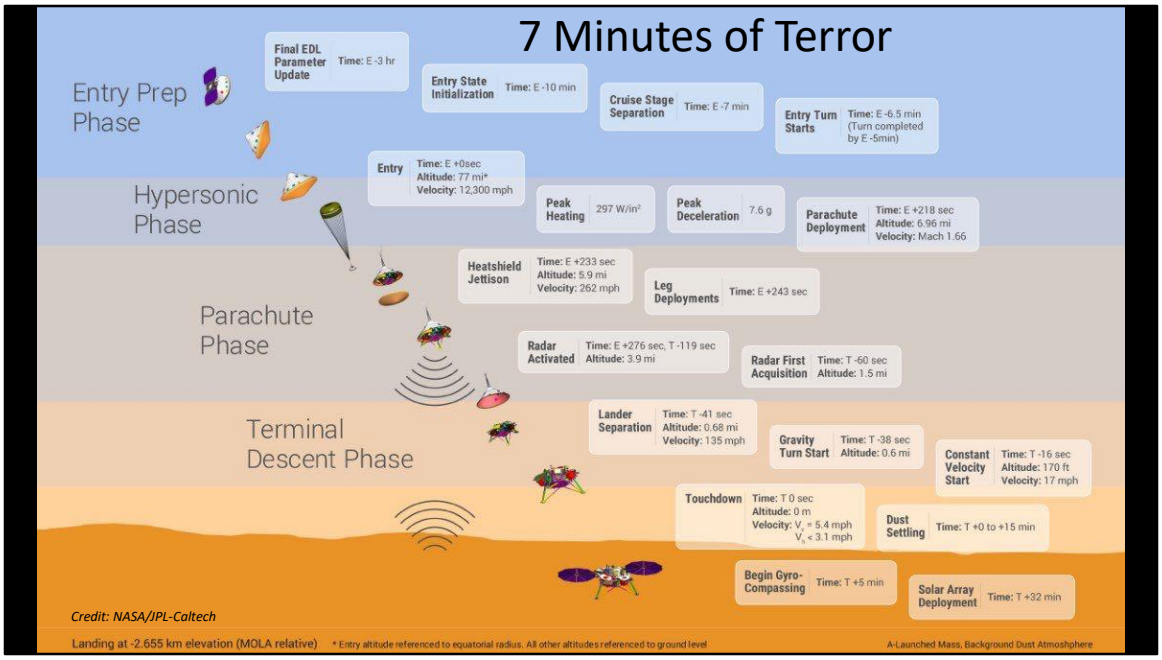
First photo taken by Insight after the landing. This image was relayed from the lander to earth by MarCO cubesats within minutes after landing. The dark specs are dust particles which are lodged on the the transparent lens cap covering the camera's lens. The lens cap will be removed in the near future.

Seen in this photo is a rock lower, center and one of the lander's landing leg pods in the lower right.



This diagram shows the Entry, Descent and Landing phase for InSight. Because it takes a radio signal close to 8 minutes to travel from Mars to Earth at the distance Mars was from Earth at the time of the landing, all the steps show above had to be accomplished completely autonomously by the lander without any intervention by controllers on the Earth. Earth bound controllers would only know (at best) 8 minutes after the fact whether these steps had been accomplished. Seven minutes atfter the landing, the X-band antenna will be deployed and a signal sent to Earth indicating success. Sixteen minutes after landing, giving time for the dust to settle, the solar arrays were deployed, a process which took 16 more minutes. Controllers on the ground had to wait for approx. 5 and a half hours to get a signaled from the lander relayed through the Mars Odyssey Orbitor to know whether the solar panels had been successfully deployed.

"Picking a good landing site on Mars is a lot like picking a good home: It's all about location, location, location," said Tom Hoffman, InSight project manager at JPL. "And for the first time ever, the evaluation for a Mars landing site had to consider what lay below the surface of Mars. We needed not just a safe place to land, but also a workspace that's penetrable by our 16-foot-long (5-meter) heat-flow probe."

The site also needs to be bright enough and warm enough to power the solar cells while keeping its electronics within temperature limits for an entire Martian year (26 Earth months).

The team focused on a band around the equator, where the lander's solar array would have adequate sunlight to power its systems year-round. Finding an area that would be safe enough for InSight to land and then deploy its solar panels and instruments without obstructions took a little longer.

