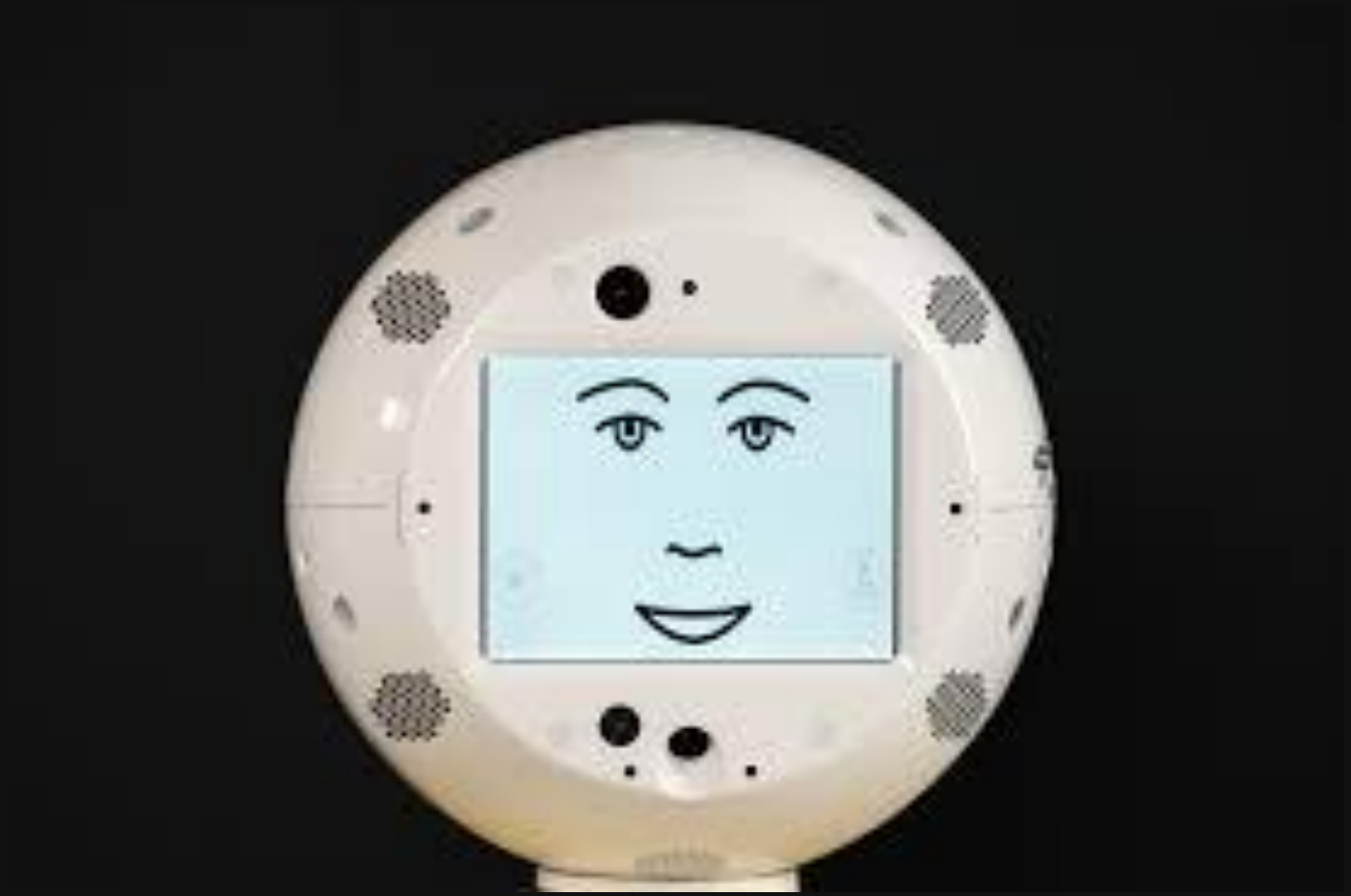
The Aerospace Update



CIMON Says…

June 29, 2018

Image Credit: IBM

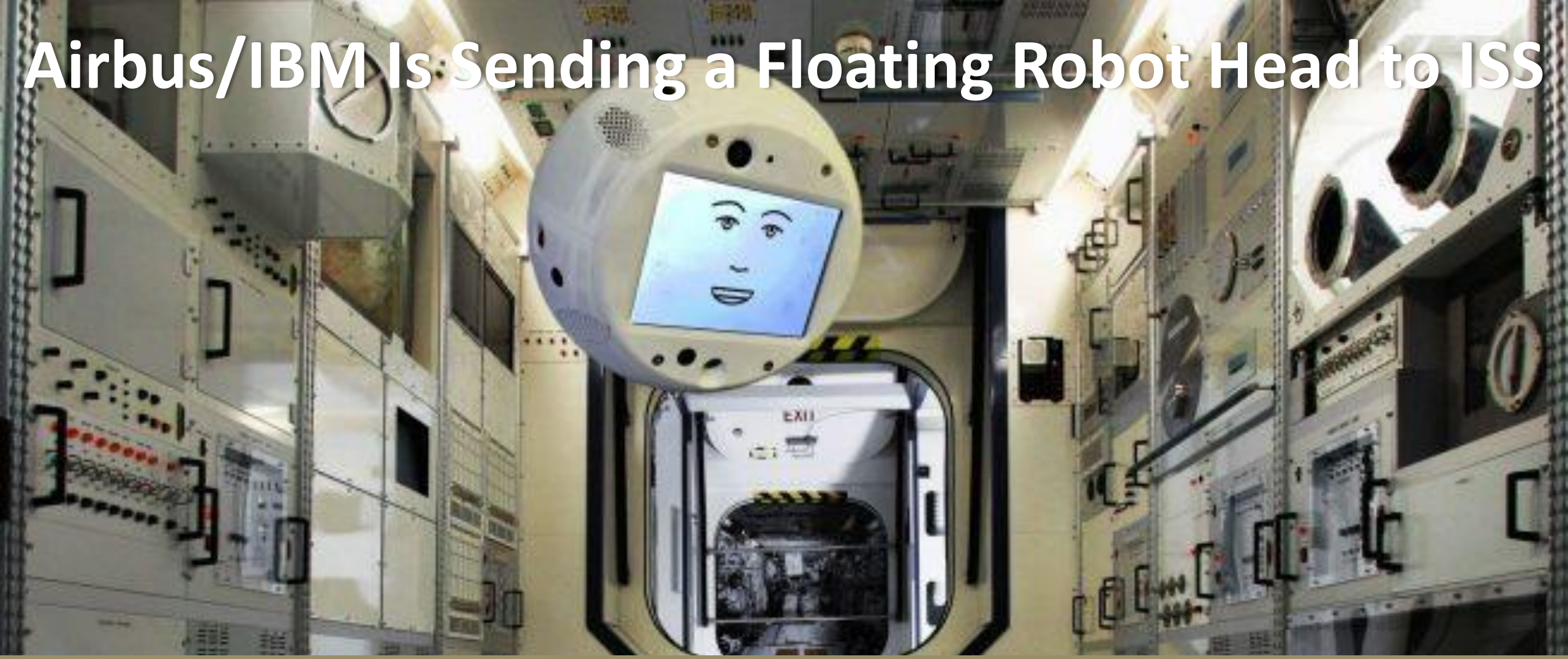
CRS-15 Launches to ISS

Video Source: NASAKennedy

A SpaceX Falcon 9 successfully launched a Dragon cargo spacecraft early Friday, June 29th on the final flight of a Block 4 version of the rocket. The launch is the last mission to use an older Block 4 version of the rocket. The first stage for this launch first flew April 18, carrying NASA's Transiting Exoplanet Survey Satellite spacecraft. SpaceX did not attempt to perform a landing of the first stage on this launch, similar to other recent launches that has used previously-flown Block 4 first stages. The Dragon spacecraft is also reused, having previously flown the ninth mission in the company's Commercial Resupply Services (CRS) contract with NASA in 2016. Dragon is carrying nearly 2,700 kilograms of cargo to the station. As is typical for such missions, the Dragon's payload is a mix of crew supplies, space station hardware and experiments.

