January 2023

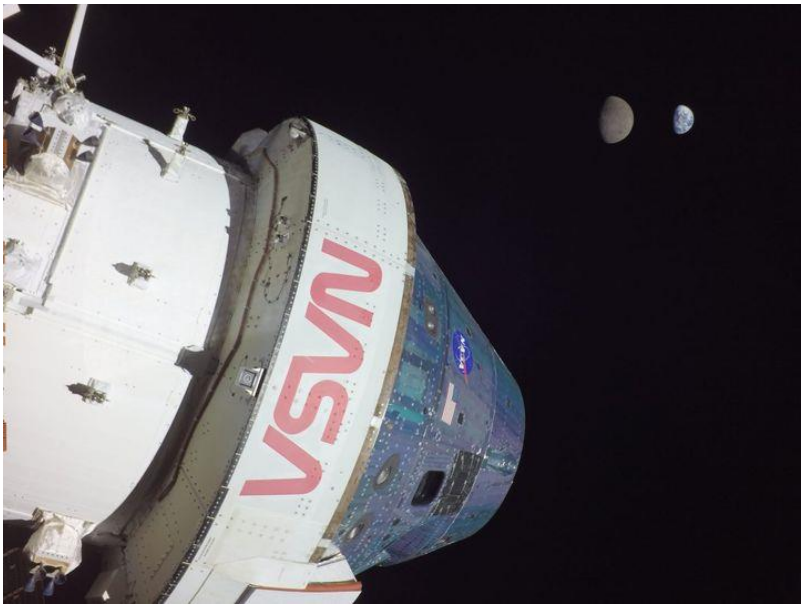
Update

A free email newsletter of the Oklahoma Space Alliance

Oklahoma Space Alliance

A Chapter of The
National Space Society

Artemis Looks Homeward



Credit: NASA

January 2023 OSA Meeting

Saturday, January 14, 2023

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

"Never a dull day aboard the International Space Station." – Dan Huot, NASA spokesperson at Mission Control at the Johnson Space Center

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Oklahoma Space Alliance
Update

January 14, 2023

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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.

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Thar She Blows!

Credit: NASA TV

Cosmonauts aboard ISS had to cancel their spacewalk on December 14 when Soyuz MS-22, docked to the station and lifeboat for three of the ISS crew, sprang a coolant leak from a hole a few millimeters in diameter. The cause is still unknown. The leak damaged the skin of MS-22's service module, but did not damage ISS. This vehicle was slated to return three crewmembers to earth in March and be replaced by Soyuz Ms-23, carrying two cosmonauts and one astronaut. Investigation determined MS-22 to be unsafe, so MS-23 will be launched unmanned and MS-22 will return to earth unmanned. This will screw up the crew rotation schedule. The stay of the crew slated to return on MS-22 will be extended by at least several months until they can be relieved by MS- 24. ISS had to cancel another spacewalk on December 21 (completed on December 23) due to necessity of avoidance maneuver to dodge a piece of Russian space debris.

Articles: https://www.space.com/soyuz-spacecraft-leak-space-station-cancels-spacewalk

https://spacenews.com/soyuz-leak-cancels-space-station-spacewalk/

https://spacenews.com/nasa-postpones-spacewalk-to-support-soyuz-investigation/

https://www.space.com/russian-soyuz-spacecraft-leak-not-geminid-meteor

https://www.space.com/russian-space-debris-cancels-nasa-spacewalk

https://www.space.com/russia-replacement-soyuz-launching-february-2023

First Crew Handoff Aboard Tiangong

Credit: CMSA

China set its own personal record for number of its citizens in space on November 29, when taikonauts Zhang Lu, Deng Qingming and Fei Junlong were launched aboard Shenzhou-15 to join the three crewmembers of Shenzhou-14 already aboard the Taingong space station. They docked with Taingong just six and a half hours later. With all three Tiangong modules in place as of November, the station is considered fully operational (although there's already talk of expanding it), and the Shenzhou-15 crew is scheduled to conduct more than 100 experiments during its six-month rotation. The Shenzhou-14 crew landed in the Gobi desert on December 4. Like ISS, Tiangong will also be a deployment station for smallsats. The Tianzhou 5 cargo ship, which since mid-November has also been docked to Tiangong, released a 12 kg cubesat on December 17.

