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Title:
Antenna Deployment for a Pathfinder Lunar Radio Observatory

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Abstract:
A first step in the development of a large radio observatory on the moon for cosmological or other astrophysical and planetary goals is to deploy a few antennas as a pathfinder mission. In this presentation, we describe a mechanism being developed to deploy such antennas from a small craft, such as a Google Lunar X-prize lander. The antenna concept is to deposit antennas and leads on a polyimide film, such as Kapton, and to unroll the film on the lunar surface. The deployment technique utilized is to launch an anchor which pulls a double line from a reel at the spacecraft. Subsequently, the anchor is set by catching on the surface or collecting sufficient regolith. A motor then pulls in one end of the line, pulling the film off of its roller onto the lunar surface. Detection of a low frequency cutoff of the galactic radio background or of solar radio bursts by such a system would determine the maximum lunar ionospheric density at the time of measurement. The current design and testing, including videos of the deployment, will be presented. These activities are funded in part by the NASA Lunar Science Institute as an activity of the Lunar University Network for Astrophysical Research (LUNAR) consortium. Part of this research was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

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