

26th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)
Small Spacecraft for Deep-Space Exploration (8)

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TELECOMMUNICATIONS SYSTEMS TESTING AND GROUND-COMPATIBILITY VERIFICATION
FOR EM-1 CUBESAT MISSIONS

Abstract

LunaH-Map (Lunar Hydrogen Mapper) and Lunar IceCube are two CubeSat missions which are expected to be launched as secondary payloads on board Exploration Mission 1 (EM-1). Both missions are expected to be deployed from the main vehicle within few hours from launch and then they will both embark on months long low energy trajectories to reach the Moon. Once at the Moon, they will perform complementary science. Specifically, LunaH-Map will use an innovative neutron spectrometer to sense hydrogen at the lunar south pole. Lunar IceCube will carry a Broadband InfraRed Compact High Resolution Exploration Spectrometer (BIRCHES) to estimate size and composition of water ice deposits on the Moon. Both missions carry the same telecommunication system composed by an Iris radio, an SSPA, an LNA, and two sets of transmitting and receiving low gain patch antennas (LGA) to be placed on opposite sides of the spacecraft to maximize coverage. The ground receivers for both missions are the 34 m Deep Space Network Stations located in Goldstone, Canberra, and Madrid plus the new Deep Space Station (DSS)-17 which is a 21 m dish located in Morehead (Kentucky) and managed by Morehead State University. Currently, both mission teams are focused on verifying compatibility between the telecommunication system and the ground stations through tests. The paper presents an overview of the missions and describes in details the efforts to verify compatibility and the results from the tests performed.