Articles: https://www.space.com/china-launches-shenzhou-15-tiangong-space-station

https://spacenews.com/shenzhou-15-astronauts-arrive-at-chinas-space-station-for-first-crew-handover/

https://www.space.com/china-shenzhou-15-plans-tiangong-space-station

https://www.space.com/china-six-astronauts-space-station-at-once

https://www.space.com/china-shenzhou-14-astronauts-land-earth

https://www.space.com/china-tiangong-space-station-releases-satellite

https://spacenews.com/china-is-considering-expanding-its-tiangong-space-station/

And in Other News from China…

Credit: CASC

Two hits and a miss. Two years after an unsuccessful debut, a Kuaizhou 11 solid-fueld rocket made its first successful flight on December 6, delivering the VDES (VHF Data Exchange System) test satellite into orbit. This rocket is capable of delivering 1,000 kg to LEO at $10K/kg. It is manufactured by ExPace, a commercial subsidiary of China Aerospace Science and Industry Corporation (CASIC). Another new solid-fueld "commercial" launcher developed by China Rocket Co. Ltd., Jielong-3, had a successful first launch on December 9. It delivered 14 satellites to orbit after liftoff from a mobile sea platform in the Yellow Sea. Jielong-3 can carry 1,500 kg to sun-synchronous orbit. The first launch of Landspace's Zhuque-2, the first launch of a "commercially"-developed Chinese liquid-fueled (Methane-LOX) rocket, ended in failure on December 14, apparently due to issues with the second stage. It was attempting to deliver a number of commercial satellites to a sun-synchronous orbit. This failure came toward the end of a busy week which saw seven Chinese launch attempts within 10 days. Meanwhile, the upper stage of the Long March 6A rocket launched on November 11 is now a spreading cloud of 350+ pieces of space debris after it broke up just one day later.

Articles: https://www.space.com/china-kuaizhou-11-solid-rocket-launch-success

https://spacenews.com/china-launches-14-satellites-with-new-solid-rocket-from-mobile-sea-platform/

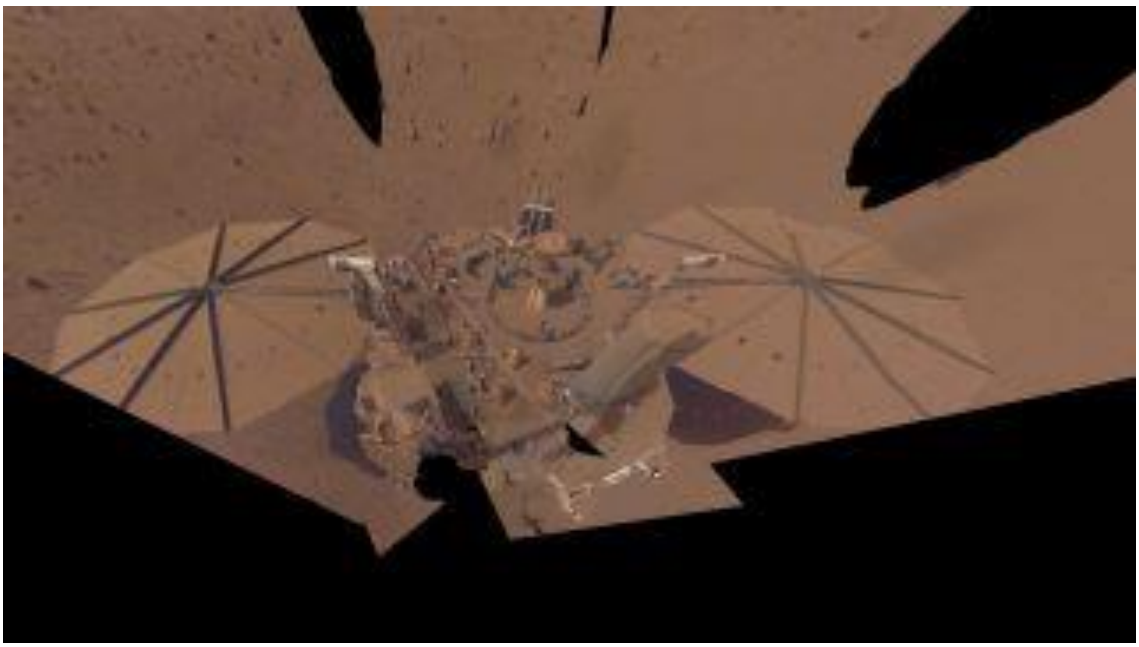
https://spacenews.com/chinese-commercial-methane-fueled-rocket-set-for-first-launch/

https://spacenews.com/historic-first-launch-of-chinese-private-methane-fueled-rocket-ends-in-failure/

https://spacenews.com/china-completes-seventh-space-launch-inside-10-days/

https://www.space.com/china-rocket-disintegrates-space-junk-cloud

InSight Bites the Dust (Literally), but Ingenuity Keeps Flying



Credit: NASA/JPL-Caltech

The end was not unexpected. Dust on its solar panels led to declining power levels, and InSight finally fell silent on December 18. NASA signed the death certificate on December 21. InSight had a good run; four years of scientific return. Meanwhile, Ingenuity made its 37th flight on December 17 (203 feet in 55 seconds), using new flight software that allows it to avoid hazards during landing and to use digital elevation maps for navigation purposes for the first time.