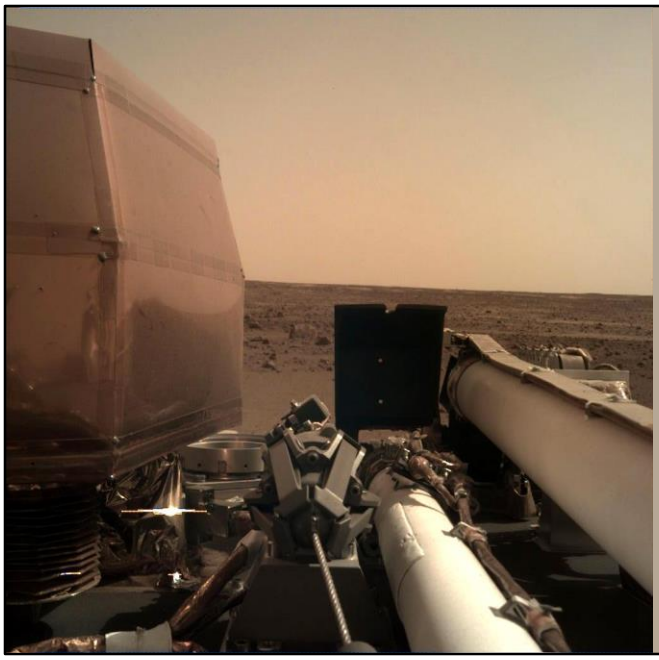
"The site has to be a low-enough elevation to have sufficient atmosphere above it for a safe landing, because the spacecraft will rely first on atmospheric friction with its heat shield and then on a parachute digging into Mars' tenuous atmosphere for a large portion of its deceleration," said Hoffman. "And after the chute has fallen away

and the braking rockets have kicked in for final descent, there needs to be a flat expanse to land on – not too undulating and relatively free of rocks that could tip the tri-legged Mars lander."

Of 22 sites considered, only Elysium Planitia, Isidis Planitia and Valles Marineris met the basic engineering constraints. To grade the three remaining contenders, reconnaissance images from NASA's Mars orbiters were scoured and weather records searched. Eventually, Isidis Planitia and Valles Marineris were ruled out for being too rocky and windy.

That left the 81-mile long, 17-mile-wide (130-kilometer-long, 27-kilometer-wide) landing ellipse on the western edge of a flat, smooth expanse of lava plain.

(https://www.nasa.gov/feature/jpl/the-mars-insight-landing-site-is-just-plain-perfect)



InSight Catching Rays on Mars

NASA's InSight sent signals to Earth indicating that its solar panels were open and collecting sunlight on the Martian surface. NASA's Mars Odyssey orbiter relayed the signals, which were received on Earth at about 5:30 p.m. PST (8:30 p.m. EST). Solar array deployment ensures the spacecraft can recharge its batteries each day. Odyssey also relayed a pair of images (including this one) showing InSight's landing site. The Instrument Deployment Camera (IDC), located on the robotic arm of NASA's InSight lander, took this picture of the Martian surface on Nov. 26, 2018, the same day the spacecraft touched down on the Red Planet. The camera's transparent dust cover is still on in this image, to prevent particulates kicked up during landing from settling on the camera's lens.

Source & Image Credits: NASA/JPL-Caltech

After landing, the next several Martian days (Sols) will be used to assess the health of the lander. Then the mast will be unstowed and its camera will be used to survey the terrain surrounding the lander to find the best places to put the seismometer and Heat probe. That process might take several months before the actual placements occur. In the meantime, the magnetometer, wind measurement instruments and thermometer mounted on the deck of the lander will be used

