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LARA: DEVELOPMENT AND EARLY HARDWARE VALIDATION OF A LOW-FREQUENCY RADIO ASTRONOMY PAYLOAD FOR LUNAR ORBIT

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ABSTRACT

The Argentine Institute of Radio astronomy (IAR) is developing a scientific payload denominated LARA (Lunar Antenna for Radio Astronomy), designed for low-frequency observations from lunar orbit or cis-lunar space.

LARA targets the 30–300 MHz band, which is difficult to observe from Earth due to ionospheric opacity and radio frequency interference. The instrument aims to observe solar and planetary emissions while enabling radio spectrum monitoring in a radio-quiet environment.

A first integrated hardware prototype is currently being manufactured and assembled, including the analogue receiver, power regulation, and digital processing modules. Initial laboratory validation focuses on gain stability, noise performance, linearity, and end-to-end data flow. Early results are expected to confirm the correct operation of the acquisition chain and subsystem synchronization, enabling progression toward flight-model development.

Current work addresses power regulation optimization and RF/mechanical integration, supporting the transition to an engineering model and subsequent environmental qualification.