per contraction). Data revealed that both measurements decreased during the first two weeks in space but improved as the astronauts adapted to the microgravity environment.

To mitigate the loss of muscle and cardiac mass caused by reduced physical demand in space, astronauts followed NASA's Exercise Countermeasures program. This regimen consisted of up to two hours of daily activity:

- 30 to 45 minutes of endurance training to strengthen the cardiovascular system.
- 60 to 75 minutes of resistance training to preserve muscle mass and strength.

Background & Context

In microgravity, the heart no longer works against gravity to circulate blood, which can lead to organ shrinkage. A primary concern for Mars missions is orthostatic hypotension—a drop in blood pressure upon returning to a gravitational environment that causes dizziness or lightheadedness. Mars possesses approximately 38% of Earth's surface gravity, requiring the heart to function differently than it does in weightlessness.

Significance & Outlook

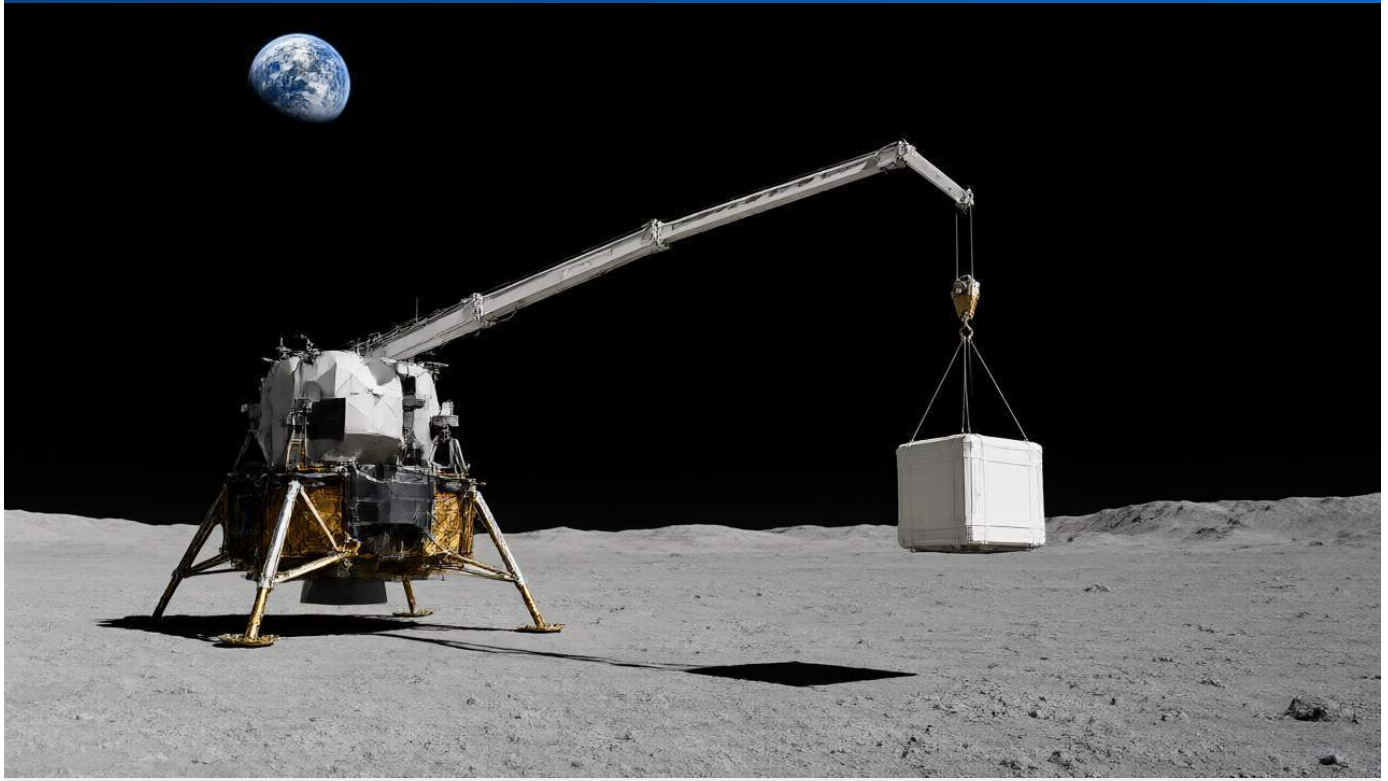
This study, published in the journal *Circulation*, is the first to investigate heart response to simulated Martian gravity following extended spaceflight. The results provide evidence that the combination of biological adaptation and rigorous exercise protocols allows the human heart to withstand the transition from microgravity to the weaker gravity of the Red Planet.

