



July 2022

Update

**Oklahoma Space
Alliance**

A Chapter of The
National Space Society

A free email newsletter of the Oklahoma Space Alliance

Ingenuity Visits Perseverance's Backshell



July 2022 OSA Meeting

Saturday, July 9, 2022

2:00 PM

**Cliff & Claire McMurray's
House**

2715 Aspen Circle, Norman, OK 73072

405-863-6173

Program— Space News and
Events

Website: <http://osa.nss.org>



Quote of the Month

"I am incredibly disappointed to see cosmonauts and Roscosmos using the International Space Station as a platform to promote their illegal and immoral war, where civilians are being killed every day." – Terry Virts, former ISS commander

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Oklahoma Space Alliance Update

July 9, 2022

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The *Oklahoma Space Alliance Update* is a bi-monthly newsletter of the Oklahoma Space Alliance a chapter of the National Space Society, a non-profit organization headquartered in Washington, D.C. The address of OSA is **102 W. Linn, #1, Norman, OK 73071.**

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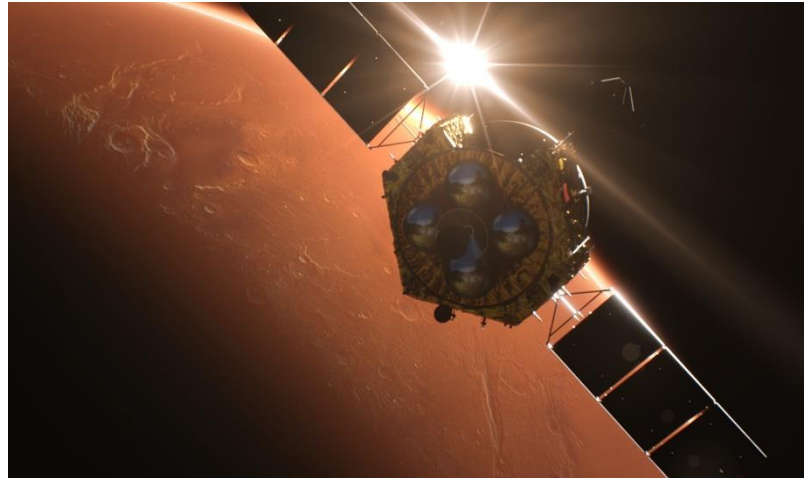
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Now It's a Race!



Credit: CASC

On June 20, the chief designer of the Tianwen-1 Mars orbiter and rover mission presented a new mission profile for China's Mars sample return. The mission's goal: to launch in 2028, collect samples from the Red Planet and deliver them to Earth in 2031. That would be two years ahead of the planned NASA/ESA joint mission. Sun Zezhou said the mission will use only two launch vehicles and a single Mars landing, with no rovers sampling different sites. This is much simpler than the Rube Goldberg architecture NASA/ESA plans to use.

Article: <https://spacenews.com/china-aims-to-bring-mars-samples-to-earth-2-years-before-nasa-esa-mission/>

On Multiple Fronts



Credit: CGTN

NASA better get cracking. China has completed preliminary tests of a LOX-LH2 engine that will power the third stage of its crewed lunar rocket. The first launch of this new vehicle (in a two-stage version) is scheduled to occur within the next five years. The three-stage version may put taikonauts on the moon before this decade is out. The prototype for the new, Apollo-style crew capsule, which flew for the first time in May 2020 and stayed in orbit for two and a half days, was displayed in public at Airshow China 2021 last October.

Articles: <https://www.space.com/china-tests-engine-new-moon-rocket>

<https://www.space.com/china-displays-next-generation-spaceship>

Progress Reboost? We Don't Need No Stinking Progress Reboost!



Credit: NASA

On June 25, Northrop Grumman's Cygnus supply vehicle fired its engine for 301 seconds, raising the International Space Station's perigee by about 0.8 kilometers and its apogee by about 0.2 kilometers. Up until now, ISS has relied on Russia's Progress supply spacecraft for reboost; we don't need to rely on them for that any longer.

