

Project Overview

This project focuses on developing a 4 dual-band Yagi antenna array to enhance satellite communication capabilities for Texas State University. In collaboration with the Physics Department's "Space Lab", it will be designed to:

- Provide dual-band functionality
- Provide higher gain than single antennas
- Offer Texas State University students with the opportunity to communicate with satellites and develop their own satellite

Features and Requirements

Features

- A gain increase over Arrow Antenna's 146/437 dual band Yagi
- Ability to uplink on the 2m band and downlink on the 70cm band
- Lightweight and sturdy construction
- Gamma matching for fine tuning impedance

Requirements

- Gain must be greater than individual antenna
- Weight must be under 40lbs

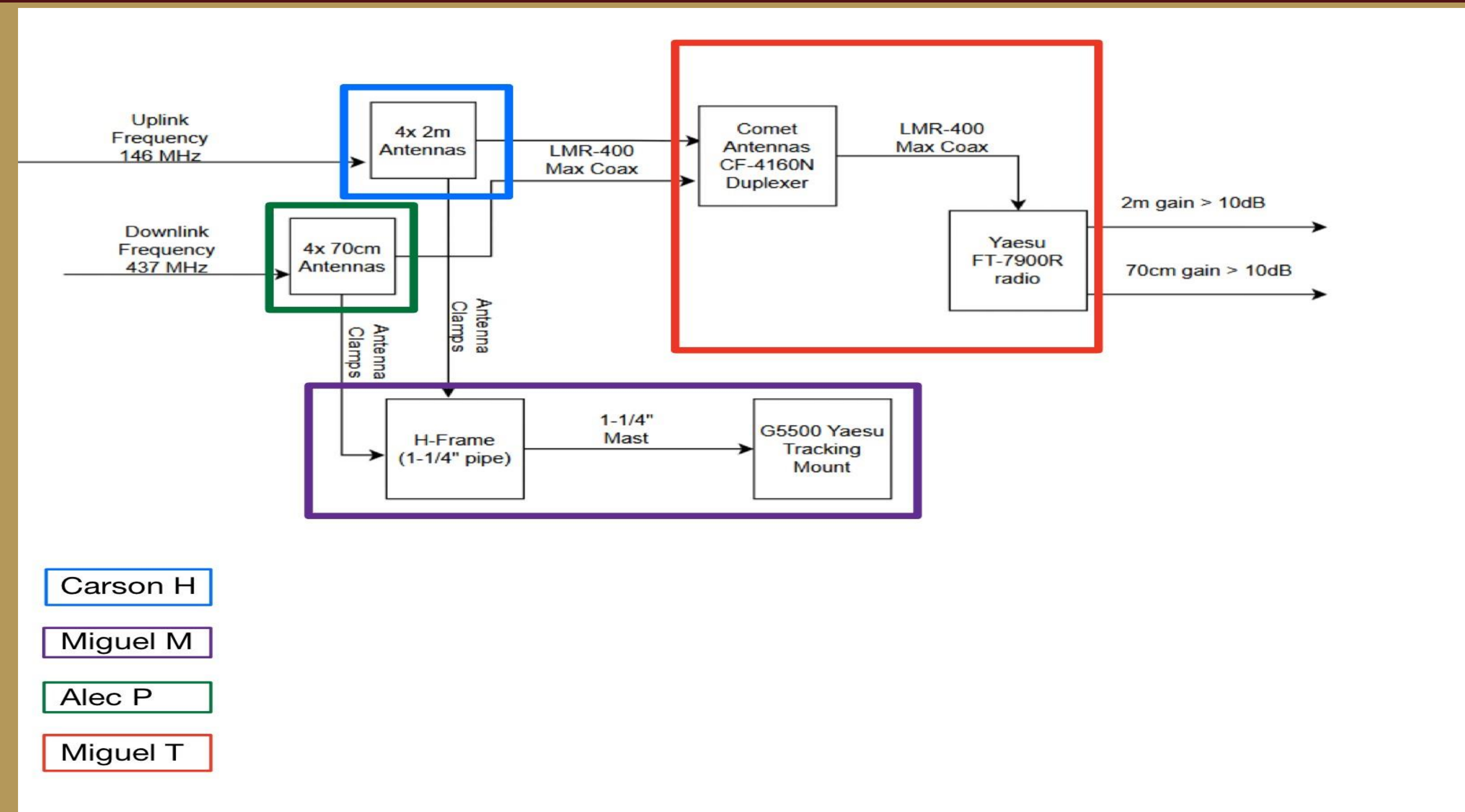
D2 Results

- Successfully demonstrate functionality at the 2m and 70cm bands
- Achieved an increase over the single dual band Yagi
2m: 5dB increase 70cm:
- Correctly phased and spaced array for optimal results
- Effectively tested system with Yaesu FT-7900r

