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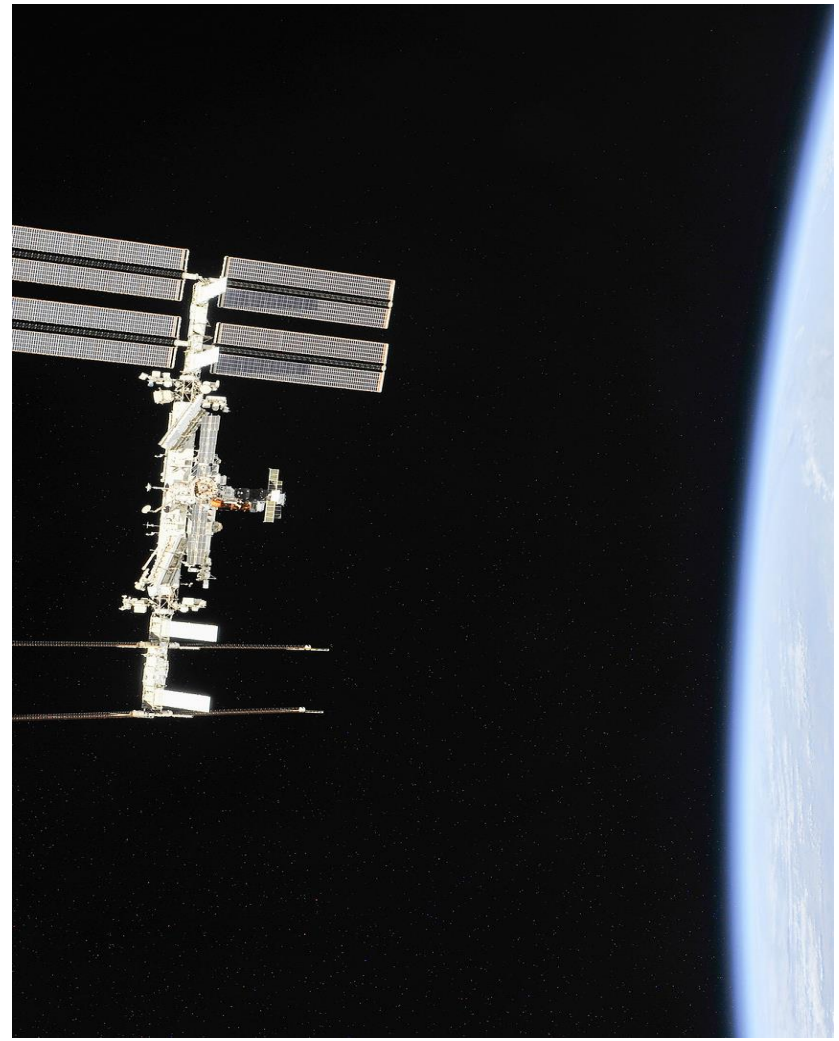
NASA, Axiom Agree to First Private Astronaut Mission on Space Station