Article: <https://spacenews.com/cygnus-departs-iss-after-reboost-test/>

Three Launches in Two Days



Credit: SpaceX

First launch: 12:09 p.m. EDT on June 17, a Falcon 9 from KSC's Launch Complex 39A put 53 Starlink satellites into LEO. The first stage used completed its 13th flight with a droneship landing, setting a new company record for booster reuse. Second launch: another Falcon 9 at 10:19 a.m. EDT June 18 from Space Launch Complex 4E at Vandenberg SFB in California, placing the SARah-1 radar imaging satellite into orbit for the German military. Third launch: 12:27 a.m. EDT June 19 from Space Launch Complex 40 at Cape Canaveral Space Force Station. The only identified payload on the launch was Globalstar FM15, a spare satellite for Globalstar, but several aspects of the mission strongly suggest that Globalstar FM15 wasn't alone under that payload shroud. Maybe another military payload? Total elapsed time: 36 hours and 18 minutes.

Article: <https://spacenews.com/spacex-performs-three-launches-within-two-days-amid-internal-dissent/>

Evidently They Didn't Understand Who Signed Their Paychecks

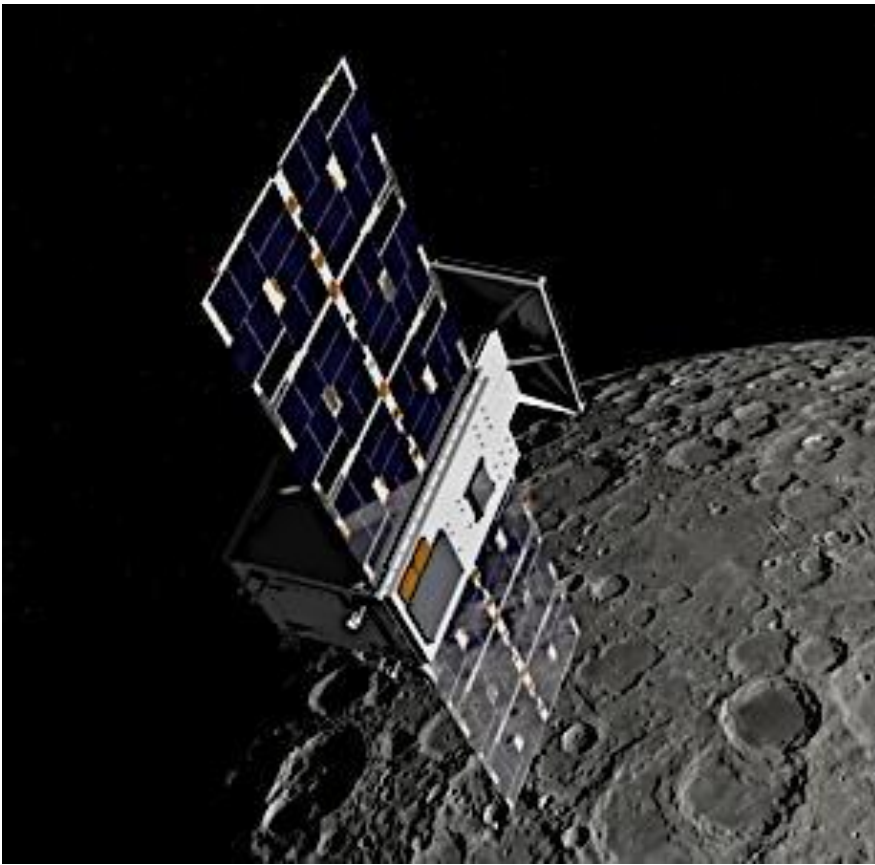


Credit: Facebook

Get woke, go broke – and get lost. On June 15, an anonymous group of SpaceX employees posted an open letter on an internal SpaceX channel, which said, "Elon's behavior in the public sphere is a frequent source of distraction and embarrassment for us, particularly in recent weeks," and other such things. They were identified and fired the very next day. As SpaceX President Gwynne Shotwell said in her announcement of the firings, "We have too much critical work to accomplish and no need for this kind of overreaching activism."

