

# The Aerospace Update

A vibrant astronomical image showing a dense cluster of stars in various colors (yellow, orange, red, blue) set against a dark background. Several large, wispy nebulae in shades of blue and purple are visible, framing the central star cluster. The overall scene is a rich field of celestial objects.

Burst of Celestial Fireworks

July 5, 2018

Image Credit: NASA, ESA, et al.:



# Burst of Celestial Fireworks



Like a July 4 fireworks display, a young, glittering collection of stars resembles an aerial burst. The cluster is surrounded by clouds of interstellar gas and dust - the raw material for new star formation. The nebula, located 20,000 light-years away in the constellation Carina, contains a central cluster of huge, hot stars, called NGC 3603. NGC 3603 contains some of the most massive stars known. These huge stars live fast and die young, burning through their hydrogen fuel quickly and ultimately ending their lives in supernova explosions. This Hubble Space Telescope image was captured in August 2009 and December 2009 with the Wide Field Camera 3 in both visible and infrared light, which trace the glow of sulfur, hydrogen, and iron.

*Credits: NASA, ESA, R. O'Connell (University of Virginia), F. Paresce (National Institute for Astrophysics, Bologna, Italy), E. Young (Universities Space Research Association/Ames Research Center), the WFC3 Science Oversight Committee, and the Hubble Heritage Team (STScI/AURA)*



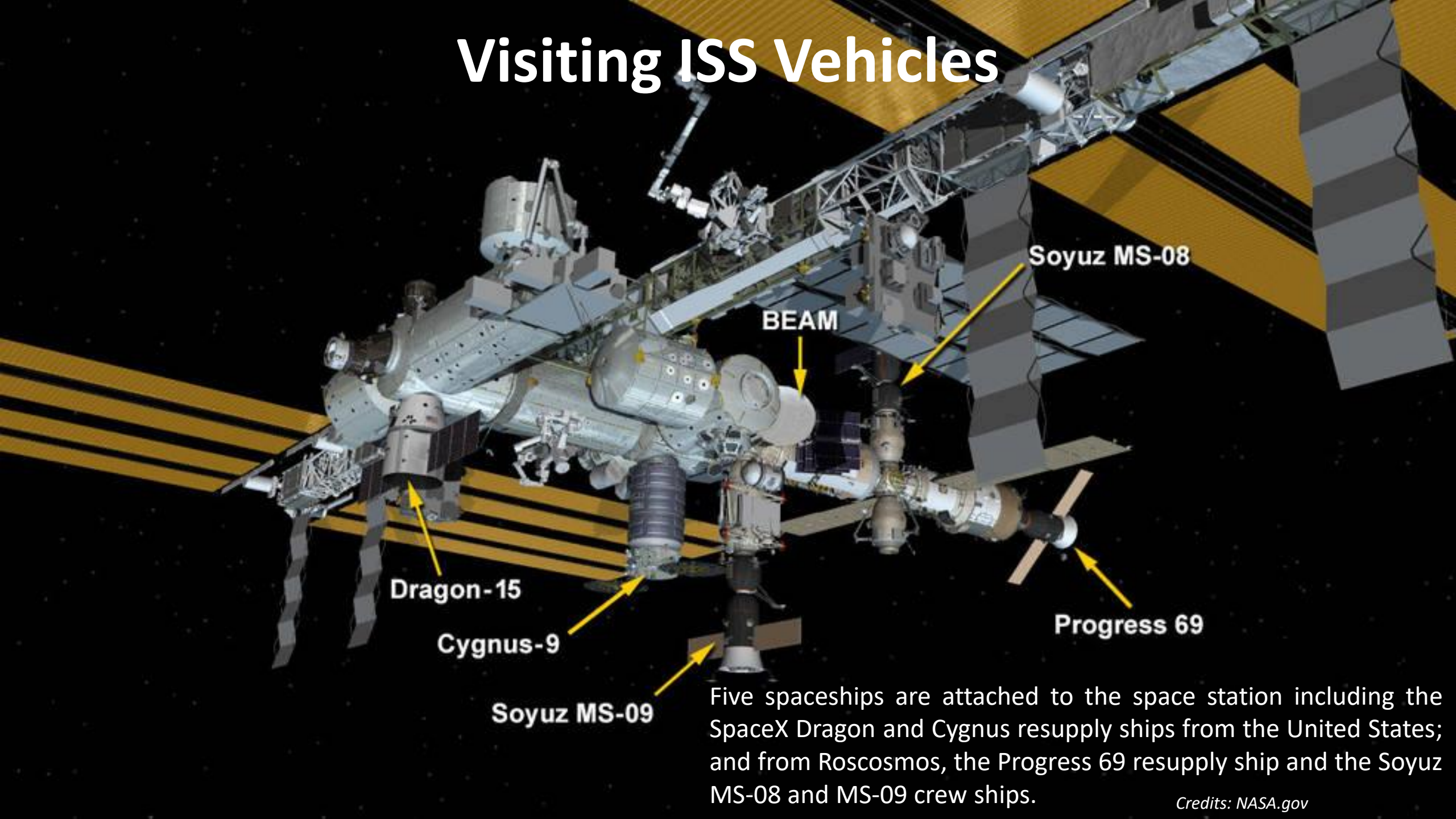
# CRS-15 Dragon Brings Science Experiments, Artificial Intelligence to ISS



