The Aerospace Update

Hurricane Harvey from the ISS

Aug. 29, 2017

Video Credit: NASA

Minotaur IV Rocket Launch ORS-5 Mission

Video Source: InterSpace

Receiving a boost from a modified decades-old Peacekeeper missile originally built for nuclear war, a U.S. military space surveillance satellite streaked into space early Saturday, Aug. 26th from Cape Canaveral to help the Air Force track threats and debris in orbit. The Orbital ATK Minotaur's lower three stages were repurposed from the Air Force's stockpile of retired Peacekeeper nuclear missile. The modified Peacekeeper motors launched Saturday were originally built in the 1980s and put on alert in a missile silo ready to hurl nuclear warheads to distant targets. The Air Force phased out the Peacekeeper in 2005 in favor of the Minuteman missile, leaving the leftover rocket stages available for satellite launches. Two commercial Orion 38 rocket motors built by Orbital ATK did the extra lifting needed to reach a unique orbit hugging the equator, an unusual perch required for the ORS-5 satellite to conduct its space surveillance mission.

Source: Stephen Clark @ SpaceFlightNow.com

Eyes to the Sky

Photo credit: Lincoln Lab / MIT

While many surveillance satellites have their sensors trained at terrestrial targets, upon reaching orbit, the ORS-5 SensorSat will turn its hardware skyward. Though the spacecraft will operate in LEO, in a 372.8-mile (600-kilometer) circular orbit, it will scan the valuable space located at the much higher geosynchronous equatorial orbit (GEO) altitude.

The satellite was built for the USAF by Lincoln Laboratory at the Massachusetts Institute of Technology (MIT) and is being launched to monitor the space more than 22,236 miles (35,786 kilometers) above the equator. With the GEO space representing a significant operational area for military satellite operations, the USAF hopes the mission will provide enhanced monitoring and detection of threats and targets of interest.

Source: Curt Godwin @ SpaceFlightInsider.com

SpaceX Notches 15th Landing After Launching Overdue Formosat-5

Video Credit: SpaceX

A SpaceX Falcon 9 successfully launched a long-delayed remote sensing satellite from Vandenberg Air Force Base in California for the government of Taiwan Aug. 24th, executing another first stage landing on a barge in the Pacific in the process. Formosat-5 was built by Taiwan's space agency, the National Space Organization, known by the acronym NSPO. The 450-kilogram spacecraft was the first such satellite built domestically by Taiwan, and succeeds Formosat-2, retired a year ago. The spacecraft carries cameras capable of producing panchromatic images at a resolution of two meters and color images at a resolution of four meters. It also carries an ionospheric science instrument developed by a Taiwanese university.

Source: Jeff Foust @ SpaceNews.com

Elevated Zinc and Germanium Levels Bolster Evidence for Habitable Environments on Mars