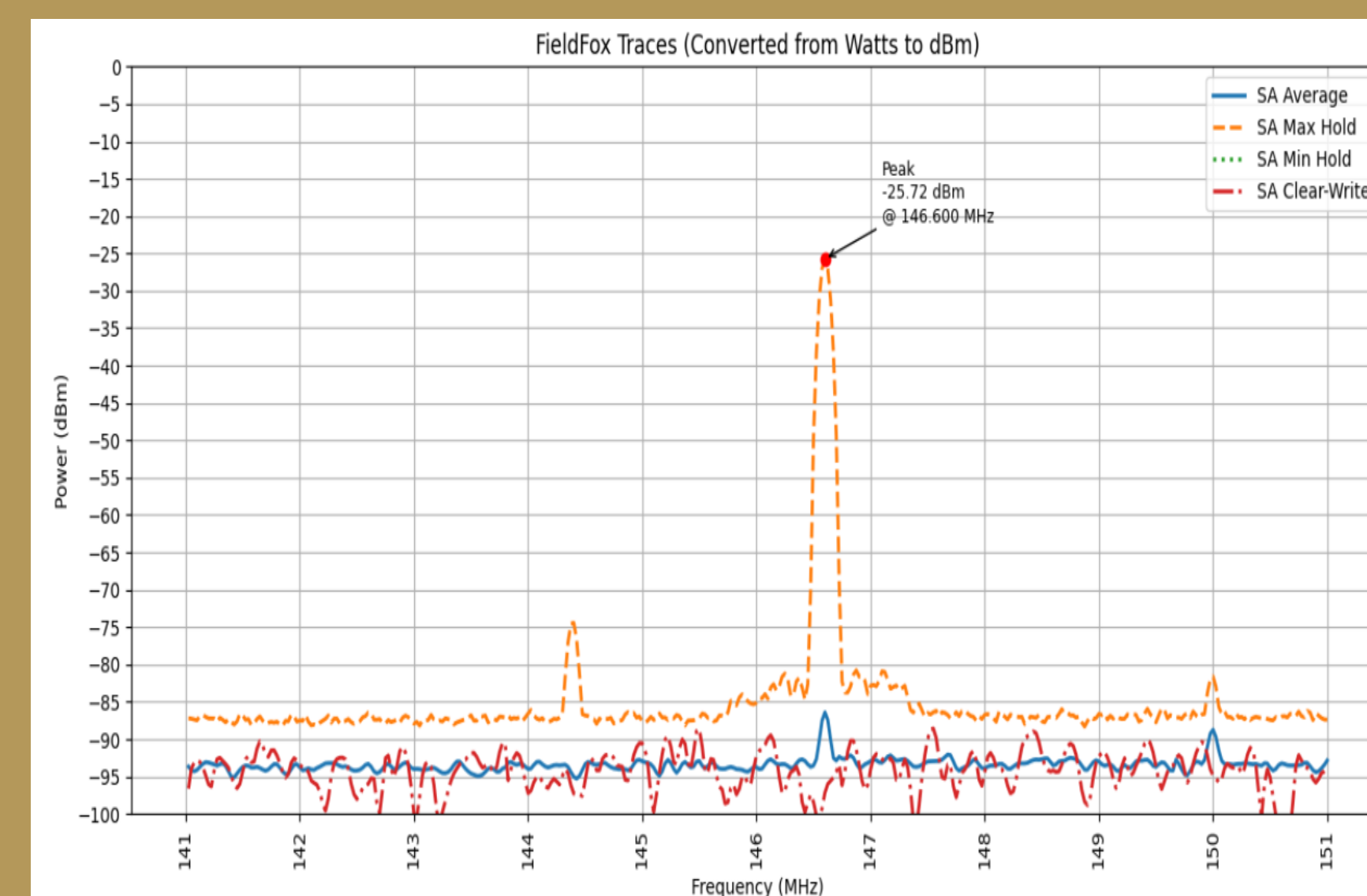
Acknowledgments

Faculty Advisor: Dr. Karl Stephan
Sponsor: Dr. Cecil Compeau
Physics Department Collaborator: Mr. Evan Jellison

