

# The Aerospace Update

A satellite image of Madagascar, showing the island's coastline and interior. The land is a mix of green and brown, with a prominent yellowish-brown area in the center. The surrounding ocean is a deep blue-green. The sky is filled with numerous white, fluffy clouds scattered across the scene.

MADAGASCAR

May 2, 2017

A Celebration of Clouds

VideoCredit: NASA



# SpaceX Successfully Boosts Top Secret NRO Satellite Into Space



A SpaceX Falcon 9 rocket was fired into space from Florida’s Atlantic coastline Monday, May 1<sup>st</sup> with a classified payload for the National Reconnaissance Office, and then returned to Cape Canaveral for a pinpoint landing. After separation of the 1<sup>st</sup> and 2<sup>nd</sup> stage, SpaceX coverage of the launch progress ceased in a bid to keep the satellite’s final orbit and purpose secret. SpaceX’s first mission dedicated to a U.S. national security payload was declared a success.

Video Credit: SpaceX

Source: Stephen Clark @ SpaceFlightNow.com

# Falcon 9 Booster Nails Landing

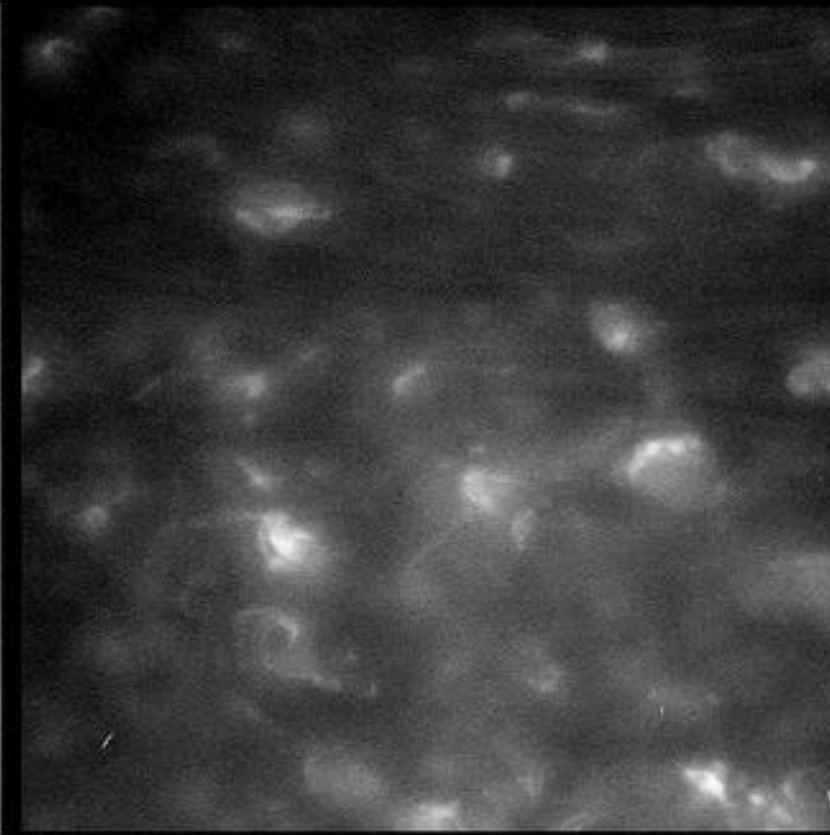
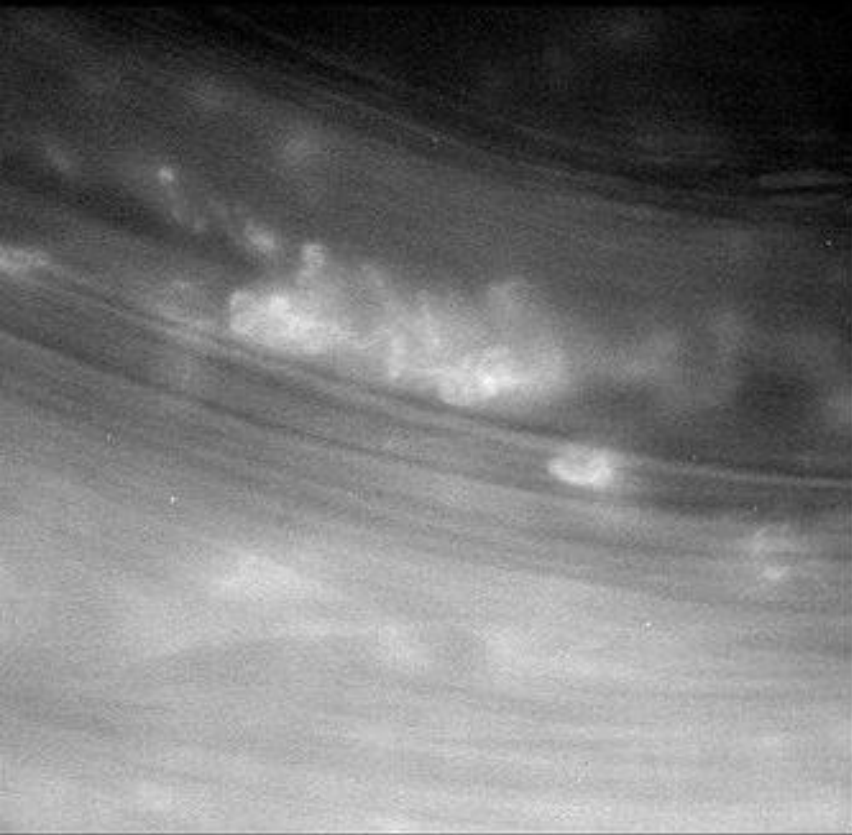