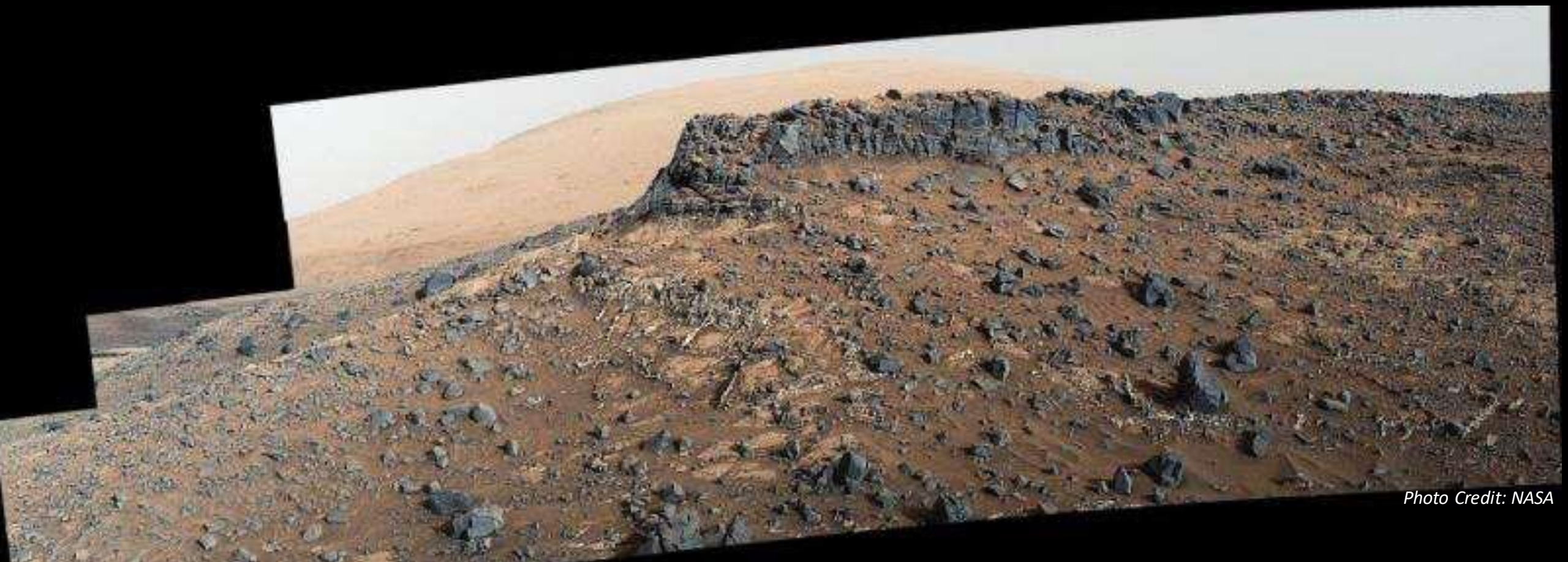


Photo Credit: NASA

New data gathered by the Mars Curiosity rover indicates a potential history of hydrothermal activity at Gale Crater on the red planet, broadening the variety of habitable conditions once present there, scientists report in a new study. Researchers found concentrations of the elements zinc and germanium to be 10 to 100 times greater in sedimentary rocks in Gale Crater compared to the typical Martian crust. The elevated concentrations of zinc and germanium in Gale Crater can potentially be explained by hydrothermal activity that occurred in the region.