Articles: https://www.space.com/mars-lander-insight-contact-lost

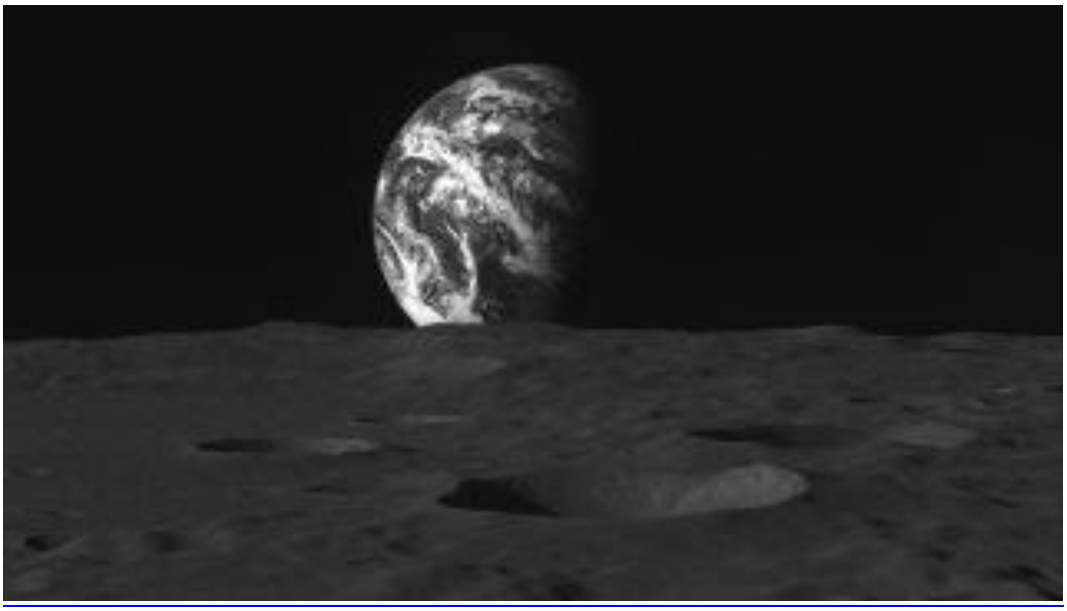
https://www.space.com/nasa-mars-insight-lander-mission-ends

https://spacenews.com/nasa-declares-end-of-insight-mars-mission/

https://www.space.com/saving-mars-robots-from-death-by-dust

https://www.space.com/ingenuity-mars-helicopter-37th-flight-new-software

Danuri Arrives in Lunar Orbit, and Company's Coming



Credit: KARI

Lunar space is getting busier. After the last of five engine burns beginning on December 17, South Korea's Danuri probe settled into lunar orbit on December 28. It took a circuitous route; 134 days and over 3 million miles. It will have company, also taking the long, slow way to the moon. Ispace's Hakuto-R lander, carrying a UAE rover, launched on a Falcon 9 on December 11. Also aboard that Falcon 9 was a briefcase-sized NASA smallsat called Lunar Flashlight, which will make its own way to the same near-rectilinear halo orbit to be used by the Gateway space station (NASA's CAPSTONE smallsat entered the Gateway orbit on November 13). Hakuto-R is scheduled to land inside Atlas Crater on the southeastern edge of Mare Frigoris ("Sea of Cold") in April. Intuitive Macines and Astrobotics both have missions scheduled for Q1 2023, and one or both may beat it to touchdown.

