Summer, Mason, Nicole

**Subsystem: Structure**

**Failed Prototypes**:

Our original idea was to use a foam box and attach parachutes to it, but this idea was quickly thrown out because we wanted something more durable and we knew from the start that we wanted to have it 3D printed. Therefore Dylan started working on the cad, while we worked on the pvb board and sautering it and working on the parachutes.

Originally we were going to buy parachutes and we tried to but they were way to small so we decided to make 3 large parachutes. We originally made them 22 inches wide and then decided they were still to small so we cut open one side and added a panel which made them 26 inches wide. These three parachutes were sewn and cut to precise measurements and small knots were tied on each ends of the parachute. Little loops were then sewn onto each of the 6 panels so that the strings could attach to the actual chassis.

The first time the chassis was 3D printed, the lid did not fit on top and the measurements for the holes where the camera and button were too small. This led to different complications with fitting the three different parachutes onto the chassis as well, therefore our second attempt at the 3D printed Chassis, each of these things were made bigger.

**Purpose of the Subsystem:**

The purpose of the structure subsystem was to design the chassis, create the parachutes, and solder the arduino to the PCB board. When designing the chassis, our subsystem decided to design it like the Apollo 13 capsule, this is because it is sturdy while falling, while also limiting surface area and drag. This design also gave us enough room to place the camera, servo, arduino, and other required systems inside the chassis.

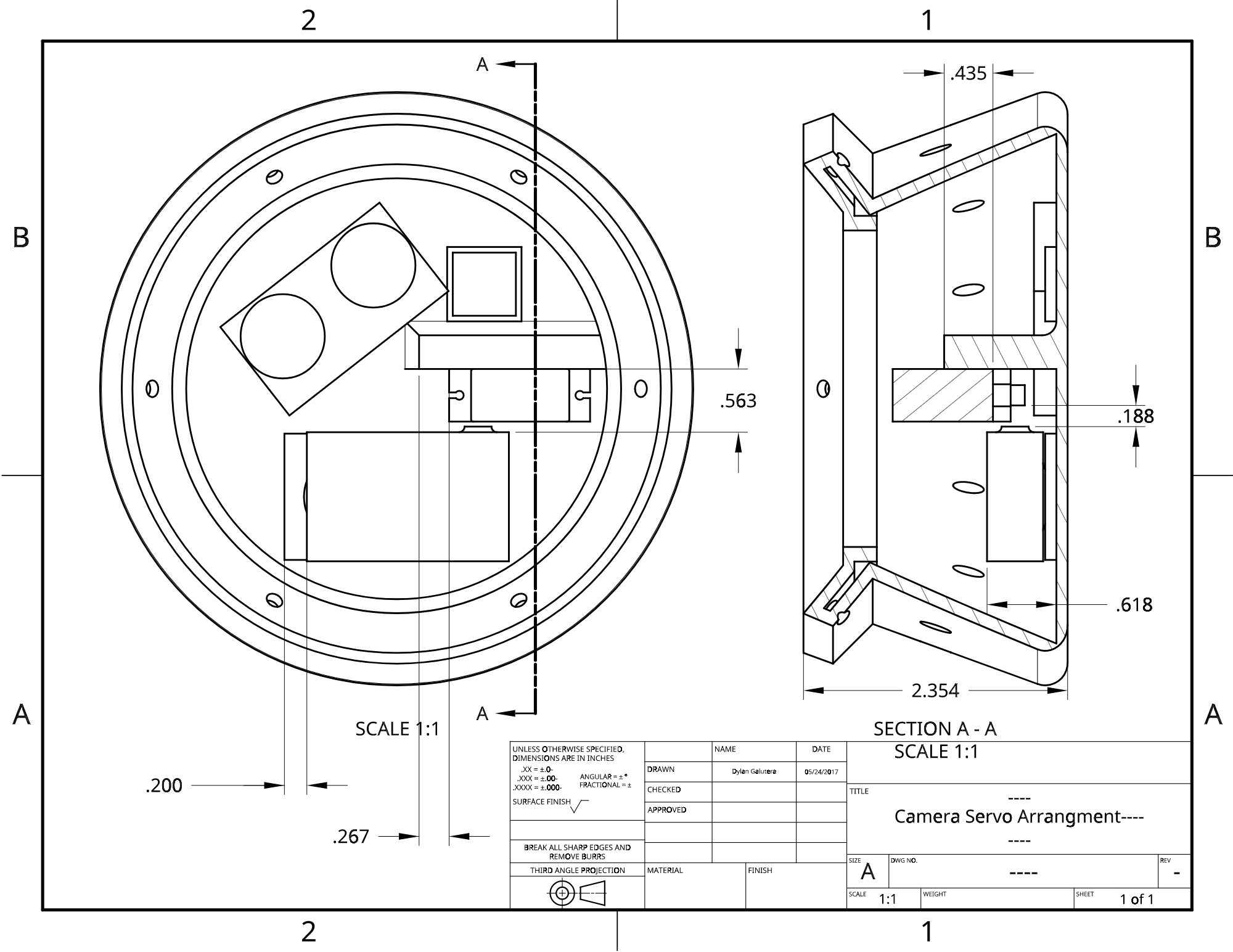
When designing the parachutes, we decided to create 3 large parachutes made up of 6 panels and 3 strings attached. We hand made these parachutes by cutting and sewing each panel to each other and creating loops on the bottom corners of each panel to attach the strings. When attaching the strings to the parachutes they were then tied in pre-cut holes on the top of the chassis.

