

TROY TECHNICAL

SPACE INDUSTRY WEEKLY REPORT

September 12 - September 18, 2026 | Issue 2026-W37

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

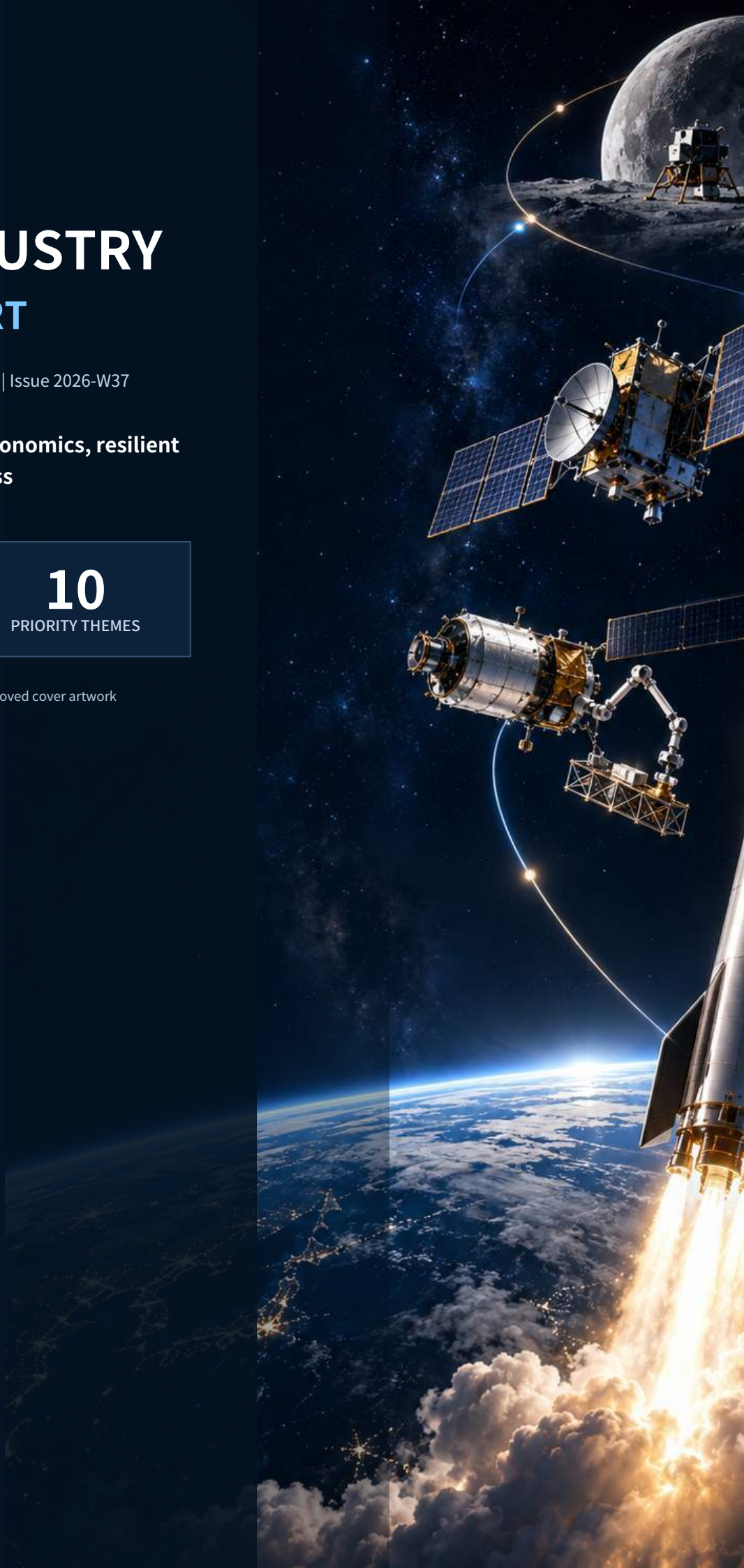
24

ANALYZED ARTICLES

10

PRIORITY THEMES

Issued 2026-09-18 | English edition | fixed approved cover artwork



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

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

SIGNAL 01 | COMPONENTS

Chinese Space Startup Space Epoch Secures New Funding to Accelerate Reusable Rocket Development

Chinese commercial space company Space Epoch has completed a new funding round to accelerate its reusable rocket technology development. The capital will be used for R&D and testing to enhance the reusability of its flagship Jielong-3 rocket.

SIGNAL 02 | SPACECRAFT

BAE Systems Secures \$16M to Restore RH45 Radiation-Hardened Chip Capability, Bolstering US Supply

BAE Systems announced it received \$16 million from the Department of Defense to restore and strengthen its RH45 radiation-hardened semiconductor manufacturing capability.

SIGNAL 03 | LAUNCH

Antares Wins \$161M Strategic Award from DoD to Demonstrate Space Nuclear Power System

Antares has secured a \$161 million Strategic Breakthrough Award from the U.S. Department of Defense (DoD) for the demonstration of a space nuclear power system.

SIGNAL 04 | ON-ORBIT SERVICE

Rocket Lab Successfully Launches 16th Mission of the Year, Deploying Earth Observation Satellite

Rocket Lab successfully launched an Earth observation satellite for an undisclosed customer on September 10, 2026, marking its 16th mission of the year.

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

**\$16 milli
on**

A18

SOURCE-BOUND CONDITION

BAE Systems announced it received \$16 million from the Department of Defense to restore and strengthen its RH45 radiation-hardened semiconductor manufacturing capability.

**\$161 mil
lion**

A14

SOURCE-BOUND CONDITION

Antares has secured a \$161 million Strategic Breakthrough Award from the U.S.

500 km

A23

SOURCE-BOUND CONDITION

The 'Happily Ever Faster' mission utilized an Electron rocket to precisely deploy a single commercial satellite into a 500 km low Earth orbit.

**\$1 billio
n**

A08

SOURCE-BOUND CONDITION

has announced nearly \$1 billion in funding opportunities to rebuild its domestic supply chain for rare earth permanent magnets, critical components for fighter aircraft, missiles, drones, satellites, and electric motors.

P05

A11

SOURCE-BOUND CONDITION

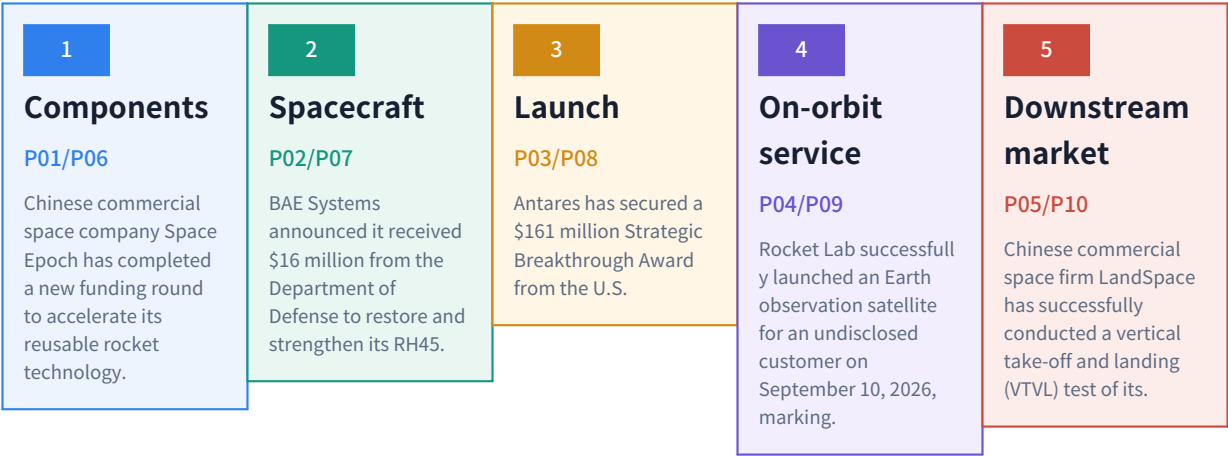
Chinese commercial space firm LandSpace has successfully conducted a vertical take-off and landing (VTVL) test of its Zhuque-3 reusable rocket.

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 business impact



P01	Chinese Space Startup Space Epoch Secures New Funding to Accelerate Reusable Rocket Development
P02	BAE Systems Secures \$16M to Restore RH45 Radiation-Hardened Chip Capability, Bolstering US Supply
P03	Antares Wins \$161M Strategic Award from DoD to Demonstrate Space Nuclear Power System
P04	Rocket Lab Successfully Launches 16th Mission of the Year, Deploying Earth Observation Satellite
P05	China's LandSpace Successfully Conducts Vertical Landing Test of Zhuque-3 Rocket, Advancing Reusable Rocket
P06	U.S. Invests Nearly \$1 Billion to Rebuild Domestic Rare Earth Magnet Supply Chain
P07	LandSpace Achieves China's First Ground-Controlled Booster Recovery with Zhuque-3 Rocket, Advancing Reusability
P08	Orange and Telesat Inaugurate Europe's First Lightspeed Gateway in France, Enhancing Low-Latency Satellite
P09	AI and Reusable Rockets Drive New Commercial Space Cycle: Space-Based Computing Spurs Demand
P10	Helogen to Launch Two October Space Missions for In-Space Manufacturing of Artificial Retinas

REPRODUCIBLE POSITIONING RULE
Horizontal position uses five discrete stages: Research, Prototype, Joint evaluation, Product adoption and Scale. Vertical position uses three impact levels: single use, multiple customers and multiple supply tiers. Bubble diameter reflects the editorial score inherited from the weekly selection rubric.

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

P01

Chinese Space Startup Space Epoch Secures New Funding to Accelerate Reusable Rocket Development

A12 | Components | Research

Date not stated

FACT

Chinese commercial space company Space Epoch has completed a new funding round to accelerate its reusable rocket technology development. The capital will be used for R&D and testing to enhance the reusability of its flagship Jielong-3 rocket. As China encourages commercialization and innovation in its space industry, Space Epoch aims to catch up with global leaders like SpaceX.

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 1/5 | IMPACT 3/3

P02

BAE Systems Secures \$16M to Restore RH45 Radiation-Hardened Chip Capability, Bolstering US Supply

A18 | Spacecraft | Product adoption

Date not stated

FACT

BAE Systems announced it received \$16 million from the Department of Defense to restore and strengthen its RH45 radiation-hardened semiconductor manufacturing capability. This investment aims to establish a domestic supply chain for critical radiation-hardened space electronics, reducing foreign dependence for essential US space and defense missions.

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 21/25 | MATURITY 4/5 | IMPACT 2/3

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

P03

Antares Wins \$161M Strategic Award from DoD to Demonstrate Space Nuclear Power System

A14 | Launch | Product adoption

Date not stated

FACT

Antares has secured a \$161 million Strategic Breakthrough Award from the U.S. Department of Defense (DoD) for the demonstration of a space nuclear power system. This contract aims to accelerate the development of fission reactor technology, crucial for providing high-performance, long-duration power to future lunar, Martian, and orbital missions. Antares targets demonstrating an orbital nuclear power system prototype by 2029, marking a significant step in bolstering U.S.

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 21/25 | MATURITY 4/5 | IMPACT 1/3

P04

Rocket Lab Successfully Launches 16th Mission of the Year, Deploying Earth Observation Satellite

A23 | On-orbit service | Research

Date not stated

FACT

Rocket Lab successfully launched an Earth observation satellite for an undisclosed customer on September 10, 2026, marking its 16th mission of the year. The 'Happily Ever Faster' mission utilized an Electron rocket to precisely deploy a single commercial satellite into a 500 km low Earth orbit. This launch underscores Rocket Lab's consistent and high-frequency deployment capability in the small satellite market, demonstrating its robust operational efficiency and expanding market presence.

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 21/25 | MATURITY 1/5 | IMPACT 2/3

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

P05

China's LandSpace Successfully Conducts Vertical Landing Test of Zhuque-3 Rocket, Advancing Reusable Rocket

A11 | Downstream market | Research

Date not stated

FACT

Chinese commercial space firm LandSpace has successfully conducted a vertical take-off and landing (VTVL) test of its Zhuque-3 reusable rocket. This marks China's first successful landing of a reusable rocket, representing a significant milestone in catching up with SpaceX's technology. The Zhuque-3, powered by methalox engines, aims to be a fully reusable launch 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 P05.

UNKNOWN

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

EDITORIAL SCORE 21/25 | MATURITY 1/5 | IMPACT 2/3

P06

U.S. Invests Nearly \$1 Billion to Rebuild Domestic Rare Earth Magnet Supply Chain

A08 | Components | Product adoption

Date not stated

FACT

The U.S. has announced nearly \$1 billion in funding opportunities to rebuild its domestic supply chain for rare earth permanent magnets, critical components for fighter aircraft, missiles, drones, satellites, and electric motors, a market currently dominated by China. Evolution Metals & Technologies Corp. (Nasdaq: EMAT) is highlighted for expanding its rare earth magnet production capacity tenfold by November 2026 to meet U.S. defense sourcing deadlines.

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 20/25 | MATURITY 4/5 | IMPACT 2/3

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

P07

LandSpace Achieves China's First Ground-Controlled Booster Recovery with Zhuque-3 Rocket, Advancing Reusability

A24 | Spacecraft | Product adoption

Date not stated

FACT

Chinese private aerospace firm LandSpace successfully executed China's first ground-controlled recovery of its Zhuque-3 rocket booster in August 2026, utilizing landing legs akin to SpaceX's Falcon 9. This landmark achievement positions China as a serious contender in the reusable rocket sector, though the use of heavy stainless steel for reentry durability currently imposes payload capacity limitations, presenting a key hurdle for full reusability and commercial relaunch.