Source: Kelsey Simpkins @ Phys.org

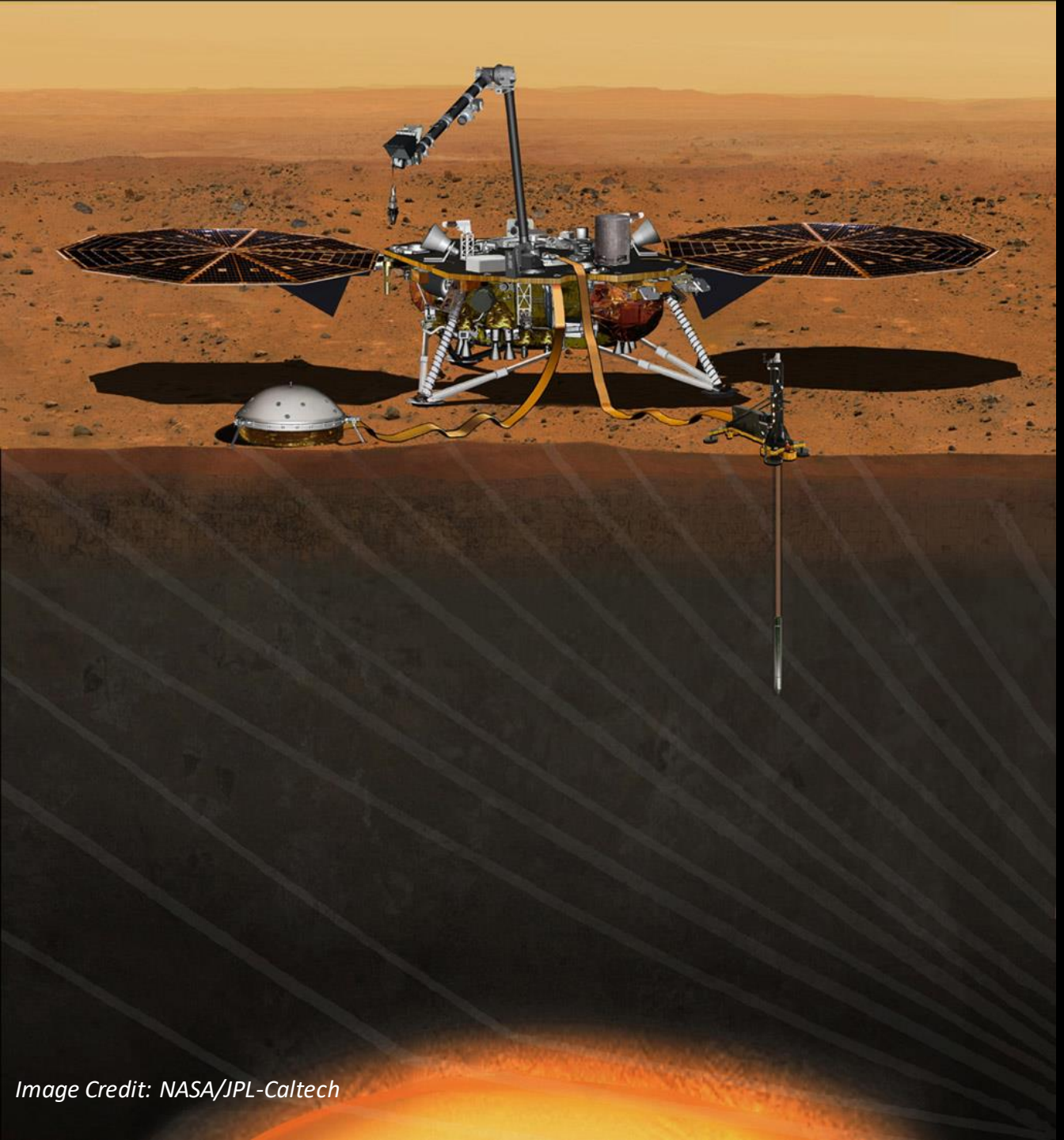


Image Credit: NASA/JPL-Caltech

NASA's Next Mars Mission to Investigate Interior of Red Planet

Preparation of NASA's next spacecraft to Mars, InSight, has ramped up this summer, on course for launch next May from Vandenberg Air Force Base in central California—the first interplanetary launch in history from America's West Coast. InSight is the first mission to focus on examining the deep interior of Mars. Information gathered will boost understanding of how all rocky planets formed, including Earth. The mission will place a stationary lander near Mars' equator. With two solar panels that unfold like paper fans, the lander spans about 20 feet (6 meters). Within weeks after the landing, InSight will use a robotic arm to place its two main instruments directly and permanently onto the Martian ground. These two instruments are: a seismometer accurate enough to detect ground movements half the diameter of a hydrogen atom and a heat probe to measure the amount of energy coming from the planet's deep interior. A third experiment will use radio transmissions between Mars and Earth to assess perturbations in how Mars rotates on its axis, which are clues about the size of the planet's core.

Source: Guy Webster @ Phys.org

NASA Proposes Rapid Mars Sample Return Architecture

NASA is studying a “lean” architecture for Mars sample return that could allow the agency to bring back Martian rocks as soon as the end of the 2020s. The concept would focus on getting samples cached by the upcoming Mars 2020 mission off the planet and back to Earth as soon as possible. It would involve the launch of a Mars lander no earlier than 2026, equipped with a sample collection rover and a rocket, known as a Mars ascent vehicle. The spacecraft would land near the Mars 2020 landing site and dispatch its rover to collect the samples cached by the earlier mission, returning them to the lander. Those samples would be loaded onto the Mars ascent vehicle on the lander, which would then launch them into Mars orbit. A sample collection orbiter, launched separately, would then rendezvous and grab the sample for a return either direct to Earth or to cislunar space.

