

The Aerospace Update

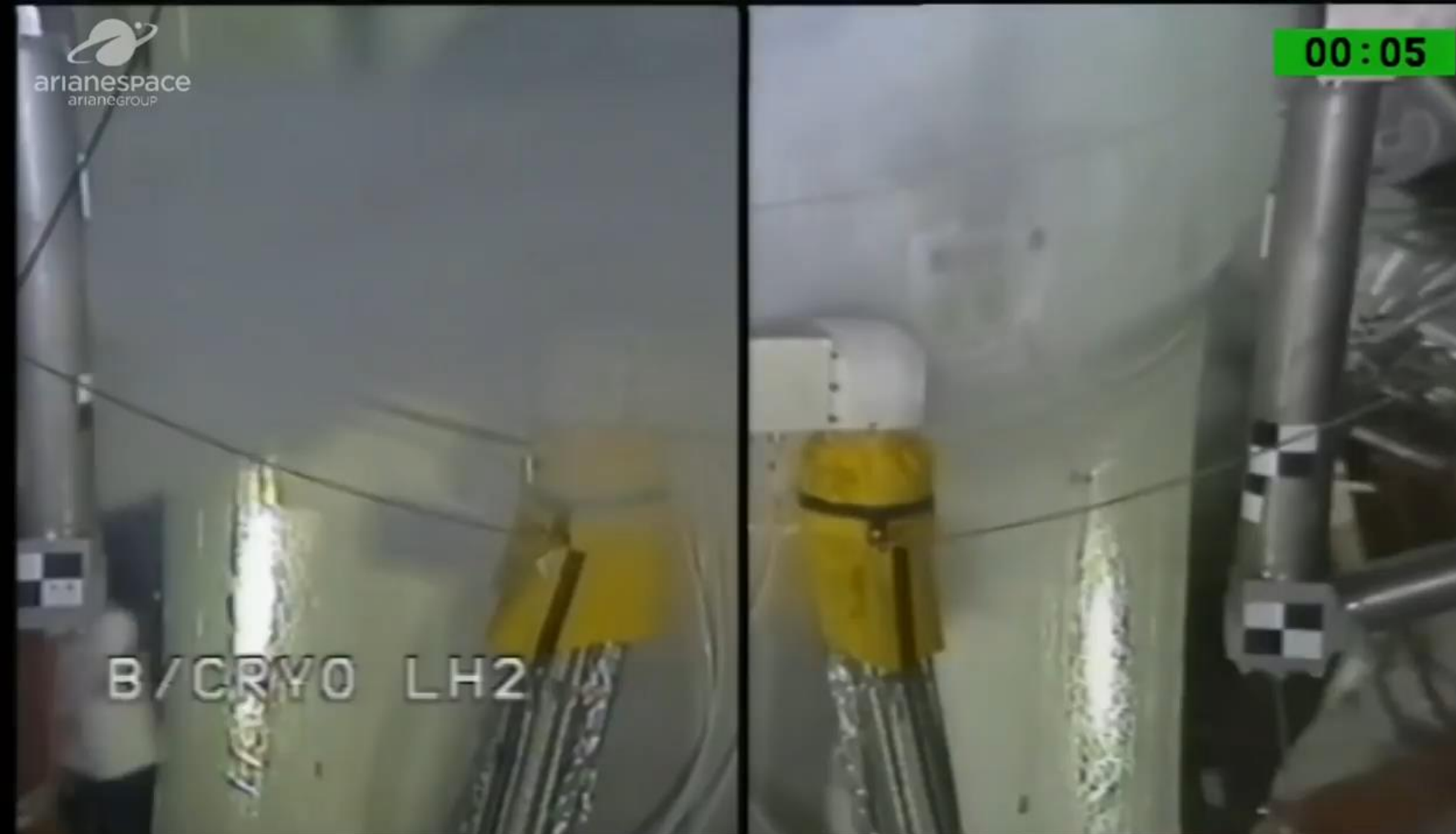


Sept. 27, 2018

Arianespace's 100th Ariane 5 Lifts Off

Image Credit: Arianespace

Arianespace Launches 100th Ariane 5



European launch provider Arianespace completed the 100th launch of a heavy-lift Ariane 5 rocket on Sept. 25th, carrying two satellites co-owned between Intelsat and partner satellite operators. The rocket lifted off from the European spaceport in Kourou, French Guiana at 6:38 p.m. Eastern at the end of its 45-minute launch window, carrying the Horizons-3e and Intelsat-38/Azerspace-2 satellites. The 6,400-kilogram Horizons-3e satellite from manufacturer Boeing separated from the rocket's upper stage 28 minutes later, followed by the 3,500-kilogram Intelsat-38/Azerspace-2 from Space Systems Loral 14 minutes later. Luxembourg- and Washington-based Intelsat confirmed signal acquisition from both spacecraft shortly after separation.

