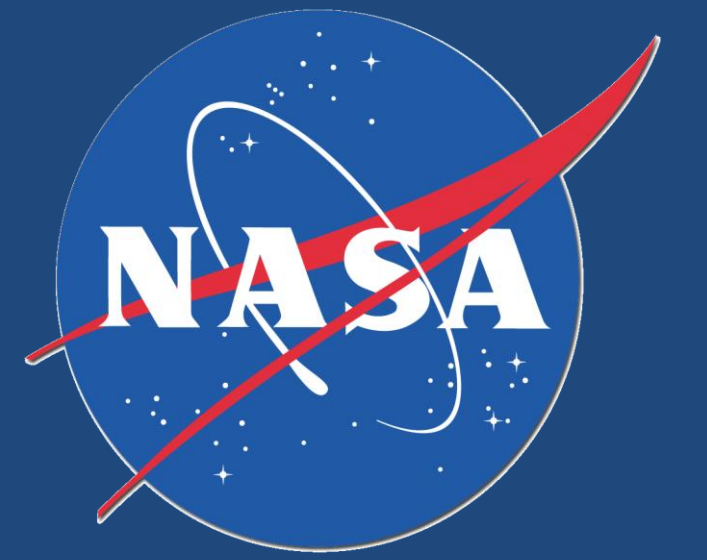


Temperature Tuned FOSS System Enclosure Design

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Code 540: Advanced Systems Development



Introduction

The Fiber Optics Sensing System (FOSS) was developed more than 20 years ago at the Armstrong Flight Research Center. The Temperature Tuned FOSS System utilizes this technology and can be applied to many different areas, such as in the lab for testing and for pseudo-static cryogenic temperature measurement.