Source: Jeff Foust @ SpaceNews.com

Airbus/IBM Is Sending a Floating Robot Head to ISS

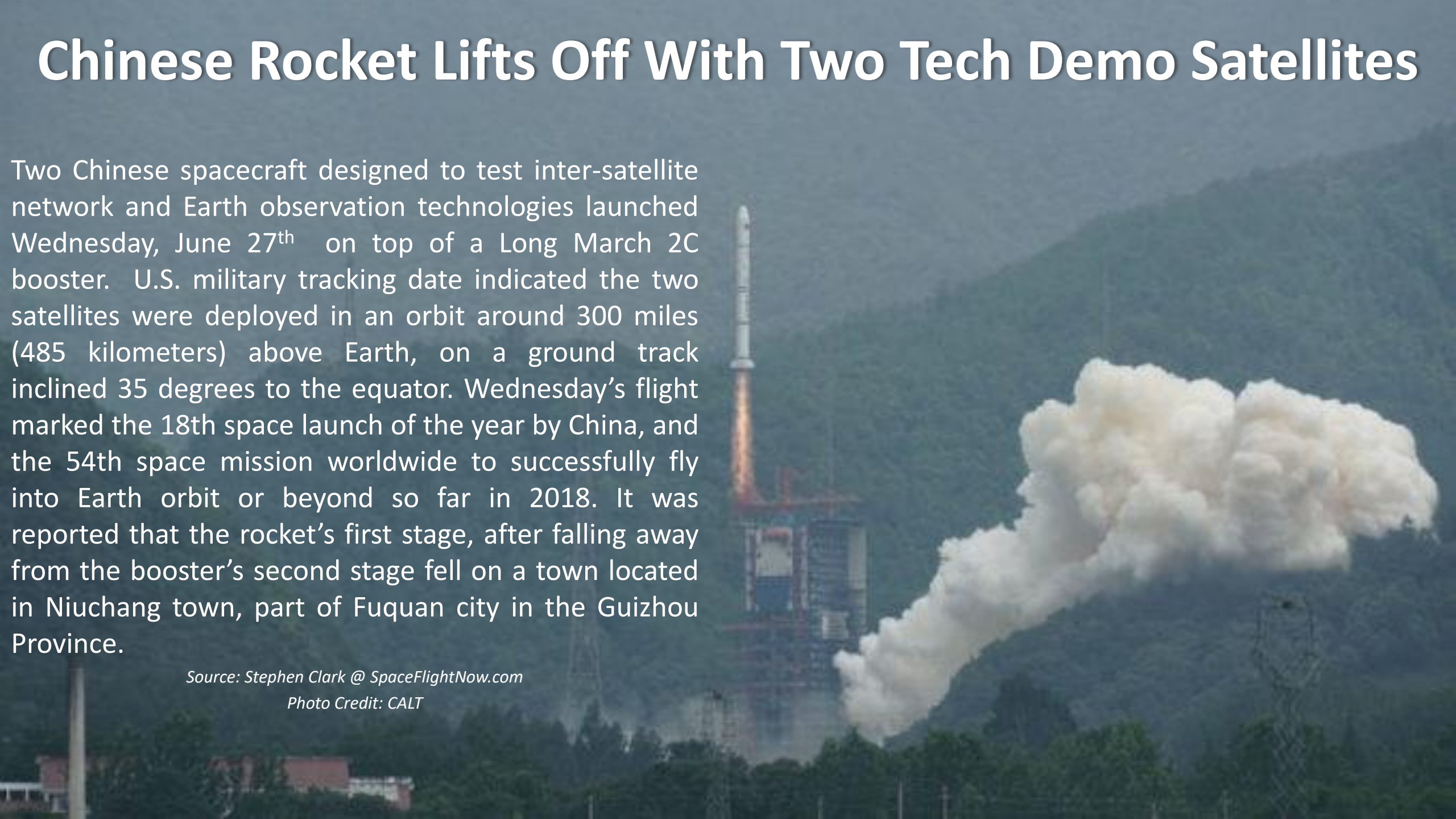


Included in the CRS-15 Payload is an Airbus and IBM developed CIMON (Crew Interactive MObile CompanioN), a floating robot the size of a medicine ball that is equipped with Watson AI technology. CIMON will use its neural AI network, combined with its face and voice recognition technology, to assist astronauts during the European Space Agency's Horizons mission between June and October 2018. The idea is that the floating robot head will not only improve the efficiency of astronauts but also reduce their stress. By acting as an early warning system in the event of technical problems, the developers hope that CIMON will also enhance safety aboard the ISS.

Source: Anthony Cuthbertson @ Newsweek.com

Photo: Airbus

Chinese Rocket Lifts Off With Two Tech Demo Satellites



Two Chinese spacecraft designed to test inter-satellite network and Earth observation technologies launched Wednesday, June 27th on top of a Long March 2C booster. U.S. military tracking date indicated the two satellites were deployed in an orbit around 300 miles (485 kilometers) above Earth, on a ground track inclined 35 degrees to the equator. Wednesday's flight marked the 18th space launch of the year by China, and the 54th space mission worldwide to successfully fly into Earth orbit or beyond so far in 2018. It was reported that the rocket's first stage, after falling away from the booster's second stage fell on a town located in Niuchang town, part of Fuquan city in the Guizhou Province.