Source: <https://sciencedaily.com/releases/2026/10/261020085016.htm>

Collected: October 24, 2026 | Automated Research System (AI)

#03 Loader Lunar Crane: COMOTI and Initium Space Cargo Specs

Published October 22, 2026 European Space Agency Europe



OVERVIEW

The Romanian research institute COMOTI and Initium Space have developed Loader, a specialized lunar crane capable of moving up to 1000 kg of cargo. The system allows the European Space Agency's Argonaut landers to place heavy equipment up to six metres from the landing site, enabling uninterrupted measurements for sensitive instruments.

Key Findings

The Loader project, supported by ESA's Technology Development Element, introduces a lunar crane designed to offload cargo from the Argonaut lander. While Argonaut can transport up to 1500 kg of cargo—including rovers, science instruments, and infrastructure building blocks—the Loader crane specifically handles loads up to 1000 kg. It extends the reach of cargo placement to six metres, surpassing the capabilities of standard robotic arms.

Technical Details

The crane is launched in a folded configuration on the lander's payload deck and deploys upon reaching the lunar surface via a defined unfolding sequence and a dedicated cable-management system. To ensure stability on sloped terrain, the system incorporates a special levelling system to keep the crane vertical.

The mechanical assembly consists of a long arm with two joints and a dual-gripper system:

- A passive, spring-loaded gripper that locks into place without power.
- A battery-powered gripper capable of rotating the load for precise positioning.

Background and Context

Functionality and accuracy were validated using a scaled model at ESA's Planetary Robotics Laboratory in the Netherlands. According to ESA robotics engineer Gunter Just, the scaled model can lift 30 kg under Earth gravity, which is equivalent to over 180 kg on the Moon. The final production crane will be more than twice the size of the demonstrator; combined with the Moon's gravity being six times weaker than Earth's, this allows for the one-tonne lift capacity.

Significance and Outlook

Daniel Useriu of COMOTI states that the demonstrator has met or exceeded initial expectations, providing a strong foundation for further refinement. The ability to place sensitive science instruments metres away from the lander is critical for ensuring that measurements remain uninterrupted by the lander's presence.

Source:

https://www.esa.int/ESA_Multimedia/Images/2026/10/Moon_crane_to_take_a_load_off_lunar_landers

Collected: October 24, 2026 | Automated Research System (AI)

#04 Ohara Optical Glass: MMX Mars Moon Mission Adopters and Specs

Published October 21, 2026 sorae Japan



OVERVIEW

Ohara's optical glass has been integrated into JAXA's Martian Moons eXploration (MMX) mission for high-precision imaging and mineral analysis. The materials are utilized in the OROCHI wide-angle spectrograph and the RAX Raman spectrometer to ensure performance in harsh radiation environments.

Key Findings

Ohara, an optical glass manufacturer based in Sagamihara, announced on October 20, 2026, that its products are employed in JAXA's MMX probe. The mission, launched on October 20, 2026, via the H3 rocket flight 10, aims to land on the Martian moon Phobos, collect surface samples, and return them to Earth.

Technical Details

Ohara's glass is utilized in two primary instruments:

- **OROCHI Wide-Angle Spectrograph:** This camera captures visible light reflected from the satellite surface across multiple wavelengths to analyze terrain and the distribution of organic matter and hydrated minerals. Ohara's glass is used in the lenses to enable precise imaging.
- **RAX Raman Spectrometer:** Integrated into the IDEFIX rover—a joint development by the French National Centre for Space Studies (CNES) and the German Aerospace Center (DLR)—this instrument analyzes the mineral composition of Phobos' regolith.