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 20/25 | MATURITY 4/5 | IMPACT 1/3

P08

Orange and Telesat Inaugurate Europe's First Lightspeed Gateway in France, Enhancing Low-Latency Satellite

A13 | Launch | Joint evaluation

Date not stated

FACT

French telecom giant Orange and Canadian satellite provider Telesat have opened Europe's first Telesat Lightspeed gateway in France. This new gateway connects Telesat's advanced Low Earth Orbit (LEO) Lightspeed constellation with Orange's terrestrial network, providing high-speed, low-latency, and highly secure broadband connectivity across Europe.

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 20/25 | MATURITY 3/5 | IMPACT 2/3

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

P09

AI and Reusable Rockets Drive New Commercial Space Cycle: Space-Based Computing Spurs Demand

A07 | On-orbit service | Joint evaluation

Date not stated

FACT

The article highlights how advancements in reusable rocket technology and space-based computing are catalyzing a new cycle in the commercial aerospace sector. Reusable rockets drastically reduce launch costs, enhancing the economic viability of space infrastructure. The expansion of space-based computing necessitates the development of highly efficient, lightweight, and radiation-resistant photovoltaic materials, fostering deep collaboration across the energy, materials, and semiconductor industries.

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 20/25 | MATURITY 3/5 | IMPACT 2/3

P10

Helogen to Launch Two October Space Missions for In-Space Manufacturing of Artificial Retinas

A19 | Downstream market | Product adoption

Date not stated

FACT

Startup Helogen announced it will launch two space missions in October for manufacturing artificial retinas and orthopedic implants in microgravity. These missions aim to explore the production of more precise, high-quality biocompatible materials that are challenging to achieve under Earth's gravity. Microgravity is expected to enhance material homogeneity and minimize defects, contributing to improved long-term implant performance and patient safety.

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 20/25 | MATURITY 4/5 | IMPACT 2/3

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 01-12

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	Advanced Space Solar Cells Boost Radiation Hardness with III-V Multi-Junctions, Perovskites, and Improved Silicon PV for Extended Mission Life	https://www.shgulier.com/news/top-tips-for-extending-the-life-of-space-solar-cells.html
A02	NASA Parker Solar Probe Braves Solar Corona at 692,000 km/h with a 73kg Heat Shield, Keeping Instruments at 30°C	https://www.spacegroup.no/nasa-probe-plunges-into-the-solar-corona-at-692000-km-h-the-shield-protecting-its-instruments-weighs-almost-no-thing/
A03	NASA Solicits Proposals for Lunar Surface Technologies: Vertical Solar Arrays, Regolith Oxygen Extraction, and Radioisotope Stirling Generators for Moon Base	https://douglasmessier.substack.com/p/nasa-calls-for-proposals-to-accelerate
A04	NASA Solicits High-Efficiency Radioisotope Power Systems for Lunar Exploration, Targeting 3-4x Fuel Reduction with RSGs	https://www.ans.org/news/article-8380/nasa-solicits-lunar-radioisotope-power/
A05	Inversion Awarded NASA Contract to Advance Aerocapture Technology for Mars, Uranus, and Neptune Missions Using Arc Spacecraft	https://www.prnewswire.com/news-releases/inversion-selected-by-nasa-to-advance-aerocapture-technology-for-future-interplanetary-missions-302874697.html
A06	JAXA Successfully Conducts Reusable Rocket RV-X Takeoff and Landing Test, Completes Epsilon S Second-Stage Combustion Re-test	https://sj.jst.go.jp/stories/2026/s0916-01p.html
A07	AI and Reusable Rockets Drive New Commercial Space Cycle: Space-Based Computing Spurs Demand for Novel Energy Materials	https://eu.36kr.com/en/p/3988217539116038
A08	U.S. Invests Nearly \$1 Billion to Rebuild Domestic Rare Earth Magnet Supply Chain; Evolution Metals to Ten-Fold Production for Defense Needs	https://www.tradingview.com/news/financewire:9fe5adf5f094b:0
A09	Eascra Biotech Partners with NASA to Accelerate Space-Manufactured Nanomedicine Development	https://deeptechdigest.com/biotech/eascra-biotech-receives-nasa-contract-for-space-manufactured-nanomedicine/
A10	Astrogate Labs Successfully Demonstrates India's First Optical Inter-Satellite Link (OISL), Revolutionizing Space Communication	https://www.shankariasparliament.com/current-affairs/gs-ii/prelim-bits-5/indias-first-indigenous-optical-inter-satellite-link-oisl
A11	China's LandSpace Successfully Conducts Vertical Landing Test of Zhuque-3 Rocket, Advancing Reusable Rocket Technology to Compete with US	https://www.robocap.com/chinas-first-reusable-rocket-lands-successfully/
A12	Chinese Space Startup Space Epoch Secures New Funding to Accelerate Reusable Rocket Development and Bolster International Competitiveness	https://www.caixinglobal.com/2026-09-16/chinese-space-startup-raises-new-funds-in-reusable-rocket-push-102485526.html

ANALYZED ARTICLES | ITEMS 13-25

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
A13	Orange and Telesat Inaugurate Europe's First Lightspeed Gateway in France, Enhancing Low-Latency Satellite Communications	https://markets.businessinsider.com/news/stocks/orange-and-telesat-in-augurate-europe-s-first-telesat-lightspeed-gateway-in-france-1036553317
A14	Antares Wins \$161M Strategic Award from DoD to Demonstrate Space Nuclear Power System	https://payloadspace.com/antares-wins-161m-award-for-space-nuclear-power/
A15	Cailabs and Kepler Communications Explore Partnership for Satellite-to-Ground Optical Service, Accelerating Data Transmission	https://www.cailabs.com/news/aerospace-and-defense/cailabs-and-kepler-communications-to-explore-satellite-to-ground-optical-service-for-customers/
A16	NASA Artemis III to Integrate and Verify SpaceX Starship and Blue Origin Lunar Landers	https://scitechdaily.com/nasas-artemis-iii-will-test-spacex-and-blue-origin-moon-landers/
A17	Startup Besxar Initiates In-Space Semiconductor Manufacturing Tests, Aiming for Ultra-High Quality Chips Unachievable on Earth	https://www.kucoin.com/news/flash/startup-besxar-begins-testing-semiconductor-manufacturing-in-space
A18	BAE Systems Secures \$16M to Restore RH45 Radiation-Hardened Chip Capability, Bolstering US Supply Chain	https://defence-industry.eu/bae-systems-secures-16-million-to-restore-rh45-chip-capability-and-strengthen-us-supply-of-radiation-hardened-space-electronics/
A19	Helogen to Launch Two October Space Missions for In-Space Manufacturing of Artificial Retinas and Orthopedic Implants	https://labusinessjournal.com/technology/helogen-readies-two-october-space-missions/
A21	IBM and NASA Open-Source Multimodal AI 'Lunar Foundation Model' for Moon Mapping, Accelerating Lunar and Mars Missions	https://research.ibm.com/blog/nasa-ibm-lunar-foundation-model
A22	NASA Launches Call for Proposals to Accelerate Moon Base Technologies, Focusing on Vertical Solar Arrays, ISRU Oxygen Extraction, RSG, Advanced Manufacturing, and Nanomaterials	https://www.meritalk.com/articles/nasa-seeks-proposals-to-advance-technology-for-moon-base/
A23	Rocket Lab Successfully Launches 16th Mission of the Year, Deploying Earth Observation Satellite for Undisclosed Customer	https://www.space.com/space-exploration/launches-spacecraft/rocket-lab-launches-mystery-satellite-to-orbit-for-secret-customer-photo
A24	LandSpace Achieves China's First Ground-Controlled Booster Recovery with Zhuque-3 Rocket, Advancing Reusability	https://www.scmp.com/tech/tech-trends/article/3367874/china-has-gained-pace-space-race-recovering-rockets-can-it-relaunch-one
A25	NASA's Lunar Base Plan Eyes Sunpower's Stirling Radioisotope Generator for Crucial Power	https://www.fool.com/investing/2026/09/17/nasas-new-moon-base-contact-could-be-an-out-of/

SpaceIndustry — Selected Articles

Date: 2026-09-20

Articles: 24

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- #03 NASA Solicits Proposals for Lunar Surface Technologies: Vertical Solar Arrays, Regolith Oxygen Extraction, and Radioisotope Stirling Generators for Moon Base
- #04 NASA Solicits High-Efficiency Radioisotope Power Systems for Lunar Exploration, Targeting 3-4x Fuel Reduction with RSGs
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#19 Helogen to Launch Two October Space Missions for In-Space Manufacturing of Artificial Retinas and Orthopedic Implants

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#23 Rocket Lab Successfully Launches 16th Mission of the Year, Deploying Earth Observation Satellite for Undisclosed Customer

#24 LandSpace Achieves China's First Ground-Controlled Booster Recovery with Zhuque-3 Rocket, Advancing Reusability

#25 NASA's Lunar Base Plan Eyes Sunpower's Stirling Radioisotope Generator for Crucial Power

#01 Advanced Space Solar Cells Boost Radiation Hardness with III-V Multi-Junctions, Perovskites, and Improved Silicon PV for Extended Mission Life

Published September 10, 2026 Industry Today (Department of Energy) USA



OVERVIEW

To extend the operational life of space solar cells, multi-junction solar cells utilizing III-V semiconductors are crucial for their inherent radiation resistance. Emerging perovskite photovoltaics also show promise with high efficiency, low cost, lightweight manufacturing, and excellent radiation endurance for satellite constellations. Additionally, advancements in performance and radiation tolerance have renewed interest in silicon PV as a lower-cost alternative for various space missions.

Key Findings

Significant advancements are being made in extending the operational lifespan of space solar cells, crucial for the longevity and reliability of spacecraft. These innovations include the use of highly radiation-resistant materials such as multi-junction solar cells based on III-V semiconductors, alongside the application of sophisticated protective coatings and cover materials. Perovskite photovoltaics are emerging as a transformative technology, offering a compelling combination of high efficiency, lower manufacturing costs, reduced weight, and superior radiation endurance, particularly for large-scale satellite constellations. Furthermore, improved performance and enhanced radiation tolerance have reignited interest in silicon photovoltaic technology, positioning it as a more cost-effective power solution for space applications.

Technical Details

- **III-V Multi-Junction Solar Cells:** These cells, often incorporating materials like gallium arsenide (GaAs) and indium phosphide (InP), achieve high conversion efficiencies by stacking multiple sub-cells with different bandgaps, optimized to absorb a broad spectrum of sunlight. Their inherent material properties and sophisticated design make them significantly more resistant to degradation from high-energy particles prevalent in space radiation environments compared to single-junction cells.
- **Protective Coatings and Cover Materials:** To mitigate damage from ultraviolet radiation, atomic oxygen, and charged particles, solar cells are encapsulated with specialized protective coatings and cover glasses. These materials are engineered to be transparent to sunlight while effectively shielding the underlying cell structure, slowing down radiation-induced degradation and ensuring long-term performance stability.
- **Perovskite Photovoltaics:** Perovskite materials offer advantages such as tunable bandgaps, high power conversion efficiencies, and suitability for flexible, lightweight manufacturing processes. Their demonstrated resilience to various forms of radiation, coupled with their potential for cost reduction, makes them highly attractive for future satellite constellations where large numbers of durable, inexpensive solar arrays are required.

- **Improved Silicon PV:** Recent research and development have overcome some traditional limitations of silicon solar cells in space, particularly their susceptibility to radiation. Innovations in cell design, such as back-contact architectures, and improvements in silicon material purity have led to enhanced performance and increased radiation tolerance, making silicon a viable and economical option for certain types of space missions.

Background & Context

The burgeoning space industry, driven by the proliferation of satellite constellations and long-duration deep-space missions, demands power systems that can operate reliably for extended periods under extreme conditions. Solar arrays are the primary power source for most spacecraft, but their performance degrades over time due to exposure to cosmic rays and solar flares. The strategies outlined—from advanced material selection to novel cell architectures—directly address this critical challenge. By providing more robust and cost-effective power solutions, these technologies are pivotal for sustaining the expansion of space infrastructure and enabling ambitious future missions.

Strategic Significance & Outlook

These advancements will profoundly impact the design and economic viability of future space missions. The availability of more resilient and cost-efficient solar cells will accelerate the deployment of large satellite constellations, enhancing global communication, Earth observation, and navigation services. For deep-space probes and human-crewed missions, improved solar cell longevity translates into increased mission duration and reduced operational risks. Continued investment in radiation-hardened solar cell technologies is essential for the long-term sustainability and growth of humanity's presence and activities in space, pushing the boundaries of scientific exploration and commercial exploitation.

Source: <https://www.shgulier.com/news/top-tips-for-extending-the-life-of-space-solar-cells.html>

#02 NASA Parker Solar Probe Braves Solar Corona at 692,000 km/h with a 73kg Heat Shield, Keeping Instruments at 30°C

Published September 10, 2026 Space Group Norway



OVERVIEW

NASA's Parker Solar Probe has achieved record-breaking speeds and proximity to the Sun, relying on its groundbreaking Thermal Protection System (TPS). This ultra-lightweight, 73-kilogram carbon composite shield, just eleven centimeters thick, withstands external temperatures nearing 1400 degrees Celsius while maintaining internal scientific instruments at approximately 30°C. The design ingeniously utilizes the vacuum of space, precise geometry, and active thermal regulation to preserve instrument functionality in the Sun's extreme environment.