Source: Stephen Clark @ SpaceFlightNow.com

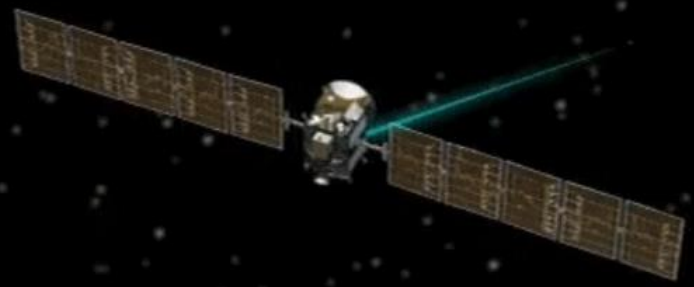
Photo Credit: CALT

Complex Organics Bubble up from Enceladus

Data from NASA's Cassini spacecraft reveal complex organic molecules originating from Saturn's icy moon Enceladus, strengthening the idea that this ocean world hosts conditions suitable for life. Research results show much larger, heavier molecules than ever before. Powerful hydrothermal vents mix up material from the moon's water-filled, porous core with water from the moon's massive subsurface ocean - and it is released into space, in the form of water vapor and ice grains. A team led by Frank Postberg and Nozair Khawaja of the University of Heidelberg, Germany, continues to examine the makeup of the ejected ice and has recently identified fragments of large, complex organic molecules. Such large molecules can be created by complex chemical processes, including those related to life, or they can come from primordial material in some meteorites. At Enceladus, it's most likely they come from hydrothermal activity driving complex chemistry in the core of the moon, Postberg said.

Source & Image Credits: Credit: NASA/JPL/Space Science Institute

Dawn's Engines Complete Firing, Science Continues



Mission controllers have turned off the industrious ion engines on NASA's Dawn spacecraft for the last time and do not expect to turn them back on again, if everything goes as planned for the rest of Dawn's mission in orbit around Ceres, the largest body in the main asteroid belt. Mission managers expect Dawn to continue gathering science data and transmitting it to Earth for another few months. Dawn turned on its innovative ion engines for the first time on Oct. 6, 2007. That technology has allowed Dawn to become the first mission to orbit two solar system destinations outside of the Earth-Moon system -- first Vesta and then Ceres - and to do groundbreaking science at these two bodies. During more than a decade in space, Dawn's ion engines have set records for total firing time of 5.87 years and total effective velocity change by a spacecraft of 25,700 mph.

