



March 2022

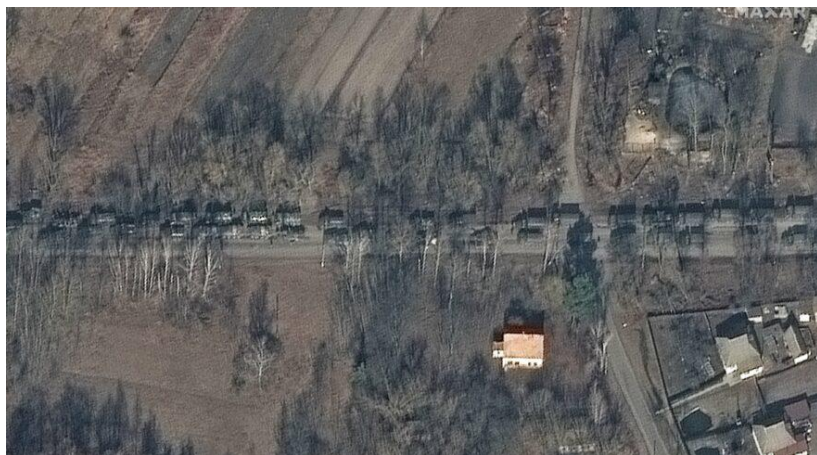
Update

**Oklahoma Space
Alliance**

A Chapter of The
National Space Society

A free email newsletter of the Oklahoma Space Alliance

Spy Eye on the Russian Convoy



March 2022 OSA Meeting

Saturday, March 12, 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

"Time to let the American broomstick fly, and hear the sound of freedom." – Flight Director Julia Black

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Oklahoma Space Alliance Update

March 12, 2022

Editor Cliff McMurray

Asst Editor Claire McMurray

cliffmcmurray@hotmail.com

405-863-6173 (C)

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.

OSA Officers for 2022

President & Update Editor Cliff McMurray

cliffmcmurray@hotmail.com

405-863-6173 (C)

Vice President David Sheely

david.sheely51@gmail.com

405-8321-9077 (C)

Secretary & Outreach Editor Syd Henderson

sydh@ou.edu

405-321-4027(H)

405-365-8983(C)

Treasurer Tim Scott

ctsscott@mac.com

405-740-7549(H)

NSS Headquarters

1155 15th Street NW, Suite 500 Washington DC 20005

Exec Director Kirby Ikin

nsshq@nss.org

202-429-1600

Accidents Will Happen



At 7:25 a.m. on March 4, the moon suffered its first accidental impact of a man-made object. Initially thought to be the upper stage of the SpaceX rocket that launched the Deep Space Climate Observatory in 2015, it is now thought to be the upper stage of China's Chang'e 5-T1 mission launched in 2014. Whatever it is, it hit the far side of the moon in or near Hertzprung Crater. NASA's Lunar Reconnaissance Orbiter will be looking for the crater; that could take many weeks.

Articles <https://www.space.com/rogue-rocket-stage-hit-moon-today>

<https://scitechdaily.com/space-junk-just-crashed-into-the-far-side-of-the-moon-at-5800-mp/h/>

<https://www.scientificamerican.com/article/looming-rocket-impact-forecasts-trouble-for-future-lunar-exploration/>