For the RAX instrument, Ohara provided "radiation-resistant optical glass." This specific material prevents the discoloration typically caused by space radiation, which otherwise reduces light transmission. According to the company, the transmittance of this glass remains nearly constant even in space radiation environments, maintaining the optical performance of the observation equipment over long-term exploration.

Background & Context

The MMX mission seeks to clarify the origins of the solar system's planets and the evolutionary process of the Martian sphere. The IDEFIX rover lands before the main MMX probe to assess the properties of regolith, thereby reducing risks associated with the main probe's landing and sample collection.

Significance & Outlook

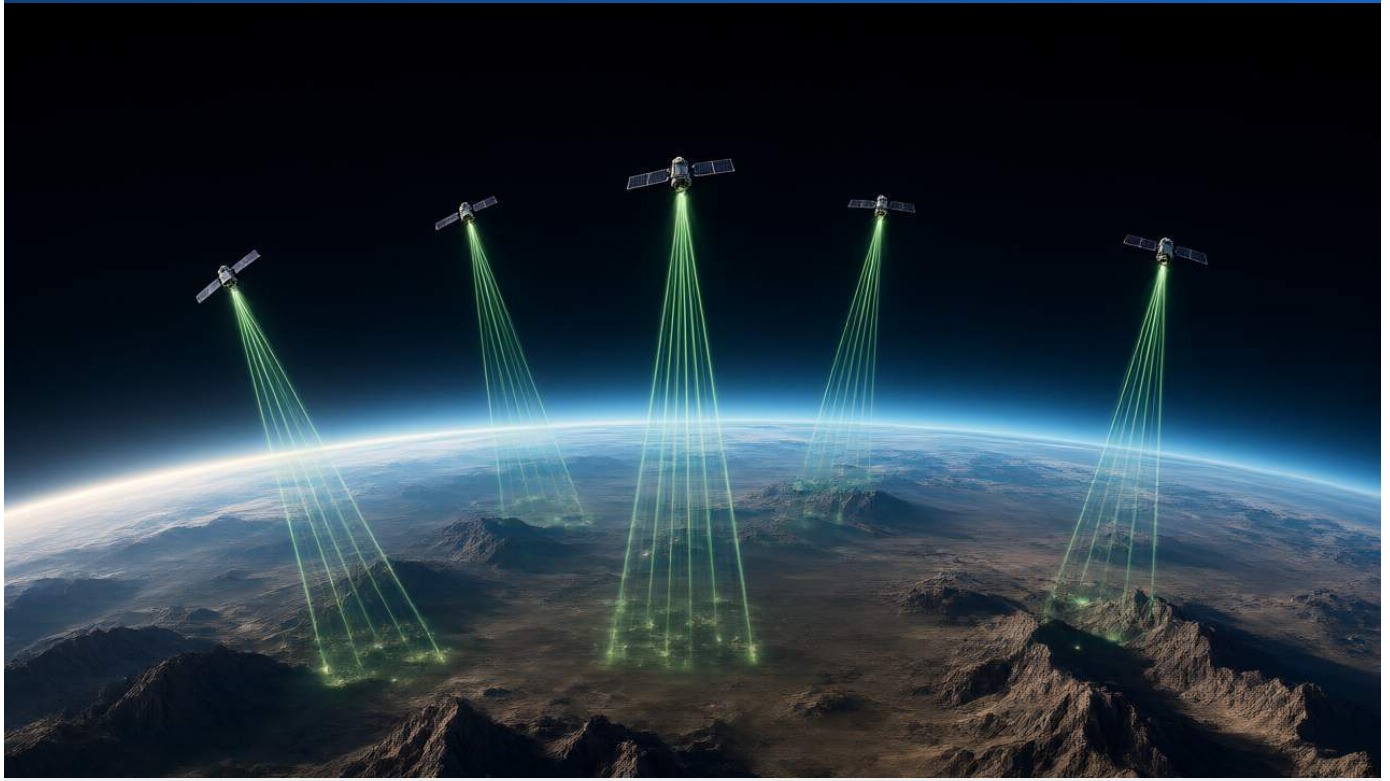
Ohara has a long history of supplying materials for space and astronomy, including the Skylab space station (1973), the Columbia space shuttle (1982), the Subaru Telescope (1999, 2012), and the Nancy Grace Roman Space Telescope (2026). Recent adoptions include NASA's Perseverance rover (2021) and JAXA's SLIM lunar lander (2023). The MMX mission represents the latest application of these materials in a world-first attempt at a sample return from a Martian moon.

