

## **NASA's Space Launch System and Deep-Space Opportunities for Smallsats**

Dr. Paul S. Bookout, Secondary Payload Integration Manager  
NASA's Space Launch System Program  
paul.bookout@nasa.gov

Designed to provide the significant capability required for human deep-space exploration, 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. This opportunity will be leveraged beginning with the rocket's first flight; a launch of the SLS's Block 1 configuration, capable of delivering >26 metric tons (t) to Trans-Lunar Injection (TLI), which will see the Orion crew vehicle travel around the Moon and return to Earth. On that flight, SLS will also deploy 13 6U CubeSat-class payloads to multiple destinations including deep space. These secondary payloads will include not only NASA research, but also spacecraft from international partners, industry and academia. The payloads represent a variety of disciplines including, but not limited to, studies of the Moon, Earth, Sun, and asteroids, along with technology demonstrations that could pave the way for even more ambitious smallsat missions in the future.

As the SLS Program is making significant progress toward that first launch, preparations are already under way for future missions, which will see the booster evolve to its more-capable Block 1B configuration, able to deliver 40 metric tons to TLI. 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. SLS will evolve to its full Block 2 configuration, with a TLI capability of >45 metric tons. Both the Block 1B and Block 2 versions of SLS 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 lecture will provide a status of the SLS development and outline the progress being made toward flying smallsats on the first flight of SLS, and discuss future opportunities for smallsats on subsequent flights.