It's a Small World After All

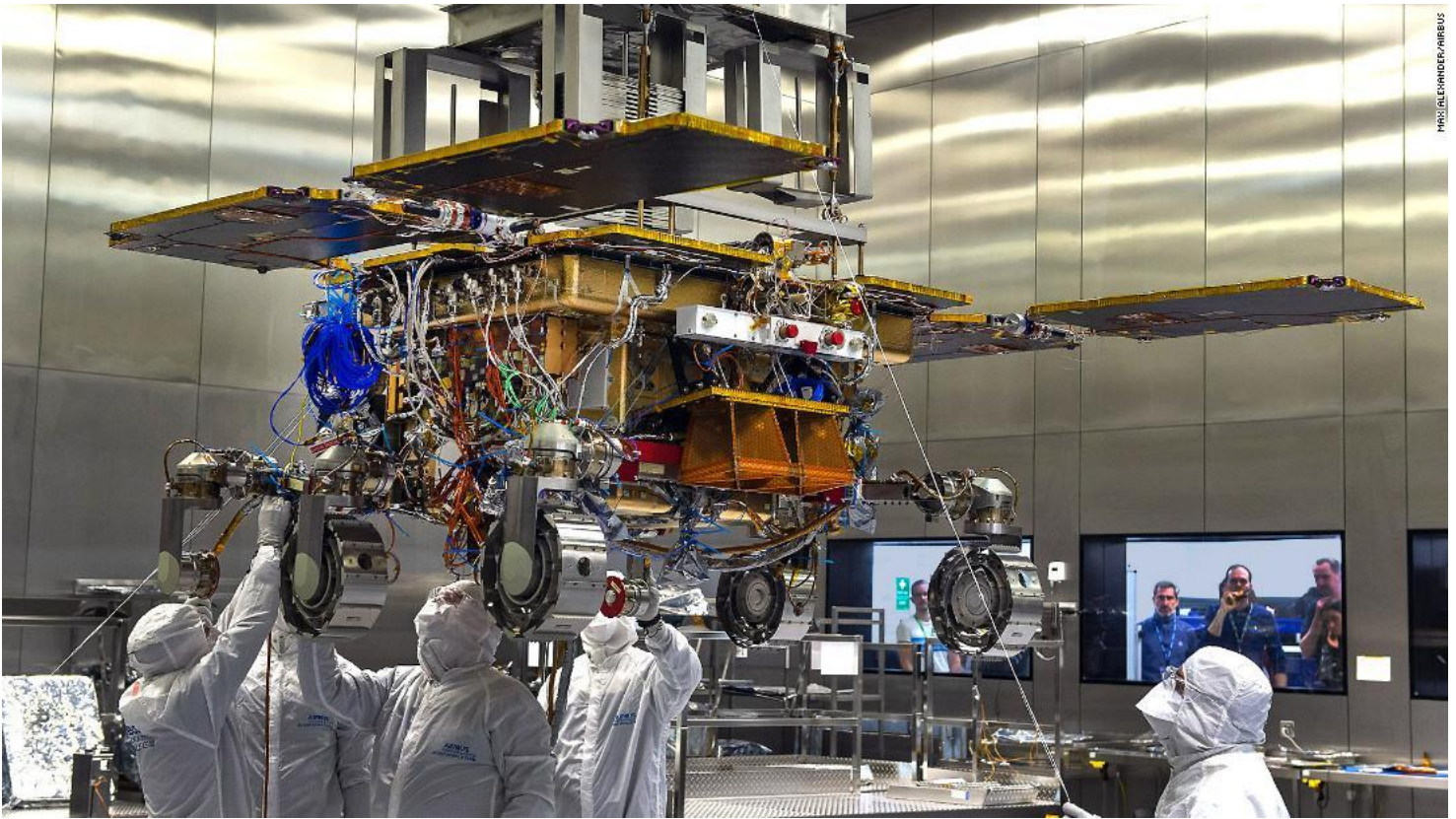


Even before Vladimir Putin announced his “special military operations” in the early morning of February 24, images taken by the remote sensing startup Capella Space led a group of independent researchers to realize the invasion of Ukraine was underway. From the beginning, the world has had an unprecedented bird’s-eye view of the war, as commercial satellites have been providing data to news media and Ukraine, as well as to the governments to whom they are contracted to give first priority.

Articles: <https://spacenews.com/satellite-imaging-companies-increase-profile-as-they-track-russias-invasion-of-ukraine/>

