



Synthetic Aperture Radar Imager



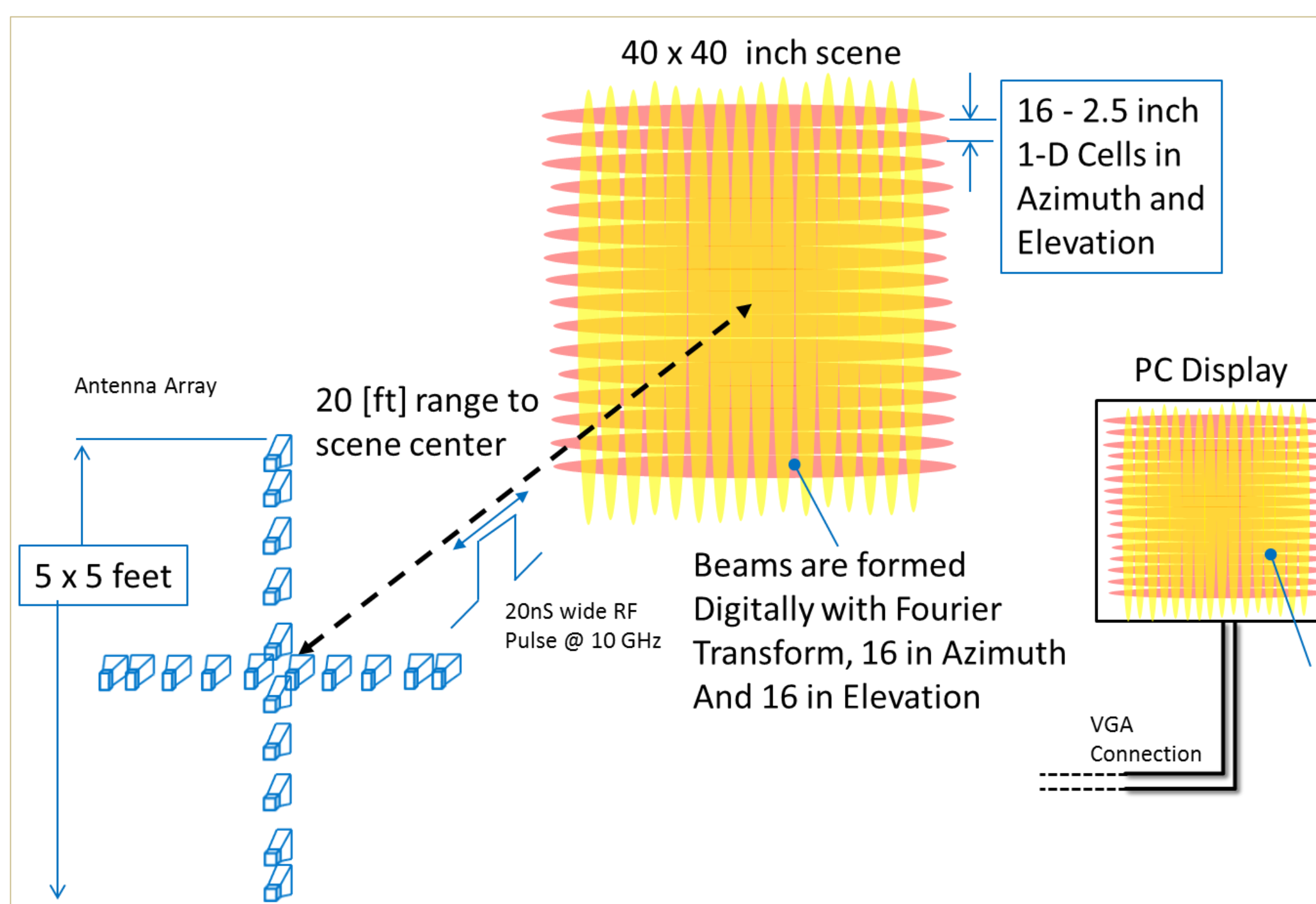
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Purpose

Use Synthetic Aperture Radar (SAR) technology to detect and image metal from a distance for use in the security industry.