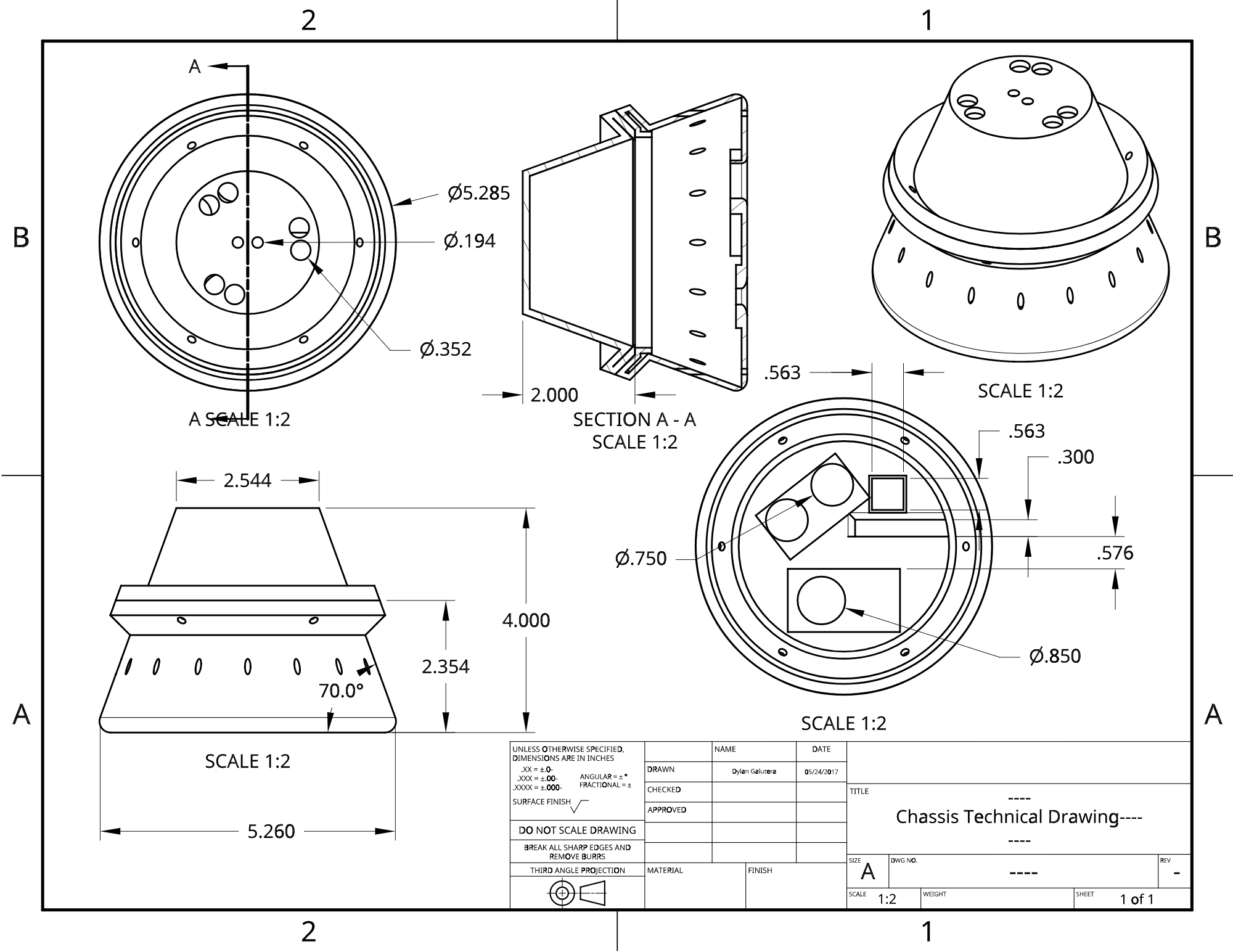
All electronics were run through a PCB board that was attached to an arduino. There were a large amount of wires that was required to be soldered to the PCB board, so that the code could run all programs required.

**Key Specification and Requirements:**

The key specification and requirements were that the chassis must hold all systems needed to complete the task. The chassis must fall from a certain height, take a picture of a specific target area, and land safely. The requirements were that the chassis must weigh less than 350 grams, and must fall slower than 3 meters per second. Other than these requirements the design was open to the creators.

**These are the technical drawings for our final design for the chassis.**

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