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SYMPOSIUM ON NEW TECHNOLOGIES FOR FUTURE SPACE ASTRONOMY MISSIONS (A7)
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Author: Mr. Justin Trammell
University of Houston, United States

FEASIBILITY STUDY OF RADIO TELESCOPE ARRAY AND COMMUNICATION SYSTEM DEVELOPMENT ON THE FAR SIDE OF THE MOON.

Abstract

The basis of this study is to outline a feasible and affordable method for lunar interferometry on the moon's far side. The idea of radio astronomy on the moon has been around for decades, with radio astronomy's inception in the 1930's by Karl Janskey. Coupling radio astronomy with development of lunar landers in the latter half of the 20th century brought lunar astronomy to the forefront of cutting edge research.

Outlined will be all essential aspects of lunar radio astronomy development. The moon's far side, where optimal research would take place, is shielded from communicating with Earth. If communication is completely blocked, so is interference from the massive technological super systems on Earth. This renders the moon's far side the most practical place, possibly in the solar system, to conduct astronomy experiments. A system of 2 satellites is proposed to continually relay data to Earth. The paper discusses the overall mission, which includes:

•Development of 4 individual, ultra-light landers, for each radio dish. When landed, deployment is completely automated and communication with an L2 satellite and the 3 other lunar telescopes are immediately set up. Before deployment, communication relay satellites will need to be set up at L2 and L4. Validation for these respective placements will come later.

•Proposed rockets for this launch are not addressed in this paper. Any rocket capable of launching with, and deploying 2 telescope landers at a time would be ideal. In total, 3 launches would be needed. 2 for surface structures and 1 for communication satellites.

•During development stages, ground based receiving stations will need to be built. Either new or pre-existing receiving stations can be used. Preferably 2-3 stations, to attain 24 hour coverage of the telescope.

There are 3 stages to this mission:

1)Launching and deploying the surface landers,

2)Launching and injecting the communication satellites,

3)And setting up receiving stations on Earth.

Communication between the surface and the satellites will be done with LASER technology. This is an unique proposition and details will be presented later along with an experiment, which can also be done in conference. LASER technology would be optimal because it will not produce any harmful interference with the sensitive radio equipment. The paper will outline instrumentation, significant values, cost, theoretical data, pathways, as well as a brief breakdown of radio interferometry and communications. Lunar lander designs with the radio telescope attached will be proposed and analyzed.