SpaceX's CRS-15 Dragon cargo resupply ship rendezvoused and berthed with the ISS in the early-morning hours of July 2<sup>nd</sup>, and is expected to remain berthed for about a month. The vehicle contains some 5,900 pounds (2,700 kilograms) of cargo. Inside Dragon's pressurized capsule, this includes 452 pounds (205 kilograms) of crew supplies, 2,718 pounds (1,233 kilograms) of science investigations, 139 pounds (63 kilograms) of spacewalking equipment, 392 pounds (178 kilograms) of vehicle hardware, 46 pounds (21 kilograms) of computer resources, and 27 pounds (12 kilograms) of Russian hardware. The unpressurized trunk contains the 1,213-pound (550-kilogram) Earth science instrument called the ECOSystem Spaceborne Thermal Radiometer Experiment on Space Station (ECOSTRESS), and a 959-pound (435-kilogram) latching end effector in the event a spare is needed for Canadarm2.



# Visiting ISS Vehicles



Dragon-15

Cygnus-9

Soyuz MS-09

BEAM

Soyuz MS-08

Progress 69

Five spaceships are attached to the space station including the SpaceX Dragon and Cygnus resupply ships from the United States; and from Roscosmos, the Progress 69 resupply ship and the Soyuz MS-08 and MS-09 crew ships.

# Private Japanese Rocket Crashes to Earth in Fiery Launch Failure

Live Leak




A private Japanese rocket crashed to Earth in a fiery explosion on Saturday (June 30) just moments after lifting off from a test site near the town of Taiki on Japan's northern island of Hokkaido. This was the second failed launch attempt for the startup Interstellar Technologies, which became the first Japanese company to launch a privately funded space rocket 11 months ago, on July 30, 2017. Its first rocket, Momo-1, crashed into the ocean after losing contact with flight controllers about 70 seconds after liftoff. Its second mission, Momo-2, went out with more of a bang. After lifting off at 5:30 a.m. local time on June 30 (8:30 p.m. GMT on June 29), the uncrewed rocket had barely left the launchpad before it lost its upward thrust and succumbed to gravity, smashing back down onto the launchpad after less than 10 seconds of flight.