Key Findings

NASA's Parker Solar Probe has set unprecedented records for speed and solar proximity, plunging into the Sun's corona at an astonishing 692,000 km/h. This audacious mission is enabled by its highly innovative Thermal Protection System (TPS), a carbon composite shield weighing a mere 73 kilograms. This eleven-centimeter-thick shield is capable of enduring temperatures approaching 1400 degrees Celsius on its outer surface, while remarkably maintaining the internal scientific instruments at a stable 30°C, showcasing a monumental leap in extreme environment spacecraft survivability.

Technical Details

The Parker Solar Probe's TPS, often referred to as the heat shield, is a marvel of materials science and engineering. Constructed from a carbon-carbon composite sandwich structure with a lightweight foam core, the 11-centimeter thick shield is designed to absorb the immense solar energy and re-radiate it into space. Its effectiveness stems from a combination of design principles: Firstly, its precise geometrical design ensures that direct sunlight is largely blocked from reaching the spacecraft body. Secondly, the vacuum of space between the shield and the spacecraft acts as an extremely efficient thermal insulator. Thirdly, the probe incorporates passive and active thermal management systems, including an elaborate fluid cooling system, to distribute and reject residual heat, ensuring that the sensitive instruments operate within their optimal temperature range of around 30°C. The white ceramic coating on the sun-facing side further enhances emissivity, aiding in heat rejection.

Background & Context

Understanding the Sun's corona—the outermost layer of its atmosphere—and the origins of the solar wind has been a grand challenge in heliophysics. These phenomena profoundly influence space weather, which can impact Earth's technology and astronauts. To unravel these mysteries, direct measurements within the corona are essential, requiring a spacecraft to survive conditions of extreme heat and radiation that were previously thought impossible. The Parker Solar Probe's mission represents a paradigm shift, allowing in-situ data collection closer to the Sun than any previous mission, thereby pushing the boundaries of material science and thermal engineering for space applications.

Strategic Significance & Outlook

The Parker Solar Probe mission is expected to deliver revolutionary insights into solar physics, addressing fundamental questions about our star's dynamics and evolution. The advanced TPS technology developed for this mission has profound implications for future deep-space exploration, particularly for missions to inner planets like Mercury and Venus, or potentially even exoplanetary systems with close-orbiting stars. The ability to manage extreme thermal loads in such challenging environments will offer unprecedented design flexibility for spacecraft and enable humanity to venture into regions of the cosmos that were once considered unreachable, opening new avenues for scientific discovery and technological innovation.

Source: <https://www.spacegroup.no/nasa-probe-plunges-into-the-solar-corona-at-692000-km-h-the-shield-protecting-its-instruments-weighs-almost-nothing/>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#03 NASA Solicits Proposals for Lunar Surface Technologies: Vertical Solar Arrays, Regolith Oxygen Extraction, and Radioisotope Stirling Generators for Moon Base

Published September 10, 2026 NASA USA



OVERVIEW

NASA is actively seeking proposals to advance key technologies for lunar exploration and the establishment of a Moon Base at the lunar South Pole. Critical areas include vertical solar array technology for consistent power, in-situ resource utilization (ISRU) for oxygen extraction from regolith, radioisotope Stirling generators for nuclear energy, and advanced in-space manufacturing. These initiatives aim to significantly reduce reliance on Earth resupply missions, thereby enhancing mission flexibility and resilience on the Moon.

Key Findings

NASA is issuing a broad solicitation for technology proposals aimed at accelerating lunar exploration and establishing a sustainable human presence at the lunar South Pole. This call focuses on critical advancements such as vertical solar array technology for continuous power generation, in-situ resource utilization (ISRU) for oxygen extraction from lunar regolith, radioisotope Stirling generators (RSGs) for reliable nuclear energy, and advanced manufacturing capabilities in space. These strategic investments are designed to drastically decrease dependence on Earth-based resupply missions, thereby enhancing the autonomy, flexibility, and resilience of future lunar operations.

Technical Details

- **Vertical Solar Array Technology:** At the lunar South Pole, the sun's angle is consistently low, making vertically oriented solar arrays more effective at capturing sunlight over long periods, including during lunar day-night cycles that can last for Earth-weeks. This design maximizes power output and ensures continuous energy supply for a permanent lunar outpost.
- **Oxygen Extraction from Regolith (ISRU):** Lunar regolith contains oxygen bound within its mineral compounds. Technologies to extract this oxygen – such as reduction with hydrogen or methane, or molten salt electrolysis – are vital for producing breathable air, propellants (oxidizer), and water. This significantly reduces the mass that needs to be launched from Earth.
- **Radioisotope Stirling Generators (RSGs):** As a highly efficient nuclear power source, RSGs convert the heat from the radioactive decay of plutonium-238 dioxide into electricity using a Stirling engine. These systems are crucial for providing continuous power during the two-week-long lunar nights and in permanently shadowed regions where solar power is unavailable, offering superior efficiency and longevity compared to traditional Radioisotope Thermoelectric Generators (RTGs).
- **In-Space Advanced Manufacturing:** This involves technologies like 3D printing and robotic construction to fabricate tools, spare parts, and structures directly on the Moon from lunar resources or feedstock transported from Earth. This reduces logistics burdens, allows for rapid repair, and enables the construction of larger habitats and infrastructure that would be impractical to launch fully assembled.

Background & Context

NASA's Artemis program aims to establish a long-term human presence on the Moon, a goal that necessitates robust, self-sustaining infrastructure. The high cost and logistical complexity of launching all necessary supplies from Earth make ISRU and autonomous power generation critical. By developing technologies that allow astronauts to 'live off the land' and generate their own power, NASA can unlock longer-duration missions and reduce the overall risk and expense. This solicitation reflects a strategic shift towards greater lunar self-sufficiency, building foundational capabilities not just for the Moon, but as a stepping stone for future Mars missions.

Strategic Significance & Outlook

Successful development and deployment of these technologies will transform a lunar outpost into a sustainable, self-sufficient base. The combination of vertical solar arrays and RSGs will ensure reliable power, while ISRU-derived oxygen will support both life support and propulsion needs. In-space manufacturing will revolutionize construction and maintenance on the Moon, enabling more ambitious scientific endeavors and exploration. These advancements are not merely incremental; they are fundamental to expanding humanity's reach into the cosmos, making deeper space exploration, including crewed missions to Mars, a more tangible reality and establishing a true multi-planetary civilization.

Source: <https://douglasmmessier.substack.com/p/nasa-calls-for-proposals-to-accelerate>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#04 NASA Solicits High-Efficiency Radioisotope Power Systems for Lunar Exploration, Targeting 3-4x Fuel Reduction with RSGs

Published September 10, 2026 American Nuclear Society USA



OVERVIEW

NASA is soliciting proposals for radioisotope power systems (RPSs), specifically focusing on high-efficiency radioisotope Stirling generators (RSGs), to support lunar exploration missions and a base at the lunar south pole. The primary goal is to develop systems that can reduce plutonium-238 fuel requirements by three to four times compared to current RPS technologies. The solicitation targets systems providing 50 We–150 We DC power with at least 20% efficiency and a five-year design life, also covering related technologies like vertical solar arrays and oxygen extraction.

Key Findings

NASA has issued a call for proposals to develop advanced radioisotope power systems (RPSs), with a particular emphasis on high-efficiency radioisotope Stirling generators (RSGs), to enable sustained lunar exploration and support a future base at the lunar South Pole. The ambitious objective is to develop systems capable of reducing plutonium-238 (Pu-238) fuel requirements by three to four times compared to current RPS technologies. This initiative seeks systems delivering 50 We–150 We DC power with a minimum 20% efficiency and a five-year design life, representing a critical step towards more sustainable and resource-efficient lunar operations.

Technical Details

Radioisotope power systems convert heat generated by the radioactive decay of Pu-238 dioxide into electrical energy. While traditional Radioisotope Thermoelectric Generators (RTGs) use thermocouples for direct heat-to-electricity conversion, RSGs employ a Stirling engine, which converts thermal energy into mechanical motion and then into electricity, offering significantly higher conversion efficiency. The specific requirements outlined in NASA's solicitation include:

- **Power Output:** 50 We to 150 We (electrical watts) of DC power.
- **Conversion Efficiency:** A minimum of 20%, which is substantially higher than typical RTG efficiencies (around 7-10%). This increased efficiency directly translates to a reduced need for scarce Pu-238 fuel.
- **Design Life:** At least five years, to support extended lunar missions and continuous base operations.
- **Broader Scope:** The solicitation also covers related technologies essential for lunar self-sufficiency, such as vertical solar arrays for polar environments, in-situ resource utilization (ISRU) for oxygen extraction, advanced manufacturing in space, and novel nanomaterials for enhanced system performance.

Background & Context

The lunar South Pole is a region of high scientific and strategic interest due to the potential presence of water ice in permanently shadowed regions. However, these areas, along with the two-week-long lunar nights, pose significant challenges for solar-dependent power systems. RPSs, proven in deep-space missions like New Horizons, offer a reliable, continuous power source independent of solar illumination. However, the global supply of Pu-238 is limited. Developing more fuel-efficient RSGs is a strategic imperative to maximize the utility of available fuel, enabling a greater number of high-priority lunar missions and supporting NASA's long-term Artemis program goals of establishing a sustainable human presence on the Moon.

Strategic Significance & Outlook

The successful development of high-efficiency RSGs will dramatically expand the scope and duration of lunar exploration activities. It will enable sustained scientific investigations in permanently shadowed regions, facilitate the exploration and utilization of lunar water ice, and support the eventual production of local resources, including propellant. Reliable power is fundamental to supporting lunar habitats, scientific instruments, and preparing for future human missions to Mars. This technology is expected to set a new standard for power systems in space exploration, serving as a critical foundational technology for humanity's enduring presence and future ventures deeper into the solar system.

Source: <https://www.ans.org/news/article-8380/nasa-solicits-lunar-radioisotope-power/>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#05 Inversion Awarded NASA Contract to Advance Aerocapture Technology for Mars, Uranus, and Neptune Missions Using Arc Spacecraft

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OVERVIEW

Inversion has secured a NASA contract to study aerocapture demonstration using its Arc spacecraft, aiming to mature the technology for future interplanetary missions such as Mars telecommunications satellites and outer planet exploration (Uranus and Neptune). Arc, a highly maneuverable reentry spacecraft designed for rapid cargo delivery and hypersonic testing, will be instrumental in mission design, aerodynamics, trajectory analysis, and vehicle definition. This collaboration targets precise, fuel-efficient atmospheric flight beyond Earth.

Key Findings

Inversion has been awarded a significant contract by NASA to conduct a study on advancing aerocapture technology using its Arc spacecraft. This crucial collaboration aims to mature aerocapture for future interplanetary missions, including the deployment of Mars telecommunications satellites and ambitious exploration of distant ice giants like Uranus and Neptune. By leveraging the highly maneuverable Arc spacecraft, designed for rapid cargo delivery, hypersonic testing, and national security missions, Inversion will focus on critical aspects of mission design, aerodynamics, trajectory analysis, and vehicle definition to enable precise and controlled flight through non-Earth atmospheres.

Technical Details

Aerocapture is a propulsive maneuver that uses a planet's atmosphere to dissipate kinetic energy and reduce a spacecraft's velocity, allowing it to enter orbit around the target body with minimal use of onboard propellant. This technique drastically reduces the fuel mass required for orbital insertion, thereby enabling larger payloads or smaller launch vehicles. Inversion's Arc spacecraft is a robust, high-maneuverability reentry vehicle known for its precise flight control and ability to operate across a wide range of hypersonic conditions. Its characteristics make it an ideal platform for demonstrating aerocapture, which requires sophisticated guidance, navigation, and control (GNC) systems to manage atmospheric interactions accurately. The study will encompass:

- **Mission Design:** Optimizing trajectories and operational sequences for aerocapture around Mars and outer planets.
- **Aerodynamics:** Analyzing and modeling the spacecraft's behavior in different planetary atmospheres.
- **Trajectory Analysis:** Developing algorithms for precise entry corridor control and orbit shaping.
- **Vehicle Definition:** Refining Arc's design for interplanetary aerocapture capabilities, including thermal protection and structural integrity.

Background & Context

Interplanetary missions, especially to the outer solar system, are severely constrained by the amount of propellant that can be carried. Traditional propulsive maneuvers for orbital insertion consume a significant fraction of a spacecraft's mass, limiting payload size and mission duration. Aerocapture, while theoretically superior in fuel efficiency, has remained a challenging technology to implement due to its stringent requirements for thermal protection, atmospheric modeling, and real-time control. Despite its promise, aerocapture has never been operationally used for orbital insertion at another planet. The current push, utilizing advanced re-entry vehicle platforms like Arc, aims to overcome these historical hurdles and validate the technology for routine use in future deep-space endeavors.

Strategic Significance & Outlook

The successful maturation of aerocapture technology through this NASA-Inversion partnership will be a game-changer for future planetary exploration. It promises to unlock more ambitious and cost-effective missions by significantly reducing the mass of propellant needed for orbital insertion. This could lead to larger science payloads, smaller launch requirements, and extended mission lifetimes for complex probes to gas giants and icy moons. For human exploration of Mars, aerocapture could enable more efficient delivery of cargo and crew. By establishing a proven aerocapture capability, this collaboration is setting a new standard for interplanetary travel, opening new frontiers for scientific discovery and expanding humanity's reach across the solar system.

