

Title: Development of Telecommunication Systems for EM-1 Interplanetary CubeSat Missions
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CubeSats are now providing a new way to explore space: they can be built by a smaller team, on a shorter schedule and on a smaller budget than traditional missions. For this reason, the development of CubeSats spread rapidly among universities, industries and government centers with currently hundreds of CubeSats launched in space. However, all the CubeSats launched so far are in Low Earth Orbit and they have very different needs from interplanetary CubeSats. Interplanetary CubeSats and SmallSats face harsher environments, longer path distance and have more navigation needs than the LEO CubeSats. For this reason, the design of telecommunication systems for interplanetary missions is extremely challenging and a lot of development is currently ongoing in the areas of radio design, antenna design and ground support. This presentation focuses on the telecommunication design for some of the interplanetary CubeSats missions that will be launched on SLS EM-1: BioSentinel, CuSP, Lunar Flashlight, LunaH-Map, Lunar IceCube, NEA Scout. Given the commonalities among these missions, an effort has been carried on at JPL to develop a common set of telecommunication hardware to fit the envelope of all the six missions' goals and mission environments. This design approach is very unique for JPL, as compared to the traditional "one of a kind" design approach, that characterizes many JPL missions. However, this approach offers a considerable cost-saving-advantage, which is desperately needed for the interplanetary CubeSats missions to succeed. This presentation will provide a quick overview for each of the missions (including goals and telecommunication requirements) and it will also focus on the development of the telecommunication design with a particular focus on the Iris radio.

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