Source: <https://sora.info/space/20261021-ohara-mmx.html>

Collected: October 24, 2026 | Automated Research System (AI)

#05 NTT and JAXA: LEO Satellite MIMO and IoT Transmission Results

Published October 23, 2026 Impress Watch Japan



OVERVIEW

NTT and JAXA have successfully demonstrated that MIMO technology in low Earth orbit (LEO) satellites can more than double communication capacity compared to single-antenna systems. The experiment also established a method for LEO satellites to collect data from large-scale IoT devices located in areas without terrestrial coverage.

Key Findings

NTT and JAXA have confirmed that the implementation of MIMO (Multiple-Input Multiple-Output) technology on a low Earth orbit (LEO) satellite increases communication capacity by more than two times compared to conventional single-antenna communications. Additionally, the partners successfully demonstrated a "satellite sensing technology" capable of accommodating large-scale IoT devices in terrestrial dead zones.

Technical Details

The experiments utilized "LEOMI," a MIMO/IoT technology integrated into JAXA's Innovative Satellite Technology Demonstration Satellite 4 (RAISE-4), which was launched in December 2025. Orbital experiments have been ongoing since April.

- **MIMO Performance:** The system demonstrated a capacity increase of over 2x. Analysis of simulation and actual measured values also allowed for high-precision estimation of transmission capacity fluctuation patterns, which enables the optimization of LEO satellite operations.
- **IoT Integration:** Using the 920MHz band for terrestrial IoT devices based on existing LPWA standards, the experiment confirmed that the satellite could successfully separate two signals transmitted simultaneously from different points using the same frequency. This resolves the issue of "simultaneous collision" where time and frequency overlap.

Background and Context

The MIMO technology is not limited to LEO satellites; the findings suggest it could also be integrated into high-altitude platform stations (HAPS) and balloons. The current phase of the project involves steady operation until March 2027, with the goal of establishing the technology within the 2026 fiscal year.

Significance and Outlook

The increase in transmission capacity is expected to enable the high-speed transfer of high-definition imagery and radar data for disaster prediction, ocean observation, and weather monitoring. By overcoming signal collision issues, the project moves toward the realization of an "ultra-wide area satellite IoT platform." The specific timing for commercial service remains undecided, as the technology must be integrated into actual service-providing satellite hardware.

Source: <https://www.watch.impress.co.jp/docs/news/2150343.html>

Collected: October 24, 2026 | Automated Research System (AI)

#06 Orion Heat Shield: Artemis II Performance and Trajectory Analysis

Published October 15, 2026 NASA USA



OVERVIEW

NASA's post-flight analysis of the Artemis II mission confirms that the Orion spacecraft's heat shield performed as expected, with char loss reduced by a factor of ten compared to Artemis I. This validation proves the effectiveness of trajectory modifications and provides critical data for the upcoming Artemis III mission.

Key Findings

Rigorous engineering analysis confirms that the Orion spacecraft's thermal protection system (TPS) effectively safeguarded the crew and systems during reentry from the Moon. The most significant result was a ten-fold reduction in cracking and char loss compared to the Artemis I mission; engineers identified only nine spots of char loss on the Artemis II heat shield, down from 103 in Artemis I.

Technical Details

During reentry, Orion reached a maximum velocity of 39 times the speed of sound, with external temperatures exceeding 4,000 degrees Fahrenheit. Despite these conditions, the cabin temperature remained in the mid-70 degree Fahrenheit range. The spacecraft demonstrated high precision, entering within 192 feet of its targeted entry interface and splashing down 0.59 miles from the predicted site off the coast of San Diego.