Source: <https://www.prnewswire.com/news-releases/inversion-selected-by-nasa-to-advance-aerocapture-technology-for-future-interplanetary-missions-302874697.html>

#06 JAXA Successfully Conducts Reusable Rocket RV-X Takeoff and Landing Test, Completes Epsilon S Second-Stage Combustion Re-test

Published September 16, 2026 Science Japan Japan



OVERVIEW

The Japan Aerospace Exploration Agency (JAXA) successfully conducted a takeoff and landing test of its RV-X experimental vehicle on September 11, 2026, marking a significant step towards reusable rocket technology. The 7.3-meter, 3.1-ton RV-X ascended 11 meters, moved 16 meters horizontally, and landed autonomously within 40 seconds. This achievement is critical for establishing engine reuse technology for the H3 rocket's successor. Additionally, JAXA completed a re-test of the Epsilon S small rocket's second-stage combustion, addressing material procurement challenges by replacing key binder and insulation materials.

Key Findings

The Japan Aerospace Exploration Agency (JAXA) successfully executed a takeoff and landing test of its RV-X experimental vehicle on September 11, 2026, marking a pivotal advancement in its pursuit of reusable rocket technology. The RV-X, a prototype measuring 7.3 meters in length and weighing 3.1 tons, demonstrated autonomous flight by ascending 11 meters, traversing 16 meters horizontally, and landing precisely within 40 seconds. This success represents a crucial milestone in establishing engine reuse technology for the successor to the H3 rocket. Concurrently, JAXA also finalized a re-test of the second-stage combustion for its Epsilon S small rocket, successfully overcoming material procurement challenges by implementing alternative binder and insulation materials.

Technical Details

The RV-X experimental vehicle was developed to validate Vertical Takeoff and Vertical Landing (VTVL) technology, essential for enabling rocket engine reuse. This prototype, sized and weighted to mimic a real rocket stage, performed its complex VTVL sequence through highly precise thrust vectoring and attitude control, facilitated by advanced flight control software and integrated hardware. The ability to ensure stable and accurate landing is paramount for reducing recovery costs and enhancing operational efficiency for future large-scale reusable rockets. In parallel, the re-test of the Epsilon S second-stage engine addressed initial material procurement difficulties by successfully testing alternative components. This demonstrates a strengthened supply chain and increased manufacturing flexibility, significantly mitigating risks in ongoing rocket development.

Background and Industry Context

The global space industry is rapidly transitioning towards reusable rocket technology, pioneered by systems like SpaceX's Falcon 9. This shift dramatically reduces launch costs, democratizing access to space and fueling the rapid expansion of the satellite launch market. JAXA's successful RV-X test is a vital step for Japan to establish its presence in this competitive international landscape of reusable rocket development. Integrating reusability into the H3 rocket's successor is expected to enhance Japan's space transportation capabilities, making them more competitive and adaptable to diverse space missions. Furthermore, the successful material replacement in the Epsilon S re-test highlights Japan's commitment to ensuring the sustainability and stability of its indigenous rocket development, a critical aspect given current geopolitical risks and supply chain volatilities.

Strategic Significance and Outlook

The success of the RV-X experimental vehicle provides significant momentum for JAXA's goal of realizing reusable technology for the 'H3 rocket successor.' Future plans likely involve tests at higher altitudes, more complex flight profiles, and ultimately, demonstrating re-entry and landing capabilities from space. This progression is expected to make Japan's launch services more competitive in the international market. The completion of the Epsilon S material replacement and re-combustion test secures a stable launch capability for the small satellite market, reinforcing Japan's autonomous space activities in scientific missions and national security. These technological advancements are strategic elements for Japan's space industry to establish its unique position and achieve sustainable growth amidst global collaboration and competition.

Source: <https://sj.jst.go.jp/stories/2026/s0916-01p.html>

#07 AI and Reusable Rockets Drive New Commercial Space Cycle: Space-Based Computing Spurs Demand for Novel Energy Materials

Published September 18, 2026 LinkedIn (Industry expert post via 36Kr English) China



OVERVIEW

The article highlights how advancements in reusable rocket technology and space-based computing are catalyzing a new cycle in the commercial aerospace sector. Reusable rockets drastically reduce launch costs, enhancing the economic viability of space infrastructure. The expansion of space-based computing necessitates the development of highly efficient, lightweight, and radiation-resistant photovoltaic materials, fostering deep collaboration across the energy, materials, and semiconductor industries. This trend is set to accelerate the growth of the space economy and create new extraterrestrial business opportunities.

Key Findings

The convergence of advancements in reusable rocket technology and the expanding capabilities of space-based computing is igniting a new growth cycle within the commercial space industry. Reusable rockets significantly slash launch costs, making the deployment and operation of space infrastructure far more economically feasible, which in turn accelerates investment in 'space-based computing.' This surge in computational power in orbit necessitates the development of novel photovoltaic materials that are highly efficient, lightweight, and exceptionally radiation-resistant. This trend is expected to deepen technological collaboration across diverse industries, including energy, materials science, and semiconductors, acting as a powerful catalyst for scaling the space economy and fostering innovation and business opportunities beyond Earth.

Technical Details

Reusable rockets, through Vertical Takeoff and Vertical Landing (VTVL) technologies and optimized recovery and refurbishment processes, dramatically reduce launch costs compared to traditional expendable rockets. This enables more frequent and affordable payload deployment to orbit, accelerating the expansion of various satellite services such as Earth observation, telecommunications, and navigation. In the context of space-based computing, performing parts of AI model training and data processing on-orbit minimizes data latency and allows for on-demand, sophisticated analysis. To realize this capability, solar cells that can reliably operate in the harsh space radiation environment, are lightweight, and offer high power generation efficiency are essential. Next-generation photovoltaic materials, such as perovskite solar cells and further refinements of III-V multi-junction solar cells, are key candidates. These materials require both robust radiation tolerance for long-term space operation and high efficiency to deliver maximum power from limited installation areas.

Background and Industry Context

Over the past decade, private companies like SpaceX have revolutionized the space industry by establishing reusable rocket technology, which has drastically lowered the cost of access to space. This has made the deployment of mega-constellations of thousands of satellites, space tourism, and even extraterrestrial resource extraction more tangible. Space-based computing is positioned as a core technology supporting these burgeoning activities. Space offers unique advantages and challenges compared to terrestrial data centers, including an unimpeded global view, microgravity environments, and unrestricted global data collection capabilities. Simultaneously, however, it presents severe operational conditions such as extreme temperature fluctuations, intense space radiation, and the risk of debris collisions. Overcoming these challenges necessitates robust and efficient power supply systems, particularly radiation-hardened solar cell technologies.

Strategic Significance and Outlook

The synergy between AI and reusable rocket technology is set to accelerate a paradigm shift in the commercial space industry. Enhanced space-based computing capabilities will drive innovation across a wide range of applications, including real-time analysis of Earth observation data, accelerated inter-satellite communication, and autonomous spacecraft operations. This trend will create new demand for radiation-hardened semiconductor chips, advanced thermal management systems, and especially highly energy-efficient photovoltaic materials. Consequently, large-scale investment and technological innovation are anticipated not only within the aerospace sector but also across related industries such as energy, materials science, and semiconductor manufacturing. Ultimately, this will lead to a future where space is established not just as a domain for research, but as a new economic zone, creating sustainable business opportunities that expand humanity's frontier.

Source: <https://eu.36kr.com/en/p/3988217539116038>

#08 U.S. Invests Nearly \$1 Billion to Rebuild Domestic Rare Earth Magnet Supply Chain; Evolution Metals to Ten-Fold Production for Defense Needs

Published September 17, 2026 Nasdaq (via Reuters) United States



OVERVIEW

The U.S. has announced nearly \$1 billion in funding opportunities to rebuild its domestic supply chain for rare earth permanent magnets, critical components for fighter aircraft, missiles, drones, satellites, and electric motors, a market currently dominated by China. Evolution Metals & Technologies Corp. (Nasdaq: EMAT) is highlighted for expanding its rare earth magnet production capacity tenfold by November 2026 to meet U.S. defense sourcing deadlines. This strategic move addresses national security vulnerabilities and aims to secure self-reliance for next-generation space and defense technologies.

Key Findings

The U.S. government has announced approximately \$1 billion in funding opportunities to reconstruct a domestic supply chain for rare earth permanent magnets, which are indispensable components for critical defense and advanced technology sectors, including fighter aircraft, missiles, drones, satellites, electric motors, and sophisticated electronics. This market is presently overwhelmingly dominated by China, and the U.S. aims to address inherent national security vulnerabilities. As part of this broader initiative, Evolution Metals & Technologies Corp. (Nasdaq: EMAT) has publicly declared plans to increase its rare earth magnet production capacity tenfold by November 2026. This aggressive expansion is specifically targeted at meeting sourcing deadlines mandated by the U.S. Department of Defense, marking a crucial step towards ensuring U.S. self-reliance for these strategic resources.

Technical Details

Rare earth permanent magnets, primarily composed of rare earth elements such as neodymium and samarium, possess exceptional magnetic properties, enabling the generation of very strong magnetic fields. These magnets are vital across a wide array of high-tech industries, including aerospace, defense, renewable energy, and electric mobility, due to their high energy density and superior magnetic performance. They contribute to the miniaturization and increased efficiency of high-performance motors, generators, and compact electronic devices. Evolution Metals & Technologies Corp.'s projected tenfold increase in production capacity signifies a substantial strengthening of U.S. domestic processing capabilities and technology across the entire supply chain, from raw material extraction and refinement to magnet manufacturing. This effort likely includes the development of more efficient and environmentally sustainable extraction and refining techniques, alongside the optimization of manufacturing processes for high-performance magnets.

Background and Industry Context

The global supply of rare earth elements has been largely controlled by China for decades, and its geopolitical implications have been a longstanding concern, particularly for the U.S. defense industry. The U.S. military systems and many advanced technologies are heavily reliant on rare earth magnets, making supply instability and price volatility a recognized national security risk. In the past, China has demonstrated its ability to tighten rare earth export controls, leading to a scramble in the U.S. to address its lack of domestic production capabilities. In response, the U.S. government, primarily through the Department of Energy (DOE), has been actively investing in domestic critical-mineral mining, processing, and manufacturing technologies. The recently announced \$1 billion funding opportunity is a direct continuation of this strategic initiative, aimed at diversifying and strengthening the rare earth supply chain.

Strategic Significance and Outlook

The substantial investment by the U.S. government, coupled with production capacity increases by companies like Evolution Metals & Technologies Corp., will accelerate the rebuilding of the domestic rare earth permanent magnet supply chain, significantly reducing reliance on China. This move will not only enhance the autonomy of the U.S. defense industrial base but also bolster the foundation for the sustained growth of burgeoning industries such as electric vehicles, wind power generation, and next-generation space technologies. In the long term, securing a stable domestic supply is expected to further catalyze technological innovation within these industries, promoting the development of new products and services. However, establishing an efficient and environmentally responsible end-to-end process from mining to manufacturing will require continuous technological development and substantial investment, with public-private collaboration remaining key.

Source: <https://www.tradingview.com/news/financewire:9fe5adf5f094b:0>

#09 Eascra Biotech Partners with NASA to Accelerate Space-Manufactured Nanomedicine Development

Published September 10, 2026 Deep Tech Digest USA



OVERVIEW

Eascra Biotech has signed a Space Act Agreement with NASA to accelerate the development of nanomedicines manufactured in microgravity. This collaboration aims to leverage the unique space environment to produce highly efficient and uniform nanopharmaceutical products, which are challenging to create on Earth. The focus includes enhancing drug delivery systems for cancer therapies and developing novel vaccines. This strategic partnership positions microgravity as a new frontier for pharmaceutical innovation, potentially transforming terrestrial medicine and expanding the space economy.

Key Findings: Eascra Biotech Partners with NASA to Accelerate Space-Manufactured Nanomedicine Development

Eascra Biotech has announced a landmark Space Act Agreement with the National Aeronautics and Space Administration (NASA) to advance the research and development of nanomedicines manufactured in microgravity. This significant collaboration is designed to explore how the unique conditions of space can influence drug manufacturing processes, aiming to produce highly precise and homogeneous nanopharmaceuticals that are difficult to achieve on Earth. The partnership is expected to accelerate the creation of innovative drug delivery systems and vaccines, particularly for cancer treatment and infectious disease prevention.

Technical & Clinical Details: Leveraging Microgravity for Superior Nanomedicine Quality

The microgravity environment eliminates gravitational effects such as sedimentation, convection, and buoyancy present on Earth. This allows for the formation of more uniform and defect-free nanostructures, including nanocarriers, liposomes, and polymeric nanoparticles, with precise control over their size, shape, and surface characteristics. Eascra Biotech plans to utilize these advantages to optimize drug biodistribution, pharmacokinetics, and target specificity, thereby maximizing therapeutic efficacy while minimizing adverse effects. Leveraging NASA's expertise and access to spaceflight resources, the agreement is expected to facilitate rapid prototyping and optimization of nanomedicine formulations.

Background & Context: Space as a New Frontier for Pharmaceutical Innovation

The pharmaceutical industry is increasingly looking towards microgravity as a unique physical environment that can overcome limitations in traditional drug development. Previous research has demonstrated space's benefits in protein crystal growth, cell culture, and materials science, often yielding higher quality results than terrestrial methods. Similarly, the nanomedicine sector stands to benefit significantly from microgravity manufacturing, with the potential to dramatically improve drug purity, stability, and efficacy. Eascra Biotech's collaboration with NASA aligns with a broader industry trend of viewing space not just for exploration, but as a platform for advanced manufacturing and research.