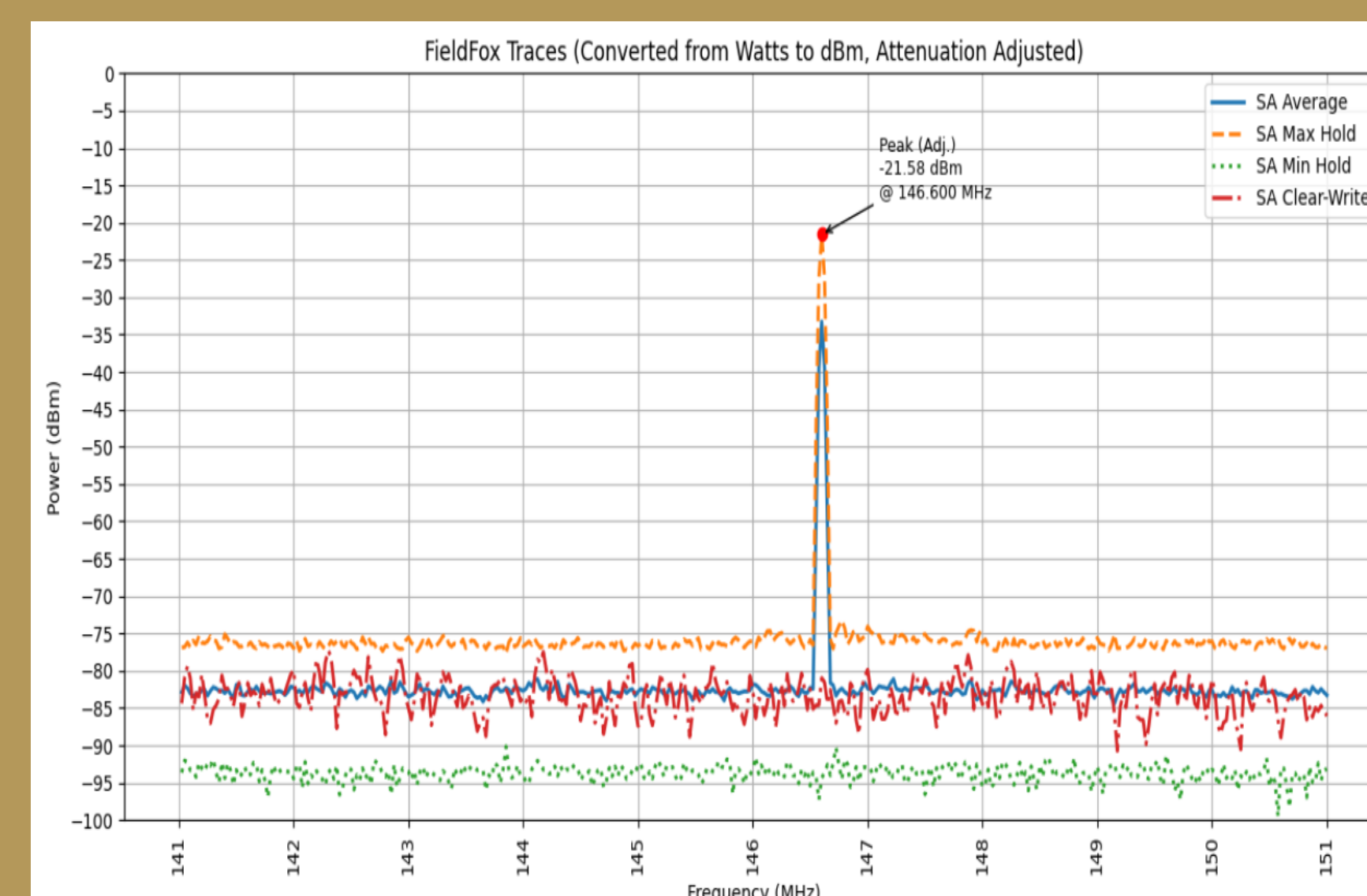
Top Level Block Diagram



2m Band



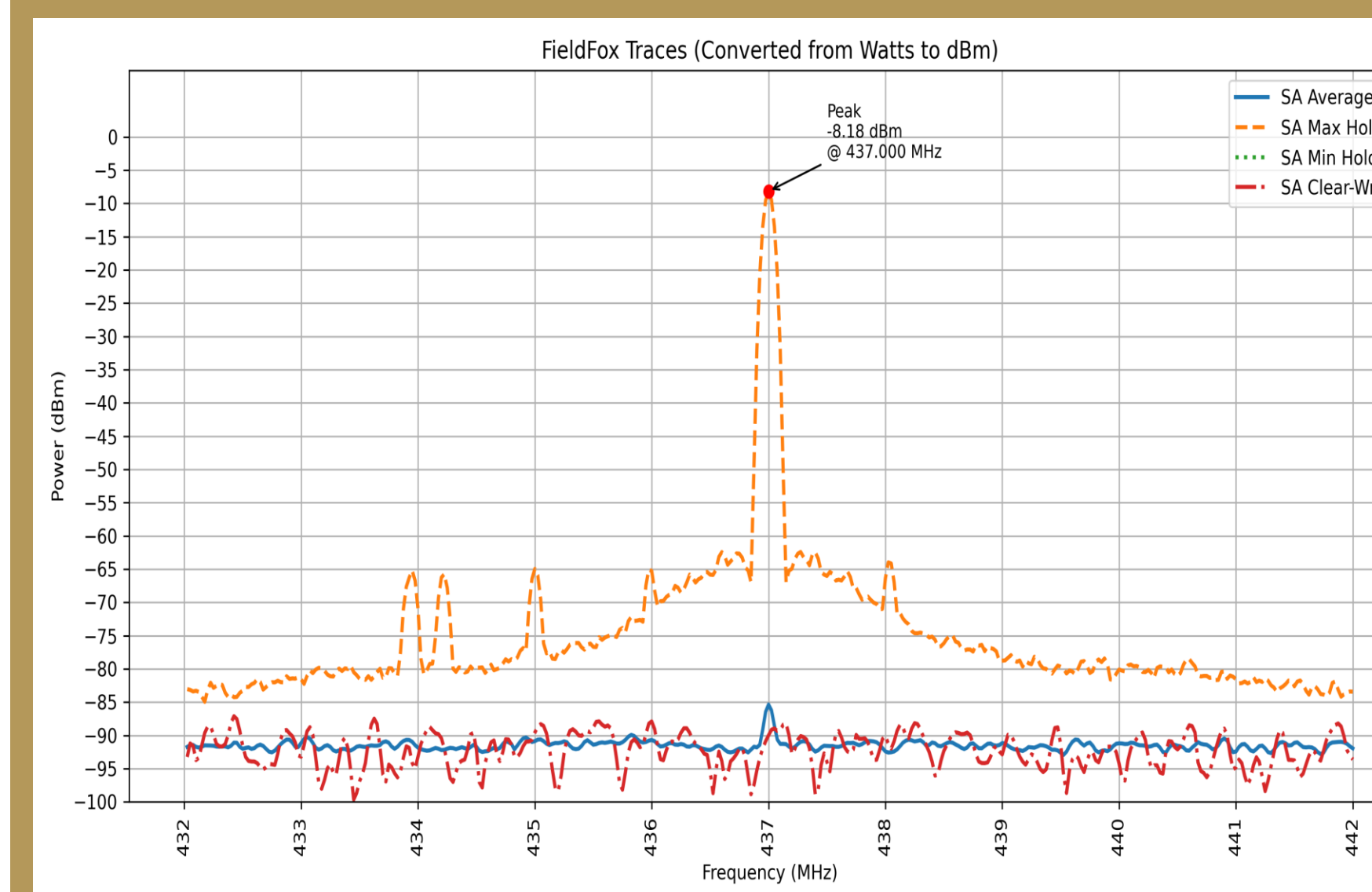