Source: Jeff Foust @ SpaceNews.com

Image Credit: NASA/JPL-Caltech

Asteroid Sample Return Mission Successfully Adjusts Course

NASA's OSIRIS-REx spacecraft fired its thrusters to position itself on the correct course for its upcoming Earth flyby. The spacecraft, which is on a two-year outbound journey to asteroid Bennu, successfully performed a precision course adjustment on Wednesday, Aug. 23rd to prepare for the gravity slingshot on Sept. 22nd. This trajectory correction maneuver was the first to use the spacecraft's Attitude Control System, or ACS, thrusters in a turn-burn-turn sequence. In this type of sequence, OSIRIS-REx's momentum wheels turn the spacecraft to point the ACS thrusters toward the desired direction for the burn, and the thrusters fire. After the burn, the momentum wheels turn the spacecraft back to its previous orientation. The total thrust is monitored by an on-board accelerometer that will stop the maneuver once the desired thrust is achieved.

Source and Image Credit: NASA

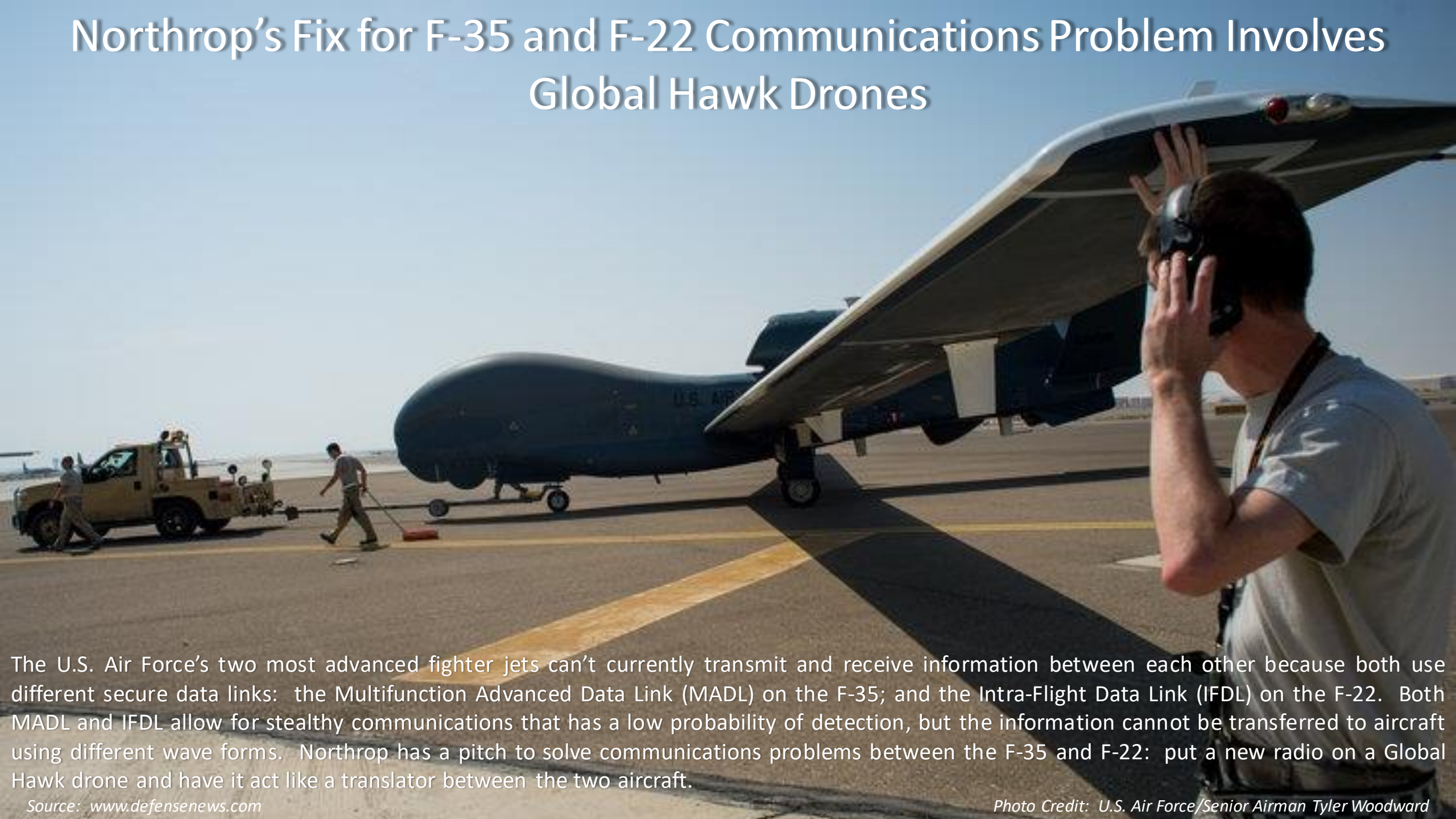
Image Credit: SpaceX

Elon Musk Teases SpaceX Spacesuit Concept

On Aug. 23, 2017, Elon Musk released a photograph teasing the SpaceX spacesuit design that will be used on crewed flights of the Dragon 2 spacecraft. The post, which was made on both Twitter and Instagram, provided few details on the specifications of the suit beyond indicating the company has a functional design in place. “First picture of SpaceX spacesuit.” Musk tweeted to his nearly 11.8 million followers on Twitter. “Worth noting that this actually works (not a mockup). Already tested to double vacuum