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NASA'S SPACE LAUNCH SYSTEM: SMALLSAT DEPLOYMENT TO DEEP SPACE

Abstract

Leveraging the significant capability it offers for human exploration and flagship science missions, NASA's Space Launch System (SLS) also provides a unique opportunity for lower-cost deep-space science in the form of small-satellite secondary payloads. Current plans call for such opportunities to begin with the rocket's first flight; a launch of the vehicle's Block 1 configuration, capable of delivering 70 metric tons (t) to Low Earth Orbit (LEO), which will send the Orion crew vehicle around the moon and return it to Earth. On that flight, SLS will also deploy 13 CubeSat-class payloads to deep-space destinations. These secondary payloads will include not only NASA research, but also spacecraft from industry and international partners and academia. The payloads also represent a variety of disciplines including, but not limited to, studies of the moon, Earth, sun, and asteroids. While the SLS Program is making significant progress toward that first launch, preparations are already under way for the second, which will see the booster evolve to its more-capable Block 1B configuration, able to deliver 105t to LEO. That configuration will have the capability to carry large payloads co-manifested with the Orion spacecraft, or to utilize an 8.4-meter (m) fairing to carry payloads several times larger than are currently possible. The Block 1B vehicle will be the workhorse of the Proving Ground phase of NASA's deep-space exploration plans, developing and testing the systems and capabilities necessary for human missions into deep space and ultimately to Mars. Ultimately, the vehicle will evolve to its full Block 2 configuration, with a LEO capability of 130 metric tons. Both the Block 1B and Block 2 versions of the vehicle will be able to carry larger secondary payloads than the Block 1 configuration, creating even more opportunities for affordable scientific exploration of deep space. This paper will outline the progress being made toward flying smallsats on the first flight of SLS, and discuss future opportunities for smallsats on subsequent flights.