Single antenna transmission



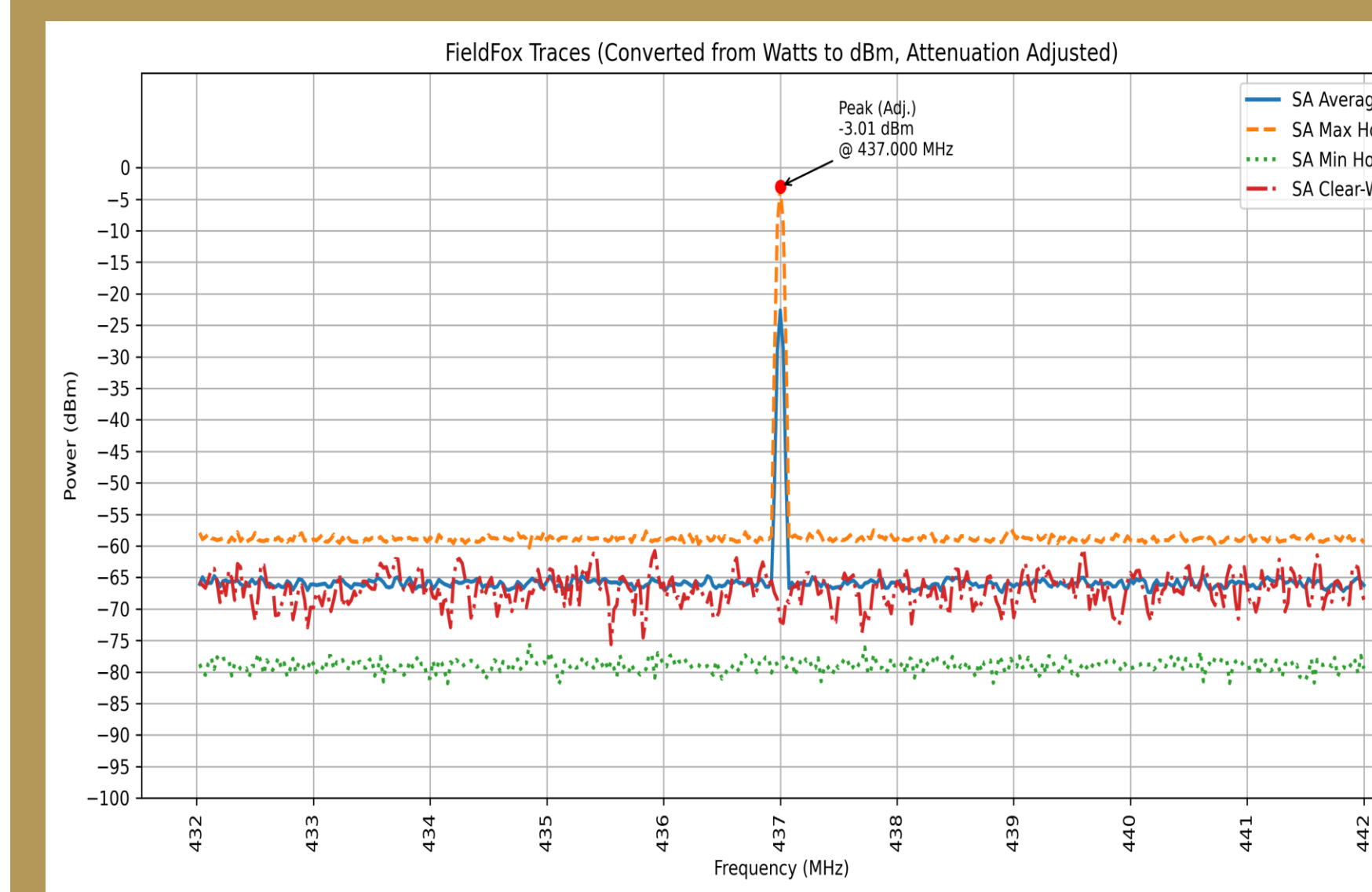
Array transmission