*Video Source: The Space Program*

*Source: Hanneke Weitering @ Space.com*



# Historic Photo Is 1st View of Alien World Being Born

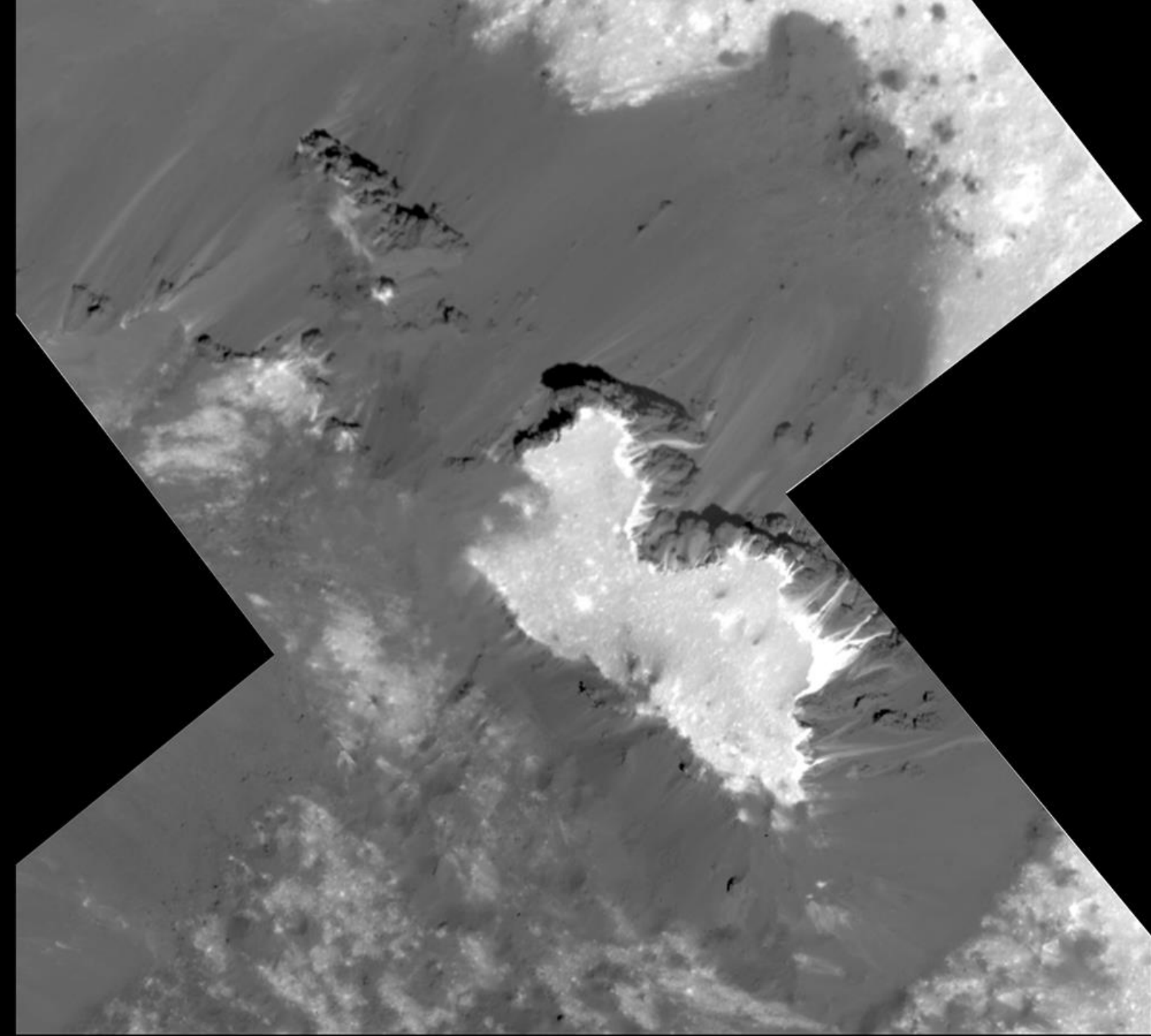


This photo from the SPHERE instrument on the European Southern Observatory's Very Large Telescope is the first clear image of a planet caught in the act of formation, around the dwarf star PDS 70. The planet is clearly visible as a bright point to the right of center, which is blacked out by the coronagraph mask used to block the blinding light of the star. SPHERE features a coronagraph, which blocks out the blinding light of a star, allowing dim orbiting planets to be resolved. (The Gemini instrument, the Near-Infrared Coronagraphic Imager, has one as well.) The researchers' analyses suggest that alien planet now known as PDS 70b is two to three times bigger than Jupiter and lies about 1.9 billion miles (3 billion kilometers) from its star — about as far as Uranus is from the sun.