<https://www.arabnews.com/node/2035851/world>

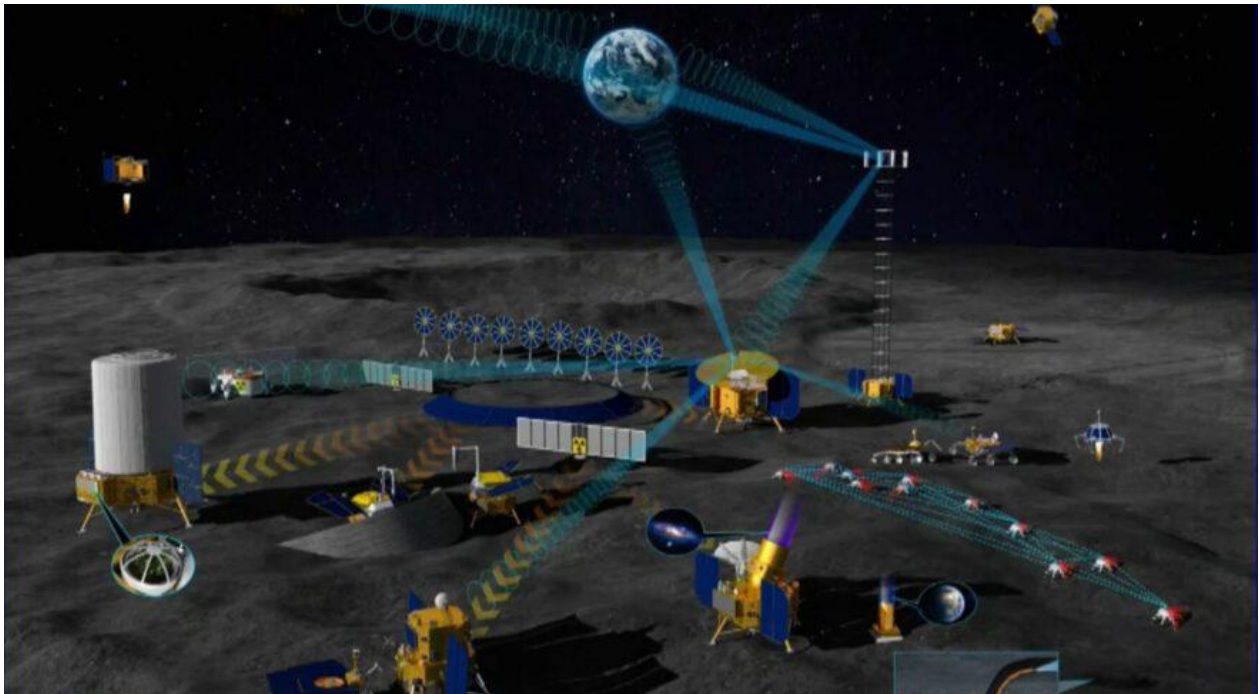
Fallout



As sanction is met with countersanction, the dominoes are falling. On February 24, President Biden announced sanctions on Russia, including high-tech exports used in its aerospace industry. On February 25, Germany's Federal Ministry of Education and Research suspended all cooperation in science and research with Russia; the next day, Germany shut off its black hole-hunting telescope eROSITA, housed on Russia's Spetr-G satellite. On February 26, Roscosmos halted cooperation with Europe on Soyuz launches from French Guiana, affecting at least 2 missions this year and 2 in 2023. On February 28, ESA announced that launch of its ExoMars lander, scheduled for September on a Russian Proton, is "very unlikely" after "fully implementing" sanctions imposed by its 22 member states. Besides the Proton, Russia had contributed a landing platform, called Kazachok. If ESA/Russia cooperation on ExoMars is permanently severed, it's hard to say how Kazachok would be replaced. On March 9, the United Kingdom banned aerospace exports to Russia. Not much left to halt...

- Articles: <https://spacenews.com/biden-sanctions-will-degrade-russian-space-program/>
<https://spacenews.com/ukraine-impact-on-u-s-russia-space-cooperation/>
<https://spacenews.com/russia-halts-soyuz-launches-from-french-guiana/>
<https://www.space.com/germany-halts-russia-black-hole-telescope-space-cooperation>
<https://www.space.com/esa-exomars-rover-unlikely-launch-2022>
<https://spacenews.com/esa-says-its-very-unlikely-exomars-will-launch-this-year/>
<https://spacenews.com/uk-bans-space-related-exports-to-russia/>

Nobody Will Play With Me Any More



With Russia now a pariah among almost all other spacefaring nations (India is keeping quiet for the moment), Putin & Co. look to China as their supplier of high-tech components such as microelectronics that they won't be getting from their old partners any time soon. But China is looking around at world reaction and playing cautiously, aware that they might trigger sanctions on themselves. Russia and China already had big plans for cooperation on a lunar base. All they need now is a third partner to complete their 21st century version of the Tripartite Pact.

Article: <https://spacenews.com/russia-looks-to-china-for-collaboration-in-space-but-faces-isolation-over-ukraine-invasion/>

Goodbye to Russian Engines



"Let them fly on something else, their broomsticks," said Roscosmos chief Dmitry Rogozin, announcing that Russia will no longer sell rocket engines to the U.S. The move came in retaliation for U.S. sanctions on Russia. It will have almost no impact on ULA, which uses the RD-180 engine on the first stage of Atlas V. That rocket is being phased out, and ULA already has 25 engines on hand in its U.S. warehouse, enough to fly out all the remaining Atlas V missions. Northrop Grumman has a bigger problem. It uses RD-181 engines for its Antares rocket to resupply ISS, and only has enough for two more missions.

Articles: <https://spacenews.com/u-s-air-force-sees-no-impact-from-russias-decision-to-cut-off-supply-of-rocket-engines/>

<https://www.space.com/russia-stops-rocket-engine-sales-space-cooperation-frays>

<https://www.theverge.com/2022/3/3/22959691/russia-roskosmos-rocket-engines-ula-northrop-grumman-rd-180-181>

<https://spacenews.com/ula-russia-sanctions-not-expected-to-disrupt-atlas-5-operations/>

Musk to the Rescue



"@ElonMusk, while you try to colonize Mars — Russia try to occupy Ukraine! While your rockets successfully land from space — Russian rockets attack Ukrainian civil people! We ask you to provide Ukraine with Starlink stations and to address sane Russians to stand," Ukraine's Vice Prime Minister Mykhailo Fedorov appealed to Musk on Twitter on February 26. "Starlink service is now active in Ukraine. More terminals en route," Musk tweeted in reply just 10 hours later. On March 5, citing Starlink jamming "near conflict areas," Elon Musk said SpaceX will be "reprioritized to cyber defense & overcoming signal jamming" at the expense of "slight delays" in Starship and Starlink V2. Space Command is impressed. And Canada's MDA Corp. announced on March 8 that it will provide satellite radar imagery to Ukraine; Ukraine had been begging for commercial remote sensing images.