Average of the 3 tests depicted an increase of ~5dB with the array

70cm Band



Single antenna transmission



Array transmission

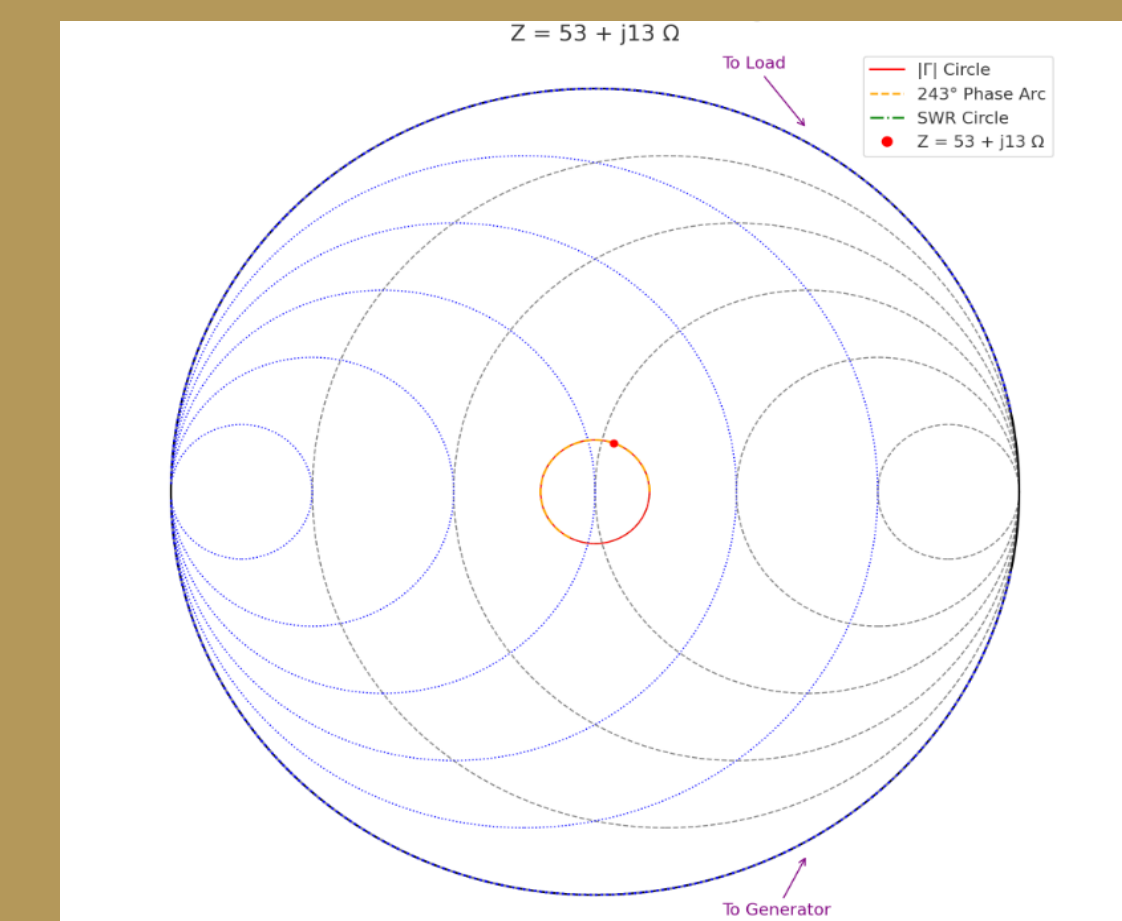
Average of the 3 tests depicted an increase of ~5dB with the array