Video Credit: Arianespace

Source: Caleb Henry @ SpaceNews.com

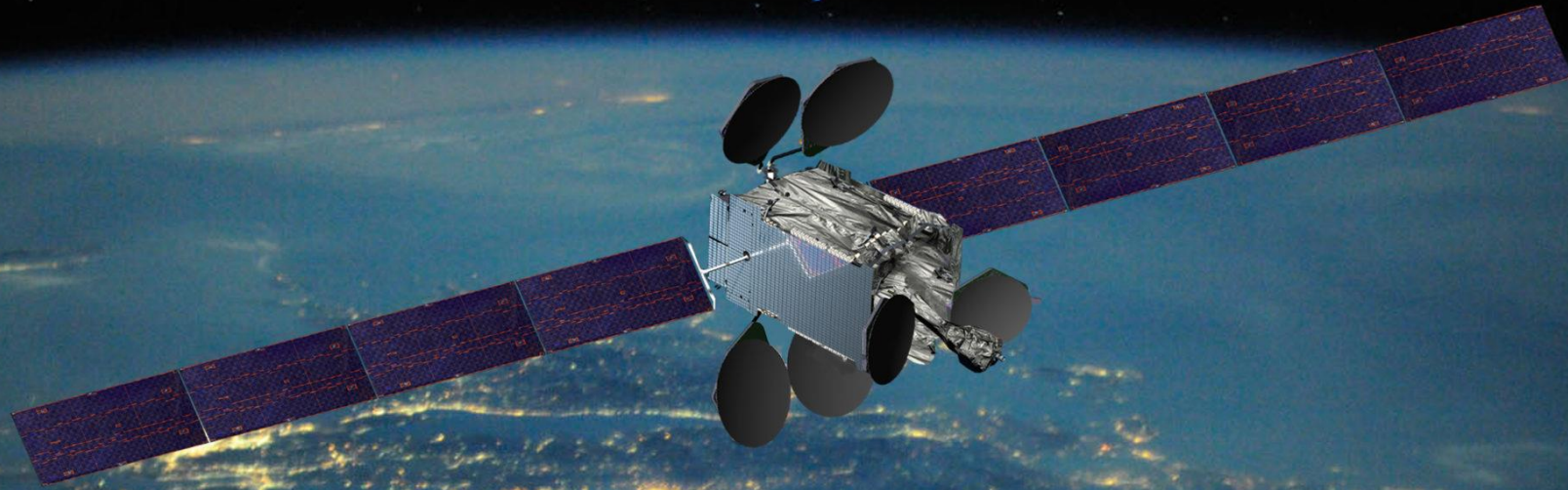
Azerspace-2/Intelsat 38 to Provide Data Communications Services to Central & Eastern Europe



Azerspace-2/Intelsat 38 was manufactured by SSL. Weighing some 3.5 metric tons, it is a multi-mission telecommunications satellite based on the SSL-1300 bus featuring two deployable solar arrays. The satellite will be jointly operated by Intelsat and Azercosmos Open Joint Stock Company, a satellite operator based in Azerbaijan for more than 15 years. Intelsat plans to use Azerspace-2/Intelsat 38 to provide Ku-band capabilities and deliver continuity of service for the Intelsat 12 satellite. The spacecraft is designed to host leading Direct-to-Home television platforms for the fast-growing Central and Eastern Europe and Asia-Pacific regions.

*Source: Tomasz Nowaskowski @
SpaceFlightInsider.com*

Horizons 3e to Provide High Throughput Data Communications to Asia-Pacific Region



Built by Boeing Satellite Systems, Horizons 3e is a high-throughput telecommunications satellite owned by a joint venture between US-based Intelsat and the Japanese company SKY Perfect JSAT. It features two deployable solar arrays and is equipped with high-throughput C- and Ku-band transponders. *Horizons 3e* is expected to operate for 15 years, offering 30 gigabits per second of bandwidth for fixed and mobile customers. It is a replacement for the Intelsat 805 satellite and is expected to provide high-throughput services to the Asia-Pacific region and expand coverage in the Pacific Ocean.

