May 2022

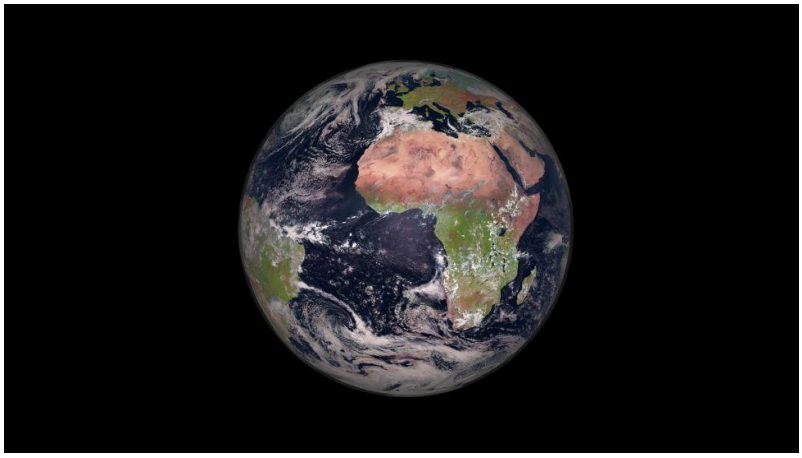
Update

Oklahoma Space Alliance

A Chapter of The
National Space Society

A free email newsletter of the Oklahoma Space Alliance

Earth as Seen from Meteosat in GEO



May 2022 OSA Meeting

Saturday, May 14, 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

"People have problems on earth. On orbit, we are all one crew… I think ISS is like a symbol of friendship and cooperation and a symbol of the future of the exploration of space." – Anton Skaplerov, at ISS change of command ceremony

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Update

May 14, 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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Articles may be submitted by U.S. mail or electronically. Articles may be sent to the Editor at 121 South Creekdale Drive, Norman, OK 73072 or to david.sheely51@gmail.com. Each submission should include the author's name and either e-mail address or phone number (for verification only). A text or Microsoft Word file is preferred. Please contact the Editor by phone, e-mail or texting before mailing your information.

Military Space Keeps Getting Hotter

Brian Weeden, director of program planning at the Secure World Foundation and one of the editors of the 2022 edition of the Secure World Foundation's "Global Counterspace Capabilities: An Open Source Assessment" said the broad theme of the report this year is "proliferation." Up to now only a handful of nations have had space weapons, but "We just keep adding more countries every year." he said. The list of countries with counterspace capabilities now includes the U.S., Russia, China, India, Australia, France, Iran, Japan, North Korea, South Korea and the United Kingdom. Cyberattacks against ground infrastructure like Russia's February 24 attack against Viasat's KA-SAT network that disrupted Ukraine's broadband just as the war began are cheap and relatively easy, and don't create space debris. Space Force hosted an international forum with military space leaders from Australia, Canada, Denmark, France, Germany, Italy, Japan, Netherlands, New Zealand, Norway, Poland, Republic of Korea, Sweden, United Kingdom and U.S. in Colorado Springs in April to address mutual concerns and, in the words of Chief of Space Operations of the U.S. Space Force Gen. John "Jay" Raymond, "mature our partnerships.

Articles: https://spacenews.com/the-space-arms-race-keeps-accelerating-new-reports-warn/

https://spacenews.com/military-space-chiefs-from-15-countries-gather-amid-growing-security-concerns/

Don’t Hold Your Breath

Renunciation of ASAT tests that create orbital debris should be a 'new international norm for responsible behavior in space', said Vice-President Kamala Harris in a speech on April 18 in which she announced that the U.S. will institute a self-imposed ban on destructive direct ascent ASAT tests (as China noted, that’s oddly specific…) The DoD agrees. Deputy assistant secretary of defense John Hill says, “Space related rules and norms of responsible behavior are in our interest.” Some Republican congressmen expressed skepticism and rumbled about unilateral disarmament, but many analysts praised the pledge as a laudable attempt to lead by example. Canada has signed on. Will Russia and China follow that example? Stay tuned.