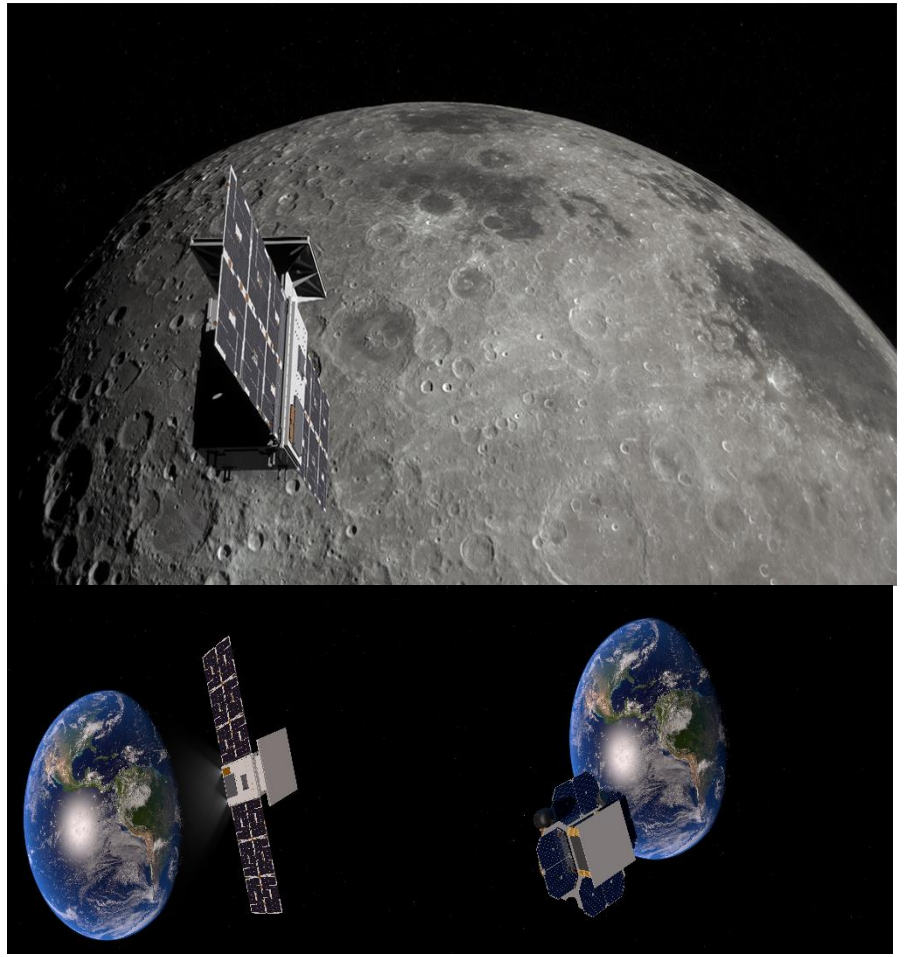


- NASA, Axiom Agree to First Private Astronaut Mission on Space StationThe International Space Station photographed by Expedition 56 crew members from a Soyuz spacecraft after undocking on Oct. 4, 2018.Credits: NASA/RoscosmosNASA and Axiom Space have signed an order for the first private astronaut mission to theInternational Space Stationto take place no earlier than January 2022."We are excited to see more people have access to spaceflight through this first private astronaut mission to the space station," said Kathy Lueders, associate administrator for human exploration and operations at NASA Headquarters. "One of our original goals with the Commercial Crew Program, and again with our Commercial Low-Earth Orbit Development Program, is that our providers have customers other than NASA to grow a commercial economy in low-Earth orbit."The spaceflight, designated as Axiom Mission 1 (Ax-1), will launch from NASA's Kennedy Space Center in Florida and travel to the International Space Station. Once docked, the Axiom astronauts are scheduled to spend eight days aboard the orbiting laboratory. NASA and Axiom mission planners will coordinate in-orbit activities for the private astronauts to conduct in coordination with space station crew members and flight controllers on the ground.Axiom will purchase services for the mission from NASA, such as crew supplies, cargo delivery to space, storage, and other in-orbit resources for daily use. NASA will purchase from Axiom the capability to return scientific samples that must be kept cold in transit back to Earth."The first private crew to visit the International Space Station is a watershed moment in humanity's expansion off the planet and we are glad to partner with NASA inmaking it happen," said Axiom President and CEO Michael Suffredini. "A thriving commercial marketplace in low-Earth orbit begins with expanding access to serious, nontraditional users and that is exactly the aim of our private astronaut missions." NASA hasopenedup the space station for commercial activities, including private astronaut missions, as part ofits planto develop a robust and competitive economy in low-Earth orbit. The agency'sneedsto achieve that goal –such as research on the effects of the space environment on humans, technology development, and in-flight crew testing –will remain in place after the retirement of the International Space Station. Commercial entities can meet those needs, providingdestinationsand transportation capabilities. Enabling Ax-1 is an important step to stimulate demand for commercial human spaceflight services so NASA can be one of many customers inlow-Earth orbit.For the Ax-1 mission, Axiom has proposed Michael López-Alegría, Larry Connor, Mark Pathy, and Eytan Stibbe as prime crew members. These private astronauts will be reviewed by NASA and its international partners, as is standard for any space station crew, and undergo NASA medical qualification testing to be approved for flight. López-Alegría will serve as the mission commander, with Peggy Whitson and John Shoffner as backups.Once the proposed crew passes review and qualification, the four members will train for their flight with NASA, international partners, and SpaceX, which Axiom has contracted as launch provider for transportation to the space station. Trainers will familiarize the private astronauts with systems, procedures, and emergency preparedness for the space station and the Crew Dragon spacecraft. Based on current mission planning, training is scheduled to begin this summer.The development and growth of the low-Earth orbit economy continues. In January 2020,NASA selected Axiomto provide at least one habitable commercial module to be attached to the forward port of the International Space Station's Harmony node in late 2024. Most recently, NASA announced the agency is seeking input from industry on futurecommercial low-Earth orbit destinationsthat will provideservices, such as crew training, scientific research, and advanced systems development for both government and private-sector astronauts and customers.For more than 20 years, NASA has supported a continuous U.S. human presence in low-Earth orbit. The agency's goal is a low-Earth orbit marketplace where NASA is one of many customers, and the private sector leads the way. This strategy will provide services thegovernment needsat a lower cost, enabling the agency to focus on its Artemis missions to the Moon and on to Mars while continuing to use low-Earth orbit as a training and proving ground for those deep space missions.