Articles: <https://spacenews.com/spacex-performs-three-launches-within-two-days-amid-internal-dissent/>
<https://www.space.com/elon-musk-embarrassing-spacex-employee-letter>

CAPSTONE Heads for the Moon, Slowly



Credit: NASA

On June 28, Rocket Lab entered the interplanetary transport business, launching NASA's tiny (55-lb., i.e., 25 kg.) Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE) cubesat on a Rocket Lab Electron booster, which lifted off from the company's Launch Complex 1 in New Zealand. It won't reach lunar orbit until November 13, when it will insert itself into a near rectilinear halo orbit (NRHO) after having followed a low-energy trajectory that will take it as much as 810,000 miles (1.3 million km) from Earth. "Electron gave everything that it could give. We've never run the engines as hard as we ran them tonight," said Rocket Lab CEO Peter Beck. Nevertheless, he sees this launch as opening possibilities for very cheap, small interplanetary flights, including his own privately funded Venus probe.

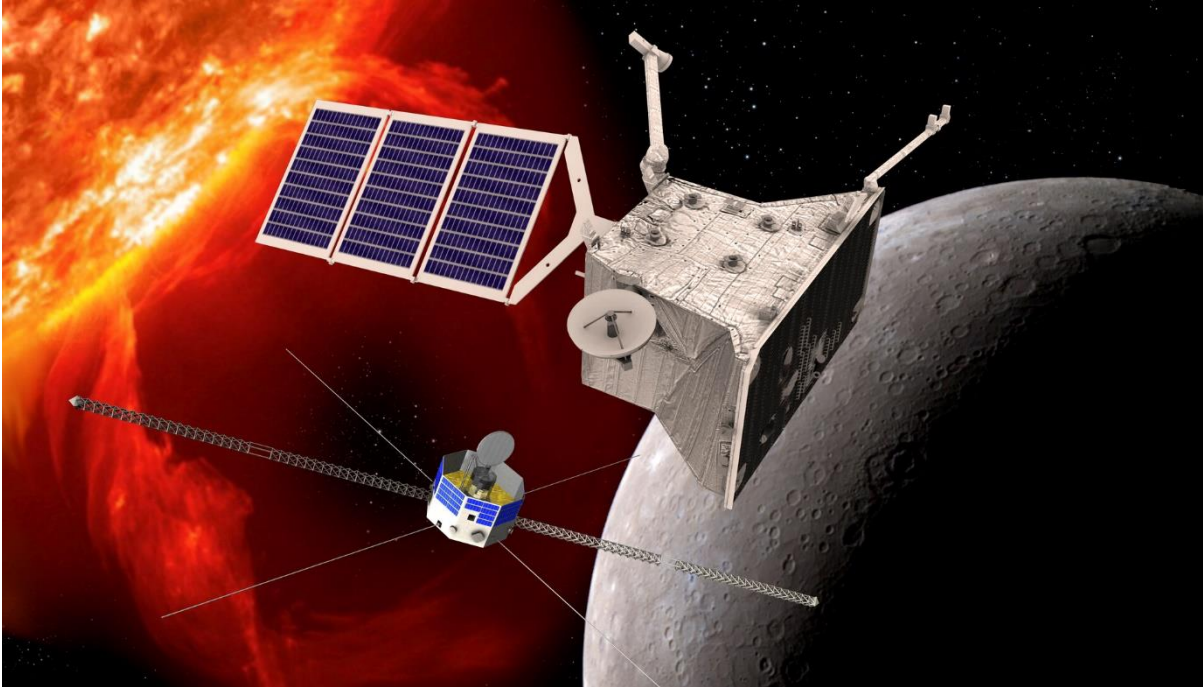
Articles: <https://www.space.com/nasa-capstone-cubesat-moon-launch-success-rocket-lab>

<https://spacenews.com/electron-launches-capstone-lunar-cubesat/>

<https://spacenews.com/rocket-lab-sees-payoff-from-capstone-launch/>

<https://www.space.com/nasa-capstone-moon-cubesat-contact-reestablished>

BepiColombo Flies By Mercury Again



Credit: ESA

ESA's BepiColombo probe flew by Mercury for the second time on June 23, 2023. Four more flybys to go before it settles into orbit around Mercury on December 5, 2025, after a seven-year cruise.