Articles: <https://www.space.com/elon-musk-says-spacex-starlink-active-ukraine>

<https://spacenews.com/spacex-heeds-ukraines-starlink-sos/>

<https://spacenews.com/spacex-shifts-resources-to-cybersecurity-to-address-starlink-jamming/>

<https://spacenews.com/u-s-general-starlink-in-ukraine-showing-us-what-megaconstellations-can-do/>

<https://spacenews.com/canada-answers-ukraines-call-for-satellite-radar-imagery/>

End of the Dream



The one-of-a-kind An-225 Mriya (“Dream”) was once the largest airplane in the world. During the Cold War, it was developed to carry the Soviet space shuttle; since 2001, the Antonov Company has operated it as the largest cargo airplane in the world. When Russia invaded Ukraine, it was parked in an open-air hangar undergoing repairs at Hostomel airport, an airport located to the northwest of Kyiv. One day after the invasion started, Russian helicopters attacked the airport and destroyed another piece of the proud heritage Putin claims to be saving. Ukraine vows to rebuild it: "It is estimated that this will take more than \$3 billion and more than five years. Our task is to ensure that these costs are covered by the Russian Federation, which caused intentional damage to Ukrainian aviation and the air cargo sector." Maybe someday. Right now, Ukraine’s entire space industry is threatened with destruction. Yuzhmash and Yuzhnoye, in the city of Dnipro, build 100+ launch vehicles per year, including the Zenit rocket family and the first stage of the Northrop Grumman’s Antares rocket. Dnipro hasn’t been attacked yet, but is bracing for assault.

Articles: <https://www.space.com/buran-shuttle-carrier-plane-antonov-an-225-mriya-destroyed-russia-ukraine>
<https://jalopnik.com/footage-from-ukraine-shows-the-sole-antonov-an-225-mriy-1848616564>
<https://www.space.com/skyrora-ukraine-staff-defend-space-city-dnipro>
<https://www.space.com/ukraine-mighty-space-industry-faces-obliteration>

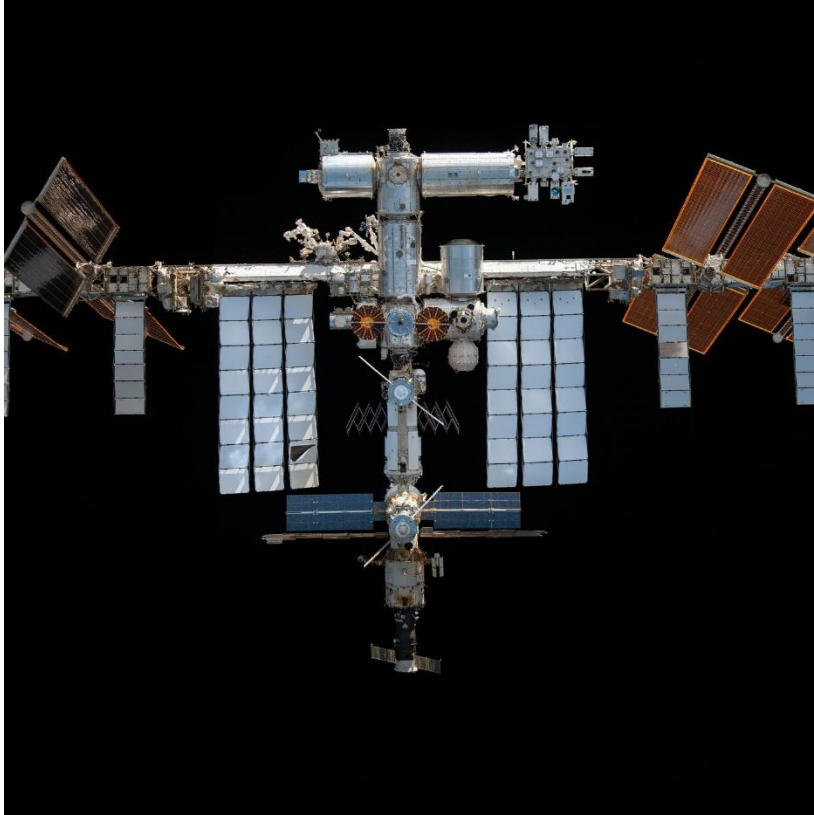
Let's Have a Twitter War, While We're at It



Roscosmos head Dmitry Rogozin and Scott Kelly, former American astronaut who flew to space twice in a Soyuz capsule, traded bitch slaps on Twitter over the Russian invasion. Another Kelly tweet, this one to Dmitry Medvedev, current deputy chairman of Russia's security council and former president and prime minister: "Mr. Medvedev, I am returning to you the Russian medal 'For Merit in Space Exploration,' which you presented to me. Please give it to a Russian mother whose son died in this unjust war. I will mail the medal to the Russian embassy in Washington. Good luck." (This was in response to Medvedev's tweet celebrating International Women's Day. All Kelly's tweets have been in Russian, which he speaks as a result of his time in Russia.).