pressure.” Double vacuum pressure is a reference to a testing procedure in which the suit is placed in a vacuum chamber while the inside of the suit is pressurized to twice its operating pressure. While the specific details of the new SpaceX suit are unknown, most American and Russian spacesuits operate at a pressure between 0.2 and 0.35 atmospheres.

Source: Paul Knightly @ SpaceFlightInsider.com

Northrop's Fix for F-35 and F-22 Communications Problem Involves Global Hawk Drones



The U.S. Air Force's two most advanced fighter jets can't currently transmit and receive information between each other because both use different secure data links: the Multifunction Advanced Data Link (MADL) on the F-35; and the Intra-Flight Data Link (IFDL) on the F-22. Both MADL and IFDL allow for stealthy communications that has a low probability of detection, but the information cannot be transferred to aircraft using different wave forms. Northrop has a pitch to solve communications problems between the F-35 and F-22: put a new radio on a Global Hawk drone and have it act like a translator between the two aircraft.

Source: www.defensenews.com

Photo Credit: U.S. Air Force/Senior Airman Tyler Woodward

Qantas Challenges Airbus and Boeing to Fly Further

Australian airline Qantas says it wants to introduce nonstop flights between Sydney and London and will choose between the Boeing 777-8X and the Airbus A350-900 to fly the 10,571 mile ultra-long-haul route. It's challenging the plane makers to tweak the designs to handle this extra range. A direct flight would cut up to four hours of travel time off the journey from Sydney to London.