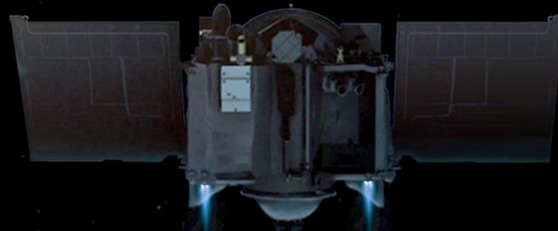
# Dawn's Latest Orbit Reveals Dramatic New Views of Occator Crater

NASA's Dawn spacecraft reached its lowest-ever and final orbit around dwarf planet Ceres on June 6 and has been returning thousands of stunning images and other data. This mosaic of a prominent mound located on the western side of Cerealia Facula was obtained by Dawn spacecraft on June 22<sup>nd</sup> from an altitude of about 21 miles (34 kilometers).

*Source & Image Credits: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA*



# Successful Second Deep Space Maneuver for OSIRIS-REx Confirmed



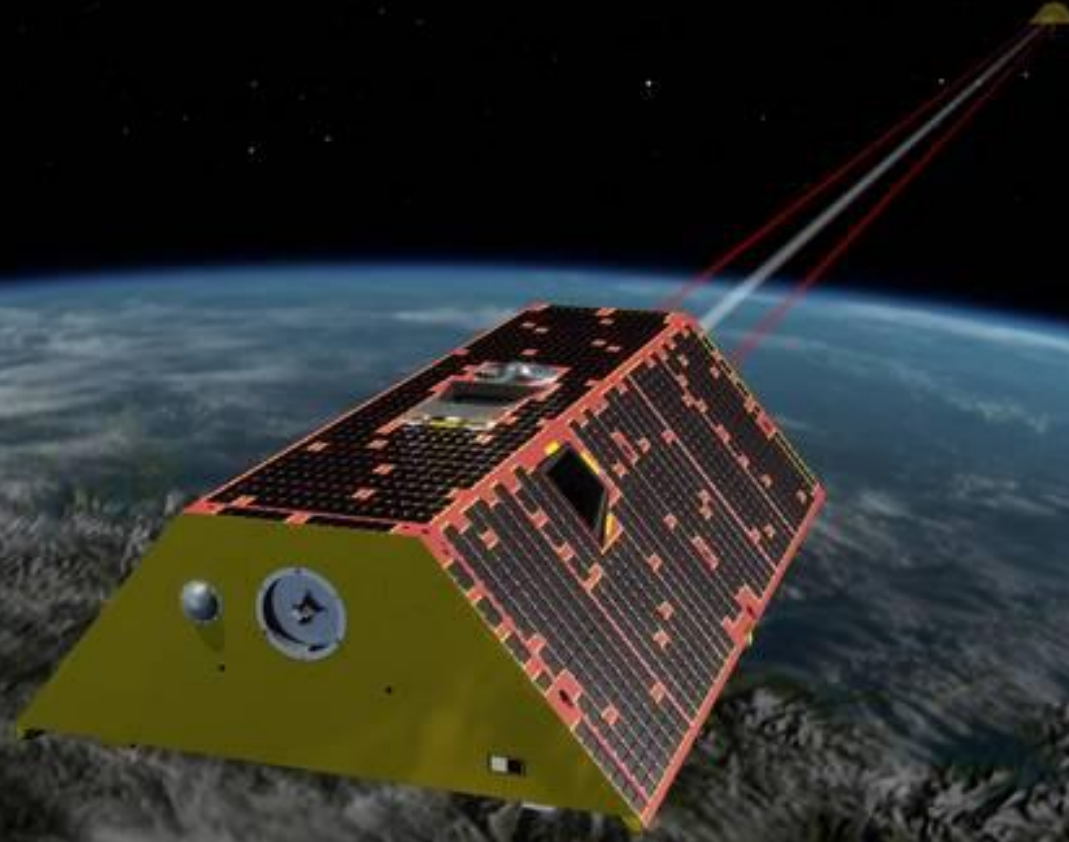
New tracking data confirms that NASA's OSIRIS-REx spacecraft successfully completed its second Deep Space Maneuver (DSM-2) on June 28. The thruster burn put the spacecraft on course for a series of asteroid approach maneuvers to be executed this fall that will culminate with the spacecraft's scheduled arrival at asteroid Bennu on Dec. 3. The DSM-2 burn, which employed the spacecraft's Trajectory Correction Maneuver (TCM) thruster set, resulted in a 37 miles per hour (16.7 meters per second) change in the vehicle's velocity and consumed 28.2 pounds (12.8 kilograms) of fuel.