Kounotori 7 Cargo Resupply to ISS Launched



Japan's seventh cargo resupply mission to the International Space Station lifted off from the Tanegashima Space Center in southern Japan on Saturday, Sept. 22nd, carrying 13,700 pounds of cargo, including supplies to for the crew, new batteries as well as various scientific experiments. Developed by Mitsubishi Heavy Industries, the 23,100-pound (10,500-kilogram) HTV-7 spacecraft is about 33 feet (10 meters) long and 14.4 feet (4.4 meters) in diameter. The vessel consists of two logistic carriers—the Pressurized Logistics Carrier (PLC) and the Unpressurized Logistics Carrier (ULC), which also includes the Exposed Pallet, as well as an Avionics Module and a Propulsion Module.

*Video Credit: JAXA
Video Courtesy of CGTN*

*Source: Tomasz Nowakowski @
SpaceFlightInsider.com*

Kounotori 7 Arrives at ISS



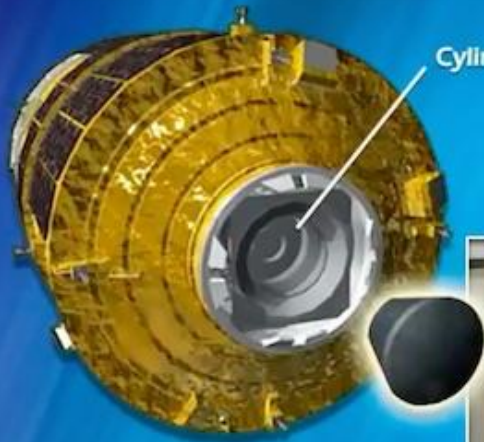
Japan's Kounotori 7 spacecraft arrived at the ISS on Thursday, Sept. 27th to begin a two-month period attached to the outpost while crews work to unload its 13,700 pounds (6,200 kilograms) of cargo. Expedition 56 Commander Drew Feustel and Flight Engineer Serena Aunon-Chancellor of NASA used the robotics workstation in the Cupola window to control the 17.6-meter robotic Canadarm2 to grab the autonomous cargo freighter. Ground teams then remotely controlled Canadarm2 to maneuver the spacecraft to the Earth-facing port of the Harmony module where it was berthed.

Photo Credit: NASA

Source: Derek Richardson @ SpaceFlightInsider.com

Kounotori 7 Cargo

HTV Small Return Capsule (HSRC)



Cylindrical Support (CS)

H-II Transfer Vehicle (HTV)



HSRC

Diameter: 2.7 feet
Height: 2.1 feet
Weight: 397 pounds



The Kounotori 7 is loaded with more than 5.2 tons of cargo including 3,014 pounds (1,367 kilograms) of external equipment comprising six lithium-ion batteries and adapter plates. Inside the HTV's pressurized cabin, workers loaded 7,489 pounds (3,397 kilograms) of cargo for JAXA, NASA, the European Space Agency and the Canadian Space Agency, including fresh food, crew provisions, scientific gear, computer equipment and spare parts. Although Kounotori 7 is designed to burn up in the atmosphere during re-entry, a small sample return capsule carries a heat shield to survive the trip back to Earth. The capsule, which carries no engines of its own, will jettison after the HTV completes its deorbit burn. The re-entry craft will deploy a parachute and splash down in the Pacific Ocean, where recovery teams will retrieve it and bring it back to Japan for inspections. The capsule can return up to 44 lbs. of biological specimens safely to earth.