Article: <https://www.space.com/mercury-bepicolombo-2nd-flyby-photos>

Bill Introduced for Space National Guard



Credit: U.S. Space Force

Try, try again. Last year a bill to create a Space National Guard was introduced in the House but failed to pass the Senate. On May 12 Senator Joe Manchin (D-W.V.) introduced the Space National Guard Establishment Act, co-sponsored by Senators Dianne Feinstein (D-Calif.), Marco Rubio (R-Fla.), John Hickenlooper (D-Colo.), Lisa Murkowski (R-Alaska), Michael Bennet (D-Colo.), Marsha Blackburn (R-Tenn.), Rob Portman (R-Ohio), Rick Scott (R-Fla.), Alex Padilla (D-Calif.), Mike Braun (R-Ind.) and John Cornyn (R-Texas). The Air Force wants it. We'll see if it passes this time.

Articles: <https://spacenews.com/manchin-introduces-bipartisan-bill-to-establish-space-national-guard/>

<https://federalnewsnetwork.com/dod-reporters-notebook-jared-serbu/2022/05/space-national-guard-still-up-in-the-air-but-lawmakers-want-to-move-forward/>

<https://www.airforcemag.com/air-national-guard-leaders-time-is-running-short-for-a-space-guard/>

<https://thehill.com/opinion/national-security/3514195-establish-the-space-national-guard-now/>

<https://www.ngaus.org/sites/default/files/2020-04/FY21-Space-National-Guard-Fact-Sheet-Final.pdf>

