

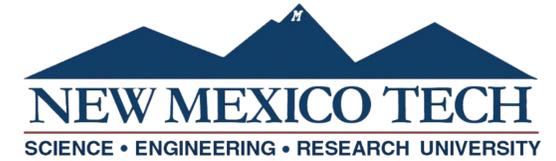


IMMORTAL DATA

Mechanical Design and Development of a Suborbital Payload for Real-Time Data Acquisition and Structural Health Monitoring

in Collaboration with

Dr. Andrei Zagrai of NMT & Dale Amon of Immortal Data INC



BACKGROUND

The Payload Enclosure design team has designed a payload enclosure to hold payloads for Immortal Data Inc. and a NMT research group. The enclosure design was designed withstand rigorous launch environments and hold all required components securely throughout the launch which will occur in August 2021 at Spaceport America.

PROGRESS

The team decided on a design with a sliding access panel and a bolted-on top plate. The team also decided to 3D print the final model in an industrial plastic, ULTEM 1010, to incorporate more complex geometries while saving on weight.

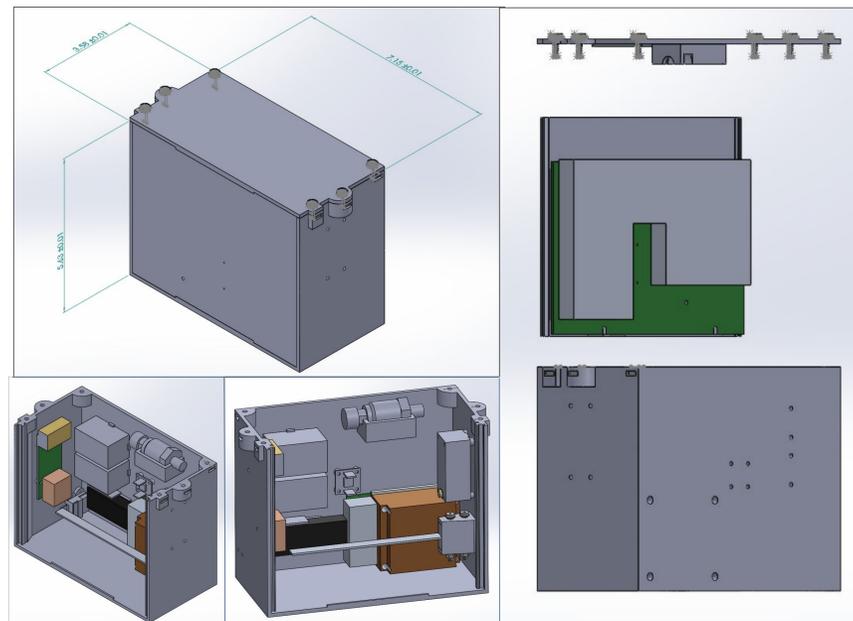


Figure 2. Final Concept Design

COMPUTATIONAL ANALYSIS

The students performed finite element analysis (FEA) simulations in Soliworks to determine the effectiveness of the design. The design proved successful.

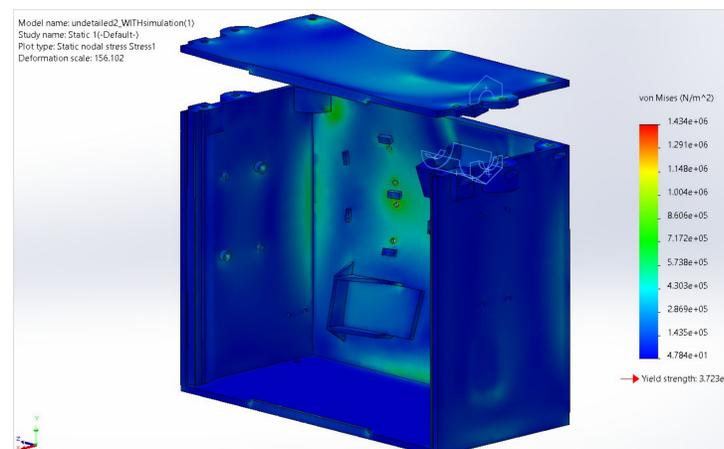


Figure 3. FEA Results

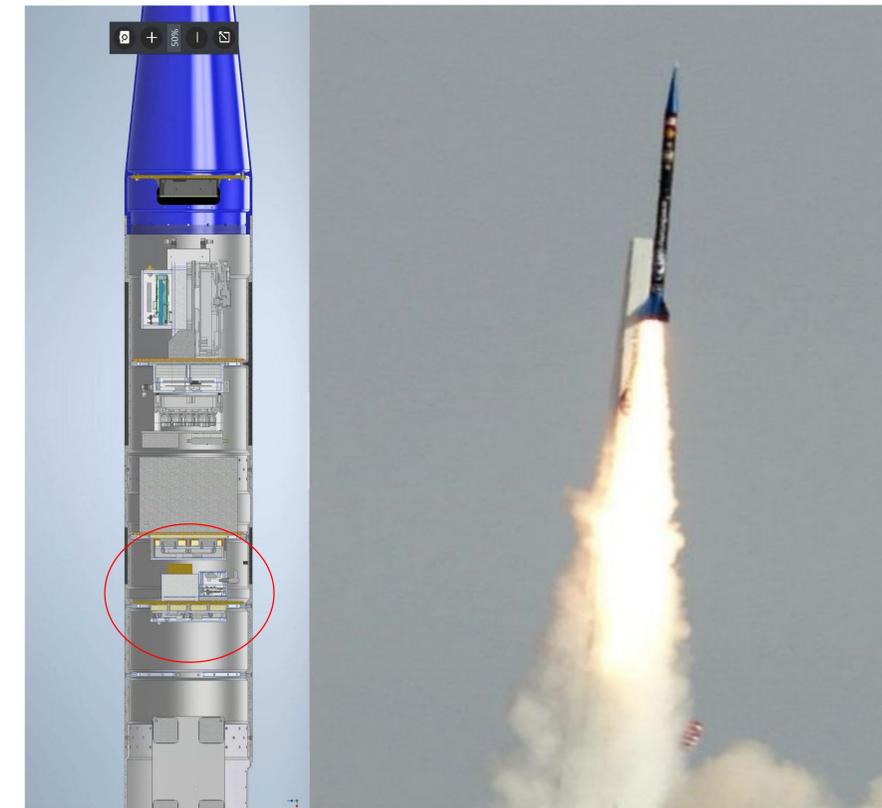


Figure 4. Up Aerospace Inc. Vehicle Model with Payload Location and Launch Photo

FUTURE PROGRESS

The students will do physical testing in Dr. Zagrai's lab and send the design to Immortal Data for assembly and launch by the end of the semester.



Figure 5: Team Members
Dillon Cvetic-Thomas, Amy Tattershall, Dane Robergs, and Eli Jackson

Figure 1: Conceptual Design 1

SPECIFICATIONS

Design specifications for the payload changed multiple times throughout the semester. The final defining criteria are as follows:

- 1000 gram mass limit with an 800 gram mass target.
- Must fit within a cylinder with a radius of 4 inches and a height of 6 inches.
- Factor of safety of 2.
- Must support a minimum components list provided by Immortal Data
- Must survive environmental conditions provided by Up Aerospace Inc.