Strategic Significance & Outlook: Contributing to Terrestrial Healthcare and Expanding Space Economy

The R&D efforts under this agreement hold the potential to revolutionize terrestrial healthcare by enabling the production of superior nanomedicines for personalized medicine and challenging diseases, leading to improved patient outcomes. Eascra Biotech aims to scale up the insights and technologies gained from this collaboration into commercial-scale space manufacturing. This initiative is expected to drive growth in the microgravity manufacturing market, fostering new value creation and job opportunities within the broader space economy. This pioneering endeavor represents a crucial step in shaping the future of life sciences both in space and on Earth, enhancing global health resilience and technological leadership.

Source: <https://deeptechdigest.com/biotech/eascra-biotech-receives-nasa-contract-for-space-manufactured-nanomedicine/>

#10 Astrogate Labs Successfully Demonstrates India's First Optical Inter-Satellite Link (OISL), Revolutionizing Space Communication

Published September 10, 2026 Shankarias Parliament India



OVERVIEW

India's Astrogate Labs has successfully conducted a demonstration of its indigenous Optical Inter-Satellite Link (OISL) technology. This breakthrough enables significantly faster and more secure data transfer than traditional radio frequency (RF) communication, dramatically enhancing data processing capabilities for satellite constellations and deep-space missions. OISL is poised to become a foundational technology for future space communication infrastructure, offering gigabit-class speeds and high security. This achievement marks a crucial milestone for India in establishing international leadership in the space communication sector.

Key Findings: Astrogate Labs Successfully Demonstrates India's First Optical Inter-Satellite Link (OISL), Revolutionizing Space Communication

Astrogate Labs, an Indian space startup, has announced the successful demonstration of India's first indigenous Optical Inter-Satellite Link (OISL) technology. This pioneering achievement enables significantly faster and more secure data transfer in space compared to traditional radio frequency (RF) communication. The establishment of OISL technology is expected to revolutionize future space communication infrastructure by dramatically improving communication efficiency between satellite constellations and facilitating rapid transmission of large volumes of scientific data from deep-space exploration missions.

Technical & Clinical Details: Gigabit-Class High-Speed Communication with Robust Security

OISL technology utilizes laser light for data transmission between satellites. This method operates at much higher frequencies than RF communication, allowing for ultra-high data rates of gigabits per second (Gbps). This capability enables the faster downlink of high-resolution imagery from Earth observation satellites and vast scientific data from deep-space probes. Furthermore, laser beams are narrow and difficult to intercept, significantly enhancing communication security. OISL also alleviates the congestion issues in RF frequency bands, providing access to more communication channels. Astrogate Labs' success stems from the design of compact and lightweight OISL terminals coupled with precise pointing and tracking technologies.

Background & Context: Exploding Demand for Space Communication and Next-Generation Transition

The burgeoning proliferation of satellite constellations in Low Earth Orbit (LEO) and the increasing number of deep-space exploration missions targeting the Moon and Mars have led to an exponential increase in demand for space data communication. However, conventional RF communication faces challenges such as bandwidth limitations, data rate constraints, and security vulnerabilities. OISL technology is being actively researched and developed worldwide as a fundamental solution to these challenges, widely anticipated to become the next-generation standard for space communication. Astrogate Labs' achievement demonstrates India's capability to compete internationally in this critical technological domain with indigenous solutions, thereby enhancing its presence in the global space communication market.

Strategic Significance & Outlook: Strengthening India's Space Industry and Creating New Services

The successful OISL demonstration by Astrogate Labs is a monumental achievement for India's space industry, significantly bolstering its international competitiveness. This technology will not only improve data transmission capabilities for various missions spearheaded by the Indian Space Research Organisation (ISRO) but also serve as a foundation for providing high-speed, high-security communication solutions to commercial satellite operators both domestically and internationally. In the future, new space data services leveraging OISL technology, such as real-time Earth observation data delivery and ultra-high-speed internet connectivity in space, are anticipated. This will position India to play a more prominent role as a hardware and service provider in the global space economy, marking a strategic advancement for its burgeoning space sector.

Source: <https://www.shankariasparliament.com/current-affairs/gs-ii/prelim-bits-5/indias-first-indigenous-optical-inter-satellite-link-oisl>

#11 China's LandSpace Successfully Conducts Vertical Landing Test of Zhuque-3 Rocket, Advancing Reusable Rocket Technology to Compete with US

Published September 16, 2026 RoboCap China



OVERVIEW

Chinese commercial space firm LandSpace has successfully conducted a vertical take-off and landing (VTVL) test of its Zhuque-3 reusable rocket. This marks China's first successful landing of a reusable rocket, representing a significant milestone in catching up with SpaceX's technology. The Zhuque-3, powered by methalox engines, aims to be a fully reusable launch system. This achievement demonstrates China's substantial progress in reducing launch costs and improving operational efficiency, strengthening its position in the global space race.

Key Findings: China's LandSpace Successfully Conducts Vertical Landing Test of Zhuque-3 Rocket, Advancing Reusable Rocket Technology to Compete with US

LandSpace, a commercial Chinese space company, has announced the successful completion of a vertical take-off and vertical landing (VTVL) test for its Zhuque-3 (Vermillion Bird-3) reusable rocket. This remarkable achievement marks the first successful landing of a reusable rocket developed by a private Chinese enterprise, signifying a groundbreaking advancement in China's technological progress within the global space transportation market. The Zhuque-3 aims to be a fully reusable launch system, and this success represents a crucial step towards catching up with and eventually competing against U.S. reusable rocket technologies, particularly those pioneered by SpaceX.

Technical & Clinical Details: Demonstration of Methalox Engines and Precision Landing Technology

The Zhuque-3 rocket is powered by Tianque (Sky Crane) engines, which use liquid methane and liquid oxygen (methalox) as propellants. Methalox engines are gaining significant attention as a key propulsion system for next-generation rockets due to their high performance, reusability, and relatively clean combustion characteristics. In the VTVL test, the rocket successfully took off, ascended to a predetermined altitude, and then executed a precise vertical landing at the designated spot using sophisticated thrust and attitude control. This demonstrated the system's in-flight stability, engine throttling capabilities, and the accuracy of its GNC (guidance, navigation, and control) system, establishing a technological foundation for future recovery and reuse after orbital launches.

Background & Context: The Rise of China's Commercial Space Industry and National Strategy

In recent years, China has positioned space development as a pillar of its national strategy, fostering not only state-owned enterprises but also private sector innovation. Reducing launch costs is a critical component of China's ambition to become a space power, with reusable rocket technology at its core. LandSpace's success with Zhuque-3 clearly indicates that Chinese commercial space companies, while supported by the state, are beginning to make their mark in the international space race through independent technological innovation. This introduces new competition into a reusable rocket market previously dominated by SpaceX, contributing to the diversification of global space launch services.

Strategic Significance & Outlook: Practical Application of Reusable Rockets and Reduction in Space Access Costs

The successful VTVL test of LandSpace's Zhuque-3 rocket significantly opens the path for China to operationalize its fully reusable rocket technology. The company plans to further enhance its orbital launch capabilities and conduct more recovery and reuse tests of its first-stage rocket, aiming to drastically reduce launch costs and provide competitive services to commercial customers. This is expected to further invigorate China's satellite launch market and expand space utilization in fields such as Earth observation, communication, and space science. The Zhuque-3 holds the potential to democratize China's access to space and significantly impact the global space industry structure, with future contributions to lunar and Martian exploration missions also within sight, marking a strategic shift in the global aerospace landscape.

Source: <https://www.robocap.com/chinas-first-reusable-rocket-lands-successfully/>

#12 Chinese Space Startup Space Epoch Secures New Funding to Accelerate Reusable Rocket Development and Bolster International Competitiveness

Published September 16, 2026 Caixin Global China



OVERVIEW

Chinese commercial space company Space Epoch has completed a new funding round to accelerate its reusable rocket technology development. The capital will be used for R&D and testing to enhance the reusability of its flagship Jielong-3 rocket. As China encourages commercialization and innovation in its space industry, Space Epoch aims to catch up with global leaders like SpaceX. This investment signifies strengthening competitiveness in China's commercial reusable rocket sector and suggests a significant future role in the space transportation market.

Key Findings: Chinese Space Startup Space Epoch Secures New Funding to Accelerate Reusable Rocket Development and Bolster International Competitiveness

Space Epoch, a commercial space company in China, has successfully completed a new funding round aimed at further accelerating the development of its reusable rocket technology. This fresh capital will be intensively invested into research and development, manufacturing, and testing programs designed to enhance the reusability capabilities of its flagship rocket, Jielong-3 (Smart Dragon-3). This fundraising occurs amidst a proactive drive by the Chinese government to promote the commercialization and innovation of its space industry, providing a critical foundation for Space Epoch to catch up with and strengthen its international competitiveness against global leaders in reusable rocket technology, notably SpaceX.

Technical & Clinical Details: Enhancing Jielong-3 Reusability and Liquid Propulsion Technology

The Jielong-3 rocket was designed with reusability in mind from its inception, and Space Epoch is particularly focusing on vertical landing and reuse technology for its first stage. The company is advancing the development of liquid propulsion engines, specifically liquid oxygen/kerosene (kerolox) or liquid oxygen/methane (methalox) engines, which possess the necessary throttling and relight capabilities for re-landing. The new funding is earmarked for landing tests, structural enhancements, avionics system improvements, and establishing large-scale production capabilities. The overarching goal is to establish a reliable reusable system that significantly reduces launch costs.

Background & Context: China's Space Power Strategy and the Rise of Commercial Space

China has set an ambitious goal to become a leading space power by 2045, and the role of commercial space companies, alongside state-owned enterprises, is deemed indispensable for achieving this. Reusable rockets are one of the most crucial technologies for increasing launch frequency and reducing costs, democratizing China's access to space and enabling new space services. Investments in companies like Space Epoch are part of the Chinese government's strategy to foster competition in this sector and pursue technological self-reliance. This development positions Chinese firms to directly compete with U.S. and European commercial space entities, potentially altering the landscape of the global space transportation market.

Strategic Significance & Outlook: Reusable Rockets Driving Space Access Revolution and Global Market Entry

The funding secured by Space Epoch provides a significant impetus for the commercialization of Jielong-3's reusable technology. Should the company succeed, it will be able to offer more affordable access to space for not only Chinese commercial clients but also international customers. This could further accelerate emerging space businesses such as satellite constellation deployment, space tourism, and in-orbit services. Space Epoch aims to commence commercial operations of its reusable rockets within the next few years, establishing itself as a significant player in the global launch market. This movement indicates China's space industry is evolving from mere imitation to a global innovator, ushering in a new phase of competition and cooperation in the international space economy.

Source: <https://www.caixinglobal.com/2026-09-16/chinese-space-startup-raises-new-funds-in-reusable-rocket-push-102485526.html>

#13 Orange and Telesat Inaugurate Europe's First Lightspeed Gateway in France, Enhancing Low-Latency Satellite Communications

Published September 17, 2026 Markets Insider France



OVERVIEW

French telecom giant Orange and Canadian satellite provider Telesat have opened Europe's first Telesat Lightspeed gateway in France. This new gateway connects Telesat's advanced Low Earth Orbit (LEO) Lightspeed constellation with Orange's terrestrial network, providing high-speed, low-latency, and highly secure broadband connectivity across Europe. It is expected to dramatically improve connectivity, especially in remote and maritime areas, creating new market opportunities in 5G backhaul, government, aviation, and shipping sectors.

Key Findings: Orange and Telesat Inaugurate Europe's First Lightspeed Gateway in France, Enhancing Low-Latency Satellite Communications

French telecommunications leader Orange and Canadian advanced satellite communications provider Telesat have announced the inauguration of Europe's first Telesat Lightspeed gateway in Lannion, France. This strategically important new infrastructure will directly connect Telesat's Low Earth Orbit (LEO) satellite constellation, 'Telesat Lightspeed,' currently under construction, with Orange's extensive terrestrial network. This integration will enable the provision of unprecedented high-speed, ultra-low-latency, and highly secure broadband connectivity services across Europe, expected to dramatically improve communication environments across land, sea, and air.

Technical & Clinical Details: Seamless Integration of LEO Satellites and Terrestrial Networks

The Telesat Lightspeed constellation will comprise hundreds of advanced satellites positioned in LEO at an altitude of approximately 1,000 km, achieving terabit-scale capacity through inter-satellite optical links (ISL). This technology allows data to be transmitted over much shorter paths than via traditional geostationary (GEO) satellites, significantly reducing round-trip latency to levels in the tens of milliseconds. The Lannion gateway will play a crucial role in receiving signals from Lightspeed satellites and routing them into Orange's terrestrial fiber optic network. This enables users to experience services comparable to terrestrial fiber optic connections, unaware that they are using satellite communication. This seamless integration is achieved through advanced routing technologies and sophisticated network management systems.

Background & Context: Bridging the Broadband Gap and Creating New Markets

High-speed broadband connectivity is a fundamental requirement of modern society, and bridging the digital divide is a global challenge. LEO satellite broadband is gaining significant attention as a powerful solution to bridge the "broadband gap" in regions with geographical constraints or high terrestrial infrastructure deployment costs. Next-generation LEO constellations like Telesat Lightspeed create new market opportunities by providing highly reliable, low-latency connectivity, particularly for enterprises, government agencies, the aviation and maritime sectors, and remote communities. The partnership between Orange and Telesat is poised to foster digital inclusion in Europe and drive innovation in areas such as 5G backhaul, IoT, and cloud services.