*Source: NASA's Goddard Space Flight Center*

*Image Credit: University of Arizona*



# First Laser Light for GRACE Follow-On

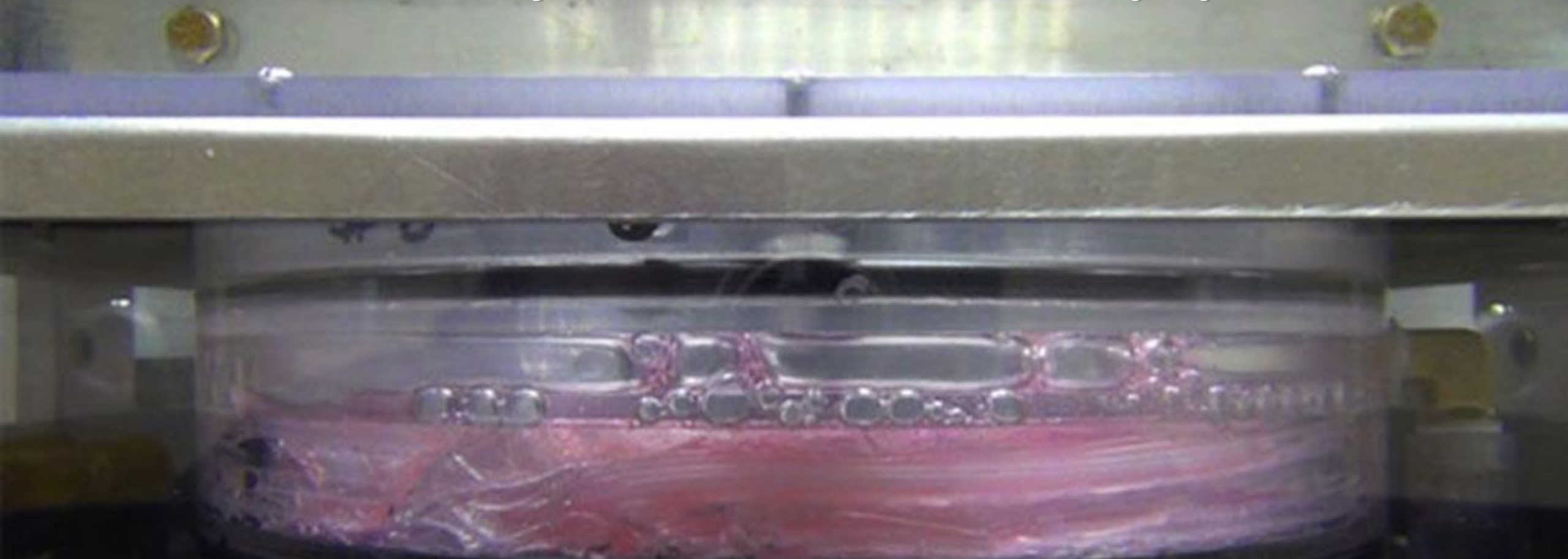


The laser ranging interferometer (LRI) instrument has been successfully switched on aboard the recently launched twin U.S./German Gravity Recovery and Climate Experiment Follow-On (GRACE-FO) satellites. The LRI, which is being flown as a technology demonstration, has made its first measurements in parallel with GRACE-FO's main microwave ranging instrument, and initial comparisons of the data from the two types of instruments show that they agree as expected.