Three of the Merlin engines at the base of the launcher ignited for “boost-back” and “entry” burns to slow the rocket’s descent, and grid fins helped stabilize the first stage as it encountered a thicker air stream deeper in the atmosphere. The booster’s center engine started up seconds before touchdown for a final braking maneuver, and four landing legs extended as the rocket approaching Landing Zone 1 at Cape Canaveral Air Force Station. The rocket landed around nine minutes after liftoff, settling on a concrete pad around 9 miles (15 kilometers) south of where the Falcon 9 took off. SpaceX intends to inspect the rocket, which was an all-new vehicle, and ready it for another mission.

*Video Credit: SpaceX*

*Source: Stephen Clark @ SpaceFlightNow.com*

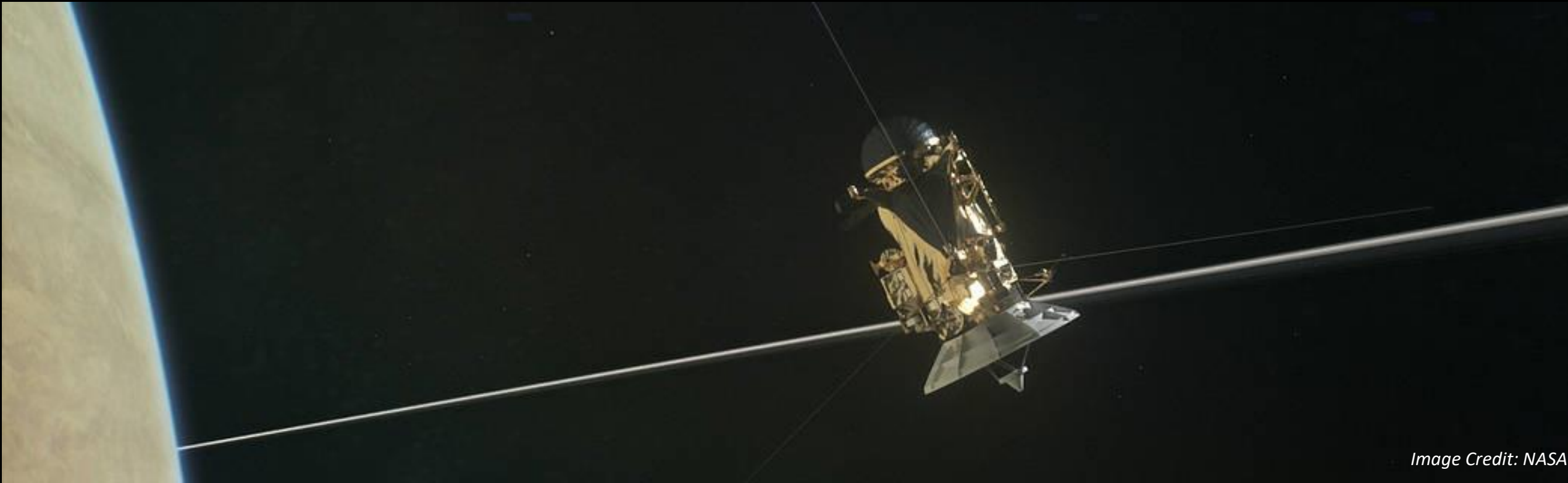
# Cassini Sends Back First Images From Its Saturn Dives