Articles: https://spacenews.com/u-s-declares-ban-on-anti-satellite-missile-tests-calls-for-other-nations-to-join/

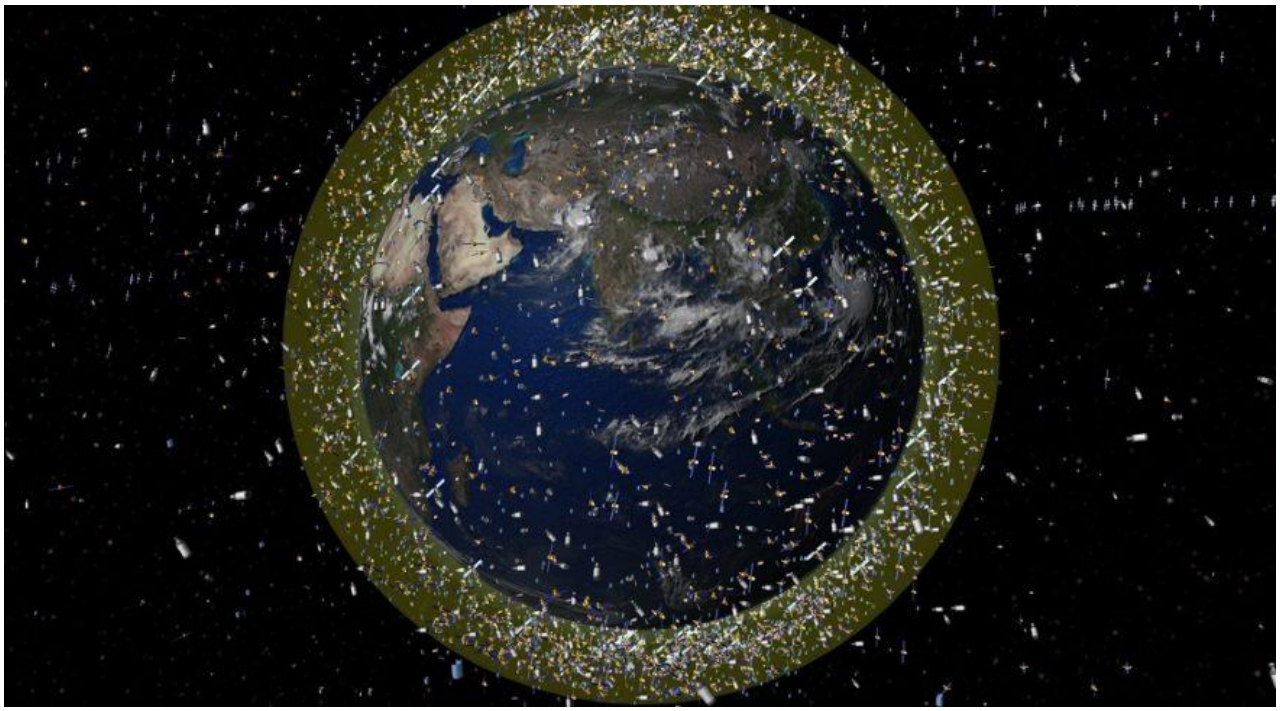
https://spacenews.com/dod-a-main-proponent-of-anti-satellite-test-ban-we-are-not-disarming/

https://spacenews.com/south-korea-welcomes-u-s-moratorium-on-anti-satellite-missile-tests-china-skeptical/

https://spacenews.com/u-s-asat-ban-meant-to-support-u-n-discussions-on-space-threats/