Japanese Robots Land on Asteroid, Send Back Pictures

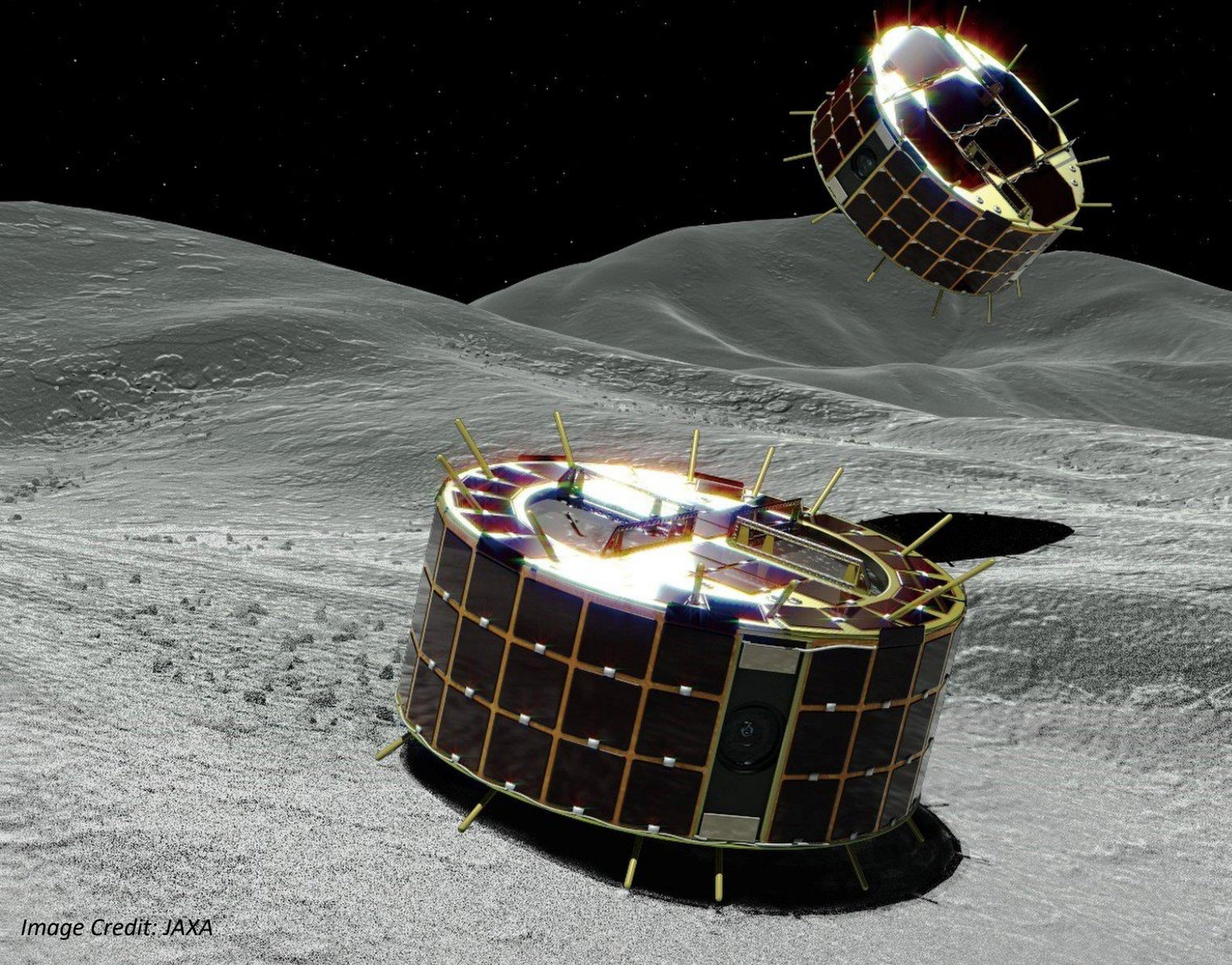


A pair of tiny automated robots touched down on asteroid Ryugu on Friday, Sept. 19th after separating from Japan's Hayabusa 2 spacecraft, sending back pictures as the probes bounced across the asteroid's alien landscape nearly 200 million miles from Earth. The miniature rovers, each smaller than the diameter of a typical dinner plate, were released from the Hayabusa 2 spacecraft as the spacecraft descended within 200 feet (as close as 55 meters) from Ryugu. The MINERVA-II1B rover snapped this photo of asteroid Ryugu right before it hopped across the asteroid's surface on Sept. 22, 2018


Source: Stephen Clark @ SpaceFlightNow.com

Image Credit: JAXA

Hop, Don't Roll: How the Tiny Japanese Rovers on Asteroid Ryugu Move



Gravity on the surface of Ryugu is very weak, so a rover propelled by normal wheels or crawlers would float upwards as soon as it started to move. So, the robots — each of which measures 7 inches wide by 2.8 inches tall (18 by 7 centimeters) and weighs 2.4 lbs. (1.1 kilograms) — hop instead. They do this by moving a "torquer" in their interior, which rests atop a disk-shaped turntable. "By rotating the torquer, a reaction force against the asteroid surface makes the rover hop with a significant horizontal velocity," a team of researchers led by JAXA's Tetsuo Yoshimitsu wrote in a 2012 study outlining the concept. "After hopping into the free space, it moves ballistically. With this mechanism, by changing the magnitude of torque, the hopping speed can be altered, so as not to exceed the escape velocity from the asteroid surface." The MINERVA-II1 rovers control the direction of their hops by manipulating the orientation of the turntable. These hops can last for 15 minutes and cover about 50 feet (15 m) of horizontal distance. The rovers are designed to make their exploration decisions autonomously, without direction from Earth.