Yesterday, space lovers everywhere held their breath as the Cassini space probe began a potentially dangerous dive between Saturn's atmosphere and its system of rings. In the wee hours of this morning, NASA established that Cassini had survived. Now the spacecraft has begun sending back a stream of images that are the closest look at Saturn's atmosphere yet. According to a NASA press release, Cassini came within 1,900 miles of the tops of Saturn's clouds and about 200 miles from the inner rings.



# Cassini Finds 'The Big Empty' Close to Saturn



*Image Credit: NASA*

As NASA's Cassini spacecraft prepares to shoot the narrow gap between Saturn and its rings for the second time in its Grand Finale, Cassini engineers are delighted, while ring scientists are puzzled, that the region appears to be relatively dust-free. This assessment is based on data Cassini collected during its first dive through the region on April 26<sup>th</sup>. With this information in hand, the Cassini team will now move forward with its preferred plan of science observations which means the spacecraft's saucer-shaped main antenna will not be needed as a shield during most future dives through the ring plane allowing more science data collection.

*Source: [www.nasa.gov/feature/cassini-finds-the-big-empty-close-to-saturn](http://www.nasa.gov/feature/cassini-finds-the-big-empty-close-to-saturn)*

# China and Europe's 'Moon Village' Could Boost Lunar Mining and Space Tourism



Chinese and European space agencies have come together to consider the possibility of a new joint base on the Moon. Representatives from both groups have begun discussing collaborative projects including the moon base alongside other joint schemes and as China continues to grow in the exploration of space, a human outpost could benefit both parties.

# Engineers Investigate a Simple, No-Bake Recipe to Make Bricks from Martian Soil



A brick made of Martian soil simulant compacted under pressure. The brick was made without any additional ingredients and without baking. Proposals to use Martian soil to build habitats for manned missions on the planet are not new. In fact, UC San Diego engineers were initially trying to cut down on the amount of polymers required to shape Martian soil into bricks and accidentally discovered that none were needed. To make bricks out of Martian soil simulant, without additives or heating to make material, requires two steps. One is to enclose the simulant in a flexible container, in this case a rubber tube. Two is to compact the simulant at a high enough pressure. The amount of pressure needed for a small sample is roughly the equivalent of dropping a 10-lb hammer from a height of one meter, said Yu Qiao, a professor of structural engineering at UC San Diego.

Source: [www.phys.org](http://www.phys.org)

Image Credit: Jacobs School of Engineering/UC San Diego



# 'Dragonfly' Could Answer Some Big Questions About Saturn's Largest Moon



A relocatable lander could explore the hazy skies of Saturn's intriguing moon Titan, according to a new mission proposal. As the eight-bladed drone travels across the moon, it could investigate some of the most promising potentially habitable sites on the Saturn satellite, while methane and ethane fall from the sky and flows as rivers and lakes. The lander-size instrument, known as Dragonfly, would take advantage of Titan's low gravity and thick atmosphere to visit multiple sites over several years, moving from one promising site to the next and recharging between the brief flights .

