

The Aerospace Update

A photograph taken from space showing a large satellite structure with multiple rows of solar panels. The panels are dark with a grid pattern. In the background, the Earth's horizon is visible, showing a blue sky and white clouds. A small, dark, rectangular satellite (a CubeSat) is seen in the distance, floating in space. The overall scene is set against the blackness of space.

CubeSat Proving Ground in Space

Nov. 28, 2017

Image Credit: NASA

NASA Begins Checkout of Dellingr Spacecraft



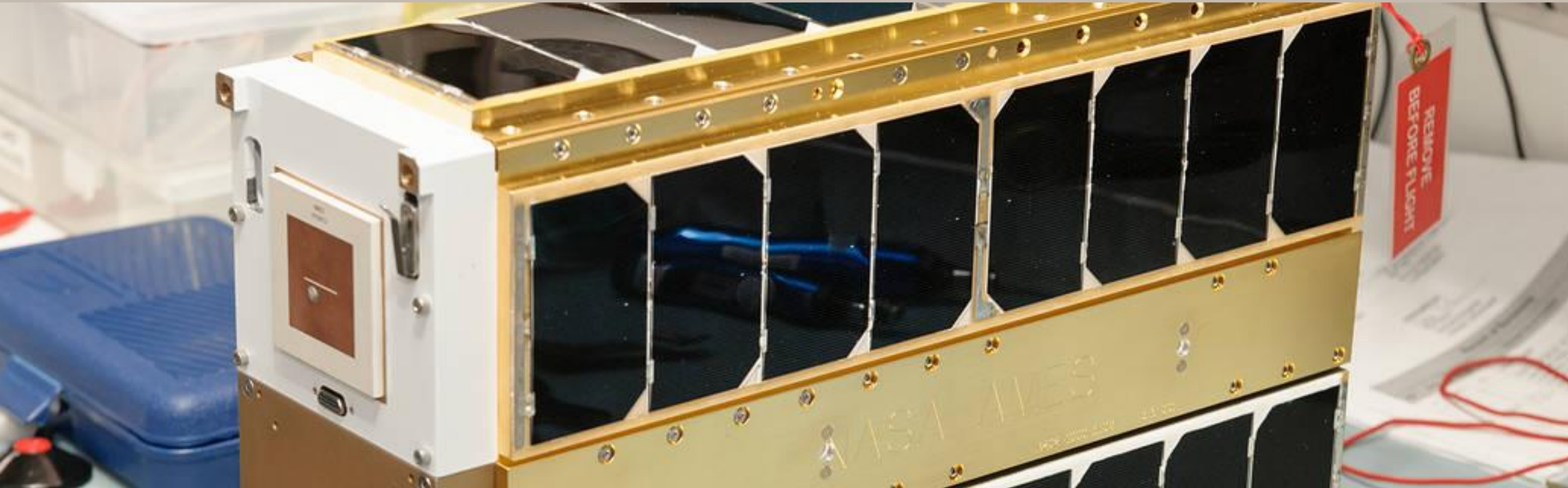
NASA ground controllers have begun checking out and commissioning a shoebox-sized spacecraft that the agency purposely built to show that CubeSat platforms could be cost-effective, reliable, and capable of gathering highly robust science. The Dellingr spacecraft, named after the mythological Norse god of the dawn, shown here on the NanoRacks CubeSat Deployer aboard the International Space Station just before the CubeSat was released into its low-Earth orbit on Nov. 20th, was designed to not only demonstrate the vigor of its design, but also gather high-quality data about the Sun's influence on Earth's upper atmosphere using a suite of miniaturized instruments and components. The spacecraft carries three heliophysics-related instruments, including the Ion-Neutral Mass Spectrometer that will sample the densities of neutral and ionized atom species in the atmosphere, and two miniaturized magnetometer systems to measure Earth's magnetic fields. Dellingr also carries a miniaturized device for deploying one of the magnetometers and its UHF antenna as well as a fine sun sensor that will orient the instrument to the Sun. A new thermal-control technology used to regulate spacecraft temperatures also will be demonstrated.