What is CAPSTONE?

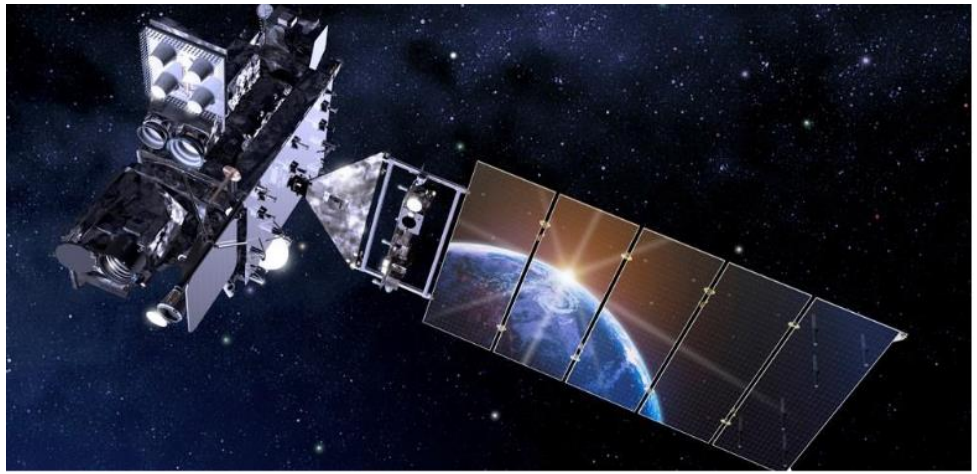
- Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE) is **a lunar orbiter that will test and verify the calculated orbital stability planned for the Gateway** space station. A microwave oven–sized CubeSat weighing just 55 pounds will serve as the first spacecraft to test a unique, elliptical lunar orbit as part of the Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE). As a precursor for Gateway, a Moon-orbiting outpost that is part of NASA's Artemis program, CAPSTONE will help reduce risk for future spacecraft by validating innovative navigation technologies and verifying the dynamics of this halo-shaped orbit.The orbit, formally known as a near rectilinear halo orbit (NRHO), is significantly elongated. Its location at a precise balance point in the gravities of Earth and the Moon, offers stability for long-term missions like Gateway and requires minimal energy to maintain. CAPSTONE's orbit also establishes a location that is an ideal staging area for missions to the Moon and beyond. The orbit will bring CAPSTONE within 1,000 miles of one lunar pole on its near pass and 43,500 miles from the other pole at its peak every seven days, requiring less propulsion capability for spacecraft flying to and from the Moon's surface than other circular orbits. After a three-month journey to its target destination, CAPSTONE will orbit this area around the Moon for at least six months to understand the characteristics of the orbit. Specifically, it will validate the power and propulsion requirements for maintaining its orbit as predicted by NASA's models, reducing logistical uncertainties. It will also demonstrate the reliability of innovative spacecraft-to-spacecraft navigation solutions as well as communication capabilities with Earth. The NRHO provides the advantage of an unobstructed view of Earth in addition to coverage of the lunar South Pole. To test these new navigation capabilities, CAPSTONE has a second dedicated payload flight computer and radio that will perform calculations to determine where the CubeSat is in its orbital path. Circling the Moon since 2009, NASA's Lunar Reconnaissance Orbiter (LRO) will serve as a reference point for CAPSTONE. The intention is for CAPSTONE to communicate directly with LRO and utilize the data obtained from this crosslink to measure how far it is from LRO and how fast the distance between the two changes, which in turn determines CAPSTONE's position in space. This peer-to-peer information will be used to evaluate CAPSTONE's autonomous navigation software. If successful, this software, referred to as the Cislunar Autonomous Positioning System (CAPS), will allow future spacecraft to determine their location without having to rely exclusively on tracking from Earth. This capability could enable future technology demonstrations to perform on their own without support from the ground and allow ground-based antennas to prioritize valuable science data over more routine operational tracking.