*Source & image Credits: NASA/JPL-Caltech*



# NASA Seeks New Ways to Handle Trash for Deep Space Missions



When trash accumulates on the ISS, astronauts manually squeeze it into trash bags, temporarily storing almost two metric tons of it for relatively short durations, and then send it away in a departing commercial supply vehicle, which either returns it to Earth or incinerates it during reentry through the atmosphere. Future spacecraft, much farther from Earth, likely will not have the regular cadence of visiting commercial ships that can remove trash, so NASA is turning to U.S. industry to advance concepts for trash compaction and processing systems. The agency has issued a call for prototypes, and eventually, flight demonstrations to fly on the space station.



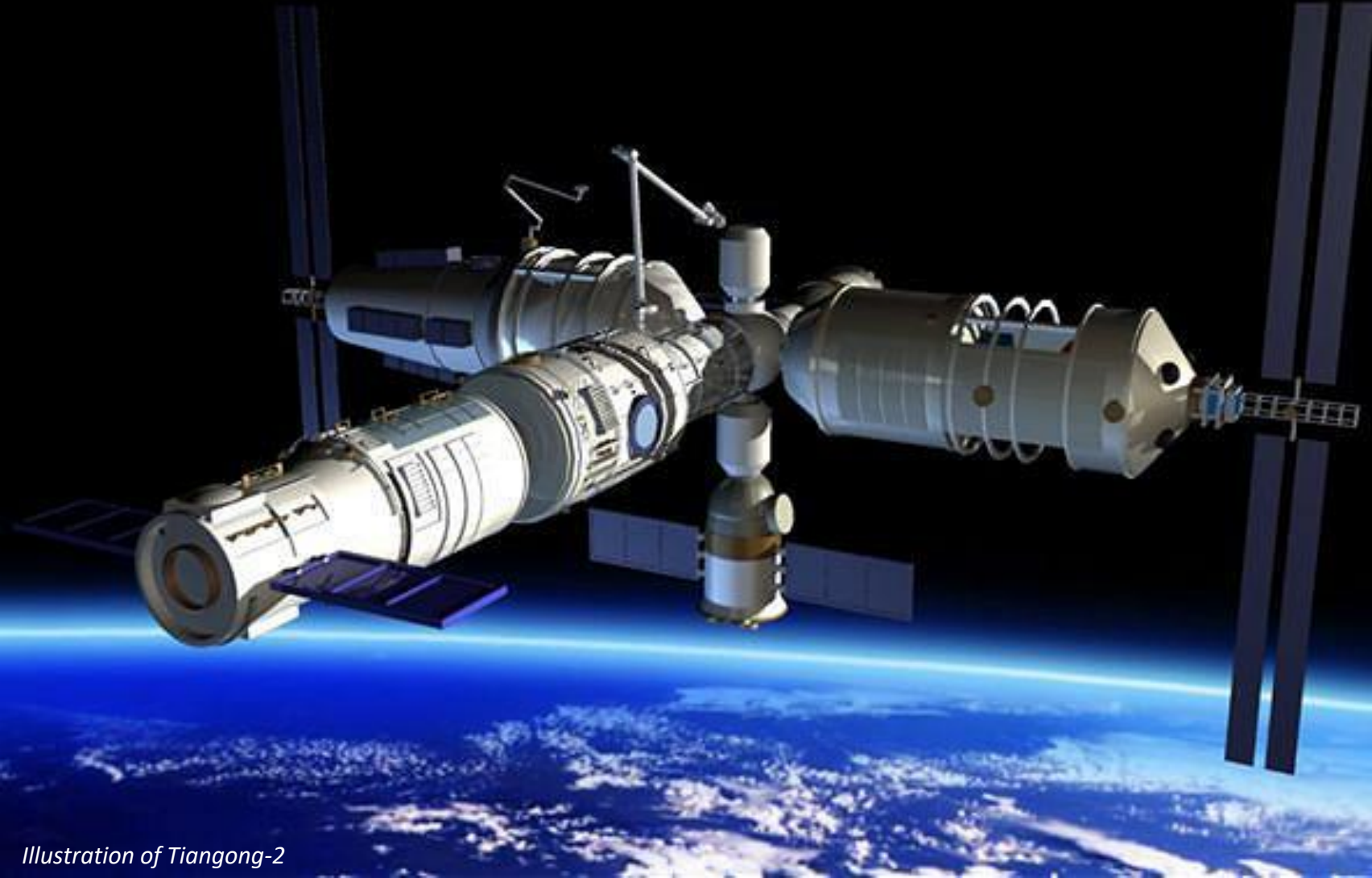
# Russia, China Consider Joint Space Station