Source: [www.nbsnews.com](http://www.nbsnews.com)

Image Credit: APL/Michael /Carrol



# 'Ice Ball' Planet Discovered Through Microlensing



This artist's concept shows OGLE-2016-1195b, a planet discovered through a technique called microlensing. The planet was reported in a 2017 study in the *Astrophysical Journal Letters*. Study authors used the Korea Microlensing Telescope Network (KMTNet), operated by the Korea Astronomy and Space Science Institute and NASA's Spitzer Space Telescope, to track the microlensing event and find the planet. Although OGLE-2016-1195b is about the same mass as Earth, and the same distance from its host star as our own planet is from the sun, the similarities may end there. This planet is nearly 13,000 light-years away and orbits a star so small, scientists aren't sure if it's a star at all.

*Source: [www.phys.org](http://www.phys.org)*

*Image Credit: JPL (Artist's Impression)*

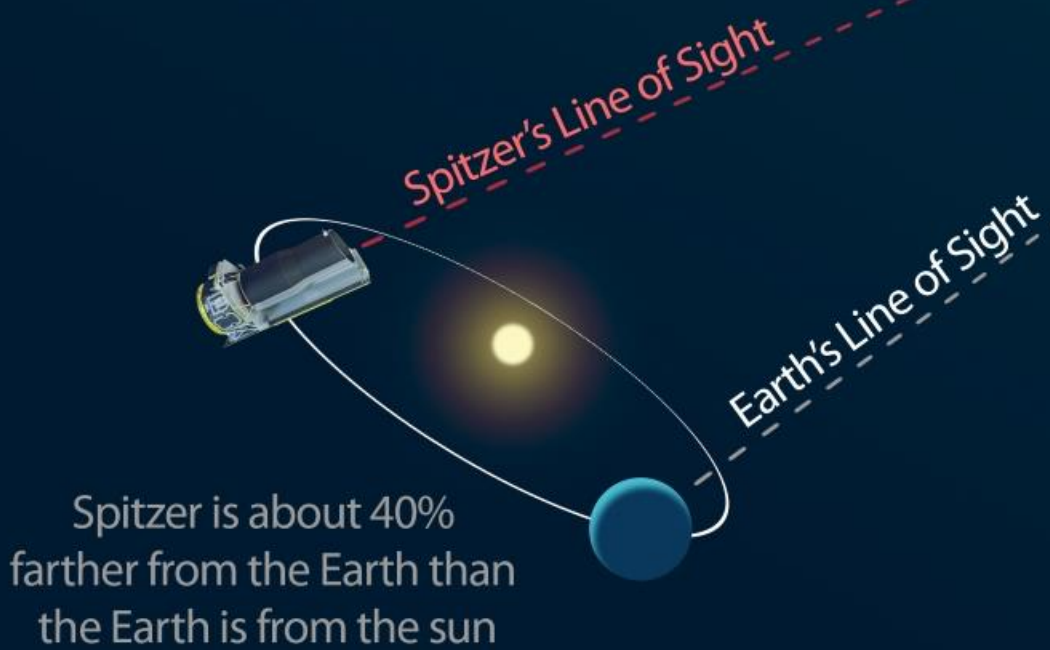


# Finding Planets With Microlensing

Astronomers use a technique called microlensing to find distant planets in the heart of our galaxy, up to tens of thousands of light-years away. This infographic illustrates how NASA's Spitzer Space Telescope, from its perch in space, helps nail down the distance to those planets.