Source & Annimation Credits: NASA/JPL-Caltech

Japanese Probe Reaches 'Spinning-Top' Space Rock Ryugu

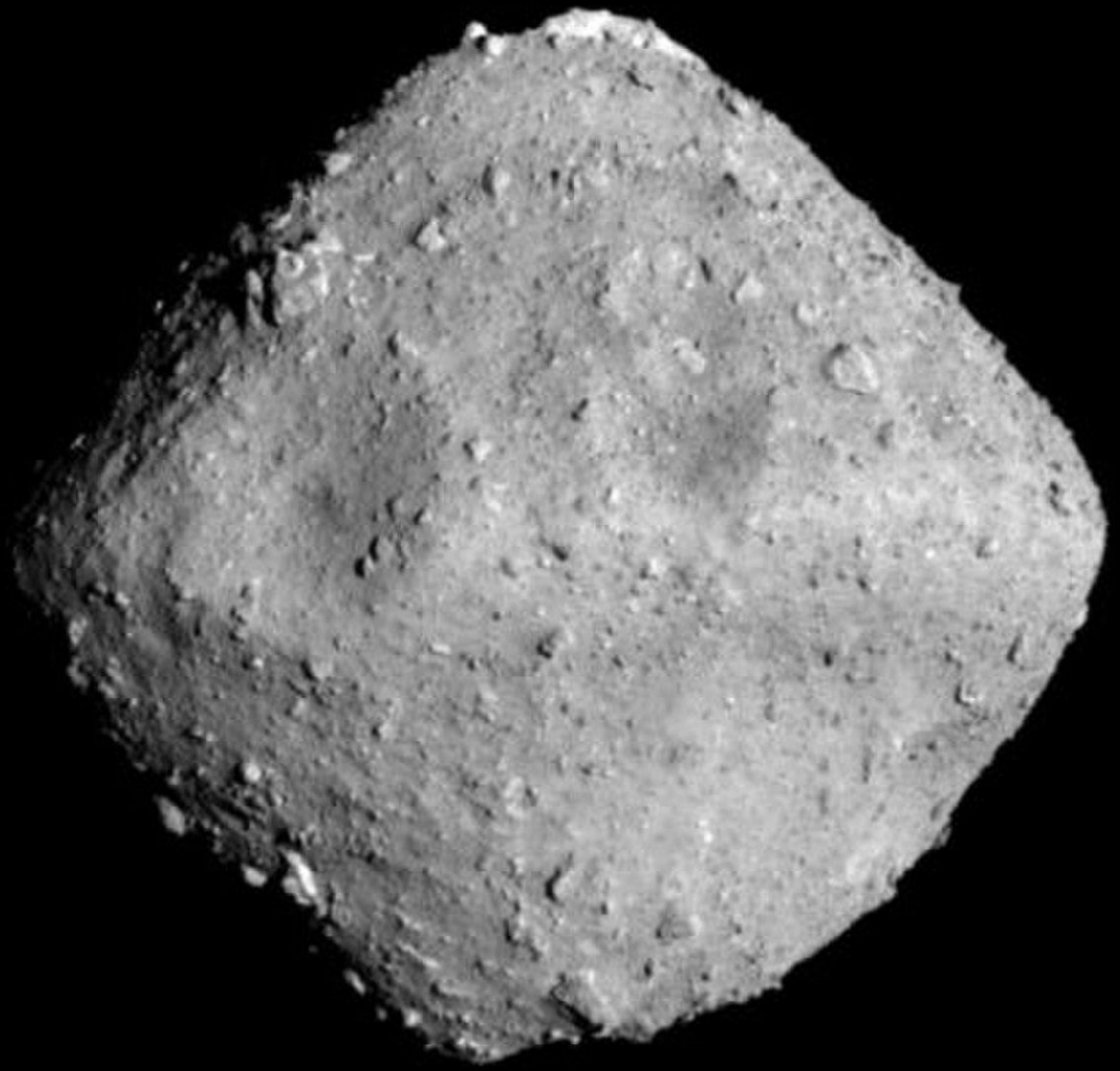


Image Credit: JAXA, University of Tokyo, Kochi University, Rikkyo University, Nagoya University, Chiba Institute of Technology, Meiji University, University of Aizu, AIST

The Japanese spacecraft Hayabusa2 has successfully rendezvoused with Ryugu, beginning an 18-month stay at the diamond-shaped asteroid. Launched by the Japan Aerospace Exploration Agency, JAXA, in 2014, the probe will poke, prod and even impact the asteroid, deploying a small lander and three rovers. It will then blast an artificial crater to analyze material below the asteroid's surface. After that, the probe will head back to Earth, arriving near the end of 2020 with samples in tow. This image of asteroid Ryugu was taken June 26, 2018, by the probe's optical navigation camera, just a day before the probe's rendezvous with the space rock. The image was taken at about 14 miles (22 km) away from the asteroid.