Articles: <https://www.space.com/rogozin-roscomos-scott-kelly-twitter-russia-invasion-ukraine>
<https://www.space.com/nasa-astronaut-scott-kelly-returning-russian-medal>

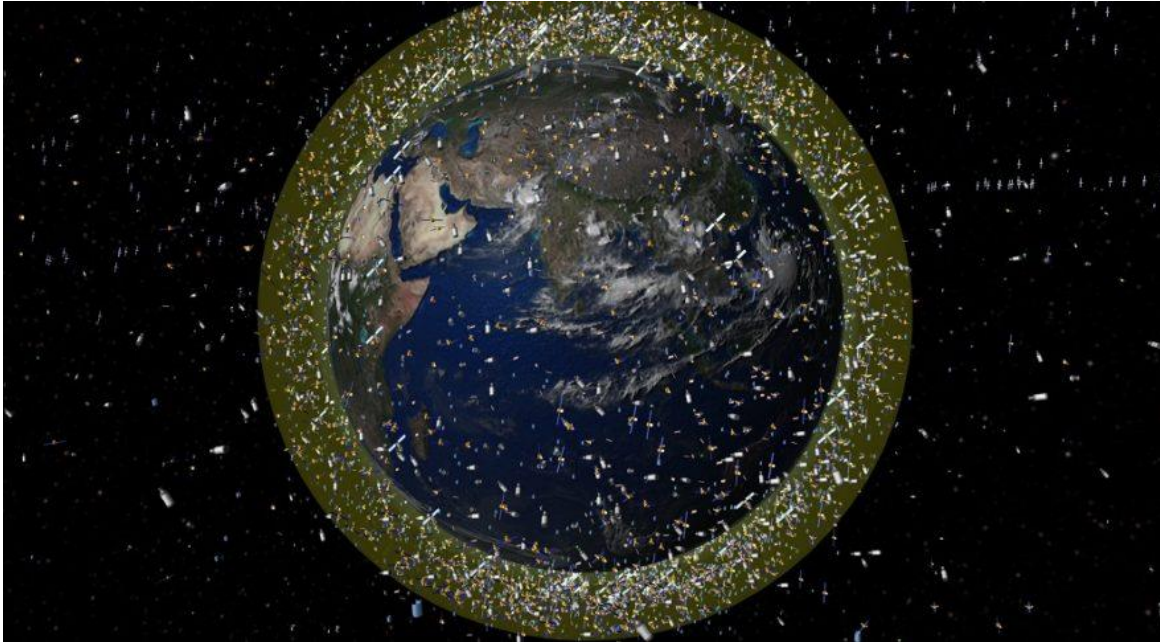
It's a Bit Tense Up There...



So far, NASA astronaut Mark Vande Hei still has a ride back to Earth. He's scheduled to return in a Soyuz capsule cosmonauts Pyotr Dubrov and Anton Shkaplerov on March 30. But the international partnership that built ISS, which has survived severe strains in the past (as when Russia took Crimea in 2014, for example), seems very close to coming apart. The two Russian cosmonauts, one European and four American astronauts on ISS must be following the news from home with some trepidation. ISS cannot survive without Russian participation, including Progress resupply and reboost flights, and the Russian modules at the core of the space station. Roscosmos chief raised the possibility of an uncontrolled ISS reentry, pointing out that ISS' orbital inclination doesn't take it over Russia. "If you block cooperation with us, who will save the ISS from an unguided deorbit to impact on the territory of the U.S. or Europe? There's also the chance of impact of the 500-ton construction in India or China."

Articles: <https://www.space.com/roscosmos-rogozin-russia-iss-space-sanctions>
<https://www.space.com/russia-ukraine-invasion-us-space-partnership-impacts>
<https://spacenews.com/ukraine-impact-on-u-s-russia-space-cooperation/>

As If They Weren't Making Enough Trouble Already



Debris from Russia's November 15 ASAT test is creating massive numbers of close approaches, sometimes as many as tens of thousands in a week, with active satellites in LEO. Space situational awareness company COMSPOC has dubbed these events "conjunction squalls." "In the first week of April, in that week alone, there will be 40,000 conjunctions that we predict purely from that one event," said Travis Langster, vice president and general manager of COMSPOC. The Cosmos 1408 debris is in an orbit at an inclination of 82.3 degrees, while many remote sensing satellites are in sun-synchronous orbits with inclinations of about 97 degrees. As the orbits precess, the debris overlaps the orbits of remote sensing satellites — but going in the opposite direction. "When they sync up, you have the perfect storm: they're in the same orbit plane but counter rotating, crossing each other twice an orbit, again and again," said Dan Oltrogge, COMSPAC's director of integrated operations and research. These squalls last for several days, until the orbits precess out of sync.