Sierra Nevada Starts Astronaut School

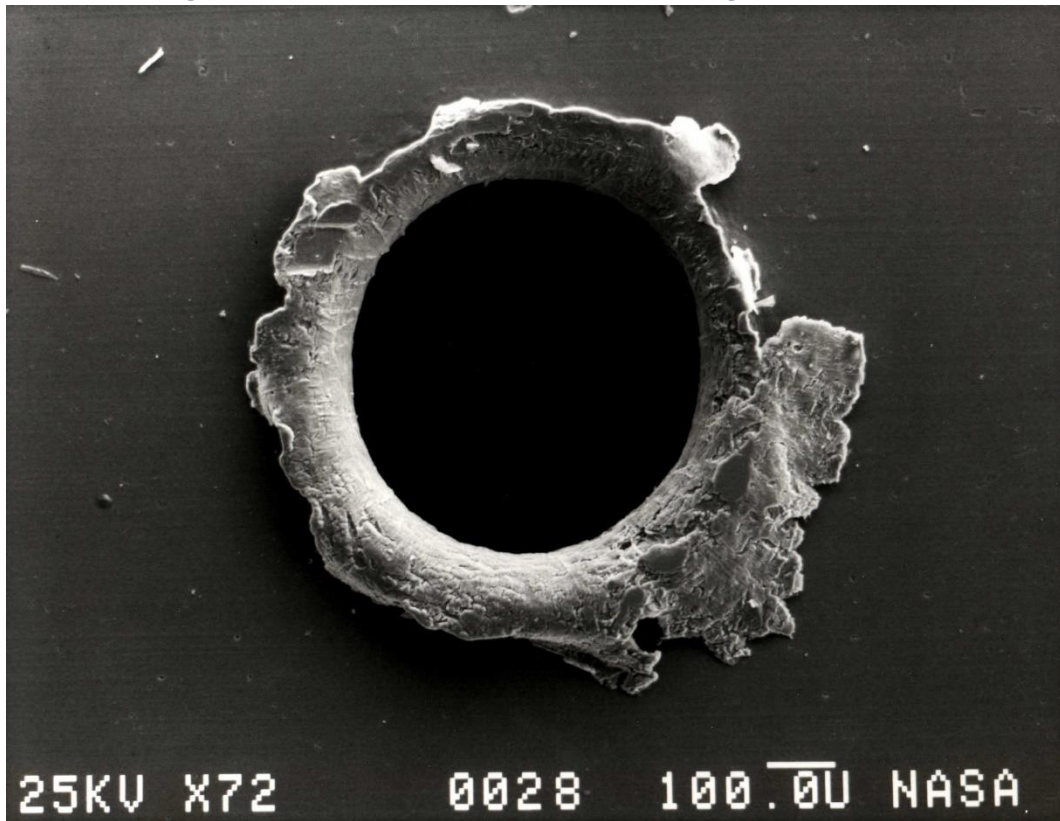


Credit: Sierra Space

Sierra Space announced June 14 it will open a commercial human spaceflight training center at its offices at the Kennedy Space Center, to be led by former NASA astronaut and president of Sierra Space Janet Kavandi. The center will have three training tracks, the first for professional astronauts who will operate the Orbital Reef commercial space station that Sierra Space is partnering with Blue Origin and others to develop (12-18 months of training), the second for “specialists” who perform research and other work on the station (3-6 months), and finally a “more modest training” curriculum for “experiential” astronauts, AKA space tourists. Selection starts next year, first classes in 2024.

Article: <https://spacenews.com/sierra-space-to-start-astronaut-training-program/>

Barely Off the Lot, It Already Has a Dent



Credit: NASA

NASA announced that the James Webb Space Telescope suffered a hit by a micrometeoroid that has impacted one of its primary mirror segments between May 23 and 25. The mirror segment was knocked out of alignment, but remedial action has been taken to minimize the distortion this caused. The telescope had already received four smaller impacts.

Articles: <https://www.sciencealert.com/a-space-rock-hit-the-james-webb-space-telescope-and-everything-is-fine>

https://interestingengineering.com/video/james-webbs-work-hit-space-rock?utm_source=Facebook&utm_medium=video&utm_campaign=organic&utm_content=Jun13&fbclid=IwAR3Ijc-Mf-cMyv_CR3DhXGkwq2dACVHtQJPchaHKplzsj6kRRzXQoVuLPm0

<https://www.cbc.ca/news/science/jwst-meteoroid-1.6482751>

<https://www.sciencealert.com/a-space-rock-hit-the-james-webb-space-telescope-and-everything-is-fine>

Space Force Wants On-Orbit Commercial Refueling



Credit: OrbitFab

In March, Orbit Fab announced a \$12M contract (\$6M from the USAF and USSF, plus \$6M from Orbit Fab's private investors) to integrate Orbit Fab's RAFTI (Rapidly Attachable Fluid Transfer Interface) fueling port with military satellites. This STRATFI contract follows a \$750K SBIR contract awarded by the USAF last year to flight qualify the RAFTI port. In April, Space Force announced plans to launch three small satellites to GEO that will attempt to dock with a propellant tanker and be refueled (also to demonstrate rapid inspection of "non-cooperative resident space objects"). The \$50M experiment is called Tetra-5, expected to launch in 2025. Also in April, the White House's Office of Science and Technology Policy (OSTP) released a national strategy for in-space servicing, assembly and manufacturing (ISAM); this document calls for coordination of R&D activities to meet identified needs for ISAM capabilities, development of a "coherent ISAM ecosystem" of capabilities, and expects the government will define its needs for ISAM capabilities to provide a "sustained demand signal" for industry.

Articles: <https://spacenews.com/orbit-fab-gets-12-million-to-integrate-refueling-port-with-military-satellites/>

<https://spacenews.com/space-force-looking-at-what-it-will-take-to-refuel-satellites-in-orbit/>

<https://spacenews.com/white-house-releases-in-space-servicing-strategy/>

An X-Prize Competition for Space Debris Removal?