Strategic Significance & Outlook: Enhancing Europe's Digital Connectivity and Global LEO Market Competition

The inauguration of the Lannion gateway represents a significant step towards the commercial deployment of the Telesat Lightspeed constellation in Europe, which is expected to dramatically improve digital connectivity across the continent. This infrastructure is projected to contribute to Europe's economic growth, education, healthcare, and security. The collaboration between Orange and Telesat will enhance Telesat Lightspeed's competitiveness in a global market intensified by competition from other LEO satellite broadband providers like OneWeb and Starlink. In the future, the expansion of this gateway network across Europe and the establishment of a more robust and widespread service delivery system will lay the foundation for Europe to be at the forefront of satellite communication technology.

Source: <https://markets.businessinsider.com/news/stocks/orange-and-telesat-inaugurate-europe-s-first-telesat-lightspeed-gateway-in-france-1036553317>

#14 Antares Wins \$161M Strategic Award from DoD to Demonstrate Space Nuclear Power System

Published September 11, 2026 Payload Space USA



OVERVIEW

Antares has secured a \$161 million Strategic Breakthrough Award from the U.S. Department of Defense (DoD) for the demonstration of a space nuclear power system. This contract aims to accelerate the development of fission reactor technology, crucial for providing high-performance, long-duration power to future lunar, Martian, and orbital missions. Antares targets demonstrating an orbital nuclear power system prototype by 2029, marking a significant step in bolstering U.S. energy self-sufficiency and security in space.

Key Findings: Antares Wins \$161M Strategic Award from DoD to Demonstrate Space Nuclear Power System

Antares has announced it has been awarded a substantial \$161 million Strategic Breakthrough Award from the U.S. Department of Defense (DoD). This funding is designated for the demonstration of a Space Nuclear Power System, a critical technology essential for providing high-performance, long-duration power to future deep-space exploration missions and orbital spacecraft. Under this contract, Antares will accelerate the development of small fission reactor technology, aiming to demonstrate a prototype system in orbit by 2029. This initiative is pivotal for enhancing U.S. energy self-sufficiency and national security in space.

Technical & Clinical Details: Small Fission Reactors for Longevity and High Power Density

The space nuclear power system being developed by Antares adapts terrestrial fission reactor technology to the stringent constraints of space. Its primary advantage over conventional solar panels and battery systems is its capability to provide high-output power for extended durations, crucially operating independently of solar illumination. The system is designed to maximize power delivery while minimizing mass and volume, making it suitable for diverse applications such as deep-space probes, lunar bases, or high-orbit surveillance satellites. The awarded funds will support research and development in areas including nuclear fuel design, thermoelectric conversion technology, radiation shielding, and ensuring launch safety. The 2029 orbital demonstration will be a decisive step in validating the system's reliability and safety.

Background & Context: Strategic Dominance and Rising Power Demand in Space

Power is one of the most critical factors determining the duration, capability, and autonomy of space missions. For long-term missions like lunar bases and Mars exploration, or the operation of orbital defense assets, large and stable power sources that cannot be met by solar power are indispensable. The U.S. DoD emphasizes innovative approaches like nuclear power technology to maintain its advantage in space, especially as potential adversaries enhance their own space capabilities. This significant investment in Antares is intended to bolster U.S. strategic autonomy and resilience in space, addressing future space defense and exploration needs.

Strategic Significance & Outlook: Transforming Space Infrastructure and Creating New Economic Spheres

Antares' demonstration of a space nuclear power system has the potential to fundamentally transform the way space infrastructure is built and operated. With the ability to provide long-duration, high-output power, the establishment of permanent human bases on the Moon and Mars becomes more feasible, accelerating activities like resource extraction, scientific research, and advanced manufacturing. Furthermore, enhanced orbital power capabilities will drive the development of more advanced satellites and create new commercial opportunities such as in-space repair and maintenance services. This technology is expected to fuel the growth of the overall space economy, potentially opening the door to a grander vision of supplying some of Earth's energy needs from space. It is anticipated to reinforce U.S. leadership in space and herald the dawn of a new 'space energy era.'

Source: <https://payloadspace.com/antares-wins-161m-award-for-space-nuclear-power/>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#15 Cailabs and Kepler Communications Explore Partnership for Satellite-to-Ground Optical Service, Accelerating Data Transmission

Published September 10, 2026 Cailabs France



OVERVIEW

French Cailabs and Canadian/US Kepler Communications announced exploring a partnership for satellite-to-ground optical communication services. This collaboration will leverage Cailabs' 'Proteus' optical beam shaping technology and Kepler's extensive Low Earth Orbit (LEO) satellite network to achieve significantly faster and more secure data transmission than existing radio frequency (RF) systems. Initial targets are several gigabits per second (Gbps), aiming for terabits per second (Tbps) in the future. This technology marks a crucial step in resolving space communication bottlenecks for Earth observation, scientific research, and government data processing needs.

Key Findings: Cailabs and Kepler Communications Explore Partnership for Satellite-to-Ground Optical Service, Accelerating Data Transmission

Cailabs, a French advanced optics company, and Kepler Communications, a Canadian/US-based satellite communication provider, have announced their intent to explore a partnership for providing satellite-to-ground optical communication services. This strategic collaboration aims to integrate Cailabs' unique Proteus optical beam shaping technology into Kepler's extensive Low Earth Orbit (LEO) satellite network, thereby achieving significantly faster and more secure data transmission compared to existing radio frequency (RF) communication systems. While initial goals target data rates of several gigabits per second (Gbps), the long-term vision includes terabit-per-second (Tbps) class communication.

Technical & Clinical Details: High-Speed, High-Reliability Communication through Proteus and LEO Network Fusion

Cailabs' Proteus technology dynamically compensates for optical beam distortions caused by atmospheric turbulence, significantly enhancing the reliability and efficiency of optical signal transmission to ground stations. This technology is key to overcoming "atmospheric propagation loss," a major challenge in laser communication. Concurrently, Kepler Communications deploys numerous small satellites in LEO, and in conjunction with their global communication coverage, Proteus technology will enable high-speed satellite-to-ground optical communication from anywhere on Earth. This system is expected to play a critical role in transmitting high-resolution data from Earth observation satellites, scientific research data, and sensitive government data quickly and securely, by avoiding RF frequency band congestion and utilizing broader bandwidths.

Background & Context: Exploding Space Data and Communication Infrastructure Challenges

The proliferation of satellite constellations in Low Earth Orbit and the exponential increase in data generated by Earth observation, IoT, and scientific exploration are placing immense strain on current space communication infrastructure. Traditional RF communication is reaching its limits in terms of bandwidth and speed, leading to a palpable "data bottleneck" between space and Earth. Optical communication is garnering attention as the next-generation technology to solve this challenge, with major space agencies and companies worldwide accelerating its development. The Cailabs and Kepler partnership aligns with this global trend, aiming to establish market leadership by combining their respective strengths.

Strategic Significance & Outlook: Next-Generation Communication Infrastructure Supporting Space Economy Growth

The partnership between Cailabs and Kepler Communications marks a significant step towards building next-generation space communication infrastructure. The realization of high-speed, secure satellite-to-ground optical communication services could enable a variety of new applications and business models, such as near real-time utilization of Earth observation data, accelerated disaster response, high-performance internet connectivity in remote areas, and even access to in-space data centers and cloud services. This technology is expected to form a cornerstone for the growth of the space economy, democratizing access to information, and contributing to global sustainable development goals. Through international collaboration, they are poised to establish new standards in space communication and become pioneers in optimizing global data flow, enhancing their global competitive standing.

Source: <https://www.cailabs.com/news/aerospace-and-defense/cailabs-and-kepler-communications-to-explore-satellite-to-ground-optical-service-for-customers/>

#16 NASA Artemis III to Integrate and Verify SpaceX Starship and Blue Origin Lunar Landers

Published September 17, 2026 SciTechDaily USA



OVERVIEW

NASA announced plans to integrate and verify two distinct lunar landing systems—SpaceX's Starship and Blue Origin's Blue Moon—for the Artemis III mission. This strategy ensures redundancy and diversity in lunar landing capabilities, enhancing the resilience of future lunar exploration. Artemis III aims to land humans on the Moon for the first time in nearly half a century, with these commercial partnerships being essential for building a sustainable lunar exploration infrastructure. The verification will focus on evaluating the interfaces between the lunar landers, NASA's Orion spacecraft, and the Gateway space station.

Key Findings: NASA Artemis III to Integrate and Verify SpaceX Starship and Blue Origin Lunar Landers

NASA has announced plans to integrate and verify two distinct lunar landing systems—SpaceX’s Starship Human Landing System (HLS) and Blue Origin’s Blue Moon—for the Artemis III mission, which aims to return humans to the lunar surface. This strategic approach is designed to ensure redundancy and diversity in lunar landing capabilities for future lunar exploration, significantly enhancing mission resilience and probability of success. The primary focus of this integrated verification will be to evaluate how each lunar lander can safely and efficiently interface with NASA’s Orion spacecraft and the Gateway lunar orbiting outpost.

Technical & Clinical Details: Interoperability and Safety Assessment of Multiple Systems

The integrated verification process will assess how Starship HLS and Blue Moon, each employing different technological approaches, provide lunar landing capabilities. Starship HLS is designed to transport massive cargo and crew to the Moon, leveraging its super heavy-lift capacity. Blue Moon, conversely, is characterized by a design specialized for long-duration lunar stays and scientific missions. Central to the verification is the evaluation of full compatibility and safe interoperability between these landers and the Orion spacecraft (for crew transport in lunar orbit) and Gateway (a small space station in lunar orbit). This includes docking procedures, crew transfer, cargo exchange, and power/data connectivity. The robustness of each system's interface and operational procedures will be confirmed through digital simulations, ground-based mock-up tests, and ultimately, flight tests.

Background & Context: Artemis Program's Commercial Partnerships and Sustainability

NASA's Artemis program actively leverages partnerships with private companies to make access to the lunar surface more frequent and sustainable. SpaceX and Blue Origin are key contractors for HLS development, and NASA is pursuing collaborations with multiple commercial partners to mitigate the risks associated with relying on a single provider. This approach aims to foster competition, accelerate technological innovation, and elicit cost-effective solutions. The integrated verification of different lunar landers is a crucial step towards enhancing flexibility in lunar activities and building a long-term lunar base.

Strategic Significance & Outlook: Building Lunar Bases and Paving the Way for Mars

The successful integrated verification of multiple lunar landers for the Artemis III mission signifies a major advancement towards the construction of the future lunar base, "Artemis Base Camp." The availability of multiple landing systems will enable a more diverse range of mission profiles, cargo transport, and crew rotations, enhancing the sustainability and extensibility of lunar activities. The insights gained will ultimately be leveraged as a stepping stone for human missions to Mars. Lunar experience is indispensable for developing technologies required for round-trip missions to Mars (e.g., in-situ resource utilization, long-duration life support, radiation protection), and this integrated verification will lay that foundation. This is expected to solidify humanity's presence in space and usher in a new era of deep-space exploration, bolstering global leadership in space endeavors.

Source: <https://scitechdaily.com/nasas-artemis-iii-will-test-spacex-and-blue-origin-moon-landers/>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#17 Startup Besxar Initiates In-Space Semiconductor Manufacturing Tests, Aiming for Ultra-High Quality Chips Unachievable on Earth

Published September 13, 2026 KuCoin News USA



OVERVIEW

Startup Besxar has commenced testing semiconductor manufacturing techniques in space. This initiative aims to grow ultra-high quality, defect-free semiconductor crystals in microgravity, which is impossible on Earth. Microgravity eliminates convection and impurity sedimentation due to gravity, making it ideal for producing high-performance chips with uniform material properties. Besxar's initial tests focus on compound semiconductors like gallium arsenide and silicon germanium, holding the potential to revolutionize markets for high-performance applications such as aerospace, defense, and quantum computing.

Key Findings: Startup Besxar Initiates In-Space Semiconductor Manufacturing Tests, Aiming for Ultra-High Quality Chips Unachievable on Earth

Startup Besxar has commenced pioneering tests of semiconductor manufacturing technology in space. This ambitious endeavor aims to leverage the unique conditions provided by the microgravity environment to grow ultra-high quality, defect-free semiconductor crystals that are challenging to produce on Earth. Microgravity is considered an ideal environment for manufacturing high-performance semiconductor chips with more uniform crystalline structures and material properties, as it eliminates physical influences such as convection and impurity sedimentation caused by gravity. Besxar's initial tests are particularly focused on compound semiconductors like gallium arsenide (GaAs) and silicon germanium (SiGe).

Technical & Clinical Details: Microgravity for Optimized Crystal Growth and Enhanced Material Properties

In terrestrial semiconductor crystal growth processes, gravity-induced convection and density differences are major causes of internal non-uniformity and defects (e.g., dislocations, lattice defects, and uneven impurity distribution) within crystals. These defects degrade the performance and reliability of the final semiconductor devices. In a microgravity environment, these gravity-related phenomena are suppressed, making it possible to grow semiconductors with more perfect single-crystal structures. Besxar aims to produce high-quality semiconductor materials by applying crystal growth techniques such as liquid-phase epitaxy and zone melting in a controlled spacecraft environment. This is expected to lead to semiconductor chips with significantly improved characteristics such as electron mobility, signal-to-noise ratio, and radiation hardness.

Background & Context: A New Frontier for the Semiconductor Industry and Technical Challenges

In modern society, semiconductors are at the core of all electronic devices, and their performance dictates the progress of entire industries. Especially in cutting-edge fields like aerospace, defense, high-speed communication, and quantum computing, there is a growing demand for semiconductor chips that can operate in extreme environments and deliver ultimate performance. However, terrestrial manufacturing technologies are facing physical limitations, making further quality and performance improvements increasingly difficult. Besxar's initiative attempts to break through these technological barriers in space, marking an effort to open a new frontier in the semiconductor industry. This holds the potential to form a crucial part of the manufacturing sector in the future space economy.