https://spacenews.com/canada-joins-u-s-in-asat-testing-ban/

It’s Not Just ASAT Tests



Besides ASATS, a primary source of space debris is the breakup of old upper stages. On May 3, The U.S. Space Force's 18th Space Defense Squadron tweeted that it’s tracking 16 pieces of space debris associated with the spontaneous breakup of a motor from a space tug that delivered three Russian GLONASS satellites to their final orbit in 2007. There are currently 64 of these Proton upper-stage ullage motors in Earth orbit, waiting their turn to explode. Gen. David Thompson, vice chief of space operations of the U.S. Space Force, says “Right now the most important thing we and others can do is stop making the problem worse.” “Ultimately, the Space Force does not want to be in the business of cleaning up debris,” he said, but “we would certainly love to partner with innovative new companies, or even innovative old companies, to develop ideas and technologies, and help in some way shape or form.” As an example, he mentioned Orbital Prime, a new effort by the Space Force’s technology arm SpaceWERX to invest in debris-removal and in-space servicing technologies. Orbital Prime’s first round will award $250,000 study contracts for technologies that develop satellite life extension, refueling, on-orbit inspection, orbit transfer, active debris removal, reuse and recycling of materials in space. Winners will be eligible to compete for a second round of $1.5 million contracts to build prototypes.

Articles: https://www.space.com/russian-rocket-motor-breakup-space-debris

https://spacenews.com/space-force-eager-to-invest-in-debris-removal-projects/

Starship as an Orbital Bombing Platform

A blogger named Austin Vernon has posted a very interesting analysis of Starship's potential as dual-use technology, i.e., as a really nifty weapons platform. Recalling a 1950s idea of placing plain old tungsten rods with terminal guidance systems on orbit and raining them down at will ("rods from God"), he says Starship makes the idea affordable. "B-52s flying from Barksdale AFB to complete a mission in East Asia incur a marginal cost of $50/kg to deliver bombs. Starships cost is cheaper and can put weapons on target in less than thirty minutes. Each Starship launch has the same payload as three B-52s." He lists a number of other possible military applications. Starship could be a real game changer for combat with China.

Article: https://austinvernon.site/blog/starshipsuperweapon.html

Axiom Sends First Commercial Crew to ISS

Axiom's Ax-1, the first fully private crewed mission to ISS, lifted out of KSC on a SpaceX Falcon 9 on April 8, and splashed down on April 25. The mission was commanded by retired NASA astronaut Michael López-Alegría, who is now Axiom's V.P. of Business Development. The other crewmembers were mission pilot Larry Connor (real estate entrepreneur) and mission specialists Eytan Stibbe (founding partner of the Vital Capital Impact investment fund) and Mark Pathy (CEO and chair of the Canadian sustainable investment company MARVIK). Stibbe is also a veteran fighter pilot of the Israel Air Force; he was the second Israeli ever to fly to space; he celebrated the eight-day Jewish Passover holy days aboard ISS. The Ax-1 crew conducted many experiments on ISS, including the Fluidic Telescope Experiment (FLUTE) to investigate using liquids to construct telescope lenses in space after the material launched.

Articles: https://spacenews.com/spacex-launches-commercial-mission-to-iss/

https://www.space.com/spacex-ax1-mission-launch-success

https://www.space.com/axiom-ax1-private-crew-personal-items

https://www.space.com/ax1-private-astronaut-eytan-stibbe-passover

https://www.space.com/liquid-telescope-construction-in-space-ax-1

https://www.space.com/spacex-ax1-private-astronauts-depart-space-station

https://spacenews.com/ax-1-undocks-from-space-station-after-extended-stay/

https://spacenews.com/crew-dragon-splashes-down-to-end-ax-1-private-astronaut-mission/

Axiom to Fly a UAE Astronaut to ISS

Credit: Mohammed Bin Rashid Space Centre

On April 29, Axiom and the UAE's Mohammed bin Rashid Space Centre (MBRSC) announced they have signed an agreement to fly an Emirati astronaut to ISS for a six-month stay on the Crew-6 mission, scheduled for launch no earlier than the spring of 2023. Whichever of the UAE's four astronauts makes the trip, he will be the first astronaut not from an ISS partner (the U.S., Canada, Europe, Japan, and Russia) to remain on the station for an extended mission. But he won't be the first UAE astronaut in space; that was Hazza AlMansoori, who became the first Emirati in space when he flew on a week-long Soyuz mission in September 2019.