- CAPSTONE is scheduled to launch in March 2022 aboard a Rocket Lab's Electron rocket from the company's Launch Complex 1 in New Zealand. With a highly ambitious schedule, CAPSTONE will demonstrate key commercial capabilities. NASA partners will test cutting-edge tools for mission planning and operations, paving the way and expanding opportunities for small and more affordable space and exploration missions to the Moon, Mars and other destinations throughout the solar system.



January 8, 2022

- NASA and theNational Oceanic and Atmospheric Administration(NOAA) are now targeting Jan. 8, 2022, for the launch of theGeostationary Operational Environmental SatelliteT (GOES-T) mission. The launch was previously planned for Dec. 7, 2021.NASA, NOAA, and United Launch Alliance (ULA) coordinated the new target date to optimize launch schedules for missions flying from Space Launch Complex-41.The GOES-T satellite is part of theGOES-Rseries that will maintain the two-satellite system extending the operational lifetime through December 2036.The GOES satellite network helps meteorologists observe and predict local weather events, including thunderstorms, tornadoes, fog, hurricanes, flash floods and other severe weather.GOES-T will launch from Cape Canaveral Space Force Station in Florida on a United Launch Alliance Atlas V 541 rocket. The two-hour launch window will open at 4:33 p.m.EST. This launch is being managed byNASA's Launch Services Program.
- NOAA manages the GOES-R Series Program through an integrated NOAA-NASA office, administering the ground system contract, operating the satellites, and distributing their data to users worldwide. NASA's Goddard Space Flight Center oversees the acquisition of the GOES-R spacecraft and instruments. Lockheed Martin designs, creates, and tests the GOES-R series satellites. L3Harris Technologies provides the main instrument payload, the Advanced Baseline Imager, along with the ground system, which includes the antenna system for data reception.Looking forward, NOAA is working with NASA on the next-generation geostationary satellite mission called GeoXO, which will bring new capabilities in support of U.S. weather, ocean, and climate operations in the 2030s. NASA will manage the development of the satellites GeoXO satellites and launch them for NOAA.AuthorLinda HerridgePosted onJuly 30, 2021CategoriesKennedy Space Center,Launch Services ProgramTagsGOES-R series,GOES-T,Kennedy Space Center,Launch Services Program,NASA,NOAA,United Launch Alliance