Article: <https://spacenews.com/russian-asat-debris-creating-squalls-of-close-approaches-with-satellites/>

Biting the Hand That Feeds You



Russia doesn't have a lot of commercial launch business left, and it will be hard pressed without it, but it threw away a large chunk of its remaining business last week. With a Soyuz rocket already on the launchpad with 36 OneWeb satellites and due to liftoff in a few days, on March 2 Roscosmos said the rocket would be removed from the pad unless OneWeb guaranteed its satellites would not be used for military purposes and that the British government would divest its stake in the company. "There's no negotiation on OneWeb: the UK Government is not selling its share," U.K. Business Secretary Kwasi Kwarteng tweeted his government's response within hours. OneWeb pulled its employees out of Baikonur, and the Soyuz was duly rolled back. All 13 of OneWeb's launches to date have been on Soyuz, and OneWeb planned to launch five more missions by the end of August to complete its 848 broadband satellite constellation. A sixth Soyuz mission had been planned to provide in-orbit backup capacity. Kiss all of that goodbye. OneWeb is now looking at American, European, Indian and/or Japanese rockets to launch its remaining 220 satellites. South Korea's CAS500-2 remote sensing satellite had been set to launch in the first half of this year on a Soyuz rocket out of Baikonur, and its KOMPSAT-6 multipurpose satellite would have launched in the second half of the year on an Angara rocket from Plesetsk Cosmodrome; South Korea says it's very likely that these plans are toast, as well.

Article: <https://spacenews.com/rogozin-puts-poison-pill-conditions-on-oneweb-soyuz-launch/>
<https://www.space.com/oneweb-pulls-employees-out-of-baikonur-cosmodrome-rosocosmos-demands>
<https://spacenews.com/russian-sanctions-throw-south-korean-satellite-missions-into-uncertainty/>

Space SPACS Get Hammered



“They’re getting obliterated,” Mike Collett said of the new publicly traded space companies. “I do think the market is still trying to figure out where the floor is.” Collett is the founder and managing partner of Promus Ventures. The Promus Ventures New Space Index, which includes many space companies that have gone public in the last year, was down more than 42% in the three months ending in February. In the past year, more than a dozen companies have gone public through mergers with special purpose acquisition corporations (SPACs) or have announced plans to do so. But since their IPOs, most of them have seen their share prices fall, sometimes by over 50%. Capital is still flowing into the sector, but some of the hardest hit companies may become a target for mergers and acquisitions by other emerging space companies and by large aerospace companies that want to diversify.

Articles: <https://spacenews.com/stock-market-losses-for-space-companies-not-affecting-private-investment/>

<https://spacenews.com/declining-value-of-space-spacs-could-trigger-mergers-and-acquisitions/>

First Commercial Spacewalk This Year



Barring schedule slips, the first of three Polaris Dawn missions will fly sometime in the last months of this year, and two of its crew will be the first private citizens to perform a spacewalk. It also aims to set a new manned earth orbital altitude record, and make the first test of SpaceX's Starlink satellite network for laser-based communications in space. Jared Isaacman, who paid for and commanded Inspiration4, the first private Crew Dragon mission, last year, announced on February 14 that he's partnering with SpaceX on a program of additional missions that will culminate in the first crewed flight of SpaceX's Starship. In the conference call announcing the program, Isaacman declined to discuss the financial arrangement, but said "This program has been purposefully designed to advance long-duration human spaceflight capabilities and guiding us toward the ultimate goal of facilitating Mars exploration."

Articles: <https://spacenews.com/spacex-and-isaacman-to-partner-on-series-of-crewed-dragon-and-starship-flights/>