InSight’s Braille 'Easter Egg' Hidden in Sight

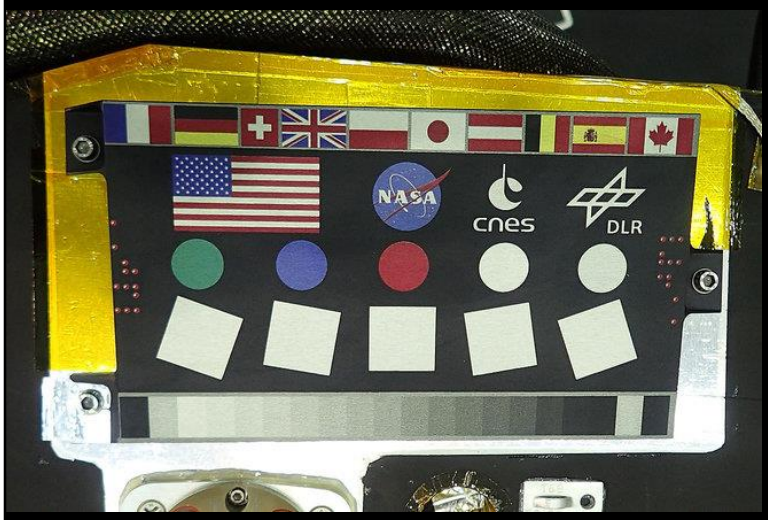


Photo Credit: NASA/JPL-Caltech/Lockheed Martin Space

A camera calibration target sits on the deck of the NASA's InSight lander, adorned with the flags of the countries participating in the mission, as well as an "easter egg," a message in coded in braille. As with previous NASA landers and rovers, InSight is adorned with the flags and logos of the countries and space agencies involved in its mission (or at least most of them, more on that below). It is also decorated with a look-and-you-might-miss-it pattern of dots that continues a tradition started by the Jet Propulsion Laboratory (JPL) in Pasadena, California. "J-P-L" is spelled out in braille, the tactile writing system that is used by the blind and visually impaired.

Source: Robert Z. Pearlman, collectSPACE.com

Farewell to Mars

MarCO-B, one of the experimental Mars Cube One (MarCO) CubeSats, took this image of Mars from about 4,700 miles (7,600 kilometers) away during its flyby of the Red Planet on Nov. 26, 2018. MarCO-B was flying by Mars with its twin, MarCO-A, in its successful attempt to serve as communications relays for NASA's InSight spacecraft as it landed on Mars. This image was taken at about 12:10 p.m. PST (3:10 p.m. EST) while MarCO-B was flying away from the planet after InSight landed.

Source & Image Credits: NASA/JPL-Caltech

Recovered Hubble Telescope Nabs Nifty New Picture

On Oct. 5, the Hubble telescope went into a protective "safe mode" when one of its orientation-maintaining gyroscopes failed. After about three weeks, the mission team was able to fix the balky gyro and get Hubble back online. Shortly thereafter, the telescope homed in on a field of star-forming galaxies located approximately 11 billion light-years away from Earth, in the constellation Pegasus. The new image, taken on Oct. 27 using the telescope's Wide Field Camera 3, was the first picture captured by the telescope after it returned to service, according to a statement from NASA.

Source: Samantha Mathewson @ Space.com
Image Credit: A. Shapley(UCLA)/NASA/ESA

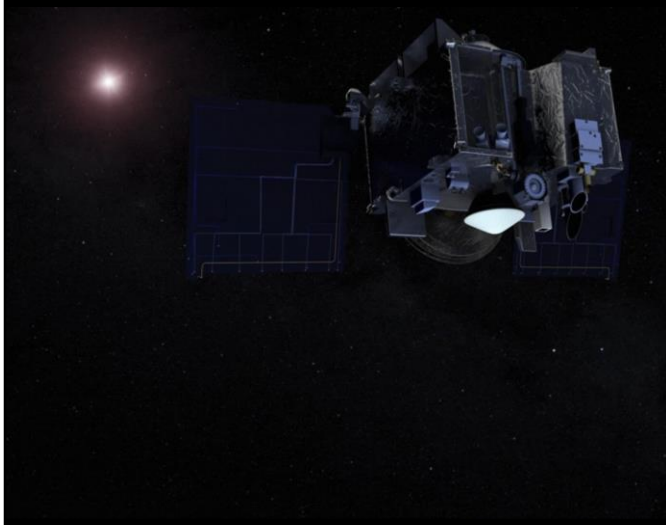
Indian Rocket Launches 31 Satellites

India's Polar Satellite Launch Vehicle lifted off Thursday, Nov 29th and deployed in orbit a hyperspectral Earth-imaging satellite designed to assess vegetation, soil conditions and pollution in rich detail, then maneuvered to a lower altitude to release 30 more smallsats, including reinforcements for Planet and Spire's commercial Earth-observing constellations. The lower orbit targeted for release of the 30 secondary payloads is expected to ensure the satellites are pulled back to Earth for destructive re-entries in the coming decades, and they do not become a source of long-term space debris.