Facts on Nasa

- NASA, or the National Aeronautics and Space Administration, was created by President Dwight Eisenhower in 1958 in response to the Soviet Union's launch of the first artificial satellite the previous year.
- President John F. Kennedy gave NASA the goal of sending a man to the moon by the end of the 1960s. On July 20, 1969, the first men walked on the moon as part of the Apollo 11 mission.
- Twelve men have walked on the moon, all during the Apollo missions.
- In 1970, the Apollo 13 lunar landing was aborted after an oxygen tank exploded.
- The space shuttle Enterprise was the first shuttle built for the reusable spacecraft fleet, though it was created for testing and never flew in space.
- Enterprise was initially to be named Constitution, but fans of the TV show *Star Trek* ran a successful write-in campaign to change the name.
- The space shuttle program has had more than 120 successful flights but also two disasters in which the shuttles and crews were lost (Challenger in 1986 and Columbia in 2003).
- Within the next year and a half, the 51-year-old agency is slated to finish construction of the international space station and retire the three remaining shuttles—Atlantis, Discovery, and Endeavour.
- Space shuttle Endeavour was built using spare parts from Discovery and Atlantis.
- The next generation of spacecraft won't be ready until 2015, so U.S. astronauts will travel with the Russians aboard their Soyuz spacecraft to visit the space station.

How does a rocket is made?

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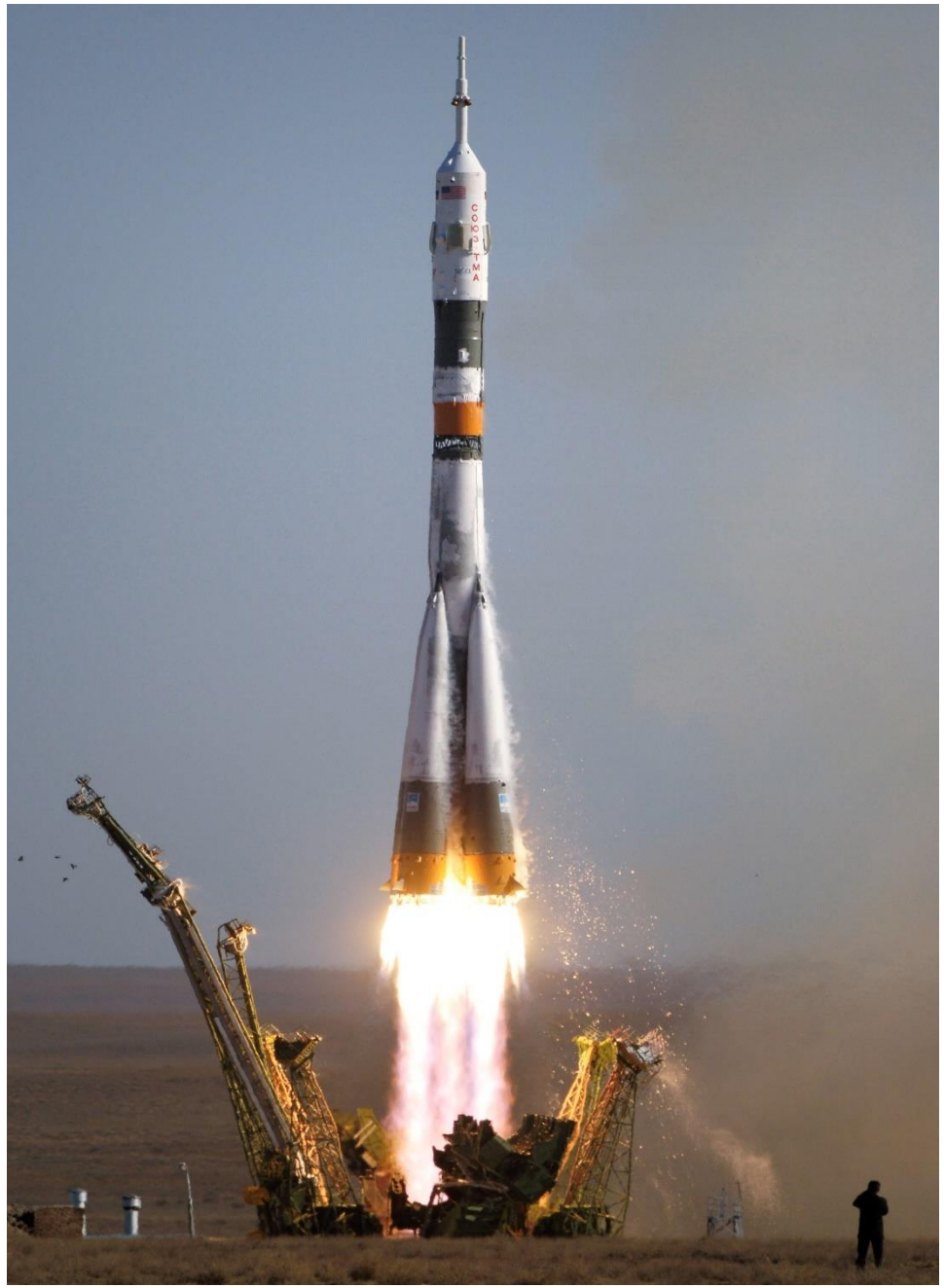
The Basics of a Rocket