“Exo-Brake” Could Land CubeSats Without Thrusters



NASA launched the Technology Educational Satellite, or TechEdSat-6, to the International Space Station on Orbital ATK's Cygnus spacecraft from NASA's Wallops Flight Facility in Virginia on Nov. 12th. This bread loaf-sized satellite is part of a continuing series to demonstrate the "Exo-Brake" parachute device, advanced communications and wireless sensor networks. TechEdSat-6 was released into low-Earth orbit from the NanoRacks platform on Nov. 20, to begin a series of wireless sensor experiments which will be the first self-powered tests, expanding the capabilities of sensor networks for future ascent or re-entry systems. This is the fourth TechEdSat satellite carrying an updated version of the Exo-Brake that will demonstrate guided controlled re-entry of small spacecraft to safely return science experiments from space. The Exo-Brake's shape can be changed to vary the drag on the satellite to provide a low-cost, propellant-less method of returning small payloads quickly, and to fairly precise locations, for retrieval

NASA Is Sending E. coli to Space for Astronaut Health



One of the agency's latest small satellite experiments is the E. coli Anti-Microbial Satellite, or EcAMSat, which will explore the genetic basis for how effectively antibiotics can combat E. coli bacteria in the low gravity of space. This CubeSat – a spacecraft the size of a shoebox built from cube-shaped units – has just been deployed from the space station, and may help us improve how we fight infections, providing safer journeys for astronauts on future voyages, and offer benefits for medicine here on Earth.