Russia's Roscosmos space corporation and its Chinese counterparts signed a number of agreements on space cooperation last month during a summit between Presidents Putin and Xi. The agreements followed a deal signed in March on Russian-Chinese cooperation in the exploration of the moon and outer space, and the creation of joint orbital groups. A delegation from China's National Space Administration is set to hold talks with Roscosmos on the possibility of creating a jointly-run orbital station, Sputnik has learned from a source in the space and rocketry industry.

*Source: SputnikNews.com*

&

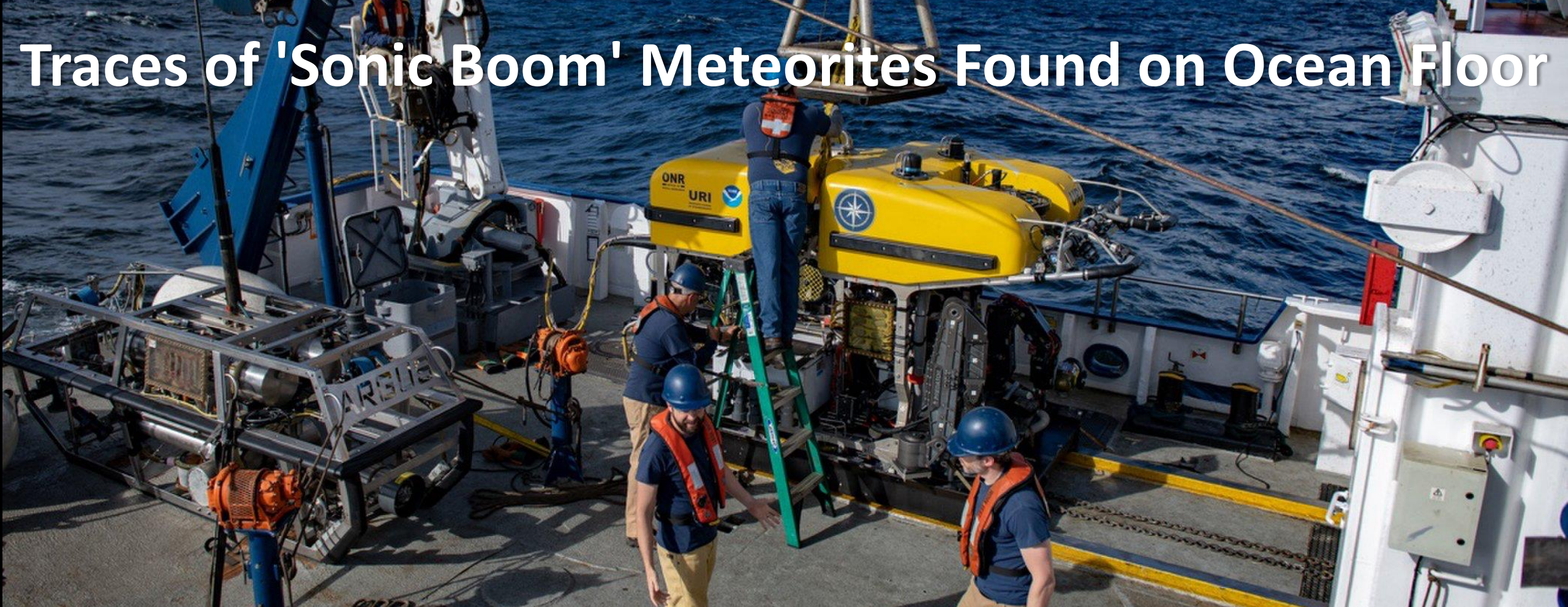
*SpaceDaily.com*



*Illustration of Tiangong-2*



# Traces of 'Sonic Boom' Meteorites Found on Ocean Floor



The first mission designed to hunt a meteorite that crashed into the ocean has now discovered what may be tiny fragments of the meteorite's crust, researchers say. On March 7, three National Oceanic and Atmospheric Administration (NOAA) weather stations detected the fall of a meteorite about 15.5 miles (25 kilometers) off the coast of Washington state. "The fall was widely seen around local areas and widely heard around local areas — it came with some loud sonic booms," Marc Fries, the cosmic dust curator for NASA, told Live Science. Fries estimated this fall might yield about 4,400 lbs. (2,000 kilograms) of meteorites. He also calculated the largest meteorite might weigh about 9.7 lbs. (4.4 kg) and have a diameter of about 5 inches (12 centimeters). This photo shows scientists aboard the Exploration Vessel Nautilus launching the ROV Hercules to search for meteorite fragments off the coast of Washington state.



# Carrier Delivery Version of the Osprey Tiltrotor Is Launched



The aircraft carrier delivery version of the Osprey tiltrotor has been funded for production, as the major part of a third multi-year buy (MYB) contract award to the Bell-Boeing partnership. The U.S. Navy will acquire a total of 39 CMV-22B versions to replace C-2 Greyhounds that have been in service since the mid-1960s.



# Boeing and Embraer Agree to \$4.75 Billion Commercial Joint Venture



Boeing will take an 80-percent share of Embraer's commercial aviation business under the terms of a non-binding agreement announced Thursday. The memorandum of understanding proposes the formation of a joint venture meant to "strategically align" the companies' commercial development, production, marketing, and lifecycle services operations. Under the terms of the agreement, Boeing will hold an 80 percent ownership stake in the joint venture and Embraer will own the remaining 20 percent stake. The transaction values Embraer's commercial aircraft operations at \$4.75 billion and contemplates a value of \$3.8 billion for Boeing's 80 percent ownership stake in the joint venture. The companies expect the transaction to close by the end of 2019, or 12 to 18 months after execution of the definitive agreements.