Article: https://spacenews.com/emirati-astronaut-to-fly-long-duration-space-station-mission/

Missed It by That Much!

Credit: Rocket Lab

Almost, but not quite. May 2 saw the 26th launch of Rocketlab's Electron booster, and the first attempt to recover the first stage by snatching it from midair by helicopter. It has recovered three first stages after soft landings in the ocean before. The helicopter successfully caught the booster, but Rocket Lab CEO Peter Beck tweeted that the helicopter pilots decided to release the booster "as they were not happy with the way it was flying, but no big deal, the rocket splashed down safely and the ship is loading it now," i.e., the booster was fished out of the ocean. The launch successfully delivered 34 satellites to LEO, a new record for Electron.

Articles: https://spacenews.com/rocket-lab-launches-smallsats-catches-but-drops-booster/

https://www.space.com/rocket-lab-helicopter-booster-catch-satellite-launch

https://www.space.com/rocket-lab-helicopter-booster-catch-video

It’s the Flight Rate, Stupid

A Falcon 9 launch on April 29 (carrying a payload of 53 Starlink satellites) was the sixth by SpaceX in April, the most by the company in any single month. The company has previously performed four launches in a month several times and launched five times in December. SpaceX has successfully made 17 Falcon 9 launches so far this year. Its goal for this year is one launch per week. So far, so good. The rocket’s first stage, flying for the sixth time, landed on a recovery ship in the Atlantic. That booster was last used just three weeks earlier for the Ax-1 mission; its 21-day turnaround is the shortest yet. But the FAA continues to slow-walk clearance for Starship’s first orbital flight test. New date for that is May 31. Bets on whether it’ll be postponed again?

Article: https://spacenews.com/falcon-9-busier-than-ever-as-starship-reviews-delayed-again/

