Human Space Exploration Update *(Feb 1-24, 2017)*

NASA Authorization Legislation

- **Senate:** Senate passes 2017 NASA Transition Authorization Act The U.S. Senate passed an updated NASA authorization measure on Friday, one similar to a House measure approved in the last Congress. Formulated with bi-partisan support, the Senate measure urges NASA to study how the Orion capsule might serve as a backup to the commercial crew vehicles under development by Boeing and SpaceX, the CST-100 Starliner and crewed Dragon. The crewed Starliner and Dragon are to transport astronauts to and from the International Space Station. The bill also questions the value of the Asteroid Redirect Mission, a robotic effort that would extract a boulder from an asteroid and maneuver it into orbit around the moon, where it could be studied by astronauts launched aboard a Space Launch System rocket and Orion crew vehicle in the 2020s.

International Space Station

- **New ISS Airlock:** The International Space Station will get a new, private airlock in 2019 Houston-based Nanoracks has reached an agreement with NASA for the installation of a cargo airlock on the U.S. segment of the International Space Station, possibly at the Tranquility module. Boeing will assemble and install a compatible berthing mechanism. The new hardware could be installed in 2019. Nanoracks expects to use the airlock to increase the numbers of small satellites it can launch from the Space Station.

- **Long-Duration Space Flight:** First results on Scott Kelly after year in space reveal space travel changes DNA NASA's offers the initial results of its twins study, a look at how long duration spaceflight alters the body's genetics. The findings are based on studies of NASA's Scott Kelly, who spent 340 days aboard the International Space Station in 2015-16 and his twin brother, Mark Kelly, a retired NASA astronaut who remained on Earth.

Orion and Space Launch System

- **Orion Update:** Insider exclusive: Orion designed to keep crew in the 'loop' Lockheed Martin, NASA's prime contractor for development of the Orion crew module, is paying close attention to the requirements and limitations of future crew members as it proceeds, according to the company's crew module director. Work is underway at NASA's Johnson Space Center on the spacecraft that is to start human explorers on new missions of deep space exploration.

- **SLS Test:** Space Launch System engine test brings out a rainbow NASA conducted its first 2017 ground test firing of an RS-25 rocket engine, which is like those that will power the first stage of the Space Launch System (SLS) exploration rocket. The 380 second test firing, closely monitored by propulsion engineers, took place at NASA's Stennis Space Center in Mississippi. Currently, the first test launch of the SLS is planned for late 2018. The SLS first stage includes four of the RS-25s, which were left over from NASA space shuttle fleet. (See also: ULA gives sneak peek at SLS' second stage before it gets shipped to Florida; NASA Space Launch System opens pathway to Mars -- and thousands of jobs on Earth; Culberson praises NASA's Space Launch System and Earth Science programs

- **Commercial Spaceflight Federation Endorsement**: Leading commercial space group embraces NASA's biggest rocket Alan Stern, chair of the Commercial Spaceflight Federation, conveyed the organization's support for NASA's Space Launch System during a Washington conference this week. The federation sees benefits accruing from the NASA-led development of the SLS, a crucial element of NASA's plans to resume human deep space exploration, said Stern. (See also: Commercial group endorses use of Space Launch System)

Commercial Space Transportation

- **Commercial Crew:** Commercial crew providers remain confident in schedules Prepare for the inaugural launches of astronauts by Boeing and SpaceX in 2018, representatives of the two companies are declaring in response to a recent U.S. Government Accountability Office audit that cautions the flights could be delayed until 2019. Boeing's Starliner 100 and SpaceX's crewed Dragon are in development under NASA's Commercial Crew Program to restore a U.S. human launch capability lost when NASA's space shuttle fleet was retired in 2011. Boeing and SpaceX are to transport astronauts to and from the International Space Station. (See also: NASA to provide Commercial Crew backup plan by March 13 in response to GAO)

- **Boeing Starliner:** Exclusive: Boeing's space taxis to use more than 600 3-D printed parts Boeing plans to feature 3-D printing technologies in the production of the company's CST-100 Starliner, which is in development under NASA's Commercial Crew Program for the transportation of astronauts to and from the International Space Station. Oxford Performance Materials will be the supplier.

- **SpaceX Resupply Mission to ISS:** SpaceX makes good on Space Station delivery a little late After a day's delay, SpaceX's tenth Dragon resupply mission spacecraft rendezvoused with the International Space Station early Thursday. European Space Agency astronaut Thomas Pesquet and NASA's Shane Kimbough teamed to capture the capsule with its 5,500 pound cargo using the Station's Canadian robot arm at 5:44 a.m., EST. The capsule, loaded with science experiments as well as crew supplies, is to remain berthed to the Space Station for about one month.

Space Policy, Missions, Benefits, International …

- **Crewed EM-1 Mission:** Panel urges caution as NASA studies flying crew on first SLS; ESA deal hinges on what Trump does with NASA's human spaceflight plans; NASA just got real about returning to the moon; Expert panel supports study to accelerate first crewed SLS mission; Trump makes NASA add astronauts to moon mission, could save $10 billion; NASA to study launching astronauts on first SLS mission

- **Lunar Exploration:** Moon is star of congressional hearing on NASA's future The U.S. should return human explorers to the moon's surface, according to Jim Bridenstine, the Oklahoma congressman often mentioned as the Trump administration's choice to become NASA administrator. The lawmaker spoke Thursday during a U.S. House Science, Space and Technology Committee hearing on NASA's future. Others who testified echoed support for a human return to the moon before attempting to explore Mars. They included Thomas Young, a former Lockheed Martin executive, NASA Goddard Space Flight Center director and frequent White House space policy advisor, and Tom Stafford, a former NASA Apollo astronaut and advisor to NASA on the International Space Station. (See also: Bill introduced to redirect NASA to Moon, establish sustained presence

- **Cis-Lunar Space:** Cis-lunar space: The next 30 years A United Launch Alliance vision would have 1,000 people living and working in space in the next three decades helping to expand the global economic sphere. They would be mining resources from the moon and the asteroids,

manufacturing products, repairing orbiting satellites, establishing solar power utilities and refueling rockets. They would live and work in commercial habitats in cis-lunar space and the surface of the moon. ULA, a joint venture between Boeing and Lockheed Martin, presented its vision to a collection of experts gathered in Colorado earlier this month, writes Paul Spudis, a planetary scientist and participant.

- **China and Mars:** Why China wants to go to Mars China's plans to launch a Mars lander in 2022 are part of a larger strategy to become a global force in space. The lander, designed to seek out methane in the thin Martian atmosphere, would help to address questions of whether there was, or is, microbial life on the red planet and lay ground work for human exploration in the 2030s.

Citizens for Space Exploration *– a pro-space, taxpayer, grassroots advocacy group (www.citizensforspace.org) – has travelled to Washington, D.C. the past 25 years to meet face-to-face with Members/staff of Congress to discuss the value of America's investment in space exploration. In order to sustain that dialogue on a regular basis, Citizens distributes "Space Exploration Update" to Congressional offices on a weekly basis. The intent is to provide an easy, quick way to stay abreast of key human space exploration program and policy developments.*