The heat shield consists of 186 unique blocks of Avcoat, an ablative material. Post-flight evaluations included:

- Diver imagery and recovery ship inspections immediately following splashdown.
- Internal x-ray scans and sample extraction at NASA's Marshall Space Flight Center.
- Post-flight laser scans to determine material recession.
- Inspection of the backshell, comprising 1,300 ceramic tiles, which showed no signs of overheating around windows, vents, thrusters, and the side hatch.

Background and Context

To mitigate the heat shield phenomena observed during Artemis I, NASA utilized arc jet material testing at the Ames Research Center to modify the Artemis II reentry trajectory. By shortening the maximum downrange distance between atmospheric entry and splashdown, NASA limited the duration the heat shield spent in the critical temperature range that caused previous issues.

Significance and Outlook

The robustness of the Avcoat blocks and the effectiveness of the trajectory change provide a foundation for future lunar missions. NASA has already implemented upgrades to the Artemis III heat shield design to ensure uniformity and consistent permeability of the Avcoat blocks. Looking ahead, NASA will launch the SLS rocket and Orion with astronauts Randy Bresnik, Frank Rubio, Andre Douglas, and Luca Parmitano to rendezvous with Blue Origin and SpaceX human lander test articles, preceding the Artemis IV mission in 2028.

Source: <https://nasa.gov/missions/artemis/artemis-2/rigorous-analysis-confirms-nasas-artemis-ii-heat-shield-performance>

Collected: October 24, 2026 | Automated Research System (AI)

#07 Planet Labs Pelican-12: Orbital AI and Relay Testing Roadmap

Published October 20, 2026 SatNews USA



OVERVIEW

Planet Labs launched the Pelican-12 spacecraft via SpaceX's Bandwagon-5 mission on October 20, 2026, to test orbital AI and space-to-space data relays. The satellite integrates NVIDIA Jetson modules for edge computing and an experimental communication package for SES Space & Defense, marking a transition toward high-volume constellation replenishment.

Key Findings

On October 20, 2026, Planet Labs PBC successfully deployed the Pelican-12 spacecraft from Cape Canaveral Space Force Station using the SpaceX Bandwagon-5 rideshare mission. This launch is the company's 25th satellite of 2026 and the fifth next-generation Pelican spacecraft launched this year. Ground controllers have already established initial contact and begun orbital commissioning.

Technical Details

Pelican-12 serves as an operational bridge between initial test articles and high-volume production. The second-generation Pelican architecture improves imagery resolution to the 30-centimeter class, compared to the 50-centimeter capabilities of the first-generation satellites.

The spacecraft incorporates two primary technical testbeds:

- **Orbital Edge Computing:** An integrated NVIDIA Jetson module enables autonomous AI inferencing on-orbit. This allows the satellite to detect ground objects and extract structured metadata before the data is downlinked.
- **Intersatellite Relay:** An experimental communication package validates space-to-space data relay for SES Space & Defense. This system routes imagery via the SES O3b mPOWER satellite constellation to deliver intelligence directly to civil and defense operators, reducing latency bottlenecks.

Background and Context

The Pelican-12 mission follows the Pelican-11 engineering pathfinder, which launched approximately three months prior. The spacecraft was delivered to Cape Canaveral in late September for transit and integration processing before its October launch.

Significance and Outlook

Current operations involve maneuvering Pelican-12 into a target mid-inclination operating orbit for sensor calibration and crosslink testing. To support recurring constellation launches scheduled for 2027, Planet Labs plans to start full-scale Pelican serial assembly at its expanded manufacturing facility in Berlin, Germany, later this year.

Source: <https://satnews.com/2026/10/20/planet-labs-launches-pelican-12-aboard-spacex-bandwagon-5-to-test-orbital-ai-and-satellite-relays/>

Collected: October 24, 2026 | Automated Research System (AI)

#08 Ariane 6 Block 2: Airbus ships lightweight Vulcain Aft Bay

Published October 21, 2026 European Spaceflight Netherlands



OVERVIEW

Airbus Netherlands has delivered the first lightweight Vulcain Aft Bay (Flight Model 16) for the Ariane 6 Block 2 upgrade, reducing the structure's mass by 880 kilograms. This modification, combined with more powerful P160C boosters, is intended to improve the rocket's performance and competitiveness.