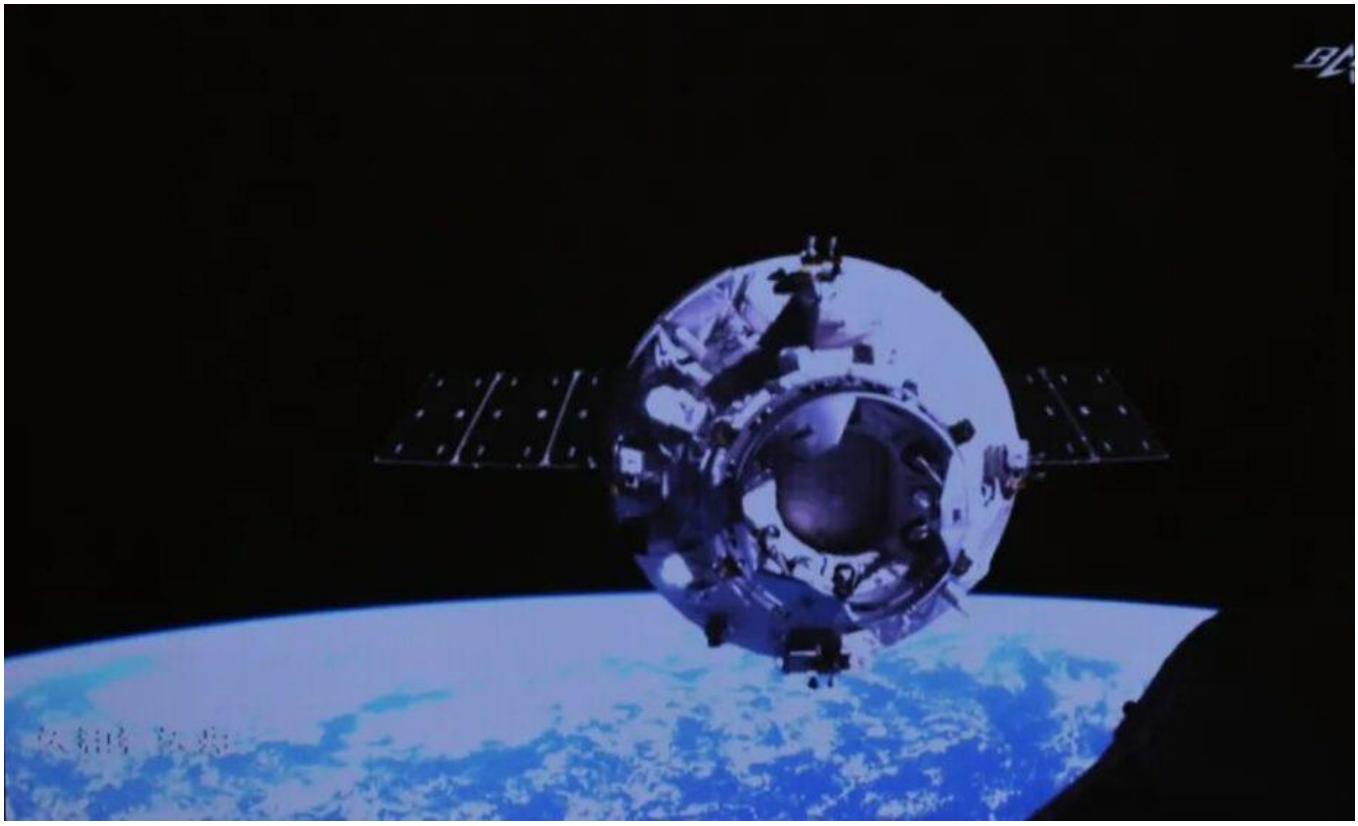
The Largest Commercial Launch Deal Ever

To launch the 3,236 satellites in its Project Kuiper broadband megaconstellation, Amazon has signed contracts to purchase up to 83 launches from Arianespace, Blue Origin and United Launch Alliance. Collectively, they're the single largest launch services buy in history. This is on top of the nine Atlas 5 launches it purchased from ULA a year ago. Total amount for the contract not disclosed, but it's billions. Amazon says the total cost for Project Kuiper will be $10B. To meet the demands of its customer, ULA is planning major production improvements for its Vulcan rocket and Arianespace will increase the performance of Ariane 6.

Articles: https://spacenews.com/amazon-signs-multibillion-dollar-project-kuiper-launch-contracts/

https://spacenews.com/amazon-launch-contracts-drive-changes-to-launch-vehicle-production/

Shenzhou-13 Down, Tianzhou-4 Up



The Shenzhou-13 mission, launched on October 15, 2021, concluded with the safe landing of its three taikonauts in northern China's Inner Mongolia Autonomous Region on April 15, about 9 hours after departure from the Tiangong space station. Their 182 days in space nearly doubled China's previous record of 92 days set by the Shenzhou-12 crew. A 13,500 kg unmanned supply vessel, Tianzhou-4, successfully docked with Tiangong seven hours after launch on May 9. It delivered around 6.9 tons of supplies for the Shenzhou-14 mission, scheduled to launch on another six-month rotation aboard Tiangong next month. The Shenzhou-14 crew is scheduled to oversee the completion of the space station with the arrival of the Wentian ("Quest for the Heavens") module, with a new airlock for extravehicular activities, living quarters and a small robotic arm, in July and the Mengtian ("Dreaming of the Heavens") module in October.