Strategic Significance & Outlook: Industrial Revolution through High-Performance Chips and Expansion of the Space Economy

If Besxar's in-space semiconductor manufacturing technology is established, ultra-high-performance semiconductor chips, impossible to produce on Earth, will become available on the market. This will revolutionize various industries, including enhancing the durability and performance of satellites and probes in the aerospace sector, strengthening electronic warfare capabilities in defense systems, and establishing foundational technologies for quantum computing. Moreover, this success will attract further investment into the microgravity manufacturing market, accelerating the transformation of space from merely a research domain into a production hub for high-value products that solve terrestrial challenges. Besxar's pioneering efforts have the potential to drive the next evolution of semiconductor technology and establish its position as a new key player in the space economy, with significant global implications.

Source: <https://www.kucoin.com/news/flash/startup-besxar-begins-testing-semiconductor-manufacturing-in-space>

#18 BAE Systems Secures \$16M to Restore RH45 Radiation-Hardened Chip Capability, Bolstering US Supply Chain

Published September 17, 2026 Defense Industry Europe USA



OVERVIEW

BAE Systems announced it received \$16 million from the Department of Defense to restore and strengthen its RH45 radiation-hardened semiconductor manufacturing capability. This investment aims to establish a domestic supply chain for critical radiation-hardened space electronics, reducing foreign dependence for essential US space and defense missions. The RH45 technology is designed for reliable performance in extreme space environments, with funds allocated for modernizing existing manufacturing processes and expanding production capacity, marking a vital step for US space security and technological superiority.

Key Findings: BAE Systems Secures \$16M to Restore RH45 Radiation-Hardened Chip Capability, Bolstering US Supply Chain

BAE Systems has announced the acquisition of \$16 million (approximately 2.3 billion JPY) in funding from the U.S. Department of Defense (DoD) to restore and enhance its RH45 radiation-hardened semiconductor manufacturing capability. This significant investment aims to establish a robust domestic supply chain for radiation-hardened space electronics, essential for U.S. space and defense missions, thereby reducing reliance on foreign sources. The RH45 technology is specifically designed to deliver high reliability and performance in harsh space radiation environments. The funds will be allocated to modernizing existing manufacturing processes and expanding production capacity, holding critical importance for ensuring U.S. space security and technological superiority.

Technical & Clinical Details: RH45 Technology for Enhanced Performance and Reliability in Extreme Environments

BAE Systems' RH45 process is a semiconductor manufacturing technology uniquely engineered to withstand the extreme radiation levels encountered in space. This technology employs structures and materials that minimize radiation-induced damage, such as single-event latch-up (SEL) and total ionizing dose (TID) effects. The DoD funding will be utilized to upgrade the RH45 production line, modernize manufacturing equipment, and strengthen quality assurance procedures. This will dramatically improve the reliability and longevity of electronic components installed in mission-critical applications like spacecraft guidance, communication, and data processing systems. This investment lays the groundwork for stably supplying domestically produced semiconductors that meet the stringent long-term operational and high-reliability requirements demanded by space missions.

Background & Context: Strategic Competition and Supply Chain Challenges in Space

In modern space missions, particularly military satellites and deep-space probes, electronic components face extremely harsh radiation environments, and their resilience dictates mission success or failure. Historically, the manufacturing of such high-performance radiation-hardened semiconductors has been concentrated among a few specialized companies, leading to concerns about supply chain vulnerabilities. As rival nations like China and Russia strengthen their space capabilities, the U.S. prioritizes strengthening domestic production capabilities for critical technologies to maintain strategic superiority in space. This investment in BAE Systems aligns with this national strategy, demonstrating concrete action by the U.S. to ensure autonomy in key technological areas.

Strategic Significance & Outlook: Strengthening Space Security and Accelerating Technological Innovation

The restoration and enhancement of BAE Systems' RH45 manufacturing capability will significantly bolster U.S. space security. By ensuring a stable domestic supply of reliable radiation-hardened electronics, U.S. space systems will become more robust against external supply chain risks. Furthermore, this investment is not merely about maintaining existing technology; it also holds the potential to accelerate the development of more advanced and efficient radiation-hardened technologies required for next-generation space missions. This is expected to lead to improvements in in-space data processing capabilities, faster communication speeds, and advancements in autonomous systems, further solidifying U.S. global leadership in space technology. This initiative carries strategic significance for reinforcing the foundation of future space defense and exploration, while promoting new technological innovation.

Source: <https://defence-industry.eu/bae-systems-secures-16-million-to-restore-rh45-chip-capability-and-strengthen-us-supply-of-radiation-hardened-space-electronics/>

#19 Helogen to Launch Two October Space Missions for In-Space Manufacturing of Artificial Retinas and Orthopedic Implants

Published September 14, 2026 LA Business Journal USA



OVERVIEW

Startup Helogen announced it will launch two space missions in October for manufacturing artificial retinas and orthopedic implants in microgravity. These missions aim to explore the production of more precise, high-quality biocompatible materials that are challenging to achieve under Earth's gravity. Microgravity is expected to enhance material homogeneity and minimize defects, contributing to improved long-term implant performance and patient safety. Helogen's initiative seeks to establish space as a new frontier for medical device manufacturing, bringing innovation to terrestrial healthcare.

Key Findings: Helogen to Launch Two October Space Missions for In-Space Manufacturing of Artificial Retinas and Orthopedic Implants

Helogen, a medical device startup, has announced it will launch two space missions in October to demonstrate the manufacturing of artificial retinas and orthopedic implants in a microgravity environment. These groundbreaking missions aim to solve challenges insurmountable under Earth's gravity, exploring the potential to produce more precise and high-quality biocompatible materials in space. Microgravity is expected to dramatically enhance material homogeneity and minimize defect formation, thereby contributing to improved long-term implant performance and patient safety. Helogen's initiative seeks to establish space as a new frontier for medical device manufacturing, bringing significant innovation to terrestrial healthcare.

Technical & Clinical Details: Microgravity for Dramatic Improvement in Material Quality

In terrestrial manufacturing of biomaterials, particularly for complex structures like artificial retinas and high-performance orthopedic implants, gravity-induced convection and impurity sedimentation can lead to material non-uniformity and microscopic defects. These imperfections impact product performance and biocompatibility. In a microgravity environment, these physical constraints are eliminated, enabling the creation of tissue scaffolds with more uniform cellular structures and alloy materials with perfect crystalline structures. Helogen's missions will process protein-based composites, biopolymers, and special alloys in space, evaluating their structural integrity, mechanical strength, and biocompatibility. This opens the door to developing next-generation medical devices that can reduce the risk of patient rejection and extend implant lifespan.

Background & Context: A New Paradigm for Medical Device Manufacturing

The medical device industry constantly seeks new manufacturing technologies to enhance product performance and ensure safety. Particularly in the fields of artificial organs and advanced implants, limitations in materials science and manufacturing processes have been bottlenecks in providing optimal solutions to patients. The microgravity environment is gaining attention as the "ultimate manufacturing environment," holding the potential to break these limits and achieve unprecedented levels of quality and precision in medical device production. Helogen's space missions are leading this new paradigm shift, offering opportunities to create high-value products at the intersection of the space and medical industries.

Strategic Significance & Outlook: Contribution to Terrestrial Healthcare and Expansion of the Space Economy

The success of Helogen's space-manufactured artificial retinas and orthopedic implants will bring direct benefits to patients on Earth. There is potential to provide safer and more effective treatments that dramatically improve the quality of life for individuals with visual impairments or motor dysfunctions. Insights gained through these missions are also expected to be applied to other medical device fields, promoting the widespread adoption of microgravity manufacturing technologies. In the long term, Helogen's efforts are anticipated to prove the economic viability of commercial manufacturing in space, establishing a pioneering medical manufacturing sector within the space economy. This represents a crucial step in creating new value from space utilization and accelerating global medical innovation, with significant global implications for health and technology leadership.

Source: <https://labusinessjournal.com/technology/helogen-readies-two-october-space-missions/>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#21 IBM and NASA Open-Source Multimodal AI 'Lunar Foundation Model' for Moon Mapping, Accelerating Lunar and Mars Missions

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OVERVIEW

IBM and NASA have open-sourced the 'NASA-IBM Lunar Foundation Model,' a multimodal AI model designed for mapping the Moon, integrating decades of data from U.S. and Japanese missions. This model is engineered to assist astronauts in navigating shadowed craters, investigating volcanic history, and prospecting for ice, supporting NASA's long-term vision for lunar base construction and Mars mission preparation. It has demonstrated performance comparable to or exceeding traditional machine-learning models for critical tasks like crater mapping and ice scouting.

Key Findings: IBM and NASA Open-Source Multimodal AI 'Lunar Foundation Model' to Revolutionize Moon Mapping and Exploration

IBM and NASA have jointly announced the open-sourcing of the 'NASA-IBM Lunar Foundation Model,' an innovative multimodal AI model specifically designed for advanced Moon mapping. This groundbreaking model integrates decades of comprehensive data from both U.S. and Japanese lunar missions, providing an indispensable tool for astronauts to safely navigate perpetually shadowed craters, meticulously investigate the Moon's volcanic history, and prospect for vital water ice resources. This initiative provides robust support for NASA's long-term strategic vision of establishing a sustainable lunar base and preparing for future human missions to Mars, marking a significant leap in AI-driven space exploration.

Technical Details: Multimodal AI for Comprehensive Lunar Data Integration

The 'NASA-IBM Lunar Foundation Model' is a sophisticated multimodal AI capable of simultaneously processing and integrating diverse types of lunar data, including topographic maps, imagery, and spectral data. Its key strengths include:

- **Data Integration:** It consolidates vast datasets accumulated over decades by both U.S. and Japanese missions within a deep learning framework. This enables more robust and accurate analyses, even in environments with missing or noisy data.
- **Task Performance:** The model has demonstrated performance comparable to or exceeding traditional, specialized machine learning models for critical tasks such as crater mapping and prospecting for water ice in lunar polar regions.
- **Inference Capabilities:** It can perform highly accurate predictions and classifications on previously unseen lunar areas or new data based on its extensive training.
- **Open-Sourcing:** By making the model open-source, IBM and NASA aim to foster broad community access, encouraging improvements and applications that will accelerate progress in space science and exploration globally.

Background and Industry Context: AI's Pivotal Role in the New Era of Lunar Exploration

As humanity prepares to return to the Moon through the Artemis program, detailed and precise lunar mapping is paramount for ensuring mission safety and efficiency. The lunar poles, in particular, hold strategic value due to the potential presence of water ice in permanently shadowed regions, making accurate understanding of their topography and composition critical for future lunar base sustainability and resource utilization. AI technology has become an indispensable tool for processing vast amounts of data at speeds and accuracies far beyond human capabilities, thereby supporting scientific discovery and operational planning.

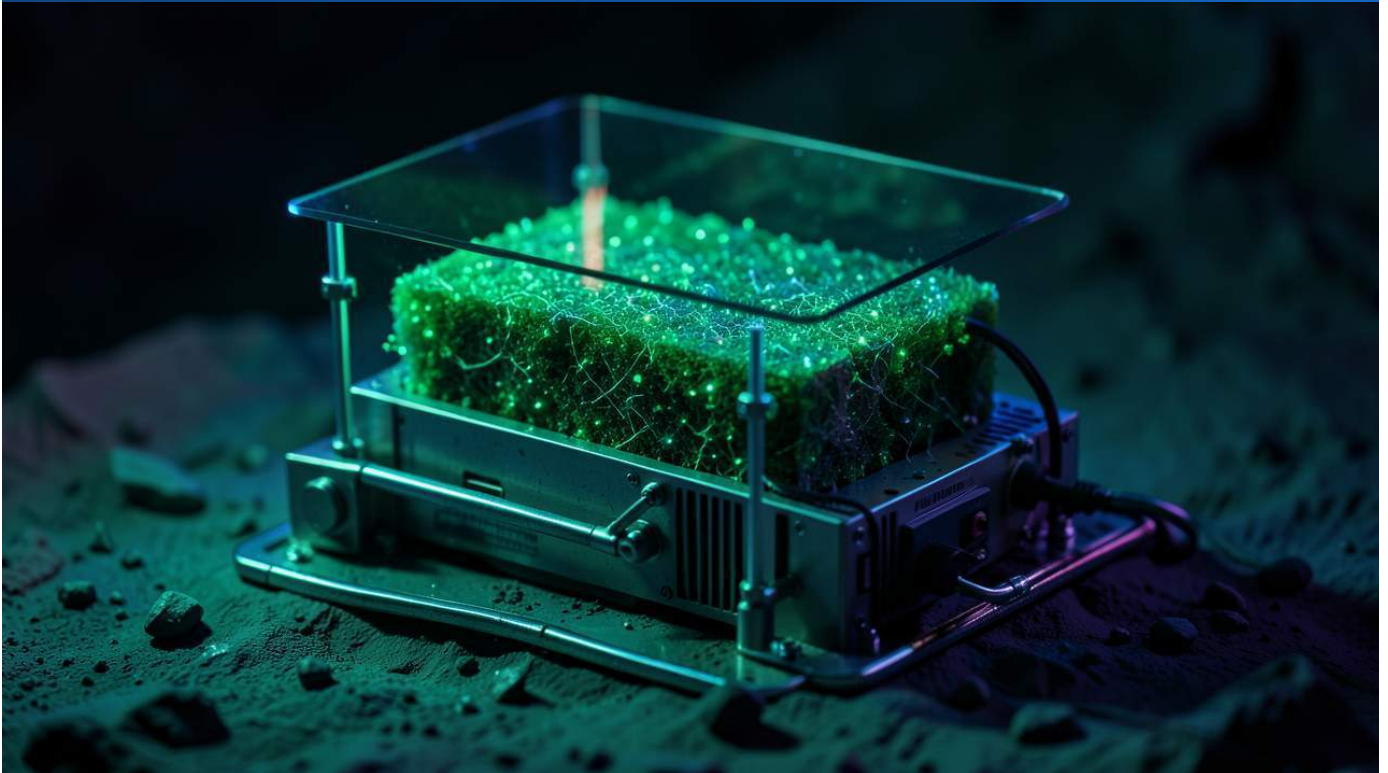
Strategic Significance and Outlook: Streamlining Space Operations and Unlocking New Discoveries

The open-sourcing of the 'NASA-IBM Lunar Foundation Model' provides a global platform for researchers and developers to leverage this powerful tool, facilitating the creation of new algorithms and applications. This will enhance safety and exploration efficiency on the Moon, accelerating the resolution of long-standing lunar mysteries. Furthermore, the AI technologies developed for this model are directly applicable to future Mars missions and mapping other celestial bodies in the solar system, laying a foundational groundwork for expanding humanity's scientific understanding and presence in deep space. This initiative represents a critical step in shaping the future of data-driven space exploration and promoting international collaboration in cutting-edge AI for scientific discovery.