Meet the Team

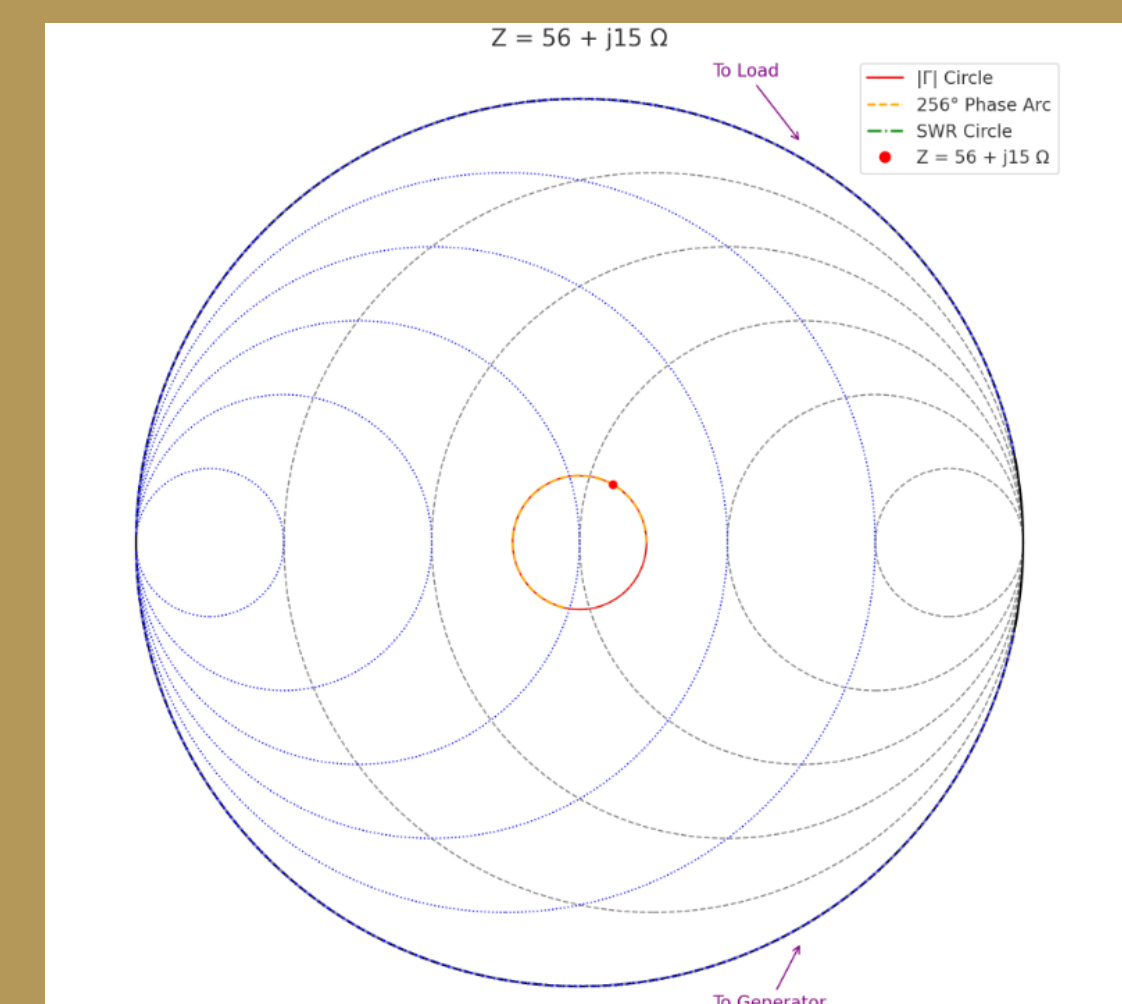


Miguel Montes, Alec Prescott, Miguel Trujillo, Carson Harville

Phasing System

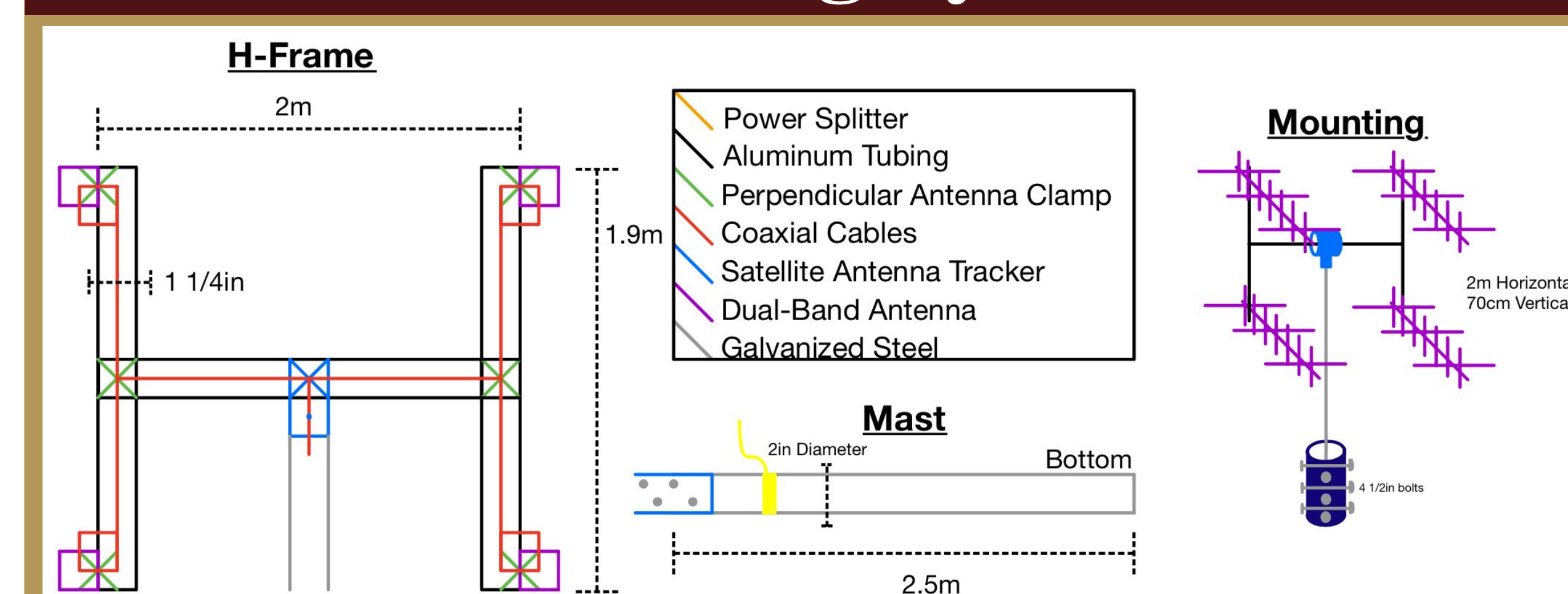


- 2 m band will use 3 quarter-wavelengths of cable for 270-degree phasing. Actual: 243 degrees



- 70 cm band will use 7 quarter-wavelengths of cable for 270 degrees of phasing. Actual: 256 degrees

Mounting System



- 90-Degree Polarization = ~60db Isolation
- Beamwidth/Main lobe tighter
- Side lobes significantly suppressed