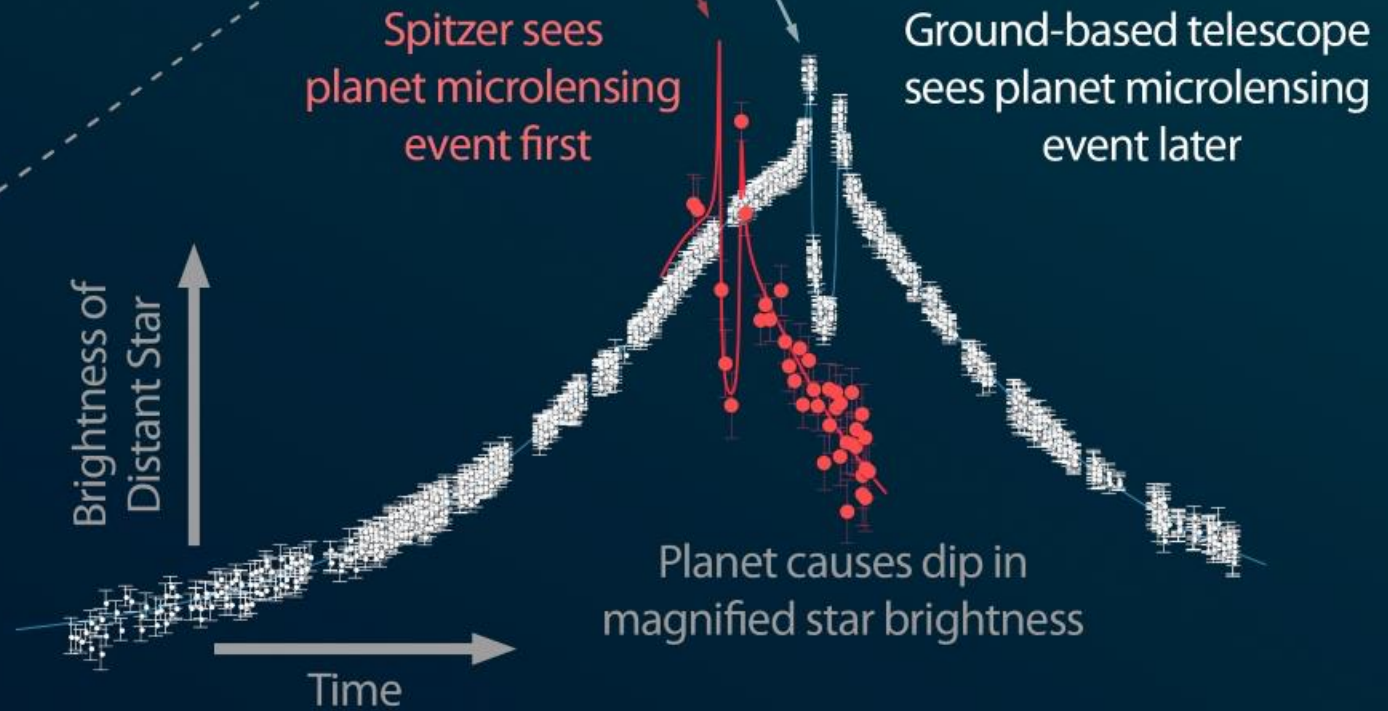
A microlensing event occurs when a faint star passes in front of a distant, more visible star. The gravity of the foreground star acts like a magnifying glass to brighten the distant star. If a planet is present around the foreground star, its own gravity distorts the lens effect, causing a brief dip in the magnification.

The great distance between Earth and Spitzer helps astronomers determine the distance to the lensing planetary system. Spitzer can see lensing events before or after telescopes on Earth, and this timing offset reveals the distance to the system.




Foreground star & planet...  
(not seen by telescopes)

... pass in front of  
distant star  
(seen by telescopes)





# Hubble's Bright Shining Lizard Star

A Hubble Space Telescope image showing a bright star on the left and a galaxy on the right. The star is a yellowish-white point source with a prominent four-pointed diffraction pattern. The galaxy is a blue, irregularly shaped object with a central bright region and a diffuse, filamentary structure. The background is a dark field of stars, with several other bright stars visible, some with diffraction patterns. The overall scene is set against a black background.

