



Lunar Reflective Calibration Beacon for Radio Astronomy and SETI

Project: EME

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Description and Objectives:

The SETI League EME Beacon consists of a microwave transmitter with antennas automatically tracking the Moon across the sky, reflecting to Earth a precision weak signal to calibrate radio telescopes worldwide.

Key Features:

- High frequency precision, locked to atomic clock
- Transmission in the 23 cm amateur radio band
- Automatic az-el antenna tracking of Moon
- Remotely programmable modulation and power
- Continuous, unattended operation



Approach:

Location: Kinnelon NJ USA, Grid Square FN21ta

Station Trustee: Richard Factor, WA2IKL

Transmitter: currently 200 watts CW output (nominal)

Frequency: 1296.000 MHz

Accuracy: better than +/- 2 Hz

Feedline: 60 feet of 5/8 inch Cellwave hardline (estimated loss 3 dB)

Antenna: quad helix array, RHCP uplink; gain +24 dBi

Tracking Hardware: Kansas City Tracker driving Yaesu az/el rotors

Tracking Software: NOVA for Windows

EIRP: estimated at +74 dBm

Partners:

- American Astronomical Society
- ARRL Foundation
- SETI Institute

Schedule Milestones and Deliverables:

Target:

04 Mar 2001: First Light, low power	TRL 5
09 Mar 2001: successful Arecibo tests	TRL 6
17 Feb 2002: First Light, high power	TRL 7
13 Apr 2003: Arecibo/Jodrell Bank FUDD tests	TRL 8
15 Nov 2003: Released for general use worldwide	TRL 9

Applications:

- Time and Frequency Standard for Project Argus
- Sensitivity calibration for amateur radio telescopes
- End-to-end system verification for Project Phoenix
- Sensitivity calibration for professional observatories

TRL = 9

Revised: 12 May 2005

Keywords: EME, Moonbounce, Microwave Beacon, Transmitter, Radio Astronomy, SETI, L-Band, Arecibo