Function Concept

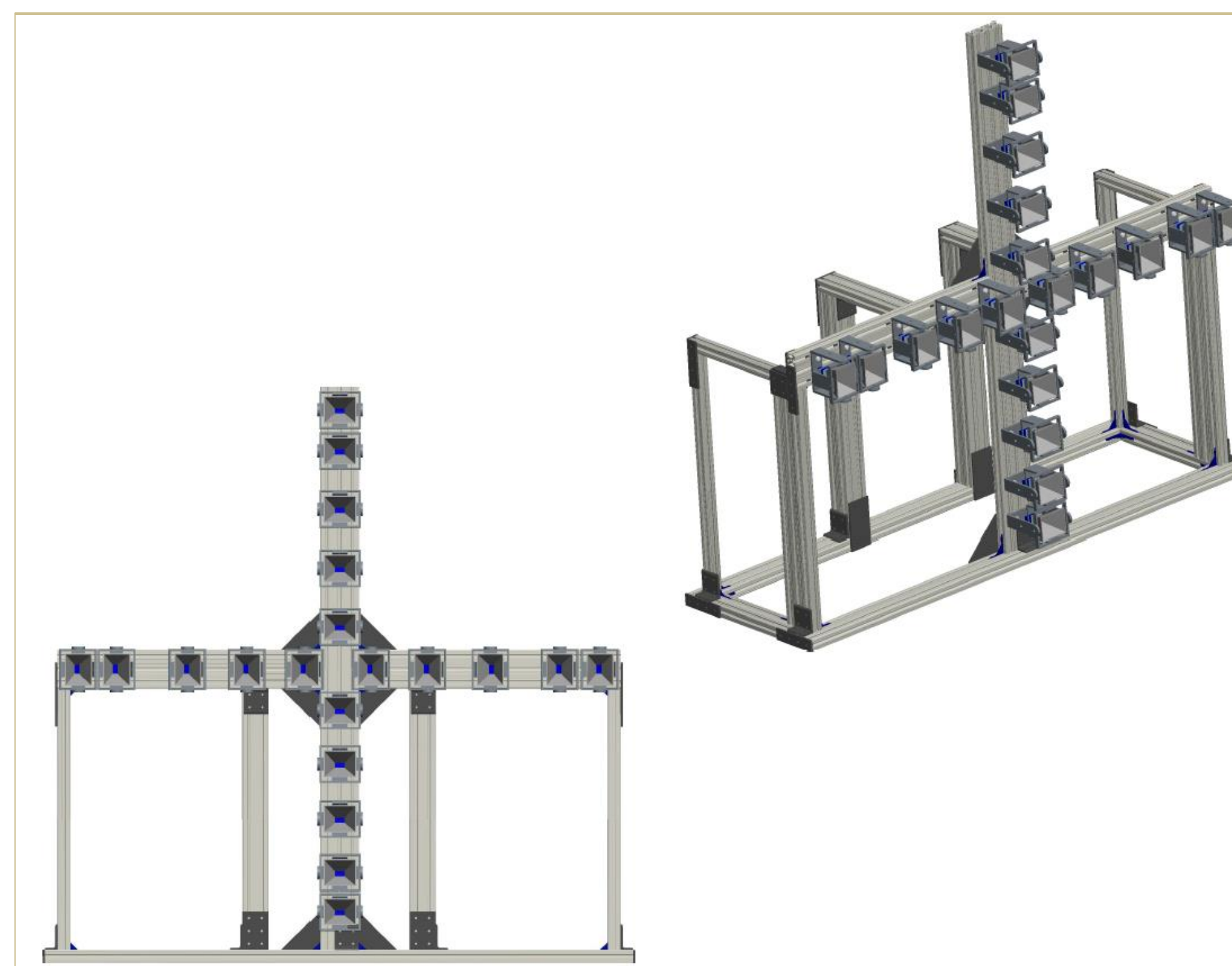
- 20 Antennas: 16 Receive – 4 Transmit
- EE Operation: FPGA (Signal Processing), Timing, A/D Conversion, and Image Generation
- Mechanical Structure: Cross array – Orthogonally Placed, Target Epicenter in Middle of 2 Rows



Design

The antennas are mounted on the structure at predetermined position.