Key Findings

Airbus Netherlands has shipped the first lightweight Vulcain Aft Bay, designated Flight Model 16 (FM16), to ArianeGroup in France via Rotterdam. The redesigned structure is 55 millimetres shorter than the previous version. While the completed assembly shipped by Airbus is 400 kilograms lighter than its Block 1 predecessor, the Vulcain Aft Bay structure itself has been reduced in mass by 880 kilograms, exceeding an original target of 800 kilograms set in July 2024.

Technical Details

The Vulcain Aft Bay is a structural assembly attached to the base of the Ariane 6 main stage. Its primary functions are to support the Vulcain 2.1 rocket engine and transfer the resulting thrust to the main structure of the rocket. The assembly currently weighs approximately five tonnes. For the Block 2 version, Airbus Netherlands has increased its scope of work; whereas it previously supplied only a basic structure for Block 1, it now delivers the complete integrated assembly.

Background and Context

The lightweight Aft Bay is a component of the broader Ariane 6 Block 2 evolution. This upgrade cycle also includes the integration of more powerful P160C solid rocket boosters, which saw their first use on an Ariane 64 rocket in June 2026. The European Space Agency (ESA) identified the mass reduction of the Vulcain Aft Bay as a critical upgrade to enhance the vehicle's competitiveness.

Significance and Outlook

The upgraded structure is expected to fly for the first time on an Ariane 6 mission in 2027. Regarding future iterations, ESA has confirmed it will not pursue the previously expected Block 3 upgrades, stating there is no programme need or justification for further development beyond the current scope.

Collected: October 24, 2026 | Automated Research System (AI)

#09 China Satellite Internet: Coverage Expansion to Polar Regions

Published October 19, 2026 CGTN China



OVERVIEW

China has successfully verified domestically-developed satellite internet communications across the Arctic, Antarctica, and the Qinghai-Xizang Plateau. This achievement effectively closes the remaining communications coverage gaps globally.

Key Findings

China has achieved a milestone in global connectivity by linking the Arctic, Antarctica, and the Qinghai-Xizang Plateau—often referred to as the "Third Pole"—via its domestically-developed satellite internet. This verification marks the first time these three extreme regions have been networked, effectively closing the last remaining communications coverage gap in the world.

Technical Details

The verification process was conducted during a voyage by the 16th Arctic Ocean expedition team. The team utilized the polar icebreaker Jidi to perform a pre-operational application test of the satellite internet system. These tests specifically targeted Arctic shipping routes to ensure the viability of networked communications in high-latitude environments.

Background and Context

The expedition was organized under the direction of China's Ministry of Natural Resources. The polar research vessel Jidi, which was documented in Qingdao, Shandong Province on July 4, 2024, served as the primary platform for these connectivity tests. The mission focused on ensuring that the domestically-developed infrastructure could maintain stable links across the most remote and geographically challenging terrains on Earth.