This Hubble Space Telescope image captures both a galaxy and a little-studied star. Only in this way can a normal star outshine an entire galaxy. Astronomers studying distant objects call these stars “foreground stars,” as their bright lights contaminate the faint light from the more distant and interesting objects they actually want to study. The galaxy on the right is called NGC 7250 which NASA notes is extremely active forming stars and playing host to supernovas. This galaxy is made up of billions of stars and is located over 45 million light-years away. The ultra-bright star to the left of the galaxy is called TYC 3202-450-1, located in the constellation called Lacerta (The Lizard).

*Source: [www.nasa.gov](http://www.nasa.gov)*

*Photo Credit: ESA/Hubble & NASA*

# NASA Tests Rocket Powered By Paraffin Fuel



The paraffin wax used in familiar products like candles and crayons is also what fuels the Peregrine hybrid rocket motor, a revolutionary aerospace engineering project from NASA and Stanford University. Paraffin fuel burns three times faster than conventional fuels, and therefore can provide more thrust and higher performance than existing hybrid rockets. In addition to being non-toxic – which helps make its manufacture and transport cheaper and safer – the paraffin-based fuel works under challenging environmental conditions, such as the very low temperatures found on the surface of Mars.



# May 2 & 3, 1923 - The First Nonstop Transcontinental Flight



U.S. Army Air Service pilots Lt. John A. Macready and Lt. Oakley G. Kelly made the first nonstop transcontinental flight on May 2–3, 1923, in the Fokker T-2 transport. They took off from Roosevelt Field, Long Island, and landed at Rockwell Field, San Diego, 2,470 miles and just under 27 hours later. During the flight, Macready and Kelly faced flying over unknown territory at night and through storms and rain for over half the flight. The Army Air Service approved the flight to test the capability and endurance of Macready and Kelly, the new T-2 transport, and the Liberty engine. The two pilots and the T-2 also demonstrated the potential of military and commercial aircraft as practical long-distance technologies.

# In The News



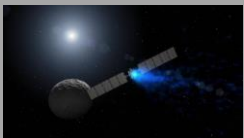
**SpaceShipTwo Tests Feather System on Latest Glide Flight.** Virgin Galactic said May 1 it successfully tested the system on its SpaceShipTwo suborbital vehicle that permits a safe reentry on the vehicle's fourth unpowered test flight. On this test, the test pilots engaged the vehicle's "feather" system, which raises the spaceplane's twin tail booms, after release from its WhiteKnightTwo carrier aircraft. The pilots then lowered the tail booms into their regular configuration and glided to a runway landing in Mojave. *(Jeff Foust @ SpaceNews.com)*



**Iridium Starting to Deorbit Legacy Satellites as Next Constellation Comes Online.** Now that its first batch of next generation satellites is in orbit and operational, mobile satellite services provider Iridium is preparing deorbit procedures for its legacy fleet of low-Earth orbit satellites that launched in the late 1990s. Iridium plans to launch four more sets of next-generation satellites this year. *(Caleb Henry @ SpaceNews.com)*



**NASA Won't Have New Spacesuits For Years - Despite \$200 Million Investment.** NASA is about to run out of spacesuits and it is years away from having any new ones ready for future missions, according to a new report. Functioning spacesuits needed for missions on the ISS are running low. NASA is committed to the ISS program until 2024, but it may not have enough suits to get that far. Astronauts who will walk around on the Moon will have very different mobility, temperatures, radiation levels and pressures to deal with and these conditions will be different again on Mars necessitating new spacesuit designs. *(Brid-Aine Parnell @ Forbes.com)*



**NASA's Dawn Spacecraft Experiences Reaction Wheel Malfunction.** During preparations for observing Ceres' Occator Crater, one of NASA's Dawn spacecraft's remaining reaction wheels stopped functioning. The probe controls its orientation in space by changing the speed these gyroscope-like devices spin. Dawn's current orbit will still allow it perform opposition observations. This is the third of the spacecraft's four reaction wheels to fail. According to the mission team, the reaction wheel's malfunction will not significantly impact the remainder of the spacecraft's extended mission at Ceres. *(Jim Sharkey @ SpaceFlightInsider.com)*