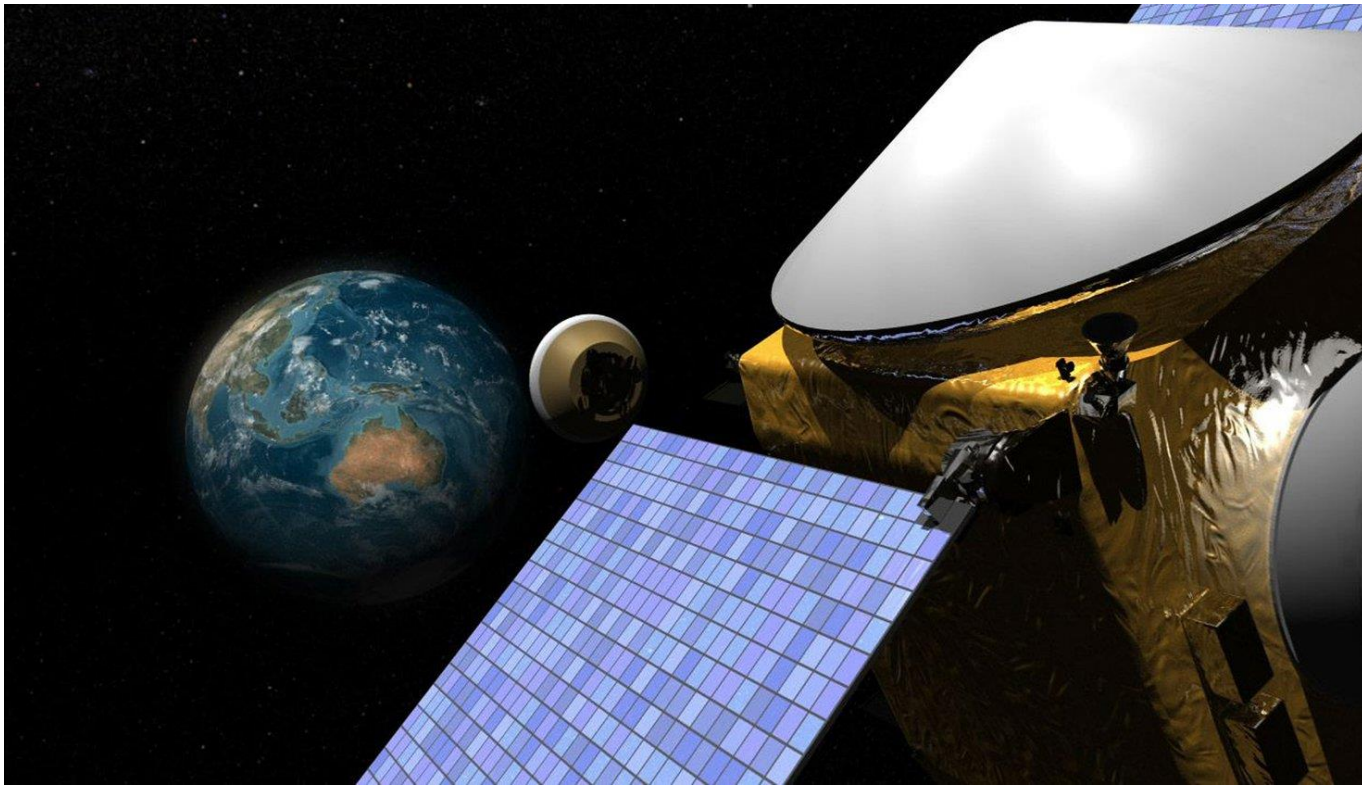
Articles: https://www.space.com/china-shenzhou-13-astronauts-landing-returns-to-earth

https://spacenews.com/shenzhou-13-astronauts-return-to-earth-after-182-day-mission/

https://spacenews.com/tianzhou-4-cargo-craft-docks-with-chinese-space-station/

https://www.space.com/china-big-plans-tiangong-space-station

OSIRIS-REx to Visit Apophis



The OSIRIS-REx mission won't end when it drops off its sample return capsule from asteroid Bennu in September 2023. As the parent spacecraft executes a flyby of Earth, it will be retargeted to intercept asteroid Apophis in 2029, shortly after that asteroid passes just 32,000 km from Earth. The spacecraft will spend 18 months in the vicinity of the 350-meter-diameter rock. NASA announced its approval of the extended mission on April 25. That's some good news. Further good news for planetary defense research is NASA's April 7 announcement that it's signed an agreement with the U.S. Space Force to release data from military satellites of bolides, meteors that explode in the upper atmosphere. The bad news is that NASA's proposed FY 2023 budget seeks to delay development of the NEO Surveyor space telescope by at least two years, to 2028, to offset cost growth in flagship science programs like Mars Sample Return and Europa Clipper. What use in learning more about asteroids and how to possibly deflect them if you don't see them coming?