Significance and Outlook

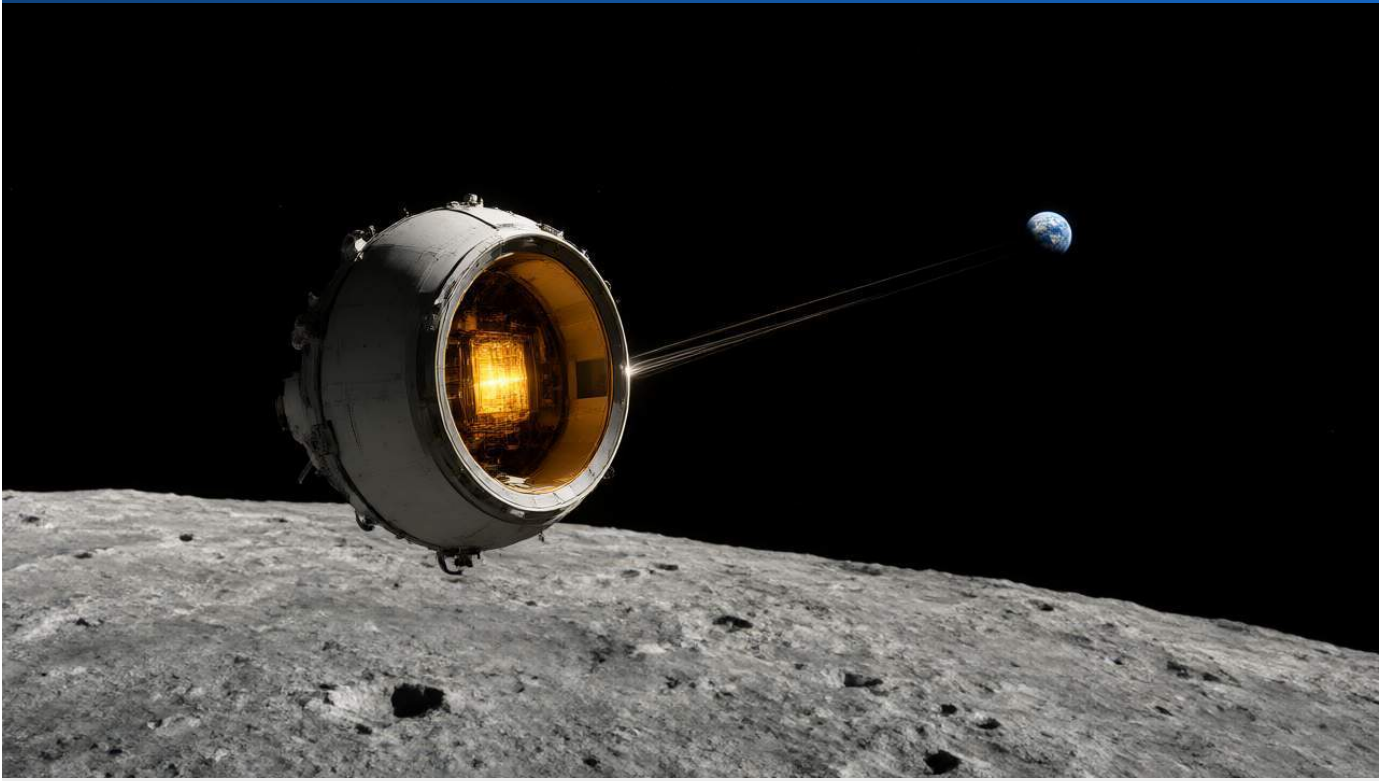
The successful integration of the Arctic, Antarctica, and the Qinghai-Xizang Plateau into a single satellite network provides a critical infrastructure update for polar research and maritime navigation. By eliminating the final coverage gaps, the system enables continuous communication for expedition teams and vessels operating in regions previously isolated from global networks. This development ensures that data transmission and operational coordination can now occur in real-time across the Earth's most extreme environments.

Source: <https://news.cgtn.com/news/2026-10-19/Satellite-internet-links-Arctic-Antarctica-Qinghai-Xizang-Plateau-1RmP7JZfXO0/p.html>

Collected: October 24, 2026 | Automated Research System (AI)

#10 SpaceBlast TENEDGE: Specs and Roadmap for Space-Based AI Edge Computing

Published October 22, 2026 ITmedia NEWS Japan



OVERVIEW

SpaceBlast is developing TENEDGE, a palm-sized AI edge computing system designed to process satellite data in orbit to reduce downlink volume. Supported by JAXA, the project aims to transition from individual edge nodes to a distributed space data center architecture by 2031.

IN DEPTH

Key Findings

SpaceBlast is developing a palm-sized computer, the TENEDGE CORE, designed to enable AI-driven data processing in space. The system aims to utilize Small Language Models (SLMs) to filter raw megabyte-scale satellite data into kilobyte-scale metadata before transmission to Earth, significantly reducing the bandwidth required for downlinking.

