



Radio Observatory for Lunar Sortie Science (ROLSS)

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The lunar surface is an ideal base for radio astronomy observations at frequencies below the terrestrial ionospheric cutoff frequency. The ionospheric cutoff (10-20 MHz) prevents observations of very low frequency radio sources outside the ionosphere from being conducted by ground-based observatories. Spacecraft or lunar-based observatories are the only alternative, with the lunar surface providing the possibility of radio arrays with large dimensions (tens of kilometers) to perform high resolution imaging at the lowest frequencies (< 10 MHz). In this presentation, we describe a concept study for a pathfinder radio observatory to be deployed during a lunar sortie. The concept study focuses on appropriate antenna, receiver, deployment, power, and communication systems for the observatory. These systems must be low mass to permit the lunar sortie package to maximize science and engineering goals. Power requirements for the receiver systems and the downlink to Earth must also be minimized. The concept study also addresses in detail the science goals of this observatory, which include observations of solar radio bursts as proxies of solar and heliospheric particle acceleration, detailed measurement of the lunar ionosphere scale height as a function of time, integrated spectra of strong (extragalactic) sources to probe particle acceleration processes, and a survey of natural and man-made emissions from the Earth. These observations will enhance our understanding of the various radio sources and the lunar observing environment and pave the way for future larger-scale lunar radio astronomy arrays.