- A rocket is a device that channels explosive force to create thrust. Generally, the rocket consists of a fuel or propellant stored in a secure container, usually a cylinder. The cylinder must be open only in one direction, so as to let out the explosive force of the fuel when it is ignited. Modern rockets have a nozzle, which directs the explosion of the rocket in one direction. The easiest way to think of rockets is that they are all simply controlled explosions. Because the explosive force wants to escape the rocket, it travels out the nozzle and propels the entire rocket in the opposite direction of its travel.



How a Rocket is Constructed

- Rockets now are so diverse that it is impossible to classify their construction in a single method. However, they all have some similar construction properties. Most rockets are made by machines. This eliminates the possibility of error. Because a rocket must control a very powerful explosion, it has to be able to withstand the force of that explosion as well as direct the explosive power in only one direction. This means that the rocket must be made of a material that is fitting for the explosive force that will be released. For instance, very small rockets found in small model rocketry activities have only a small plastic or cardboard casing to contain their explosion. As the size of rockets increases, more durable materials are used such as aluminum and steel. All rockets must also have a nozzle that can be bolted, glued or otherwise affixed to the cylinder. The nozzle is usually created from very durable material and can be even tougher than the cylinder itself. This is because the nozzle is very small and has the brunt of the explosive force placed upon it. Depending on the use of the rocket, the nozzle may be widened or decreased in size. Decreasing the diameter of the nozzle will cause the propellant to burn with less force, but longer duration. Conversely, a wider nozzle will cause a shorter burn with more force.

The **Propellant**

Rocket propellant can be either in liquid or, more commonly, solid forms. Solid propellant includes mixtures such as gunpowder, while a liquid propellant could be something as simple as gasoline. Solid mixtures are relatively simply to handle and are simply deposited inside a rocket cylinder during its construction. Liquid propellants, on the other hand, are a bit more complicated in use. All liquid propellant rockets need a liquid fuel as well as an oxidizing agent to facilitate ignition. Liquid propellant rockets look nothing like solid propellant rockets, as they necessitate very intricate tubing and pressurizing. As the picture of a liquid propellant rocket shows, they are elaborate in design and usually use a system of pumps and valves to mix the liquid propellant and oxidizing agent in a controlled manner. When the two are mixed and ignited, the rocket is active and produces thrust. The advantage of a liquid propellant rocket is that the thrust is controllable by how much propellant is allowed to ignite at a time.


THANKYOU
Efforts by Kavya Jha