Technical Details

The TENEDGE CORE provides a computational performance of approximately 60 TOPS. To ensure reliability in extreme environments, the hardware incorporates the following features:

- High thermal conductivity materials for heat dissipation.
- Error detection and repair mechanisms integrated into the memory and latch circuits to mitigate malfunctions caused by cosmic radiation.

The broader TENEDGE architecture is designed to function as an edge computer on satellites. SpaceBlast is also exploring "TENEDGE SPACE AI CLOUD," a framework where users on the ground can input data requirements into a Large Language Model (LLM), which then instructs the orbital SLM to process and extract specific data.

Background and Context

The project is part of a JAXA support fund program that SpaceBlast was selected for in February. Development officially began in April, with the project period extending through fiscal year 2031. The company showcased a mock-up of the palm-sized device at Japan IT Week Autumn 2026.

Significance and Outlook

Beyond satellite operations, SpaceBlast intends to deploy these computers in other extreme environments, such as high mountains and Antarctica. The long-term roadmap includes deploying multiple edge computers in orbit to create a functional space data center for industries such as agriculture, urban development, and construction.

Additionally, the company envisions applying this technology to lunar data centers. By combining AI data reduction with lunar positioning systems, the technology could enable real-time monitoring of lunar rover positions and observation status. The development timeline includes at least two satellite deployments and a mission to the International Space Station before commercialization.

Source: <https://www.itmedia.co.jp/news/article/2610/22/2000002510/>

Collected: October 24, 2026 | Automated Research System (AI)

#11 STMicroelectronics RHFLVDS42: QML-V Quad LVDS Receiver Specs

Published October 19, 2026 Laser Focus World (ST press release) Switzerland



OVERVIEW

STMicroelectronics has introduced the RHFLVDS42, a QML-V qualified quad low-voltage differential signaling (LVDS) receiver designed for aerospace applications. The device supports data exchange speeds up to 600Mbps and offers high radiation resistance and ESD immunity. This expansion of the space-grade portfolio provides a robust communication component compatible with both legacy CMOS and modern power supply norms.

Key Findings

The RHFLVDS42 is a quad LVDS receiver that enables high-speed data exchange up to 600Mbps while maintaining low power consumption. It is designed for extreme environments, featuring a wide operating temperature range from -55°C to +125°C and high resilience against radiation and electrostatic discharge (ESD).

Technical Details

The device operates within a voltage range of 2.3V to 3.6V, ensuring compliance with Jedec and TIA/EIA-644 low-voltage logic and power supply norms. To enhance link reliability and mitigate common-mode noise, the receiver features a broad input common-mode voltage range from -4V to +5V. Additionally, an absolute maximum voltage rating (AMR) of 4.8V protects the component against power-supply transients.

Radiation and ESD specifications include:

- **ESD Immunity:** 8kV.
- **Total Ionizing Dose (TID):** Stable up to 300krad (Si) per RHA QML-V.
- **Single Event Latch-up (SEL):** SEL-free operation at 122.6 MeV.cm²/mg.
- **Single Event Transient/Upset (SET/SEU):** SET/SEU-free at 61.3 MeV.cm²/mg.

Background & Context

The RHFLVDS42 is manufactured in Rennes, France, utilizing ST's 130nm CMOS technology, which has been used in space operations for over ten years. Because it meets EAR99 export administration regulations, the component is accessible for global supply chains, including those in Asia and the USA.

Significance & Outlook

The device is available in a grounded-lid Flat-16 hermetic package featuring a flow-through pinout to minimize crosstalk and optimize PCB space. For missions where weight and space are critical constraints, the receiver is also available as a bare die. By combining compatibility with legacy CMOS designs and modern radiation hardening, the RHFLVDS42 supports the reliability requirements of contemporary aerospace communication systems.

Source: <https://www.laserfocusworld.com/directory/laser-sources/laser-semiconductor/press-release/55412965/stmicroelectronics-stmicroelectronics-expands-space-grade-portfolio-with-qml-v-qualified-quad-lvds-receiver>

Collected: October 24, 2026 | Automated Research System (AI)