Source & Image Credits: NASA

Three Video Imaging Satellites Launched from China

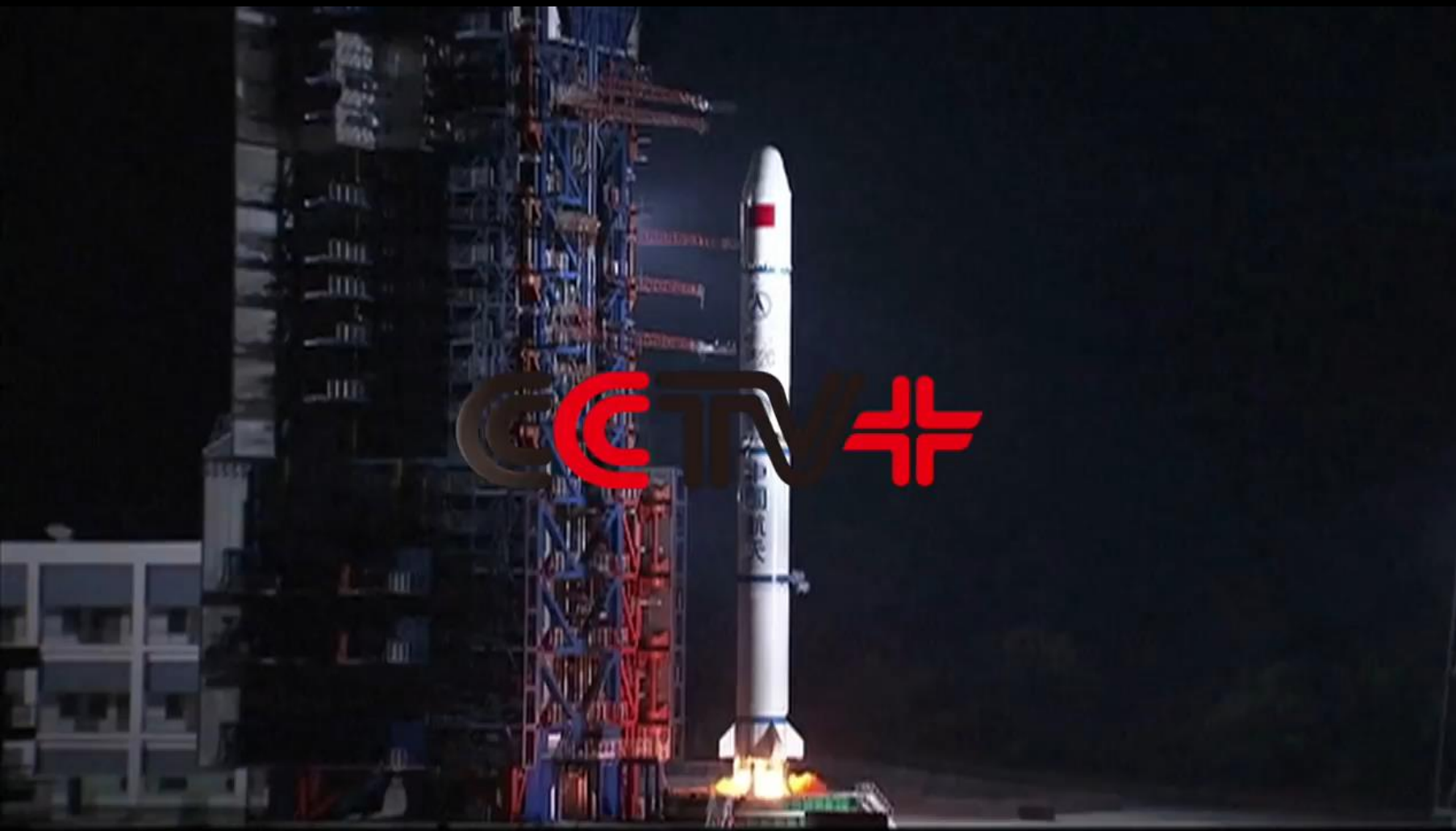


Video Credit: New China TV

A Long March 6 booster took off Tuesday, Nov 21st from China with three Earth observation satellites designed to record high-definition video and color imagery from a perch more than 300 miles above the planet. Chinese state media declared the launch successful, giving the light-class Long March 6 rocket a two-for-two record since its inaugural flight in September 2015. The three Jilin Earth-imaging satellites launched Tuesday — named Jilin 1-04, Jilin 1-05 and Jilin 1-06 — are owned by Chang Guang Satellite Technology Co. Ltd., a commercial spinoff of the Chinese Academy of Sciences. The addition of three new satellites with Tuesday's launch is expected to reduce the Jilin network's revisit time from three days to one day.

Source: Stephen Clark @ SpaceFlightNow.com

Three Chinese Military Surveillance Satellites Successfully Launched




Video courtesy of CCTV+

A Chinese Long March 2C rocket placed three experimental military surveillance satellites in orbit Friday Nov 26th, the second set of related triplets launched in less than two months. The two-stage Long March 2C booster deployed the three Yaogan 30-02 spacecraft in an orbit around 370 miles (600 kilometers) above Earth, inclined 35 degrees to the equator, according to tracking data released by the U.S. military. The Yaogan series of satellites are believed to be operated by the Chinese military for intelligence-gathering purposes. Some analysts suggested the satellite triplets launched Sept. 29 and on Friday could be testing new electronic eavesdropping equipment or helping the Chinese military track U.S. and other foreign naval deployments.

Source: Stephen Clark @ SpaceFlightNow.com

Contact Lost With Satellites After Soyuz Launch



Controllers have been unable to contact a weather satellite launched on a Soyuz rocket from the country's new Vostochny Cosmodrome in Russia's Far East Nov. 28th, raising fears of a launch failure. The lack of contact has raised concerns that the satellites failed to reach the proper orbit, or may not be in orbit at all. A report by the Russian news service Interfax, citing a Russian industry source, claimed that the Fregat upper stage was in the wrong orientation during its initial burn, sending the stage and its satellite payload into the Atlantic Ocean. That report has not been confirmed by Roscosmos.

Source: Jeff Foust @ SpaceNews.com

Photo Credit: Roscosmos




Space Dust May Transport Life Between Worlds

Life on our planet might have originated from biological particles brought to Earth in streams of space dust, a study suggests. Fast-moving flows of interplanetary dust that continually bombard our planet's atmosphere could deliver tiny organisms from far-off worlds or send Earth-based organisms to other planets, according to research. The research from the University of Edinburgh calculated how powerful flows of space dust—which can move at up to 70 km a second—could collide with particles in our own atmospheric system. The study, published in *Astrobiology*, was partly funded by the Science and Technology Facilities Council.

Source: Phys.org

Image Credit: CC0 Public Domain

On-Orbit Satellite Servicing: The Next Big Thing in Space?



A team of researchers and Pentagon contractors was recently selected to organize a space industry consortium that will consider new “rules of the road” for commercial on-orbit activities like repairing and refueling satellites. The effort, led by DARPA, is being touted as a major step in the transition of on-orbit services from experimental to reality and ultimate commercial success. “Satellite servicing and related technologies are the foundation of the future economic development of space and delivering increased benefits from space to the world,” said Brian Weeden, Director of Program Planning of the Secure World Foundation.