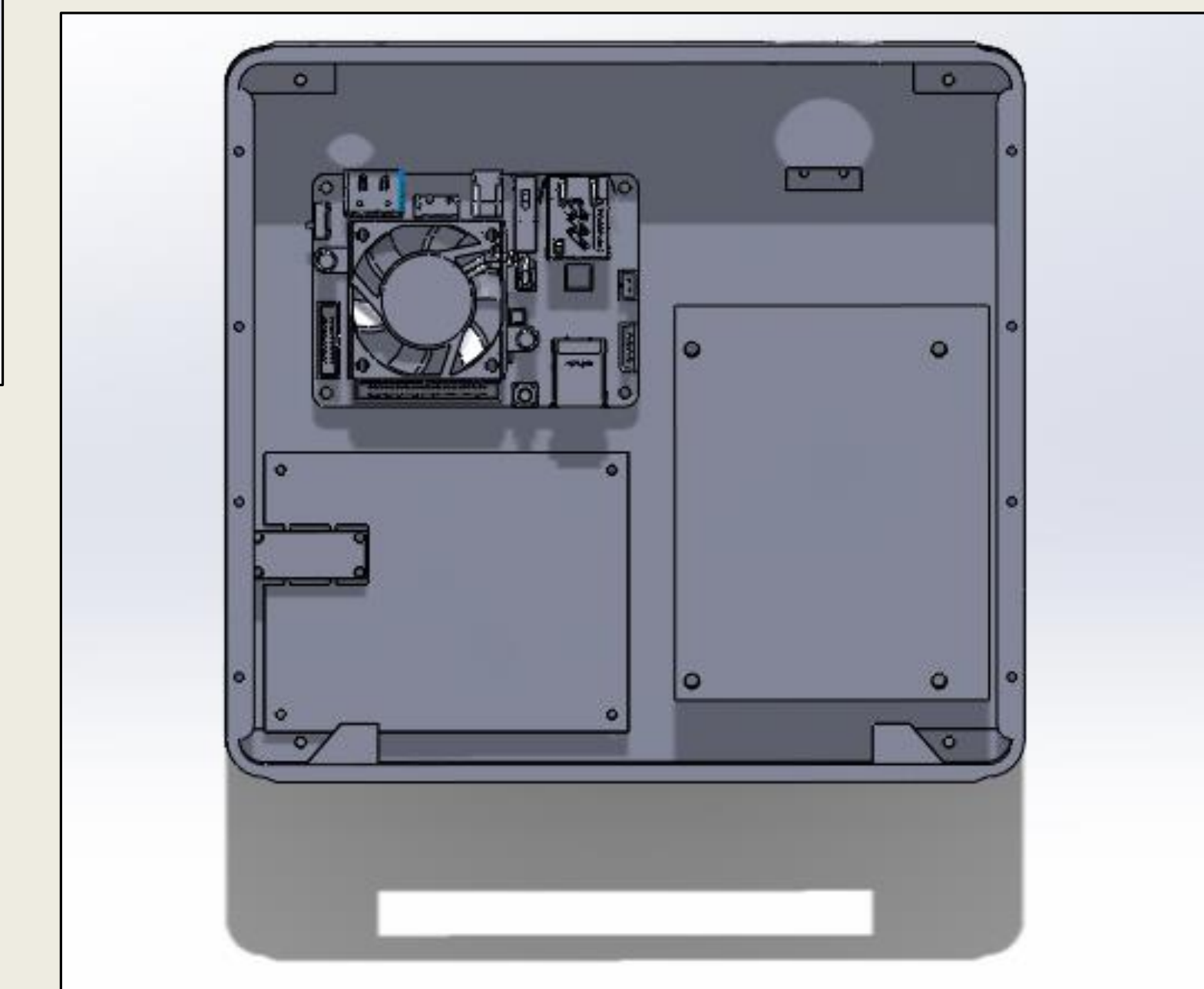
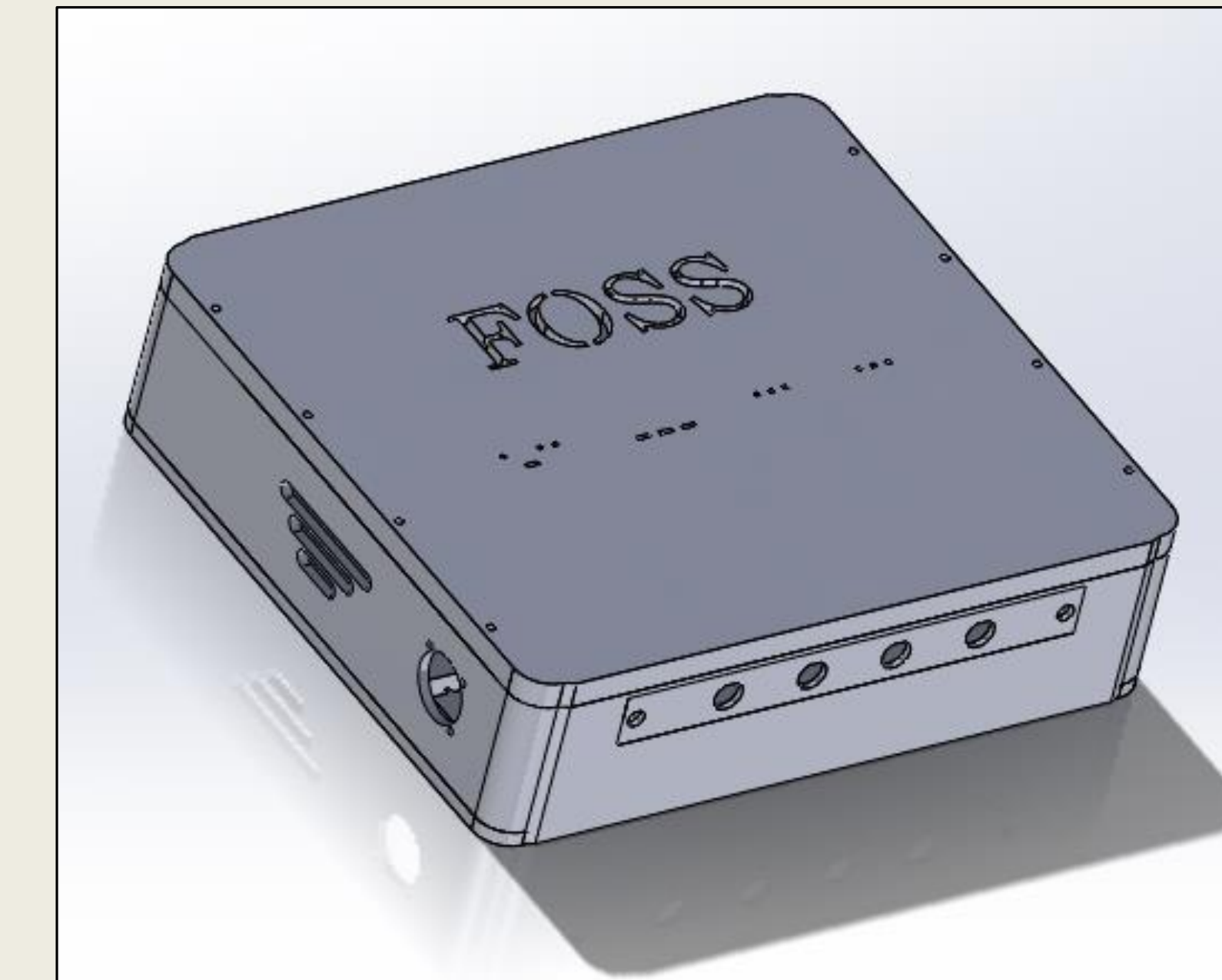
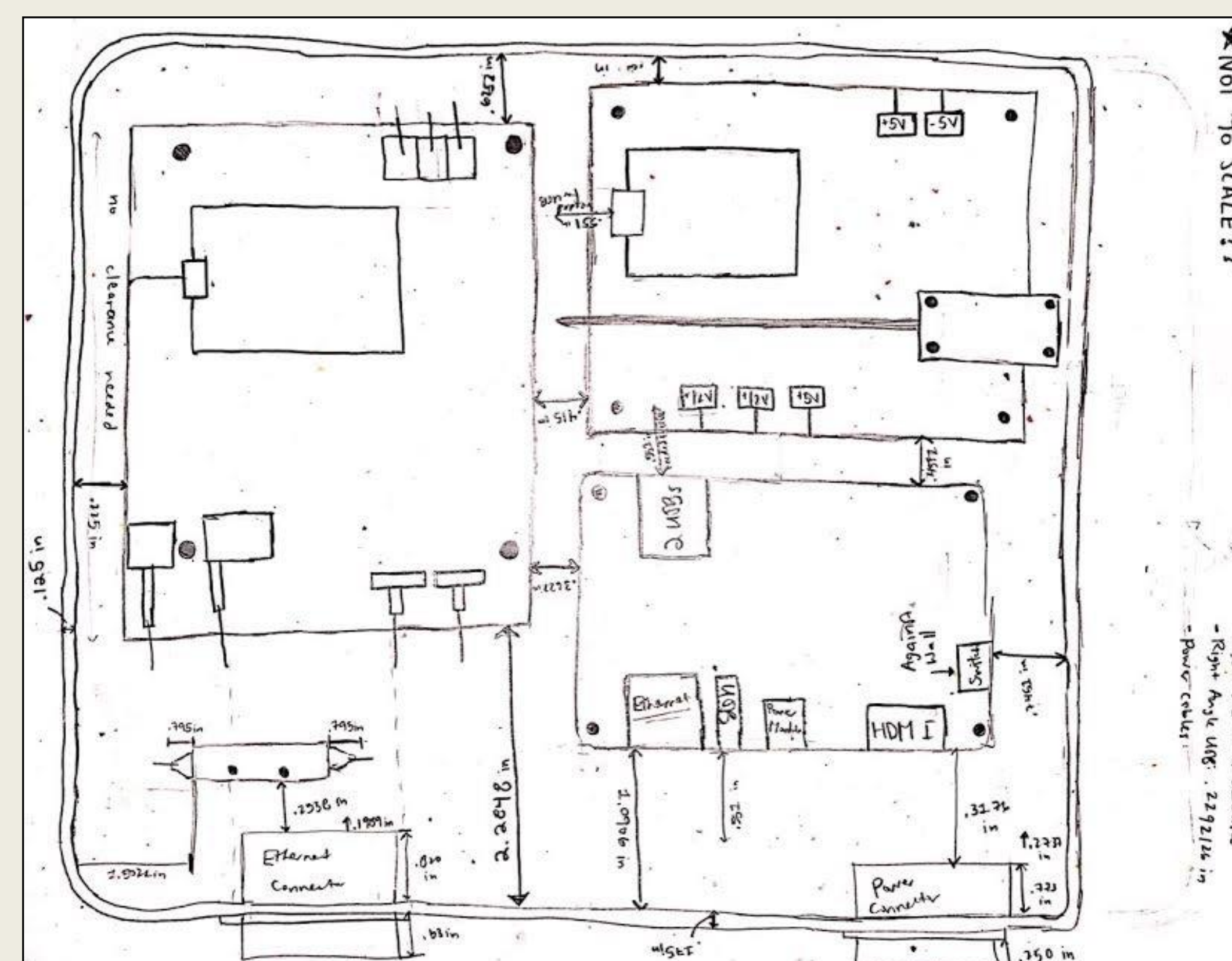
Objectives

Create next enclosure iteration to:

- Improve serviceability: all parts should be accessible
- Maintain an equal or decreased total volume of the enclosure
- Provide adequate cooling to inner electronics via conduction and convection
- Increase optical network size
- Provide ample space for power cables, ethernet and USB connections, and correct fiber optics banding radius
- Allow access from outside the enclosure to the ethernet port on the Odroid-XU4 and the power port on the laser controller board

Methodology

The enclosure was created through computer-aided design, using the SOLIDWORKS software. To prepare and plan out the design, the circuit boards and laser boards that were to be included in the design needed to be verified and measured. In order to position and calculate the spacing for the boards and the enclosure, paper models were created and utilized as documentation. Additionally, to add the dimensions of the ethernet and power connectors, the screws, and the standoffs, the correct parts needed to be found through various electronics websites to increase accuracy.



Results

The design features:

- Metallic base to aid cooling via conduction
- 20x6mm fan to aid cooling via convection
- Separate standoffs to lower cost of machining
- 6 fiber optic ports going into the optical network and 4 ports coming out
- 38999 Series III ethernet and power connectors
- Vents on two sides to aid in air flow
- Overall decreased volume

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