Articles: https://spacenews.com/nasa-to-repurpose-osiris-rex-for-second-asteroid-encounter/

https://spacenews.com/nasa-and-space-force-cooperate-on-near-earth-object-data/

China Will Perform Asteroid Deflection Test

Sometime around 2025 or 2026 (the end of the 14th Five-year plan period 2021-2025) China will launch a mission to make close-up observations of a yet-to-be-chosen potentially dangerous asteroid, then impact the rock to alter its orbit. China is showing increased interest in this problem: it held its first Planetary Defense Conference in October 2021, and in January it released a white paper detailing its plans for the next few years, which include development of plans for building a NEO defense system and increase its capacity for NEO monitoring and cataloging.

Article: https://spacenews.com/china-to-conduct-asteroid-deflection-test-around-2025/

DARPA Wants a Nuclear Rocket

As DARPA's website for the project notes, "NTP [nuclear thermal propulsion] offers a high thrust-to-weight ratio around 10,000 times greater than electric propulsion and two-to-five times greater specific impulse (i.e., propellant efficiency) than chemical propulsion." Phase 1 of DRACO (Demonstration Rocket for Agile Cislunar Operations) began over a year ago with DARPA's selection of a preliminary design for an NTP rocket engine reactor from General Atomics and two conceptual spacecraft designs by Blue Origin and Lockheed Martin. Phase 2 aims to complete "preliminary and detailed design of a demonstration system and to construct and experimentally validate the nuclear thermal rocket flight engine." Phase 3 is construction of a complete vehicle and in-orbit flight test, to be launched in FY 2026. NASA is tagging along with some support. Meanwhile, spurred by congress' ASAT concerns, the Air Force Research Laboratory is asking space companies to help identify technologies and capabilities the military will need for "responsive launch" of a small spacecraft to a specific targeted high energy orbit with only days or weeks' notice. Such orbits are thought to be beyond the reach of current small launchers.

Articles: https://spacenews.com/darpa-moving-forward-with-development-of-nuclear-powered-spacecraft/

https://www.space.com/darpa-nuclear-rocket-earth-moon-space

https://spacenews.com/air-forces-rocket-propulsion-arm-looking-to-invest-in-technologies-for-responsive-launch/

Nelson Gets Religion on Cost-Plus Contracts

Testifying before the Senate's Commerce, Justice and Science Subcommittee on May 3, NASA Administrator Bill Nelson said he likes fixed-price contracts and dislikes traditional cost-plus contracts, calling the latter a "plague" on the agency. "There is no excuse for cost overruns, but the old way of doing business was cost-plus. Because of the competition we've been talking about, we have been moving to fixed-price where we can under procurement law," he said. It's about time.

Article: https://spacenews.com/nelson-criticizes-plague-of-cost-plus-nasa-contracts/

Comsats, Insurance and Law for the Moon

Lunar commercial and legal activity is picking up the pace with every passing year, it seems. China already has a relay satellite stationed in a halo orbit around Earth-moon Lagrange point L2 to enable communications with the Chang'e-4 lander and Yutu-2 rover on the lunar far side, but will need a comsat in a different orbit would to enhance communications and enable larger volumes of data transmission between Earth and the lunar south pole, the target of its next landers. Wu Yanhua, deputy director of the China National Space Administration (CNSA), told Chinese media on April 24 that the China has plans for a small lunar comsat constellation; first launch could take place in the next couple of years. Meanwhile, cloud computing startup Lonestar will send hardback novel-sized "data center in a box" to the lunar south pole as a commercial payload on Intuitive Machine's IM-2 in 2023 as a proof-of-concept for a lunar data center. The world's first insurance coverage for a commercial mission to the moon's surface is being negotiated between Japanese lunar lander developer ispace and Mitsui Sumitomo Insurance (MSI), for ispace's first attempt to send a lander to the moon later this year. And finally, Canada is considering a bill that would amend its criminal law to apply to Canadian citizens on the moon. The moon's surface, the Gateway space station and transportation to or from the Gateway would all fall under the proposed legislation, making Canadians in these locations subject to legal action for alleged crimes.