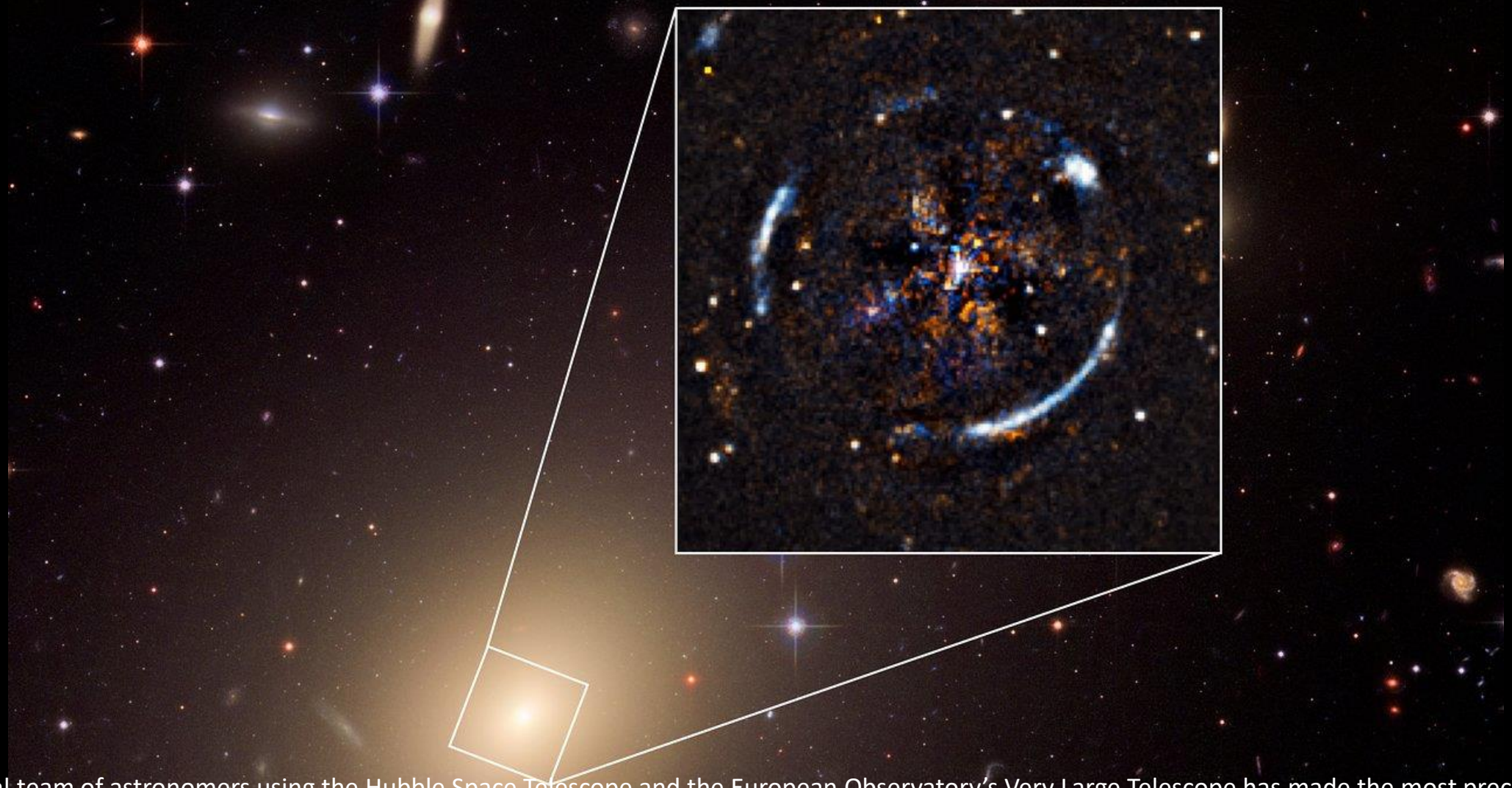
Source: Sarah Lewin & Space.com

Solar System's First Known Interstellar Object Got Unexpected Speed Boost

Using observations from NASA's Hubble Space Telescope and ground-based observatories, an international team of scientists have confirmed 'Oumuamua (oh-MOO-ah-MOO-ah), the first known interstellar object to travel through our solar system, got an unexpected boost in speed and shift in trajectory as it passed through the inner solar system last year. Analyzing the trajectory of the interstellar visitor, co-author Davide Farnocchia of the Center for Near Earth Object Studies (CNEOS) at NASA's Jet Propulsion Laboratory (JPL) found that the speed boost was consistent with the behavior of a comet. "This additional subtle force on 'Oumuamua likely is caused by jets of gaseous material expelled from its surface," said Farnocchia. "This same kind of outgassing affects the motion of many comets in our solar system." Comets normally eject large amounts of dust and gas when warmed by the Sun. But according to team scientist Olivier Hainaut of the European Southern Observatory, "there were no visible signs of outgassing from 'Oumuamua, so these forces were not expected."

Source & Image Credits: NASA/ESA/STScI

Hubble Proves Einstein Correct on Galactic Scales



An international team of astronomers using the Hubble Space Telescope and the European Observatory's Very Large Telescope has made the most precise test of general relativity yet outside our Milky Way. The nearby galaxy ESO 325-G004 acts as a strong gravitational lens, distorting light from a distant galaxy behind it to create an Einstein ring around its center. By comparing the mass of ESA 325-G004 with the curvature of space around it, the astronomers found that gravity on these astronomical length-scales behaves as predicted by general relativity. This rules out some alternative theories of gravity.

Source: www.spacetelescope.org

Image Credit: NASA/ ESA/Hubble Images and Videos

Russia’s Proton Rocket Will Finally Stop Flying

The Russian manufactured Proton rocket has been flying into space since before humans landed on the Moon. First launched in 1965, the rocket was initially conceived of as a booster to fly two-person crews around the Moon, as the Soviet Union sought to beat NASA into deep space. Indeed, some of its earliest missions launched creatures, including two turtles, to the Moon and back. But now, Russian officials confirm, the Proton rocket will finally reach its end. In an interview with a Russian publication, Roscosmos head Dimitry Rogozin said that production of the Proton booster will cease as production shifts to the new Angara booster.