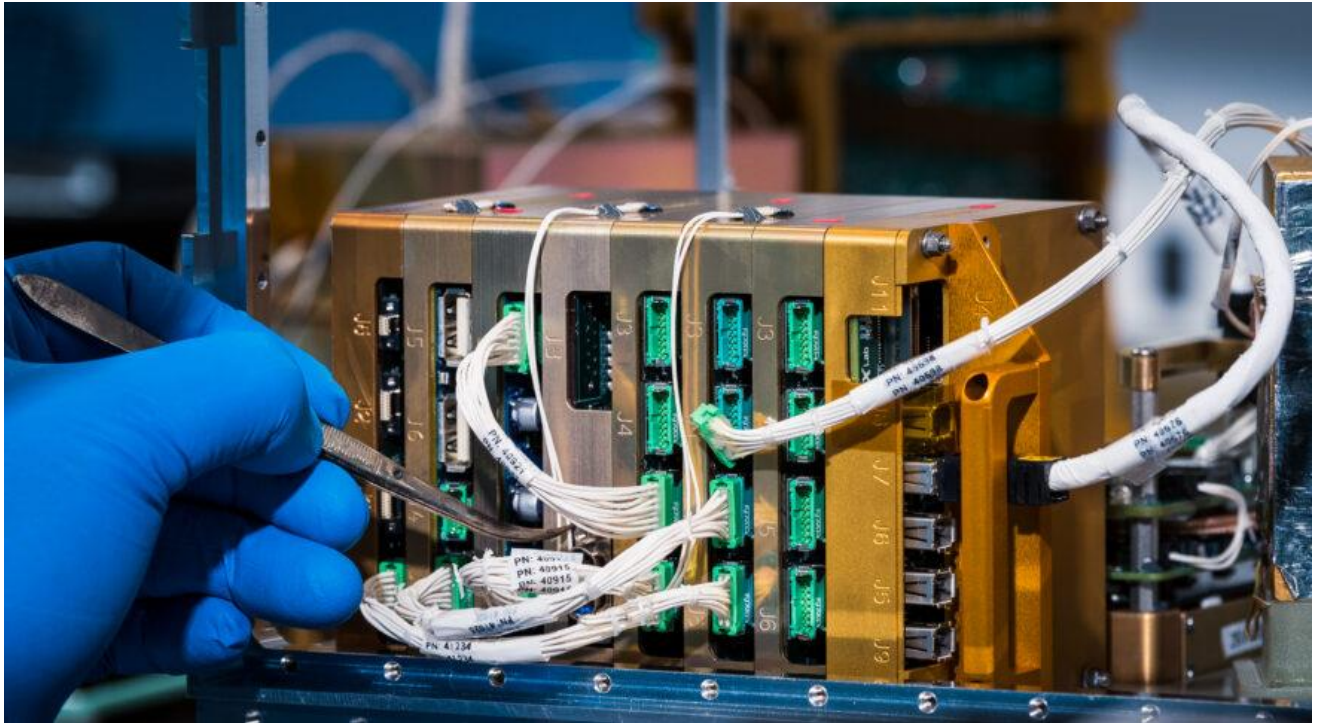


Credit: ESA

Anousheh Ansari, chief executive of the X-Prize Foundation, says her organization is studying possible ways to run a prize for development of active space debris removal systems. Her remarks came at the Fourth Summit for Space Sustainability by the Secure World Foundation and the U.K. Space Agency. The prize, which Ansari says she hopes will run for five years, may cover one or more of the following categories: large rocket bodies, several cubesat-sized objects, and/or (most challenging) a cloud of smaller debris.

Article: <https://spacenews.com/x-prize-foundation-studying-active-debris-removal-competition/>

Standardize! Standardize!