*Source: Gregory Polek @ AINonline.com*

*Photo: Embraer*



# In The News



**Boeing, Embraer form separate joint venture to boost KC-390.** Boeing and Embraer will create a joint venture to promote the KC-390 and other defense products and services for new markets and applications, the companies announced on 5 July. The new agreement expands a six-year-old relationship between Embraer and Boeing on the KC-390 program. The statement does not indicate that Boeing will assume ownership of the KC-390 programme, but rather invest in marketing, engineering and other areas. Embraer's independence as a defence manufacturer was a key sticking point in negotiations about Boeing taking a stake in Embraer's commercial aviation division.  
*(Stephen Trimble @ FlightGlobal.com)*



**Engine Tests Underway for DARPA Spaceplane Program.** A space shuttle-era main engine is undergoing a series of daily test firings to demonstrate its suitability for use on a reusable spaceplane under development. The engine is a version of the Space Shuttle Main Engine with only minor modifications including a new flight controller, or computer system, from the updated version of the RS-25 engine intended for use on NASA's Space Launch System. *(Jeff Foust @ SpaceNews.com)*



**NASA's Quiet Supersonic X-Plane Has a New Name.** NASA's experimental supersonic X-plane has a new name: the X-59 QueSST. The U.S. Air Force assigned the X-59 number to NASA's experimental supersonic plane and let the agency know on Tuesday, NASA officials said in a statement (June 27). Before receiving its X number, NASA's supersonic plane was called the Low-Boom Flight Demonstration mission. Lockheed Martin is building the jet for NASA to develop the technology needed for quiet supersonic aircraft for future commercial travel.  
*(Tariq Malik @ space.com)*



**Arianespace aims for busy second half of 2018.** Europe's first mission to Mercury, a quartet of Galileo navigation spacecraft, a global winds observatory, and a new European weather satellite have arrived at an equatorial launch base in French Guiana in preparation for launches in the coming months. The set of European missions are set to ride into space aboard four rockets, amid several more commercial flights carrying communications satellites to orbit, in what is shaping up to be a busy second half of the year for Arianespace, the French company which oversees Ariane 5, Soyuz and Vega launch operations at the European-run spaceport in Kourou, French Guiana.  
*(Stephen Clark @ SpaceFlightNow.com)*