

Exhibit B-3 – Experimentation Narrative Information For Horn Antenna Earth Station

Program: LM400 (RADAR Pathfinder)

Company: Lockheed Martin Corporation, Space

Station Description: Satellite communication ground system supporting multiple experimental satellite configurations. Designed to support multiple satellite frequency configurations and orbits (LEO, MEO, GEO, etc.) for experimentation and Research and Development projects.

Location Reference: 39°30'46.2"N 105°06'54.1"W - Lockheed Martin Space, 12257 South Wadsworth Blvd, Littleton, CO 80127

Emitter Description: Small horn aperture type antenna, circular, directional. The 3 dB beamwidth 15° (X-band Tx), enclosed in max volume diameter (including Radome) 4.90m. The horn is mounted on a full motion satellite tracking antenna, on the prime focus feed assembly (3.7, LEO, MEO, GEO), 3-axis movement, located inside Radome on remote Lockheed Martin property. The antenna is used as a positioner to point and track a LEO satellite object (TD24/RPF) for use as a Synthetic Aperture RADAR (SAR) calibration ground system with a known EIRP for calibration of the payload.

Antenna Frequency Capability Overview:

Frequency (MHz):	Transmit or Receive:	Description:
Various: 9200 - 10400 MHz	Transmit (to satellite)	RADAR calibration waveform used to calibrate SAR satellite payload from ground.

(Notional) Antenna Picture Example (Littleton, Colorado, USA), with red horn placement:



A. The complete program of research and experimentation proposed including description of equipment and theory of operation.

Theory Of Operation:

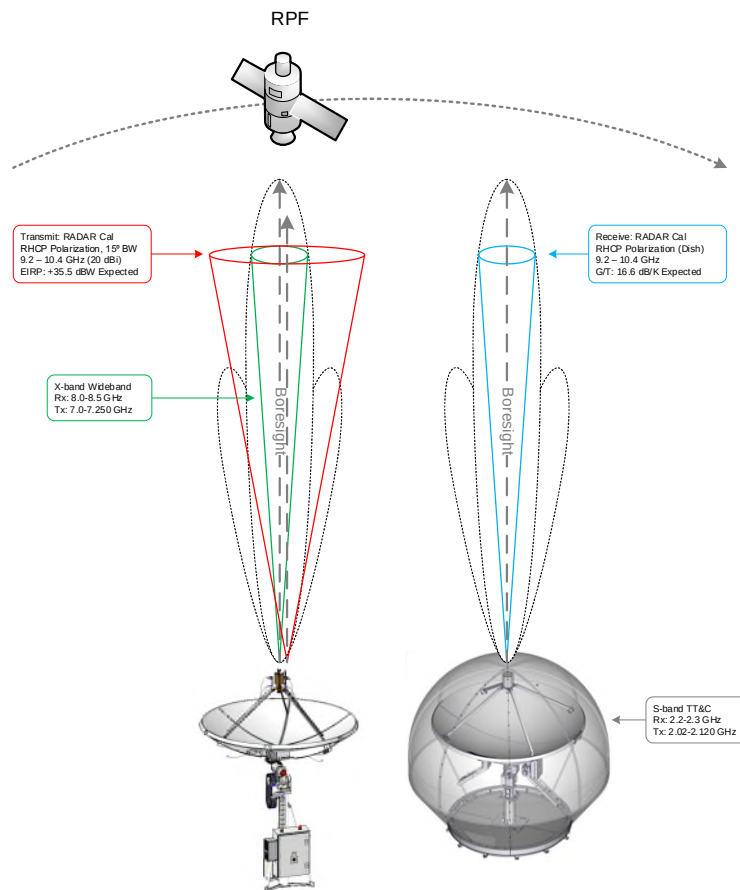
The RADAR Pathfinder (RPF) payload consists of a SAR Electronically Steered Array (ESA). While the satellite/payload is on orbit, there is a need for a ground based calibration transmit system which can transmit a known waveform (CW or pulsed waveform), from a known location, at a known power level so that the array logic and algorithms can be calibrated such that the SAR information is more accurate. Since the EIRP to the satellite payload needs to be low, only a horn antenna was needed. The horn antenna combined with an existing SSPA provides more than sufficient power for the calibration needs.

Similarly, the payload/satellite is in a LEO orbit, which means that the transmitting horn antenna needs to have the ability to track a LEO orbit to always be pointed at the satellite, thus the horn is mounted to an existing antenna which acts as a mechanical positioner for the horn, while at the same time, it can receive signals from the spacecraft on other bands.

The RADAR calibration system is a new technology with the waveform characteristics and with adding a non-reflector based emitter which acts in conjunction with the antenna. This was to help save cost and reduce complexity of the system.

For the X-band receive calibration portion of the system, an offset feed on an adjacent 3.7m antenna will be added to receive the RADAR waveform for post analysis in the ground. This receive system is not elaborated in this document as it has receive capability only.

Lockheed Martin proposes a concept of operation in which a direct Point Of Contact (POC) for Horizon software support be provided to the FCC, so if any interference is suspected from the IGS ground terminal, the FCC and interested parties can call for confirmation of transmit frequencies and can request the transmission be terminated.



B. The specific objectives sought to be accomplished.

The objective of this Ground System is to provide RADAR calibration support for reception (different antenna at the same ground station) and transmission (this filing) to support the LM400 (RADAR Pathfinder) effort. This will not only help evolve satellite space observation technology as they evolve, but also help evolve ground based technologies such as sensor data and calibration methodologies.

For the duration of this mission, the antenna will be used to support:

Supporting Program Name:	Description:	Frequencies (reference to X-band):	Timeline:
LM400 (RADAR Pathfinder)	LM IRAD Project to demonstrate X-band ESA (SAR). Aggressive, Go-fast schedule, accelerated TRL-7, Class C/D processes to trailblaze for future programs	Rx: 9.2-10.4 GHz Tx: 9.2-10.4 GHz	Q2, 2027

C. How the program of experimentation has a reasonable promise of contribution to the development, extension, expansion, or utilization of the radio art, or is along line not already investigated.

The RADAR calibration capability being provided in this filing will help pave the way for future calibration algorithms to help ensure higher SAR accuracy information and proper array calibration. This technology is new and will help the industry understand the calibration process and how to deliver better performing SAR systems.