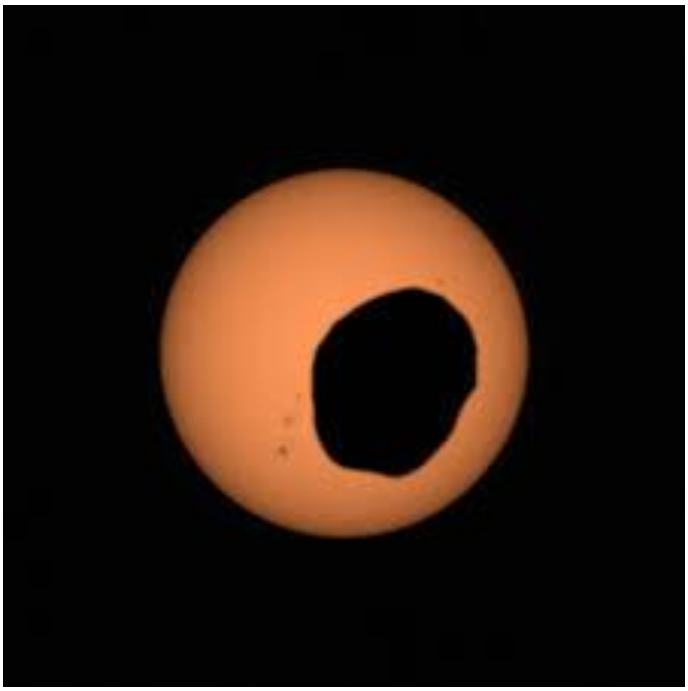
Articles: https://spacenews.com/china-to-build-a-lunar-communications-and-navigation-constellation/

https://spacenews.com/lonestar-emerges-from-stealth-with-plans-for-lunar-data-centers/

https://spacenews.com/japans-ispace-negotiating-first-commercial-moon-landing-insurance/

https://www.space.com/canada-considers-adding-crimes-moon-criminal-code

Perseverance Rover Captures Solar Eclipse by Phobos



On April 2, the Perseverance rover turned its Mastcam-Z camera from the Martian surface to the sky overhead and captured a solar eclipse by Phobos in a high frame-rate video. It hardly seems fair to call it an eclipse, since neither of the Martian moons come close to covering the solar disk. As of 2019, the Curiosity, Opportunity and Spirit rovers had between them observed 40 solar transits by Phobos and eight solar transits by Deimos.

Article with video: https://www.space.com/perseverance-rover-mars-solar-eclipse-video

A Spaceport for Scotland

A new spaceport in Scotland may see its first launch before the end of this year. SaxaVord UK Spaceport, located on the Lamba Ness peninsula on the small island of Unst in the Shetland Islands, is at work to establish launch facilities to host the UK Pathfinder Launch project led by Lockheed Martin. UK Pathfinder will put six CubeSats in orbit late this year using an 89-foot long RS1 rocket built by California-based startup ABL Space Systems. That would be the first vertical launch to orbit from the UK. SaxaVord also has deals with Skyrora, a UK-Ukrainian launch startup, which also hopes to launch its first three-stage Skyrora XL rocket from SaxaVord by the end of the year, and Venture Orbital Systems of France, which signed an MOU for launching of its Zephyr launcher from SaxaVord beginning in 2024. The most recent agreement is with Astra, which on May 10 announced plans to carry out launches from SaxaVord starting in 2023.

Website: https://saxavord.com/

Article: https://www.space.com/saxavord-scotland-spaceport-construction-begins

https://spacenews.com/astra-to-launch-from-u-k-spaceport/

This Week At NASA

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

That’s All Folks