



# 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 350 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 +76 dBm

## Partners:

- American Astronomical Society
- ARRL Foundation
- SETI Institute

## Schedule Milestones and Deliverables:

## Target:

04 Mar 2001: First Light, 20 Watt IPA	TRL 4
09 Mar 2001: Successful Arecibo tests	TRL 5
17 Feb 2002: First Light, 200 Watt PA	TRL 6
13 Apr 2003: Arecibo/Jodrell Bank FUDD tests	TRL 7
15 Nov 2003: Released for general use worldwide	TRL 8
13 Mar 2006: Upgraded, 350 Watt PA	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: 13 March 2006

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