Articles: https://www.space.com/ispace-japanese-moon-landing-launch-november-28

https://spacenews.com/japanese-lunar-lander-slated-to-launch-nov-28-at-the-earliest/

https://www.space.com/south-korea-danuri-moon-probe-begins-orbit-entry

https://spacenews.com/south-korean-spacecraft-enters-lunar-orbit-with-deceleration-maneuver/

https://www.space.com/south-korea-earth-moon-photos-danuri

https://spacenews.com/capstone-enters-lunar-orbit/

https://www.space.com/spacex-launches-japanese-moon-lander-uae-rover

https://www.space.com/japanese-moon-lander-hakuto-r-first-photos

https://spacenews.com/falcon-9-launches-ispace-lander-and-nasa-cubesat-to-the-moon/

Well, That's One

Credit: NASA/Bill Ingalls

After many delays, Artemis 1 finally made it off the pad in a spectacular night launch on November 16. Splashdown in the Pacific took place 25 days and 11 hours later, on December 11. In between the SLS launched 10 cubesats (some have failed and others are struggling), and the Orion capsule and service module surpassed the record for distance from earth for a man-rated spacecraft (set by Apollo 13), and spent two weeks in a distant retrograde lunar orbit. Closest approach to the moon: 81 miles.

Articles: https://www.space.com/nasa-artemis-1-moon-mission-launch

https://spacenews.com/sls-launches-artemis-1-mission/

https://www.space.com/artemis-1-moon-rocket-damage-launch-pad

https://www.space.com/artemis-1-cubesats-deep-space-updates

https://spacenews.com/cubesat-launched-on-artemis-1-trying-to-fix-propulsion-system/

https://www.space.com/artemis-1-orion-breaks-apollo-13-distance-earth-record

https://www.space.com/artemis-1-orion-departs-moon-orbit

https://www.space.com/artemis-1-orion-moon-eclipse-earth-video

https://www.space.com/james-webb-space-telescope-artemis-1-communications

https://www.space.com/nasa-artemis-1-orion-earth-last-view

https://www.space.com/artemis-1-orion-splashdown-moon-mission-success

https://spacenews.com/orion-splashes-down-to-end-artemis-1/

dearMoon Crew Announced

Credit: dearMoon

On December 8, the one year anniversary of his Soyuz launch as a tourist to ISS, Japanese billionaire Yusaku Maezawa announced the eight additional crewmembers and two alternates for the circumlunar tourist flight he purchased from SpaceX in 2018. The reveal came in a video release, and was the culmination of a selection from more than one million applications from 249 “countries and regions” worldwide. The prime crew includes an actor, a singer and a music producer, two photographers, a filmmaker, the “Everyday Astronaut YouTube personality Tim Dodd, and a “multi-disciplinary creative”. Seven of the eight are male, three are Americans, and they range in age from 22 to 47. Launch date TBD; obviously it won’t be in 2023, the projected date when the flight was purchased.

Articles: https://www.space.com/dearmoon-announces-moon-crew-spacex-starship

https://spacenews.com/japanese-billionaire-selects-crew-for-circumlunar-starship-flight/

NASA Isn’t Completely Woke Yet

Credit: NASA

NASA won’t be changing the name of the James Webb Space Telescope even though some folks don’t think Webb was politically correct enough. NASA Administrator Bill Nelson said NASA wouldn’t change the name last September, but the controversy didn’t die down. On November 18, NASA released an 87-page report exonerating Webb from involvement in persecuition of suspected gays in the federal government while condemning broader federal government actions in the 1950s during the "Lavender Scare." The investigation was exhaustive. Case closed. Whining will no doubt continue.