Source: <https://research.ibm.com/blog/nasa-ibm-lunar-foundation-model>

#22 NASA Launches Call for Proposals to Accelerate Moon Base Technologies, Focusing on Vertical Solar Arrays, ISRU Oxygen Extraction, RSG, Advanced Manufacturing, and Nanomaterials

Published September 14, 2026 MeriTalk USA



OVERVIEW

NASA has issued a solicitation for proposals under its Lunar Enabling Infrastructure Accelerator to advance technologies for a sustainable Moon base at the lunar South Pole. The five key areas targeted are vertical solar array technology, in-situ resource utilization (ISRU) for oxygen extraction from regolith, radioisotope Stirling generator (RSG) technology, in-space advanced manufacturing, and innovative nanomaterials production. This initiative aims to address critical gaps for long-term human exploration and reduce reliance on Earth-based resupply missions.

Key Findings: NASA Initiates Broad Call for Proposals to Accelerate Lunar Base Technologies Across Five Critical Areas

NASA has launched a comprehensive solicitation for proposals under its 'Lunar Enabling Infrastructure Accelerator' program, aiming to expedite technological innovations essential for establishing a sustainable Moon base at the lunar South Pole. This initiative is designed to enable long-term human exploration and significantly reduce dependence on Earth-based resupply missions by focusing on five critical technology domains:

1. **Vertical Solar Array Technology:** For efficient power generation in low-angle sunlight conditions found at the lunar poles.
2. **In-Situ Resource Utilization (ISRU) for Oxygen Extraction:** Technologies to produce resources like water and oxygen from lunar soil (regolith).
3. **Radioisotope Stirling Generator (RSG) Technology:** Nuclear power systems for stable, continuous power supply regardless of solar illumination.
4. **In-Space Advanced Manufacturing:** Technologies like 3D printing to produce necessary parts and structures on the lunar surface.
5. **Innovative Nanomaterials Production:** Manufacturing high-performance new materials specifically adapted for the space environment.

This initiative seeks to bridge the infrastructure and technological gaps required for sustained human activity at the lunar South Pole.

Technical Details: Specific Goals for Lunar Self-Sufficiency Across Key Areas

Each targeted technology area has specific objectives aimed at enhancing the self-sufficiency of a lunar base:

- **Vertical Solar Arrays:** Designs to maximize energy generation, particularly on crater rims, ensuring prolonged periods of sunlight capture.
- **ISRU Oxygen Extraction:** Development of processes to efficiently extract breathable oxygen for astronauts and propellant oxygen from lunar regolith, thereby reducing oxygen transportation costs from Earth.

- **RSG Technology:** Provides stable baseload power for lunar rovers and base operations during extended lunar nights and in permanently shadowed regions, where solar power is unavailable.
- **Advanced Manufacturing:** Reduces reliance on Earth-sent parts, enabling on-site repair of broken components and production of new tools, enhancing mission flexibility and sustainability.
- **Nanomaterials:** Development of lightweight, high-strength structural materials and electronic components capable of withstanding space radiation and extreme temperature fluctuations.

These technologies are designed to be mutually complementary, forming an integrated ecosystem that enables living, working, and moving on the Moon.

Background and Industry Context: Artemis Program and Sustainable Lunar Presence

NASA's Artemis program aims to return humans to the Moon and establish a long-term human presence. Achieving this 'sustainable presence' necessitates minimizing dependence on Earth and operating with near self-sufficiency on the lunar surface. This call for proposals reflects NASA's strategy to identify technological bottlenecks and actively solicit innovative solutions from private companies and research institutions to accelerate development towards this goal, aligning with the broader vision for human exploration of deep space.

Strategic Significance and Outlook: Creation of a Lunar Economy and Expansion of Deep Space Exploration

Successful development and demonstration of these technologies will transform the Moon from merely a site of exploration into a vibrant hub for research, resource utilization, and potentially even tourism—creating new industries. Specifically, ISRU and advanced manufacturing technologies will form the core of a burgeoning lunar economy and serve as crucial preparations for future Mars missions. NASA's initiative offers widespread opportunities across the entire space industry, and it is highly anticipated to strengthen the foundation for humanity's deeper exploration of the solar system. This program represents a critical step towards establishing a multi-planetary future and fostering significant economic activity beyond Earth.

Source: <https://www.meritalk.com/articles/nasa-seeks-proposals-to-advance-technology-for-moon-base/>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#23 Rocket Lab Successfully Launches 16th Mission of the Year, Deploying Earth Observation Satellite for Undisclosed Customer

Published September 11, 2026 Space.com ニュージーランド



OVERVIEW

Rocket Lab successfully launched an Earth observation satellite for an undisclosed customer on September 10, 2026, marking its 16th mission of the year. The 'Happily Ever Faster' mission utilized an Electron rocket to precisely deploy a single commercial satellite into a 500 km low Earth orbit. This launch underscores Rocket Lab's consistent and high-frequency deployment capability in the small satellite market, demonstrating its robust operational efficiency and expanding market presence.

Key Findings

Rocket Lab successfully completed its 16th mission of 2026 on September 10, deploying an Earth observation satellite for an undisclosed customer. This achievement, the 13th flight of its Electron rocket this year, solidifies the company's position as a leading provider of small satellite launch services.

Technical / Clinical Details

The mission, dubbed 'Happily Ever Faster,' employed Rocket Lab's Electron launch vehicle to precisely inject a single commercial Earth observation satellite into a 500 km circular low Earth orbit approximately 90 minutes after liftoff. The consistent performance of the Electron rocket in delivering small payloads with high accuracy and reliability demonstrates Rocket Lab's advanced operational capabilities and its ability to maintain a frequent launch cadence. The Electron rocket remains a preferred choice in the small satellite sector due to its flexibility and cost-effectiveness in dedicated launch services.

Background & Context

The space industry has witnessed a rapid increase in demand for small satellites for various applications, including Earth observation, communications, and scientific research. This trend has heightened the importance of dedicated small satellite launch providers like Rocket Lab. The company has established itself as a key player in this growing market by regularly conducting over ten launches annually. The practice of launching satellites for undisclosed customers is common in the commercial space sector, reflecting the need for confidentiality and Rocket Lab's ability to cater to diverse client requirements.

Strategic Significance & Outlook

While maintaining its rapid launch tempo for small satellites, Rocket Lab is also actively developing its next-generation medium-lift rocket, Neutron. Neutron is designed to accommodate larger payloads and deploy satellite constellations, incorporating reusable components to further reduce launch costs. This latest successful launch further validates Rocket Lab's technical reliability and operational efficiency, which are crucial for the future expansion of its launch services with Neutron and for enhancing its competitiveness in the broader space transportation market. Rocket Lab is strategically expanding its service offerings beyond small satellites to encompass a wider range of space applications.

Source: <https://www.space.com/space-exploration/launches-spacecraft/rocket-lab-launches-mystery-satellite-to-orbit-for-secret-customer-photo>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#24 LandSpace Achieves China's First Ground-Controlled Booster Recovery with Zhuque-3 Rocket, Advancing Reusability

Published September 17, 2026 Tech Trends (South China Morning Post) China



OVERVIEW

Chinese private aerospace firm LandSpace successfully executed China's first ground-controlled recovery of its Zhuque-3 rocket booster in August 2026, utilizing landing legs akin to SpaceX's Falcon 9. This landmark achievement positions China as a serious contender in the reusable rocket sector, though the use of heavy stainless steel for reentry durability currently imposes payload capacity limitations, presenting a key hurdle for full reusability and commercial relaunch.

Key Findings

LandSpace, a private Chinese aerospace company, successfully performed China's first ground-controlled recovery of its Zhuque-3 rocket booster in August 2026. This pivotal achievement, utilizing landing legs similar to SpaceX's Falcon 9, marks a significant milestone for China in the global race for reusable launch technology.

Technical / Clinical Details

The successful recovery of the Zhuque-3 booster was made possible by advanced guidance and control systems, integrated with robust landing gear. This technology, pioneered by companies like SpaceX, enables precise atmospheric reentry and vertical landing. However, LandSpace's choice of heavy stainless steel for reentry durability, while robust, adds significant mass to the booster, potentially limiting its payload capacity compared to lighter material approaches used by international counterparts like SpaceX. This engineering trade-off highlights the complex challenges in balancing structural integrity with performance.

Background & Context

The pursuit of reusable rockets is a cornerstone of modern space exploration, promising drastic reductions in launch costs and expanded access to space. SpaceX's Falcon 9 has set a global precedent, inspiring space companies worldwide to invest in similar technologies. China has consistently advanced its space capabilities, and LandSpace's achievement underscores an accelerating trend of innovation driven by the private sector within the country's broader space program. This move is crucial for China to remain competitive in the rapidly evolving commercial space market.

Strategic Significance & Outlook

The immediate challenge for LandSpace is to demonstrate the actual reusability and re-launch capability of its recovered boosters. Overcoming the payload limitations imposed by the stainless steel structure, while establishing a cost-effective operational model, will be critical for LandSpace's long-term competitiveness and the overall development of China's space industry. The maturation of this technology is a vital step towards diversifying satellite launch services and enabling a wider array of space activities, contributing to global space infrastructure.

Source: <https://www.scmp.com/tech/tech-trends/article/3367874/china-has-gained-pace-space-race-recovering-rockets-can-it-relaunch-one>

Collected: September 18, 2026 | Automated Research System (Gemini API)

#25 NASA's Lunar Base Plan Eyes Sunpower's Stirling Radioisotope Generator for Crucial Power

Published September 17, 2026 The Motley Fool USA



OVERVIEW

NASA is soliciting proposals for key nuclear power technologies, including Stirling Radioisotope Generators (RSGs), for its long-term lunar base plans. Sunpower, a subsidiary of Ametek, is a strong candidate, having developed an RSG prototype that demonstrated over 17 years of continuous functionality for NASA. RSG technology offers reliability and ease of transport, making it critical for extended lunar missions where solar power is insufficient, representing a crucial step to support a sustained human presence on the Moon.

Key Findings

As NASA seeks proposals for key nuclear power technologies, including Stirling Radioisotope Generators (RSGs), for its long-term lunar base plans, Sunpower, a subsidiary of Ametek, has emerged as a strong contender. Sunpower has developed an RSG prototype that has demonstrated over 17 years of continuous functionality for NASA, positioning it as a pivotal solution for sustainable power on the Moon.

Technical / Clinical Details

Stirling Radioisotope Generators (RSGs) produce electrical power by converting the heat generated from the decay of radioisotopes, such as Plutonium-238, into mechanical energy via a Stirling engine, which then drives an alternator. The primary advantage of RSGs is their exceptional reliability and ability to provide continuous power, even in the permanently shadowed regions of the lunar poles or during extended lunar nights where solar power is unavailable. Sunpower's prototype is noted for its higher energy conversion efficiency compared to the established Radioisotope Thermoelectric Generators (RTGs) used in past space missions, potentially delivering more power with less fuel. Its relatively compact size and ease of transport also present significant advantages for lunar deployment.

Background & Context

NASA's Artemis program aims to return humans to the Moon and establish a sustainable lunar base. Operating a lunar base requires a reliable power supply for a wide range of activities, including communications, life support, scientific experiments, and resource utilization. The lunar poles, particularly their permanently shadowed regions, are of high interest due to the potential presence of water ice; however, these areas receive minimal sunlight, making nuclear power the only practical option for long-term operations. Through advanced nuclear power systems, NASA aims to enable autonomous lunar activities less dependent on resupply missions from Earth.

Strategic Significance & Outlook

Should Sunpower's RSG technology be selected for NASA's lunar contract, it would mark a critical milestone towards the realization of a sustained lunar base. RSGs will dramatically enhance the reliability and flexibility of power supply for long-duration missions and polar exploration, where solar power alone cannot suffice. This will expand astronauts' operational range and enable more advanced scientific research and resource prospecting. Furthermore, the knowledge and technology gained on the Moon could be applied to power solutions for future crewed Mars missions, laying a fundamental groundwork for extending humanity's reach further into space.

Source: <https://www.fool.com/investing/2026/09/17/nasas-new-moon-base-contract-could-be-an-out-of/>

Collected: September 18, 2026 | Automated Research System (Gemini API)