Source: Stephen Clark @ SpaceFlightNow.com

Image Credit: ISRO

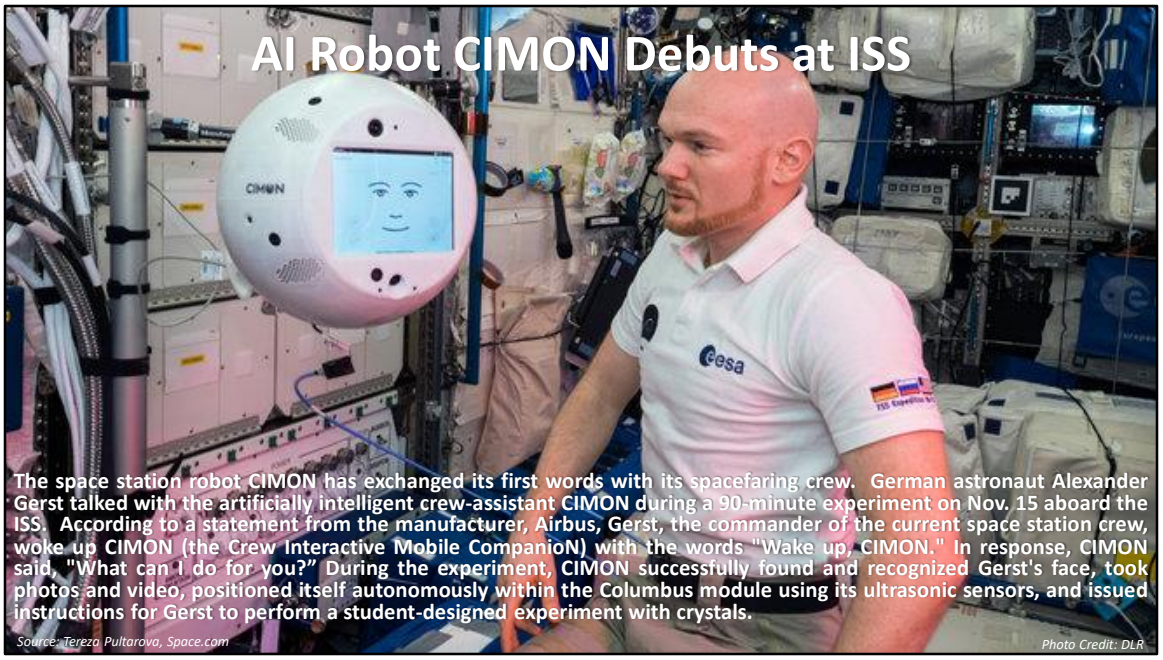
OSIRIS-Rex to Arrive at Bennu on Dec. 3rd



Animation Credits: NASA/Goddard/University of Arizona

NASA's Origins, Spectral Interpretation, Resource Identification, Security-Regolith Explorer (OSIRIS-REx) spacecraft is scheduled to rendezvous with its targeted asteroid, Bennu, on Monday, Dec. 3 at approximately noon EST. NASA will air a live event from 11:45 a.m. to 12:15 p.m. EST to highlight the arrival of the agency's first asteroid sample return mission. The program will originate from OSIRIS-REx's mission control at the Lockheed Martin Space facility in Littleton, Colorado, and will air on NASA Television, Facebook Live, Ustream, YouTube and the agency's website. NASA TV also will air an arrival preview program starting at 11:15 a.m. EST. Over the past month, the OSIRIS-REx team conducted a series of tests to ensure that TAGSAM, the spacecraft's sampling mechanism, is ready to collect a sample from Bennu in 2020. This rehearsal marked the first time since launch that the TAGSAM arm has moved through its full range of motion.

Source: NASA/GODDARD



Weighing about 5 kilograms (11 lbs. on Earth), the 3D-printed robot designed jointly by the German space agency DLR, Airbus and IBM works similarly to Apple's virtual assistant Siri or Amazon's Alexa. CIMON doesn't process commands itself, but instead communicates with a ground-based cloud computer — IBM's natural-language-processing computer Watson.

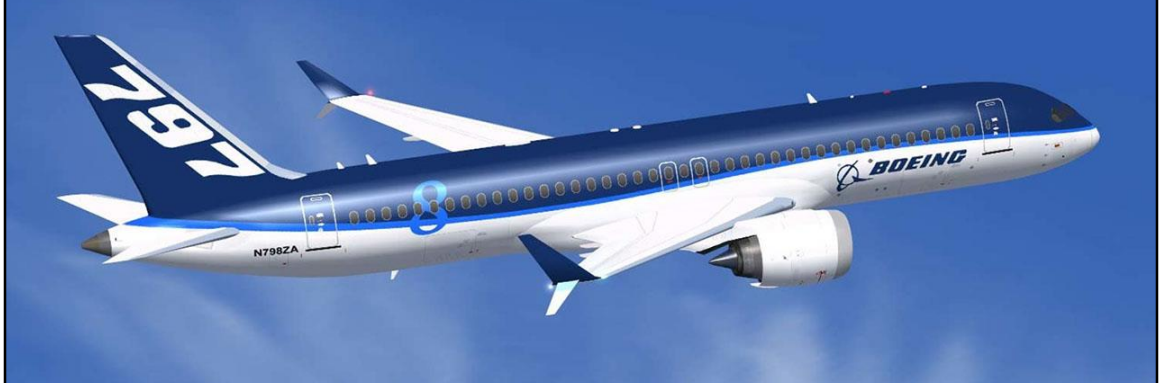
SpaceBok Robotic Hopper Being Tested at ESA's Mars Yard