Article: https://www.space.com/james-webb-space-telescope-wont-be-renamed

61

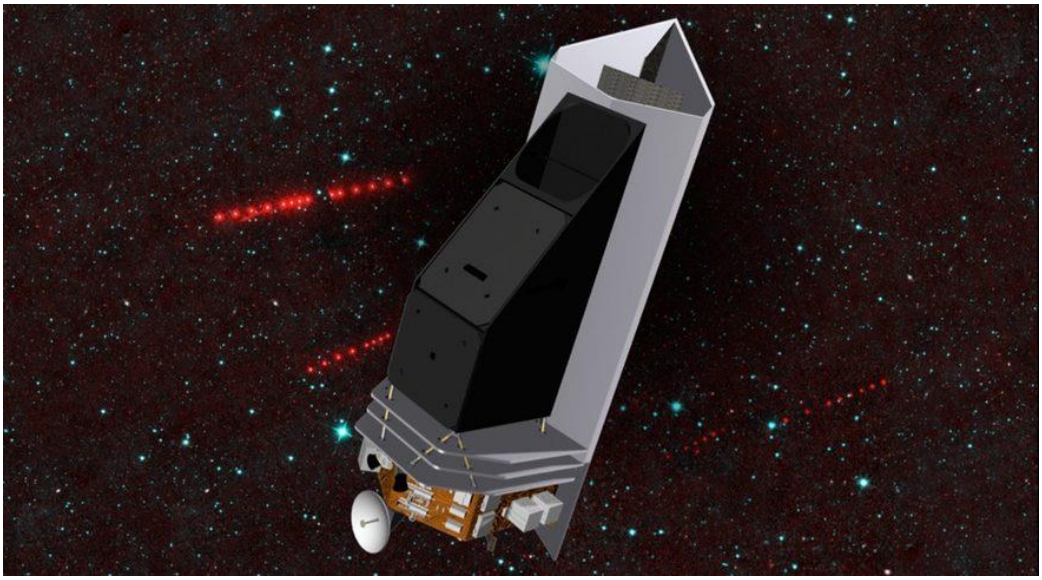
Credit: SpaceX

SpaceX's last flight of 2022 launched out of Vandenberg AFB on December 29, carrying EROS C-3, an Israeli reconnaissance satellite. It was their 61st launch this year, just shy of China's total of 64 launches. Do the math; that's one launch every six days. Total number of U.S. launches in 2022 was 87, so about 3 out of 4 U.S. launches were performed by SpaceX.

Articles: https://www.space.com/spacex-israeli-military-satellite-launch-last-of-2022

https://spacenews.com/spacex-completes-record-year-with-israeli-imaging-satellite-launch/

Better Late Than Never



Credit: NASA/JPL

NEO Surveyor will be delayed a couple of years, but it's coming. NASA slashed its funds for FY 2023 to feed Mars Sample Return and Europa Clipper and slipped its launch date by two years, but congress not only approved abot three times as much funding as NASA's request but told NASA to launch it by its original 2026 date if possible. NASA now says it estimates NEO Surveyor will cost $1.2 billion to develop (double what NASA projected when it announced in September 2019 it would pursue NEO Surveyor as a directed mission) and be ready for launch no later than June 2028. To see why they might want to pick up the pace, try the Asteroid Launcher web app to see the results of failure to detect and divert incoming rocks of various sizes and compositions.

Articles: https://spacenews.com/nasa-confirms-neo-surveyor-for-2028-launch/

https://www.space.com/asteroid-launcher-earth-impact-simulator

ESA's New Budget

Credit: ESA

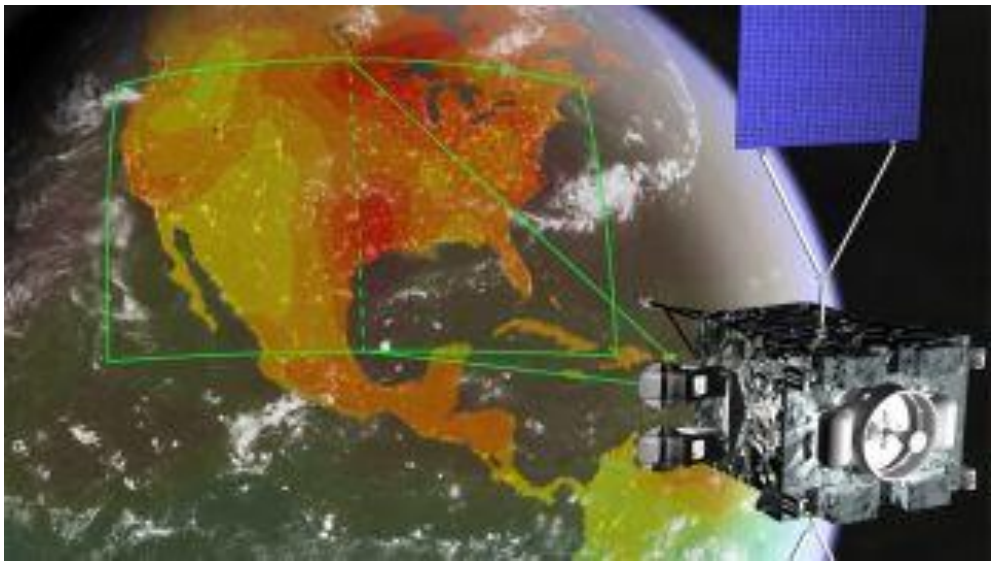
On November 23, at the conclusion of a two-day ministerial conference in Paris, ESA Director General Josef Aschbacher announced that ESA members had agreed to contribute 16.9 billion euros ($17.5 billion) to ESA for the next three years. This is a 16.6% increase (much of which is wiped out when taking inflation into account) from the previous ministerial in 2019, but it's still more than 1.5 billion euros short of ESA's request. Nevertheless, all ESA's priorities received some funding, including startup work on a lunar cargo lander called Argonaut to participate the NASA-led Artemis program and revamping the ExoMars rover mission. ESA is looking to increase commercialization of its lunar efforts, and three core ESA members (Germany, France and Italy) have signed an agreement that calls for a new framework to be in place by June 2024 for public financing of launch vehicles such as Ariane 6 and Vega C.