Drone Race: Human Versus Artificial Intelligence

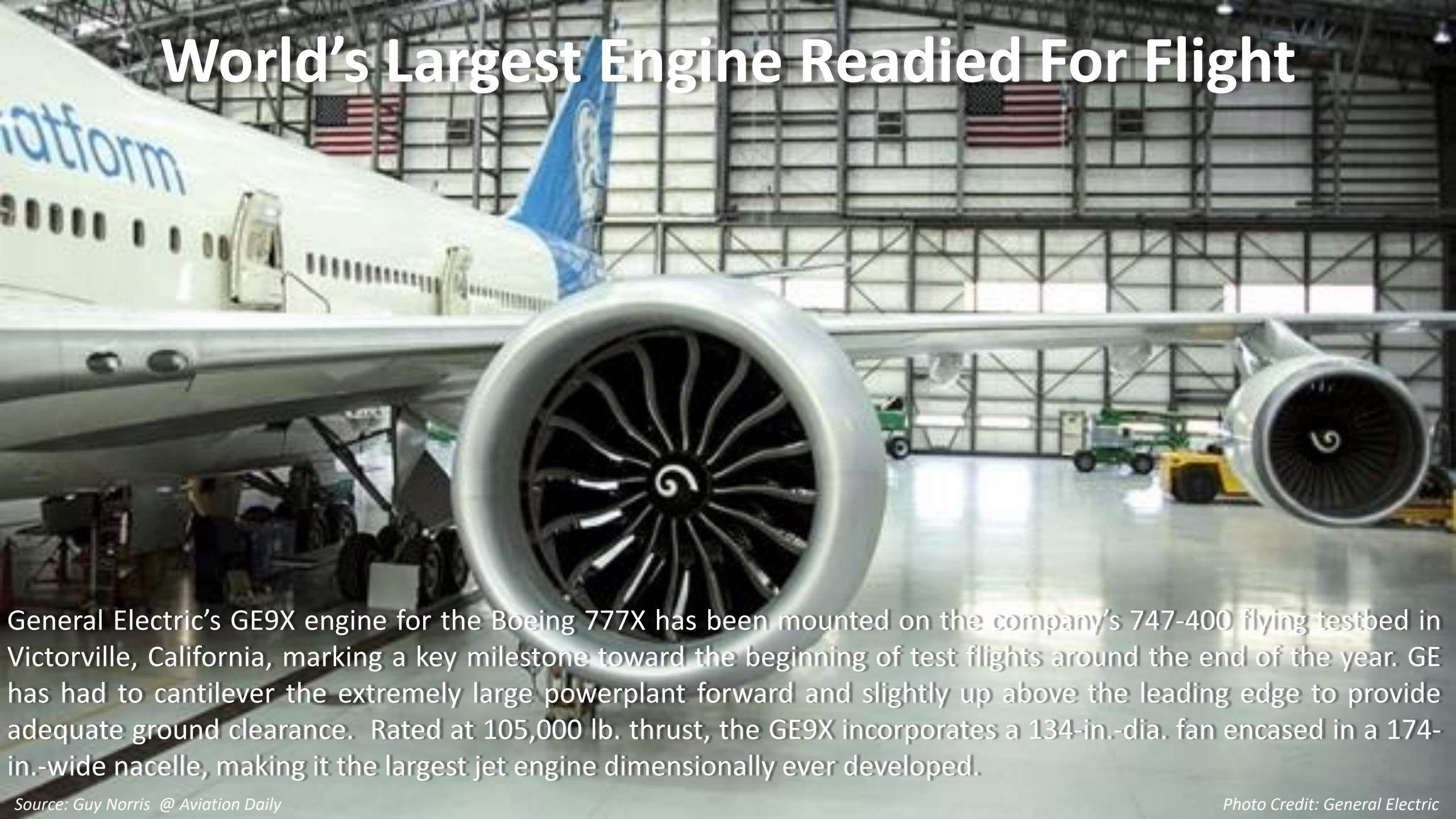


Jet Propulsion Laboratory
California Institute of Technology

Drone Race: Human vs. Machine

Researchers at NASA's Jet Propulsion Laboratory in Pasadena, California, put their work to the test recently. Timing laps through a twisting obstacle course, they raced drones controlled by artificial intelligence (A.I.) against a professional human pilot Ken Loo. The race capped two years of research into drone autonomy funded by Google. While the A.I. and human pilot started out with similar lap times, after dozens of laps, Loo learned the course and became more creative and nimble. For the official laps, Loo averaged 11.1 seconds, compared to the autonomous drones, which averaged 13.9 seconds. But the latter was more consistent overall. Where Loo's times varied more, the A.I was able to fly the same racing line every lap.

