National Aeronautics and Space Administration

NASAfacts

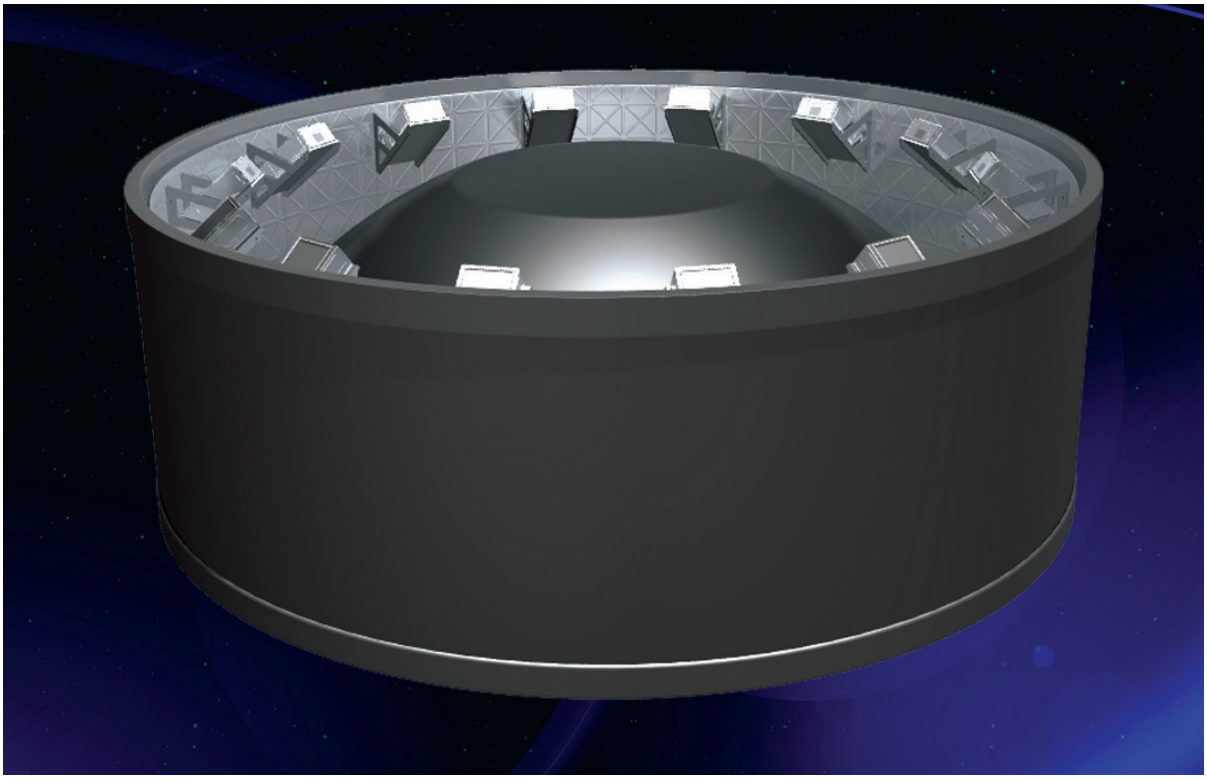
Space Launch System Secondary Payloads

SLS Advances Science and Technology: Secondary Payloads on NASA's Exploration Mission-1

NASA's new rocket, the Space Launch System (SLS), will launch America into a new era of exploration to destinations beyond Earth's orbit. In addition to demonstrating NASA's new heavy-lift capability and sending the Orion spacecraft into deep space, SLS also will carry several smaller, low-cost experiments not much larger than a shoebox. These secondary payloads are known as CubeSats and will carry science and technology investigations to help pave the way for future, deep-space human exploration.

On this first flight, known as Exploration Mission-1 (EM-1), SLS will launch an uncrewed Orion spacecraft to a stable orbit beyond the moon to demonstrate the integrated system performance of Orion and the SLS rocket. From the lunar vicinity, Orion will return to Earth to demonstrate re-entry and landing prior to a crewed flight. This mission provides the rare opportunity for these small science and technology experiments to reach deep-space destinations, as most launch opportunities for CubeSats are limited to low-Earth orbit.