<https://www.space.com/polaris-program-dawn-spacex-isaacman>

<https://www.space.com/spacex-polaris-dawn-private-astronauts-crew>

<https://polarisprogram.com/dawn/>

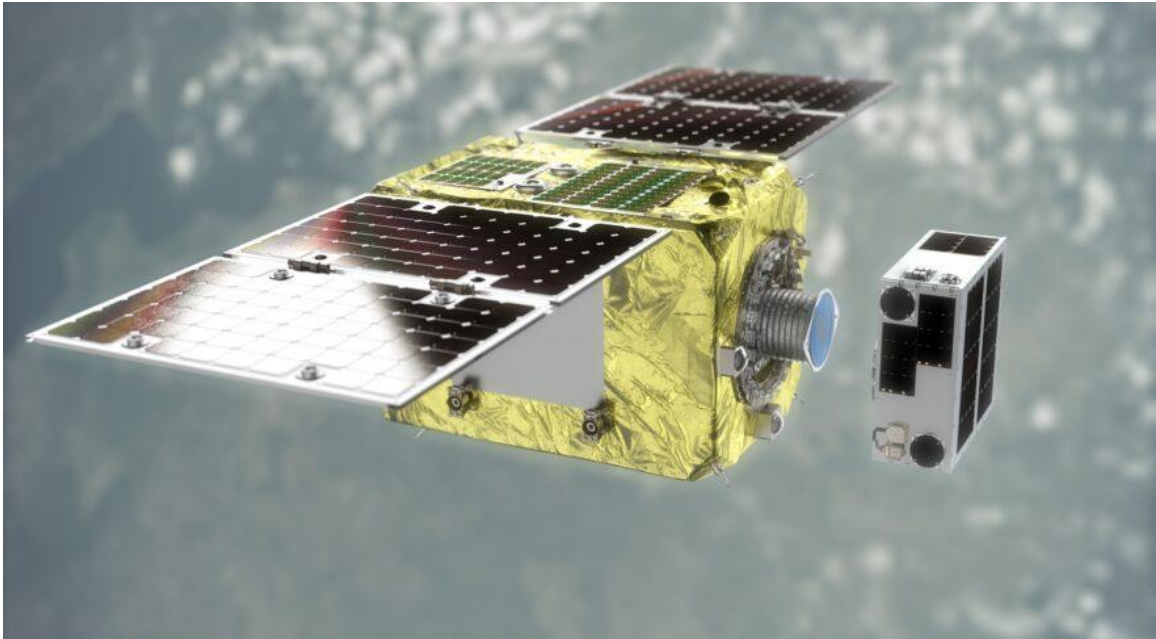
Still Waiting for Permission to Launch



The FAA was supposed to have completed its environmental assessment of SpaceX's Boca Chica launch site for orbital tests of Starship by December 31. That date was first pushed back to February 28, and a few days before that deadline the FAA announced it would be delayed again, to the end of March. If they decide that an environmental impact statement — which entails a more in-depth and time-consuming review — is needed for the activities at Starbase, the first Starship orbital test flight would likely be moved to Pad 39A at NASA's Kennedy Space Center. "We actually are approved from an environmental standpoint to launch from 39A," said Elon Musk. "So I guess our worst-case scenario is that we would, I don't know, be delayed for six to eight months to build up the Cape launch tower and launch from there."

Article: <https://www.space.com/faa-spacex-starship-review-delayed-march-28>

More Debris Removal Tests



Last year, Astroscale launched its ELSA-d mission, and in August its 175 kg servicer spacecraft successfully demonstrated magnetic grappling of the 17 kg target it had carried to orbit to simulate a piece of space debris. The next test planned to recapture the target after separating from it to a much greater distance than the August test, also demonstrating full-scale rendezvous and proximity operations for the first time. But on January 25 the control team detected an anomaly during station-keeping maneuvers, and paused the test. On February 17 they said they were preparing to resume; no further news since then. In late December China joined the club of debris removal demonstrators, using Shijian-21 to dock with the defunct Beidou-2 G2 navsat and tow it to 3,000 km above the crowded GEO belt. Shijian-21 then undocked from Beidou-2 G2 on January 26, and has since returned to GEO.

Articles: <https://spacenews.com/astrocale-pauses-debris-removal-demo-following-anomaly/>

<https://spacenews.com/astrocale-preparing-to-restart-debris-removal-demo/>

<https://spacenews.com/chinas-shijian-21-spacecraft-docked-with-and-towed-a-dead-satellite/>

<https://spacenews.com/op-ed-space-debris-management-is-even-more-urgent-than-space-traffic-management/>