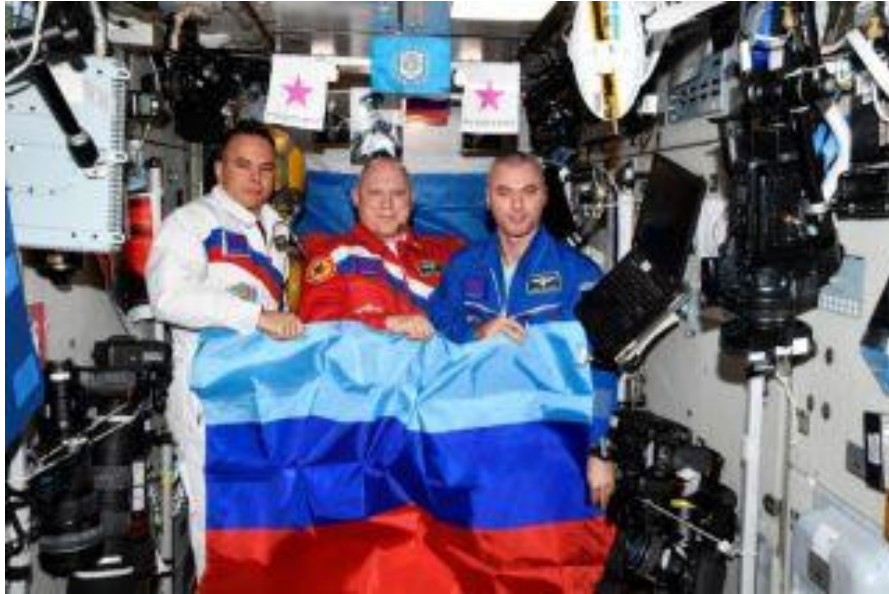
Credit: Aerospace Corp.

Slingshot 1, a 12U cubesat about the size of a toaster, was built by Aerospace Corp. on a bus from Blue Canyon Technologies. Its goal is to demonstrate is an interface box where up to 20 payloads can “plug and play.” “There hasn’t been a standard interface that has gained widespread adoption” so Slingshot is an attempt to prove the value of having a single interface, says program manager Hannah Weiher. It launched on July 2, on Virgin Orbit’s first night launch. In April, Lockheed Martin released the technical specs of a docking adapter called the Mission Augmentation Port (MAP) that could be used by manufacturers to make satellites interoperable and easier to update on orbit. This goes beyond on-orbit refueling, to allow updating of processors and hardware on the satellite.

Articles: <https://spacenews.com/space-experiment-to-push-standardization-in-small-satellites/>

<https://spacenews.com/lockheed-martin-releases-open-source-satellite-interface-for-on-orbit-docking/>

Trouble in Paradise



Credit: Roscosmos

Strains on the ISS partnership showed up almost immediately when Russia invaded Ukraine. In May, Space News reported that there had been a “voluntary departure” of some NASA personnel and their families from Star City. Negotiations for a Russian to fly on Crew-5 and an American to launch on Soyuz MS-25 (both flights to launch in September) were supposed to have been completed in June, but have yet to be finalized. Now, in an unprecedented use of ISS for political propaganda, Roscosmos has released a pair of images of its cosmonauts aboard the ISS displaying the flags of the Luhansk People's Republic and the Donetsk People's Republic, two Russian-backed separatist territories in eastern Ukraine.

Articles: <https://www.space.com/russia-cosmonauts-ukraine-luhansk-propaganda>
<https://spacenews.com/nasa-and-roskosmos-continue-seat-barter-discussions/>
<https://spacenews.com/iss-partnership-feeling-some-effects-of-sanctions-on-russia/>

More Nuclear Spacecraft Tests



Credit: Ultra Safe Nuclear Corp.