The Orion stage adapter — which will connect Orion to the upper stage of the SLS — will have 13 slots designated for secondary payloads.



Artist concept of the Orion stage adapter with secondary payloads and avionics box to control payload deployment

Several of the CubeSats chosen to fly on EM-1 were proposed by programs across the agency with shared interests and objectives that aligned with the mission as planned for SLS and Orion.

These small satellites will enable the agency to address Strategic Knowledge Gaps (SKGs) and help inform research strategies and prioritize technology development for human and robotic exploration. For example, this also will be the first time a CubeSat will contain a propulsion system. NASA also offered flight opportunities to international partners with project proposals that furthered mutual human space exploration goals.

The CubeSats will be deployed following Orion separation from the upper stage and once Orion is a safe distance away. Each payload will be ejected with a spring mechanism from dispensers on the Orion stage adapter. Following deployment, the transmitters on the CubeSats will turn on and ground stations will listen for their beacons to determine the functionality of these small satellites.

The principal investigators and engineers for the payloads will work with NASA's secondary payload integration team over the months to come to verify safety requirements and the interfaces that connect the CubeSats to the rocket. Each payload is self-contained and requires no power from the rocket, ensuring that these small science and technology missions do not interfere with the primary mission to evaluate SLS and Orion in the proving ground of deep space.

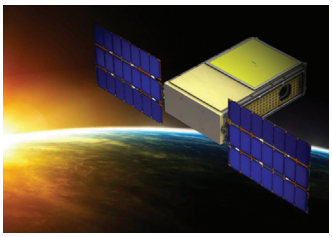
Secondary Payload Facts

Weight ..... No heavier than 30 pounds (14 kilograms)

Size ..... 4.4" x 9.4" x 14.4" (Equivalent to six 4.4" square units)

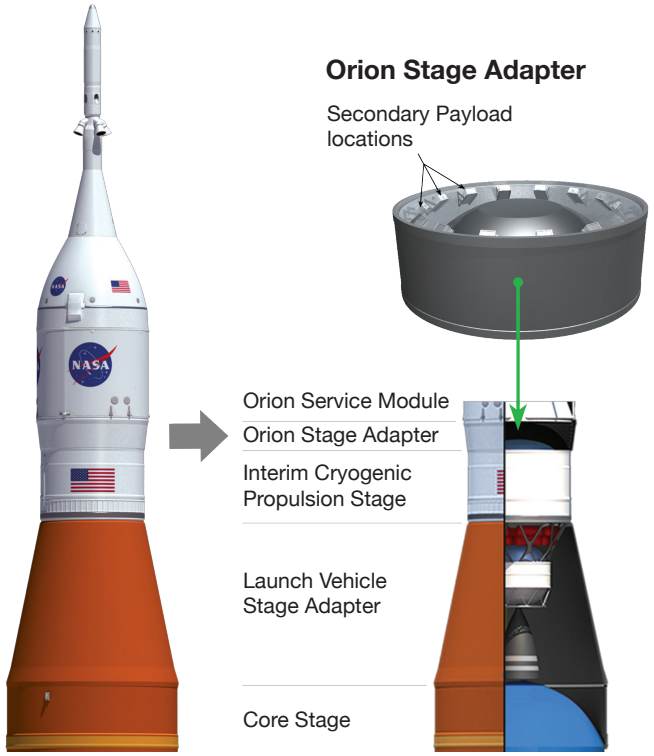
The first iteration of the SLS rocket, known as the Block 1 configuration with a 70-metric-ton (77-ton) lift capability, will be powered by twin boosters and four RS-25 engines. The next planned evolution of the SLS, Block 1B, will use a more powerful exploration upper stage to enable more ambitious missions and a 105-metric-ton (115-ton) lift capacity.

A later evolution, Block 2, will add a pair of advanced solid or liquid propellant boosters to provide a 130-metric-ton (143-ton) lift capacity. These future configurations of the vehicle will allow for larger and more varied payload capabilities. In each configuration, SLS will continue to use the same core stage and four RS-25 engines.



Artist concept of a deployed CubeSat

Orion Stage Adapter at the Marshall Center



For more information on SLS, visit:

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George C. Marshall Space Flight Center
Huntsville, AL 35812
www.nasa.gov/marshall

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