World's Largest Engine Readied For Flight



General Electric's GE9X engine for the Boeing 777X has been mounted on the company's 747-400 flying testbed in Victorville, California, marking a key milestone toward the beginning of test flights around the end of the year. GE has had to cantilever the extremely large powerplant forward and slightly up above the leading edge to provide adequate ground clearance. Rated at 105,000 lb. thrust, the GE9X incorporates a 134-in.-dia. fan encased in a 174-in.-wide nacelle, making it the largest jet engine dimensionally ever developed.

Textron Launches Cessna SkyCourier with 100-Plane FedEx Deal

A white Cessna SkyCourier twin-engine turboprop aircraft is shown in flight, banking to the right. The aircraft features two large propellers and a high-wing configuration. The word "SKY COURIER" is visible on the side of the fuselage. The background consists of a vast, mountainous landscape under a clear blue sky with some light clouds. The lighting suggests a bright, sunny day.

Textron Aviation took the wraps off a new utility twin aircraft that will become the largest in its growing in-production turboprop lineup. At the same time, the manufacturer announced its first customer, FedEx Express, with an order for up to 100 in hand. A long-time customer of Textron Aviation's Cessna Caravan, FedEx yesterday formally signed a contract for 50 cargo variants of the new Cessna SkyCourier 408 and options for up to 50 more. Including options, the order carries a potential value of up to \$550 million, based on the \$5.5 million list price.

Airbus To Lead BAe 146 Electric Propulsion Demonstration



Airbus, Rolls-Royce, and Siemens will collaborate on a hybrid-electric technology demonstrator expected to fly in 2020 called the E-Fan X, the companies announced Tuesday at the Royal Aeronautical Society in London. The partners plan to replace one of the four gas turbine engines in a BAe 146 test bed with a two-megawatt electric motor. Plans call for the replacement of a second gas turbine with an electric motor once the program achieves sufficient system maturity, said Airbus.

Source: Gregory Polek @ AINonline.com

Image: Airbus

In The News



Space Station Cargo Flight Next on SpaceX's Launch Schedule. In a reshuffling of SpaceX's launch schedule, a Falcon 9 rocket is set for liftoff no earlier than Dec. 8 on a mission to deliver several tons of supplies and experiments to the International Space Station and return to service a Cape Canaveral launch pad damaged in a catastrophic rocket explosion last year. *(Stephen Clark @ SpaceFlightInsider.com)*



James Webb Space Telescope Completes Final Cryogenic Testing. NASA's James Webb Space Telescope sits inside Chamber A at NASA's Johnson Space Center in Houston after having completed its cryogenic testing on Nov. 18, 2017. This marked the telescope's final cryogenic testing, and it ensured the observatory is ready for the frigid, airless environment of space. Webb is expected to launch from Kourou, French Guiana, in the spring of 2019. *(NASA.gov)*



NASA's InSight Lander Completes Thermal Vacuum Testing. The next robotic mission to Mars, NASA's InSight lander, has undergone a thermal vacuum (TVAC) test to ensure it can survive the six-month journey to the Red Planet. The spacecraft is set to launch in May 2018. InSight, which stands for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport, is a stationary lander, much like the 2008 Phoenix spacecraft. In fact, much of the design is based on that successful mission. InSight is operated by NASA's Jet Propulsion Laboratory (JPL) but is being manufactured by Lockheed Martin. *(Derek Richardson @ SpaceFlightInsider.com)*



Qantas is Set to Fly a Plane Powered by Mustard. Qantas is set to fly a plane powered by mustard from Australia to the United States. Early next year, the Boeing 787-9 Dreamliner will fly to Los Angeles on a mix of standard jet fuel and 30 percent biofuel made from a mustard seed. Qantas hopes to develop a sustainable aviation fuel in Australia, reduce carbon emissions by 20 percent and cut fuel costs, one of the airline's biggest expenses. *(Peter Devlin@dailymail.co.uk)*



Debut of SpaceX's Falcon Heavy rocket now planned in January. SpaceX's first Falcon Heavy rocket is expected to roll out to pad 39A at NASA's Kennedy Space Center for the first time next month for a hold-down firing of its 27 Merlin main engines, but the mega-rocket's inaugural test launch will slip into January, officials confirmed Tuesday. *(Stephen Clark @ SpaceFlightNow.com)*