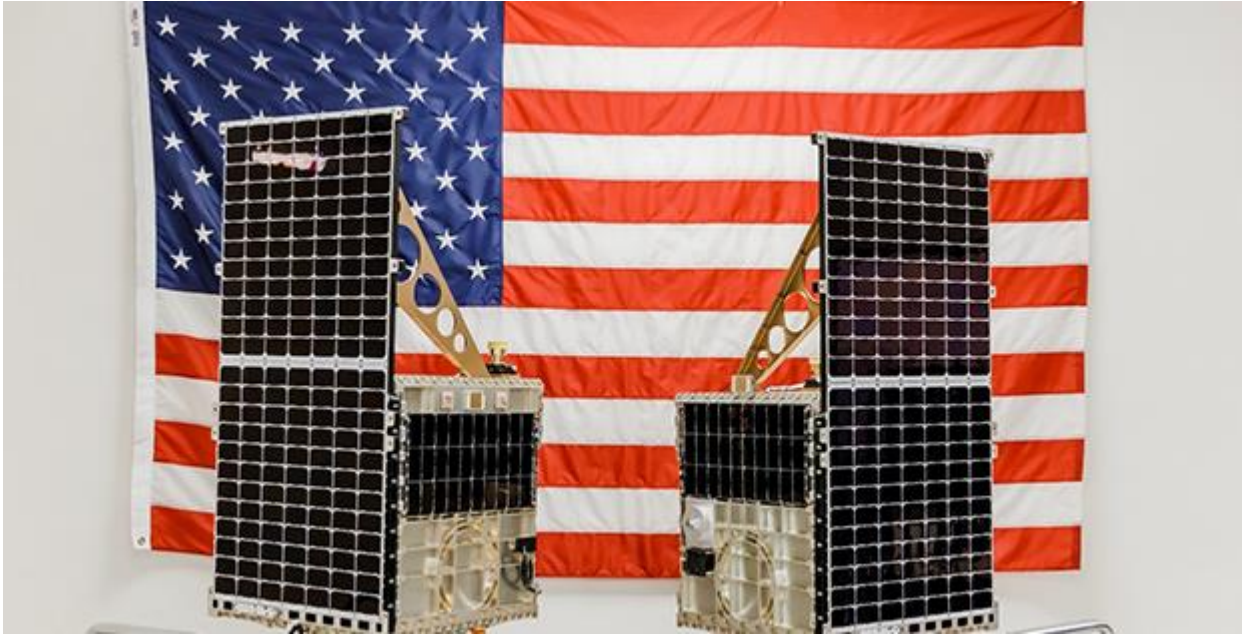
The Defense Innovation Unit (DIU), a Silicon Valley-based Pentagon organization that works with commercial industries and startups, announced in May that it has selected Ultra Safe Nuclear Corp. and Avalanche Energy to develop small nuclear-powered spacecraft for in-space demonstrations to take place in 2027. These test articles – Avalanche’s design is for a very small fusion reactor, and Ultra Safe is testing a chargeable, encapsulated nuclear radioisotope battery – will complement the DRACO nuclear thermal propulsion demonstration DARPA plans to launch in 2025.

Article: <https://spacenews.com/diu-selects-nuclear-powered-spacecraft-designs-for-2027-demonstrations/>

Websites: <https://usnc.com/EmberCore/>

<https://www.avalanche.energy/index.html>

Intersatellite Laser Communication is Here



Credit: DARPA

Mandrake 2, a test performed with two small satellites launched last summer by DARPA, successfully transmitted and received more than 200 gigabits of data over a distance of about 100 kilometers via a laser link during a nearly 40-minute test on April 14. Space-to-space laser communications is a critical technology for DARPA's Blackjack constellation (up to 12 satellites to be launched this year for communications, navigation and missile detection experiments), and for the Space Development Agency's planned mesh network of small satellites in LEO to support military operations (126 satellites, the first 20 to be launched this year).

Articles: <https://spacenews.com/military-experiment-demonstrates-intersatellite-laser-communications-in-low-earth-orbit/>

<https://spacenews.com/interoperability-demo-planned-between-darpas-blackjack-and-predasar-satellites/>

<https://spacenews.com/lockheed-martin-northrop-grumman-york-space-selected-to-build-dods-internet-in-space-constellation/>

Jupiter is a Cannibal



Credit: NASA

A study published online June 8 in the journal *Astronomy and Astrophysics* concludes that Jupiter ate baby worlds while it was forming. Using gravitational data collected by NASA's Juno space probe, the study's authors mapped out the rocky material at the core of the gas giant. They found 11 to 30 Earth masses of heavy elements (3% to 9% of Jupiter's mass) at Jupiter's core, which is much more than expected. This supports the theory that the core was formed from the absorption of many planetesimals (i.e., rocks several miles in diameter that could have formed the seeds of other rocky worlds if Jupiter hadn't eaten them first), rather than from smaller, pebble-sized rocks.

Article: <https://www.space.com/jupiter-ate-baby-planets-while-growing>

This Week At NASA

Videos: https://www.nasa.gov/multimedia/podcasting/twan_index.html

That's All Folks



Credit: ESA