- Antennas have 3 degrees of freedom.
- Locking mechanism implemented for each degree of freedom.
- The structure is light and modular



Structure Advantages

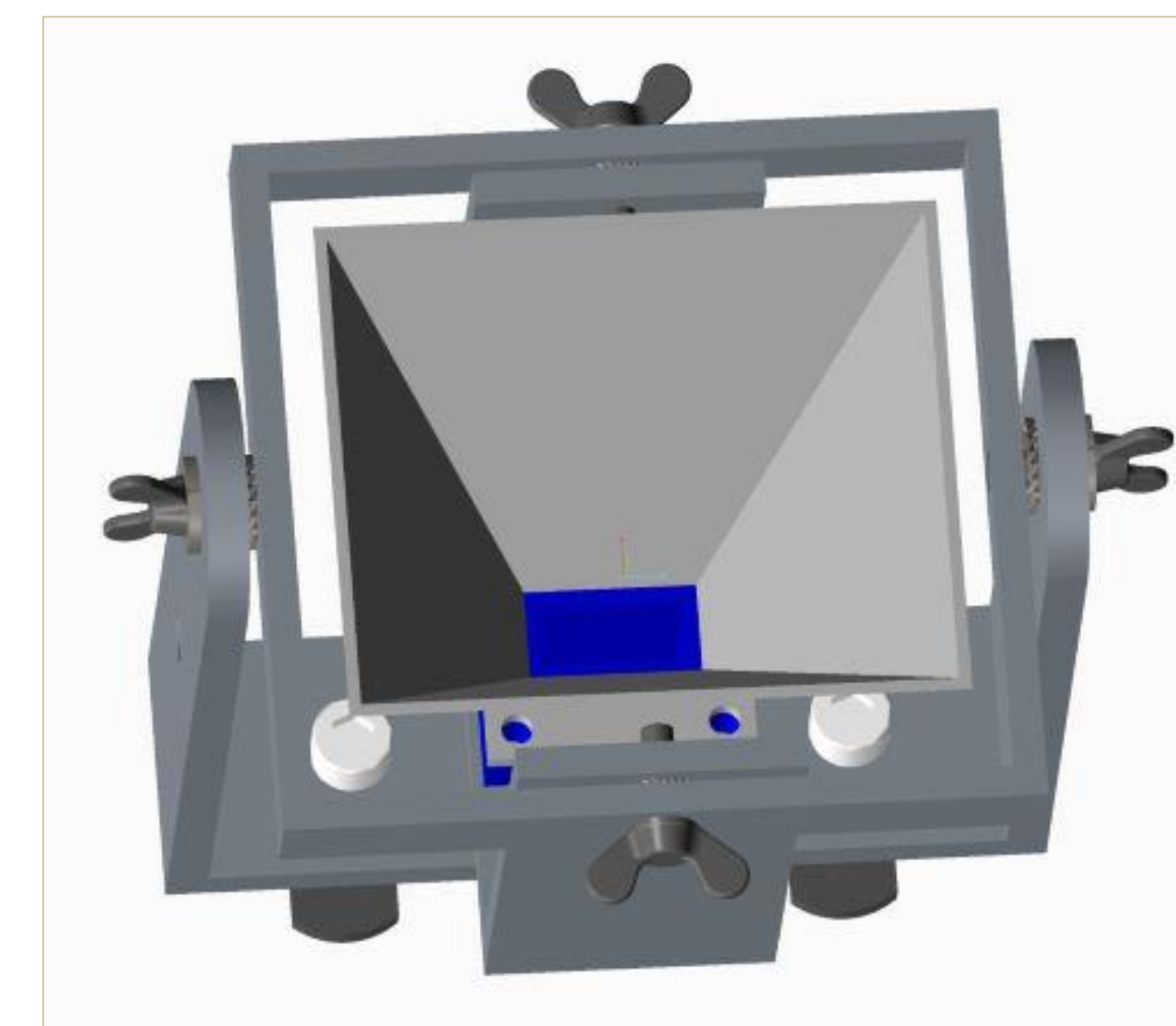
Extruded Aluminum (80/20) was preferred so the structure could be modified as needed.

- Gives maximum flexibility for adaptation
- Adds strength and stability
- Reduces error in readings

Project Goals

Improve upon aspects of design from previous year's project:

- Lower weight
- Improve stability
- Make antenna horns more adjustable
- Easy to access and set up



Holder Advantages

- Screw distance compatible with 80/20 rail spacing (3")
- Independent locking and adjustability with wingnuts
- Ample space for movement freedom
- Keeps assembly stationary
- Easy to machine

