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NASA'S SPACE LAUNCH SYSTEM: DEEP SPACE ACCESS FOR CUBESATS

Abstract

As NASA's Space Launch System (SLS) Block 1 crew vehicle nears completion for its first flight, Exploration Mission-1 (EM-1), with its accommodations for 13 6U CubeSats, the SLS Program, managed out of Marshall Space Flight Center in Huntsville, Alabama, is planning future flights. Exploration Mission-2 (EM-2), the second flight of NASA's new deep space exploration system, will send astronauts in the Orion spacecraft to the lunar vicinity for the first time since the Apollo Program. The Program's nationwide network of suppliers is actively manufacturing hardware for the second flight and beyond and mission planners are evaluating future options for smallsats. Up to 17 CubeSats in 6U and 12U sizes can be accommodated on an SLS Block 1 vehicle depending on available secondary payload mass. As with EM-1, for future flights with secondary payloads, the Program will provide a Secondary Payload Deployment System (SPDS) that includes mounting brackets, cable harnesses, commercial-off-the-shelf (COTS) dispensers and an avionics unit to control deployment. A NASA payload integration manager will work with each payload team to ensure payloads do not impact the primary mission and will be efficiently integrated with the vehicle. Similar to EM-1, deployment opportunities for CubeSats on future cislunar missions will be available anywhere along the upper stage disposal trajectory after the Orion separation event. The SLS Program, a cornerstone of NASA's plans to return astronauts to the Moon, looks forward to providing CubeSats with rare access to deep space for a variety of science missions and technology demonstrations. In addition to these near-term opportunities for CubeSats to deploy in deep space, the Program continues to evaluate other potential smallsat opportunities that would take advantage of the vehicle's unique performance, enabling larger spacecraft or a wider variety of mission profiles. In this paper, the author will review the status of secondary payloads on SLS flights and discuss future possibilities for 6U, 12U and Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA)-class payloads on SLS.