Source: Eric Berger @ arstechnica.com
Photo Credit: NASA/ESA

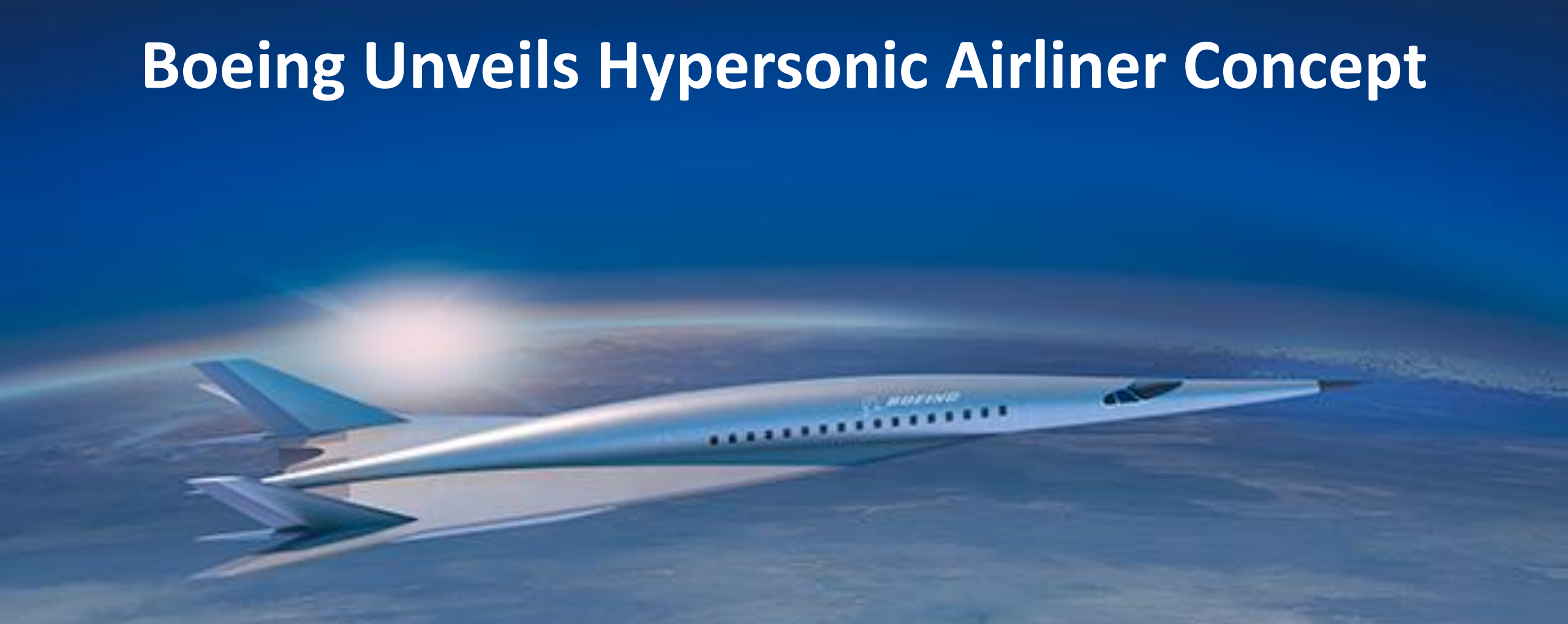
Virgin Orbit Gears Up for Captive Carry Test Flight

Virgin Orbit is planning a key test of its LauncherOne system as soon as next week, a final step before the vehicle's first launch later this summer. In a speech at the NewSpace 2018 Conference here June 27, Stephen Eisele, vice president of business development of Virgin Orbit, said that company was gearing up for a "captive carry" test of its air-launch rocket, flown on a customized Boeing 747. That flight, he said, will gather "flutter and aerodynamics testing" data. "The next test after that is the first orbital flight." The flight will take place from the Mojave Air and Space Port in California. LauncherOne is designed for small payloads, with a capacity of 300 kilograms to a 500-kilometer sun-synchronous orbit.

Source: Jeff Foust @ SpaceNews.com

Photo Credit: Virgin Orbit

Boeing Unveils Hypersonic Airliner Concept



Boeing Commercial Airplanes (BCA) has joined with hypersonic specialists at the company's Research & Technology unit to study a Mach 5 passenger transport capable of crossing the Atlantic in 2 hr. or the Pacific in 3. Although not yet defined, the concept is provisionally aimed at a passenger capacity larger than long-range business jets, but smaller than Boeing's 737, with potential entry into service from the late 2030s onward. Flying at Mach 5, and with a projected cruise altitude of 95,000 ft., the vehicle would travel at more than 2.5 times the speed and 30,000 ft. higher than the supersonic Anglo-French Concorde, which was retired in 2003. According to Boeing, the additional speed would enable same-day return flights even across the Pacific and provide airlines with increased asset utilization.

Source: Guy Norris @ Aviation Week & Space Technology

Image Credit: Boeing

Operators Exploit New Boeing 737 Range As MAX Deliveries Accelerate

With about 140 Boeing 737-8/-9s delivered to almost 30 operators since its commercial debut 13 months ago, the 737 MAX is quickly setting an industry record for the fastest introduction ever of a new jet transport. When the first anniversary passed in late May, the fleet—which then numbered 130 aircraft—had already attained a dispatch reliability rate of 99.4%. Now in operation with 28 airlines, the MAX is used on a wider variety of routes than any previous member of the 737 family. This is largely because operators such as Lion Air and Norwegian are taking advantage of its 20% fuel-burn and 500-nm-range improvement over the 737NG, particularly on longer routes not possible with the earlier generation. Yet, even though Boeing touted the extra range and endurance as a key selling point of the MAX, the manufacturer appears to have been taken aback by the speed with which some of the operators have pushed the 737-8, in particular, into service on extended missions.