Dust Storms on Titan Spotted for the First Time

Data from NASA's Cassini spacecraft has revealed what appear to be giant dust storms in equatorial regions of Saturn's moon Titan. The discovery, described in a paper published on Sept. 24 in *Nature Geoscience*, makes Titan the third Solar System body, in addition to Earth and Mars, where dust storms have been observed. Researchers believe that huge amounts of dust can be raised on Titan, Saturn's largest moon, by strong wind gusts that arise in powerful methane storms. Such methane storms, previously observed in images from the Cassini spacecraft, can form above dune fields that cover the equatorial regions of this moon especially around the equinox, the time of the year when the Sun crosses the equator.

Opportunity Seen but Not Heard



NASA still hasn't heard from the Opportunity rover, but at least we can see it again. A new image produced by HiRISE, a high-resolution camera aboard NASA's Mars Reconnaissance Orbiter (MRO), shows a small object on the slopes of the Red Planet's Perseverance Valley. That object is Opportunity, which was descending into the Martian valley when a dust storm swept over the region a little more than 100 days ago.

Source & Photo Credits: NASA/JPL-Caltech/Univ. of Arizona

Boeing Wins UH-1N Replacement Contract From USAF



Boeing has been awarded the first portion of a \$2.38 billion firm fixed-price contract to replace the US Air Force's Bell UH-1N fleet with its MH-139 helicopter, derived from Leonardo Helicopters' commercial platform. The \$375 million initial award is for four helicopters and the integration of non-developmental items, the USAF announced on 24 September. The total program cost accounts for the acquisition and sustainment of up to 84 MH-139s, training devices and associated support equipment. The service expects the first operational helicopter to be delivered in fiscal year 2021.

World War II Bombs Sent Shockwaves Into Space



In a paper published in *Annales Geophysicae*, University of Reading researchers in the United Kingdom looked back at radio evidence from the 1940s to study how bombing raids in Europe might have affected radio transmissions. They found that effects traveled far, far beyond the line 62 miles above the Earth's surface that most experts use to delineate the upper atmosphere from the edge of space. The Radio Research Centre in Slough monitored the ionosphere during this time, and it detected fluctuations especially in the 62-to-186 mile range above the Earth's surface (or 100 to 300 km). During bombing raids, the concentration of electrons dipped significantly, indicating the bombs weren't just shaking the ground in Europe, but jostling energy bands in space far above as well. This was likely caused by heating of the upper atmosphere by bombings.

Source: John Wenz @ PopularMechanics.com

Photo: Royal Air Force

In The News



Singapore Airlines Takes Delivery of a Plane to Fly World's Longest Direct Route. Singapore Airlines has taken delivery of a new plane that will perform the world's longest commercial non-stop service by miles flown. The Airbus A350-900ULR will travel on October 11 from Singapore to Newark Liberty International Airport, covering 9,000 nautical miles (9,537 miles) in about 19 hours. *(CNBC.com)*



World's First Boeing 777 Retires to Arizona Air Museum. The prototype Boeing 777-200, call sign B-HNL, rolled off the production line in 1994, eventually entering commercial service for Hong Kong's Cathay Pacific Airline in 2009. Over the years it's clocked up to 20,519 flights for Cathay. That's a whopping 49,687 hours of flying time. The venerable airplane was taken out of service in May 2018 and, after Boeing and Cathay agreed on the donation, it touched down in Tucson on Sept. 19th to begin its new life at the Pima Air & Space Museum. *(Francesca Street @ msn.com)*



Report: Blue Origin Lands Rocket Engine Contract from United Launch Alliance. A joint venture of Bethesda-based Lockheed Martin Corp. and Boeing Co. has tapped Jeff Bezos's Blue Origin to provide engines for a new rocket, The Wall Street Journal reports. United Launch Alliance LLC is expected to announce Thursday that it will use Blue Origin's BE-4 engine for the Vulcan rocket. The WSJ calls this a "potentially multibillion-dollar agreement," with an initial launch of the Vulcan scheduled for 2020, though that could be pushed back to the middle of the decade. *(Michael Neibauer @ Puget Sound Business Journal)*



US Marine Corps' F-35B Makes First Air Strike in Afghanistan. The US Marine Corps used the Lockheed Martin F-35B to launch an air strike in Afghanistan on 27 September, the first ground attack by the stealth fighter. The F-35B Lightning took off from the USS Essex, a Wasp-class amphibious assault ship, in the Arabian Sea and launched an attack on a reportedly fixed Taliban target using an undisclosed weapon. *(Garrett Reim @ FlightGlobal.com)*