Articles: https://spacenews.com/esa-secures-16-9-billion-euros-at-ministerial/

https://spacenews.com/europe-looks-to-commercialize-lunar-exploration-efforts/

https://spacenews.com/france-germany-and-italy-sign-agreement-on-launch-vehicle-development/

Remember GeoCarb?



Credit: NASA/Lockheed Martin/University of Oklahoma

Several members of this chapter will recall attending a public event at OU with then-NASA Administrator Bridenstine, which highlighted a joint project of the University of Oklahoma and Lockheed Martin, begun in 2016, aiming to put a greenhouse gas–monitoring satellite called GeoCarb into GEO. The mission's original cost estimate was $170.9 million. After seeing cost balloon to three and a half times that much, NASA has cancelled GeoCarb, citing "technical concerns, cost performance and availability of new alternative data sources."

Article: https://www.space.com/nasa-geocarb-climate-change-mission-canceled

The SBSP Race is On

Credit: AFRL

Northrop Grumman has completed ground-based tests to demonstrate critical SBSP technology for Space Solar Power Incremental Demonstrations and Research (SSPIDR) program. Next step: a demonstration of space-based solar power in orbit in 2025. Meanwhile, the Chinese have announced plans to assemble and test SBSP hardware on Tiangong.

Articles: https://spacenews.com/northrop-grumman-tests-space-solar-power/

https://spacenews.com/china-to-use-space-station-to-test-space-based-solar-power/

It’s Not (Just) Rocket Science

Credit: Aegis Trade Law (Facebook)

It takes more than good engineering to make a successful space business. To help space startups navigate the complex regulatory environment, a Space Regulatory Bootcamp will be held in February at Q Station, a collaboration center for New Mexico’s space industry in Albuquerque. The bootcamp is being organized by Washington-based Aegis Trade Law. Topics to be covered include cybersecurity, foreign investment, crowdfunding, government licensing, export control regulations, and federal contracting regulations. The bootcamp is sponsored by U.S. AFRL and SpaceWERX.

Article: https://spacenews.com/space-regulatory-bootcamp/

Europe Wants a Piece of the Action

Credit: Nanoracks

On January 4, Voyager Space announced a partnership with Airbus Defence and Space on the Starlab commercial space station being developed by VS subsidiary Nanoracks. Per the announcement, Airbus will provide “technical design support and expertise”, but additional details about the partnership or its financial terms were not revealed. ESA has been looking for a way to keep its astronauts busy after ISS is retired; this looks to be part of a solution to that problem.

Article: https://spacenews.com/airbus-joins-starlab-commercial-space-station-project/

Nobody Said It Had to Be Solid

Credit: NASA

A ULA Atlas 5 lifted off from Vandenberg Space Force Base on Nov. 10. Primary payload was a Joint Polar Satellite System (JPSS) 2 weather satellite, but the secondary payload was a 6-meter-diameter inflatable heat shield called LOFTID, a NASA technology demonstration for heat shields that have the potential to deliver much heavier payloads to the Martian surface. The test was a success.

Articles: https://spacenews.com/atlas-launch-to-test-inflatable-heat-shield/

https://www.space.com/jpss-2-satellite-loftid-launch-atlas-v-rocket

https://www.space.com/nasa-inflatable-flying-saucer-mars-heat-shield-reentry-test

https://spacenews.com/nasa-calls-test-of-inflatable-heat-shield-a-success/

An Egg Drop from Near Space, Because Why Not?

Credit: Mark Rober

From 100,000 feet (about 19 miles). Some folks have way too much time on their hands.

Articles: https://www.space.com/egg-drop-near-space-video

https://www.yahoo.com/lifestyle/egg-drop-experiment-goes-way-151545606.html

Long Video: https://www.youtube.com/watch?v=BYVZh5kqaFg

Short Video: https://www.youtube.com/watch?v=tE2Da_g5MiQ

This Week At NASA

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

That's All Folks

Credit: NASA

Credit: NASA