Source: Guy Norris, Sean Broderick, Helen Massy-Beresford and Jens Flottau @ Aviation Week & Space Technology

Photo Credit: Boeing

Korea Opts For Boeing P-8A Poseidon MPA

The Republic of Korea (ROK) will acquire Boeing P-8A Poseidon maritime patrol aircraft, the country's Defense Acquisition Program Administration (DAPA) announced on June 25. The aircraft will be procured via the U.S. Foreign Military Sales (FMS) procedure. DAPA said that the P-8A was selected after a "comprehensive review of legal aspects, cost, schedule, and performance." However, there was no open evaluation of alternative MPAs such as the Saab Swordfish or the Airbus C295 ASW. The ROK said in February that it was seeking new MPAs to better counter North Korea's ballistic missile submarines. The P-8As will replace 16 Lockheed P-3C/CK Orions. This deal will make Korea the third Asia-Pacific nation to fly the P-8A after Australia and India. New Zealand is on the verge of deciding to buy four P-8A Poseidons worth around $1.4 billion to replace six P-3K2s that have been flying since the 1960s.

Source: Chen Chuanren @ AINonline.com

Photo: Boeing

Airbus Rolls Out BelugaXL Cargo Jet

The first Airbus BelugaXL has a unique paint job to honor the whale for which the oversized cargo jet is named. Airbus rolled the freshly painted jet out of the paint shop in Toulouse Thursday with a special livery that makes it look like a smiling Beluga whale. The jet is the first of five Beluga XL aircraft component transporters. They're based on the A330-200 Freighter, with a large re-use of components and equipment and an expanded fuselage for flying large aircraft parts between Airbus' European suppliers and assembly sites.

Source: Andrew McIntosh @ Puget Sound Business Journal

Photo: Airbus

In The News

U.S. Air Force Certifies Falcon Heavy Rocket, Awards Launch Contract. The successful maiden flight of SpaceX's Falcon Heavy rocket in February was enough for the U.S. Air Force to certify the huge booster to carry the military's most precious cargo into orbit, beginning with the mid-2020 launch of a classified payload under a $130 million contract awarded last week. The mission is scheduled to lift off from pad 39A at NASA's Kennedy Space Center in Florida before the end of September 2020, according to the Air Force. *(Stephen Clark @ SpaceFlightNow.com)*

JWST Suffers Another Launch Delay. NASA announced yet another launch delay for the James Webb Space Telescope June 27, pushing the flagship observatory's launch to no earlier than late March 2021 while breaking a cost cap set by Congress. NASA said it was now aiming for a launch of the telescope on March 30, 2021, nearly a year later than the May 2020 date that the agency announced three months earlier. *(Jeff Foust @ SpaceNews.com)*

Boeing Gets a Jump on Air Show With Two Big Jet Deals. Boeing isn't waiting for next month's Farnborough Air Show to unveil blockbuster aircraft deals. In two deals worth $14.4 billion at list prices, Jet Airways India announced it was purchasing 75 of Boeing's 737 MAX single-aisle planes, and Vietnamese startup Bamboo Airways signed a commitment for 20 of Boeing's twin-aisle 787-9 Dreamliner's. *(Anurag Kotoky @ seattletimes.com)*

Turkey Set to Receive Its First F-35 Fighter Jets. Despite opposition from Congress, Turkey will receive its first F-35 Joint Strike Fighter jets from the Pentagon's top weapons supplies on June 21. Following a formal hand off ceremony at Lockheed Martin's F-35 facility in Fort Worth, Texas, the defense giant will ferry the aircraft to Luke Air Force Base in Arizona where the Turkish pilots will begin training alongside U.S. airmen. The two fifth-generation jets are the first of what the NATO member and F-35 program hopes will be the start of a 100-strong fleet. *(Natasha Turak @ cnbc.com)*

Lockheed Martin Secures $1.2 Billion Contract to Sell New F-16 Fighter Jets. Lockheed Martin received a $1.2 billion contract from the U.S. government, the company announced on Monday, which will lead to the direct creation of hundreds of U.S. based jobs. The contract is for 16 new F-16 Block 70 aircraft, which will be delivered to the Kingdom of Bahrain, for use in its air force. The Arab country located in the Persian Gulf will be the first to acquire the F-16 Block 70 fighter jet, the newest and most advanced model in the F-16 family. *(Brittany Da Lea @ foxbusiness.com)*