First Weather-Related Flight Delay on Another Planet

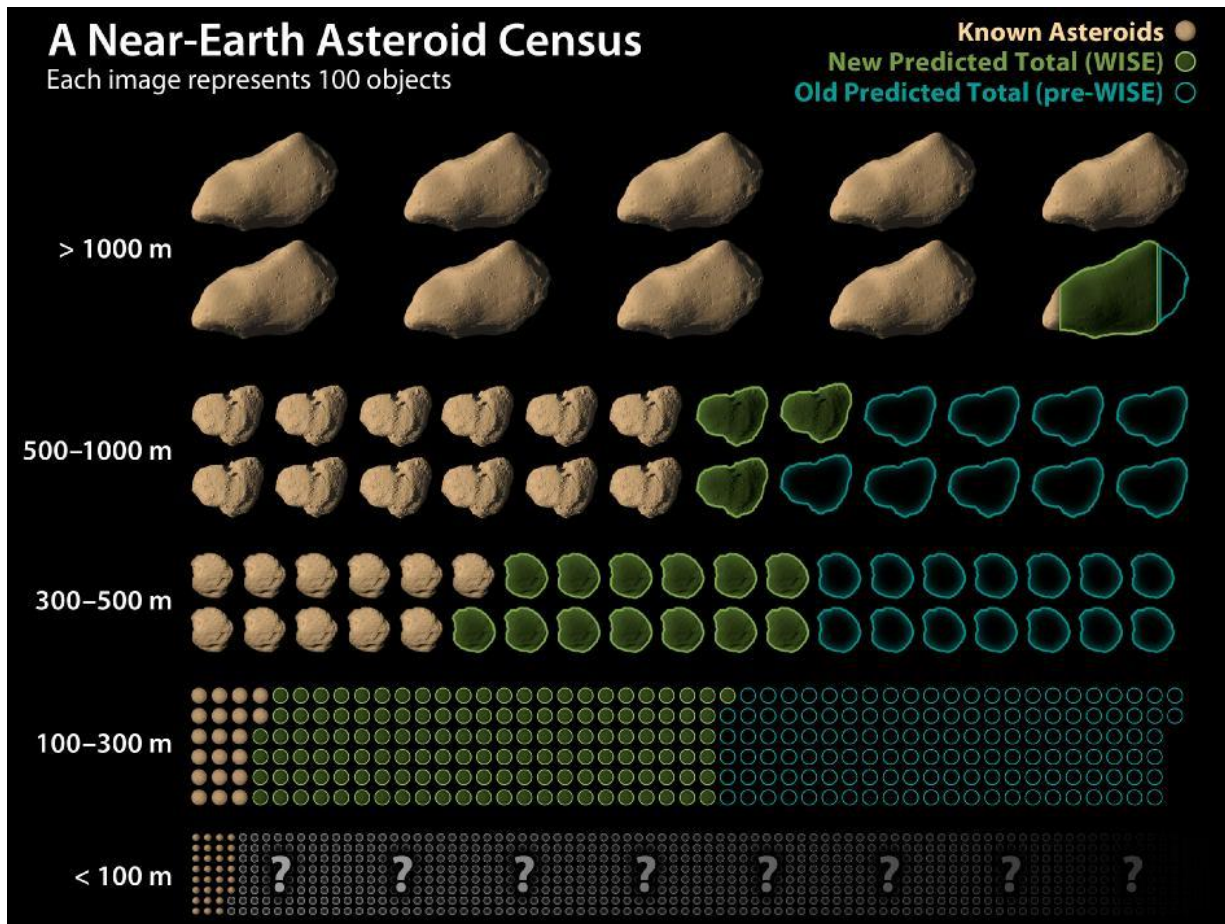


Mars helicopter Ingenuity was scheduled to make its 19th flight on January 5, but that flight was postponed due to a dust storm which blew up in the vicinity on New Years Day. The flight finally took place on February 28. As of early March, Ingenuity has completed 20 flights, for a total of 36.7 minutes aloft and a distance traveled of 4.28 km. Highest altitude reached so far is 12 m (about 39 ft.); fastest speed is 5 m/sec (11.2 mph).

Articles: <https://www.space.com/ingenuity-mars-helicopter-weather-delay-dust-storm>

Website: <https://mars.nasa.gov/technology/helicopter/#Flight-Log>

10,000 and Counting



As of February 6, NASA's near-Earth asteroid database includes 10,004 near Earth asteroids (NEOs) at least 460 ft. (140 m) wide, which are big enough to cause serious regional damage if they hit us. Asteroids more than 460 ft. across make up about a third of the NEOs scientists have spotted to date. They think this represents about 40% of near-Earth asteroids larger than 460 feet but smaller than 3,300 feet; they think they've found all of the rocks bigger than that. But this medium-size threshold is deceiving. Much smaller rocks can do a lot of damage, as the meteor that exploded over Chelyabinsk, Russia, in 2013 (likely about 56 ft., i.e. 17 m across) demonstrated. 28,266 NEOs of all sizes have been discovered as of February 14.

Articles: <https://www.space.com/planetary-defense-10000th-medium-near-earth-asteroid>

Congratulations, It's a Girl!



Elon Musk and singer Grimes (Were they ever married? He's been divorced three times.) have a new baby girl named – wait for it – Exa Dark Sideræl Musk. But (naturally) they simply call her “Y.” In addition to another child with Grimes, Musk also has five children from previous marriages and another child who died in infancy. He doesn't just make (or look at) rockets...

Articles: https://www.dailywire.com/news/elon-musk-and-singer-grimes-reveal-they-have-a-new-baby?utm_campaign=dw_newsletter&utm_medium=email&utm_source=housefile&utm_content=non_member

This Week At NASA

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

...and a Video from Jupiter

Article and video: <https://www.space.com/nasa-juno-stunning-images-jupiter-ganymede>

That's All Folks