Photo Credit: ESA

SpaceBok, designed by a team of students from a pair of Swiss research universities, ETH Zurich and ZHAW Zurich, is currently undergoing tested in the European Space Agency's Mars Yard. Students and researchers designed the robot for the purpose of navigating uneven, low-gravity environments like those found on the surface of the moon and Mars. ESA's 8 x 8 m Mars Yard 'sandbox', filled with different sizes of sand, gravel, and rock, is part of the Planetary Robotics Laboratory at the Agency's ESTEC technical centre in Noordwijk, the Netherlands.

Source: Brooks Hays @ UPI & MarsDaily.com

Taking Aircraft High-Lift Systems To The Next Level



UTC Aerospace Systems (UTAS), the leading supplier in this segment, has launched a £6.5 million ($8.5 million) project to develop the next generation of high-lift systems, with half the funding being provided by the UK government. The objective of is to develop a distributed architecture with power units at each flap and slat drive stations along the wing, rather than the current approach in which a central power unit, or PDU, drives all surfaces via a complex system of transmission shafts and gearboxes. The project is aimed at taking simpler, lighter and less costly high-lift systems to a technology and manufacturing readiness level that will enable their use in airliners entering service from the mid-2020s. Boeing's new midmarket airplane, or NMA, is one potential application.

Source: Graham Warwick @ Aviation Week & Space Technology

Image Credit: Boeing

‘Wrong-way’ Landing Caps Successful RN Deck Trials

On November 18 the UK’s new 65,000-tonne aircraft carrier HMS Queen Elizabeth completed the initial two first-of-class deck trial campaigns (DT-1 and DT-2) with the Lockheed Martin F-35B Lightning II. Toward the end of the trials, an F-35B was landed for the first time facing the “wrong” way. Flown by Integrated Test Force (ITF) chief test pilot Squadron Leader Andy Edgell, RAF, the unusual recovery involved the F-35 approaching the carrier from the bow, rather than using the traditional stern approach. As well as providing different visual cues for the pilot, the bow approach also encounters different wind conditions, as the carrier would typically be sailing into the wind while also generating airflow over the deck through its own forward motion.

Source: David Donald @ AINonline.com

Photo Credit: Royal Navy

In The News

Alaska to Decide in 2019 Whether to Retain Two Aircraft Types. Alaska Air Group will decide in 2019 if it will continue operating both Airbus and Boeing narrowbodies or shift back to a single-type fleet, says chief operating officer Ben Minicucci. Alaska's fleet includes 162 737s and 71 Airbus narrowbodies, and the company has orders for another 36 737s and 32 A320neo-family aircraft, according to Flight Fleets Analyzer. *(Jon Hemmerdinger @ FlightGlobal.com)*

FCC License Application Sheds Light on SpaceX Vehicle Testing Plans. The upper stage of SpaceX's next-generation reusable launch vehicle, now called Starship, may be the subject of an FCC application the company filed Nov. 19 to cover testing at its South Texas launch site. The application seeks an experimental communications license to cover transmissions to and from an unspecified vertical takeoff, vertical landing (VTVL) vehicle that company plans to fly at its launch site under construction on the coast of the Gulf of Mexico near Brownsville, Texas. During the tests, the vehicle "will take off, ascend vertically to a low altitude, and then descend back to its original landing spot," according to a description attached to the application. *(Jeff Foust @ SpaceNews.com)*

Lockheed Begins Manufacture of X-59 Quiet Supersonic Technology. Commercial supersonic flight has left the drawing board with Lockheed Martin announcing fabrication of the X-59 Quiet Supersonic Technology (QueSST) aircraft has begun. Milling the first part of the test aircraft has commenced at the company's famous Skunk Works, setting the project on course for the maiden flight scheduled for 2021. *(David Szondy @ newsatlasaircraft.com)*

New 'Air Force One' Completes Preliminary Design Review. The US Air Force's forthcoming Boeing VC-25B, popularly known by the call sign "Air Force One" when the president travels aboard, recently completed its preliminary design review. The Presidential and Executive Airlift Directorate also said on 26 November that it anticipates that the VC-25B program will complete its critical design review a year from now. The PDR is a comprehensive review that demonstrates that the design meets all system requirements within acceptable risk constraints, establishing approval for proceeding with detailed design. *(Garrett Reim @ FlightGlobal.com)*