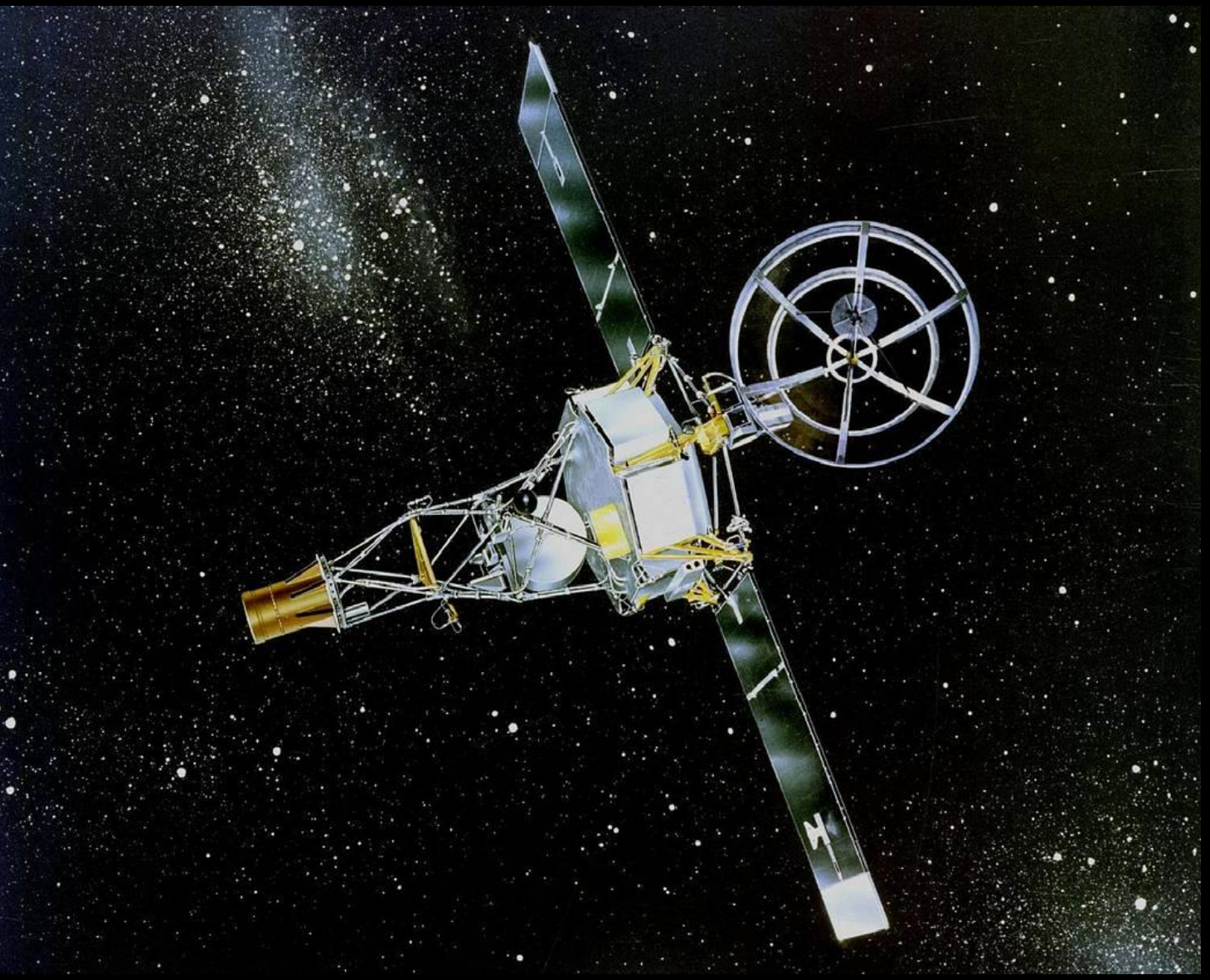
Source: www.seattletimes.com
Credit: Photo Courtesy Boeing/Dominic Gates

Saturn Plunge Nears for Cassini Spacecraft

NASA's Cassini spacecraft is two weeks from its mission-ending dive into the atmosphere of Saturn. Its fateful plunge on Sept. 15 is a foregone conclusion -- an April 22 gravitational kick from Saturn's moon Titan placed the two-and-a-half ton vehicle on its path for impending destruction. Yet several mission milestones have to occur over the coming two-plus weeks to prepare the vehicle for one last burst of trailblazing science. "The Cassini mission has been packed full of scientific firsts, and our unique planetary revelations will continue to the very end of the mission as Cassini becomes Saturn's first planetary probe, sampling Saturn's atmosphere up until the last second," said Linda Spilker, Cassini project scientist from NASA's Jet Propulsion Laboratory in Pasadena, California. "We'll be sending data in near real time as we rush headlong into the atmosphere -- it's truly a first-of-its-kind event at Saturn."

Source and Image Credit: NASA/JPL-CalTech

Aug. 27, 1962 – Mariner 2 Launched



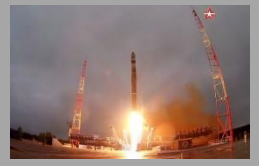
Mariner 2 was the world's first successful interplanetary spacecraft. Launched Aug. 27, 1962, on an Atlas-Agena rocket, Mariner 2 passed within about 34,000 kilometers (21,000 miles) of Venus, sending back valuable new information about interplanetary space and the Venusian atmosphere. Mariner 2 recorded the planet's temperature for the first time, revealing its very hot atmosphere of about 500 degrees Celsius (900 degrees Fahrenheit). The spacecraft's solar wind experiment was the first to measure the density, velocity, composition and variation over time of the solar wind.

Source & Image Credit: NASA/JPL

In The News

NASA Flight Controllers Shelter in Place During Storm. Flight controllers and other essential personnel at NASA's Johnson Space Center just south of Houston sheltered in place to maintain contact with the International Space Station during torrential rain and flooding across south Texas from the slow-moving remnants of Hurricane Harvey. Flight controllers monitoried a rocket firing Saturday, Aug. 26th to raise the lab's orbit slightly, putting the outpost on the proper trajectory for three crew members to depart next Saturday, Sept. 2nd for a landing in Kazakhstan. (*William Harwood @ SpaceFlightNow.com)*

Alaska could maintain mixed Airbus and Boeing fleet. Alaska Airlines could continue to operate a mixed fleet of Airbus A320 family and Boeing 737 family aircraft indefinitely, says chief executive Brad Tilden. "We feel we have enough scale to run the mixed fleet efficiently," he said at the Boyd International Aviation Forecast Summit in Las Vegas. *(Edward Russell @ FlightGlobal.com)*



Russian Inspector Satellite sets out on Orbital Endeavors with Fellow Kosmos Satellite. A previously unknown 'Inspector Satellite' separated from the Russian military-operated Kosmos 2519 satellite last week, the Russian Ministry of Defence confirmed on Wednesday and reported the small sub-satellite would be tasked with inspecting an unspecified Russian satellite via photo surveys. *(SpaceFlight101.com)*

NASA data relay craft successfully blossoms in space. NASA's new communications satellite (TDRS-M), launched to a preliminary orbit August 18th, has ascended to geosynchronous altitude more than 22,000 miles up, deployed its giant antennas and extended twin solar arrays to begin in-space commissioning. The current orbital slot is 150 degrees West longitude, over the Pacific, for checkout. Control of the satellite is being handed from Boeing's facilities in California to NASA's White Sands Complex in New Mexico for the start of on-orbit testing. Commissioning will continue through January by Boeing engineers to demonstrate the spacecraft is functioning properly before NASA accepts ownership. *(Justin Ray @ SpaceFlightNow.com)*

First F-35A Squadrons To Get Full Combat Capability In September. The U.S. Air Force's first operational F-35 squadron is slated to receive the first fully combat-capable aircraft in September, as the service contemplates sending the stealth fighter to the Pacific. The 34th Fighter Squadron, known as the "Rude Rams," of Hill AFB, Utah, is set to receive aircraft equipped with the final Block 3F software next month, which most critically will allow the fighter to employ its full suite of air-to-air and air-to-ground weapons. *(Lara Seligman @ Aerospace Daily)*