FLIR Helios

Helios
A Brighter Security Solution for Peace of Mind

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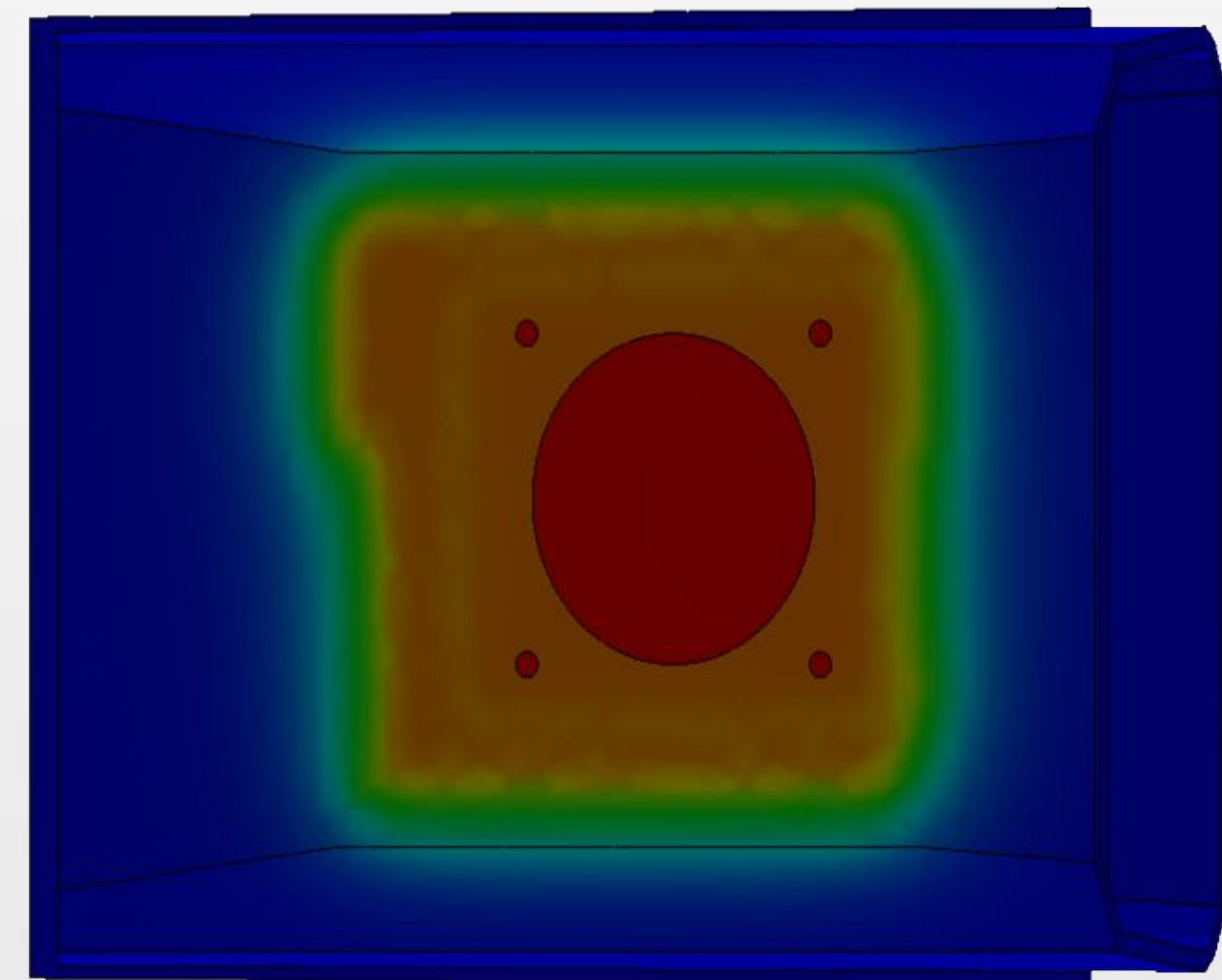
Thermal Testing/Simulations

One of the greatest dangers to the camera's internal electronics is overheating. To combat this, hand calculations, simulations, and physical tests were performed.

A picture of the initial testing apparatus is shown to the right. As is noted in the FLIR one thermal image, the temperature remains at 45.2C, which is well below the max temp ratings of the THOR Board and Lepton.

Design for Injection Molding

- Uniform wall thickness is maintained throughout the housing so that it can be injection molded from PC-ABS in production
- Injection molding allows the camera housing to be low cost
  - Ex: The "Design Curve" (*figure 1*) allows uniform wall thickness to be maintained while providing structural support for screw bosses
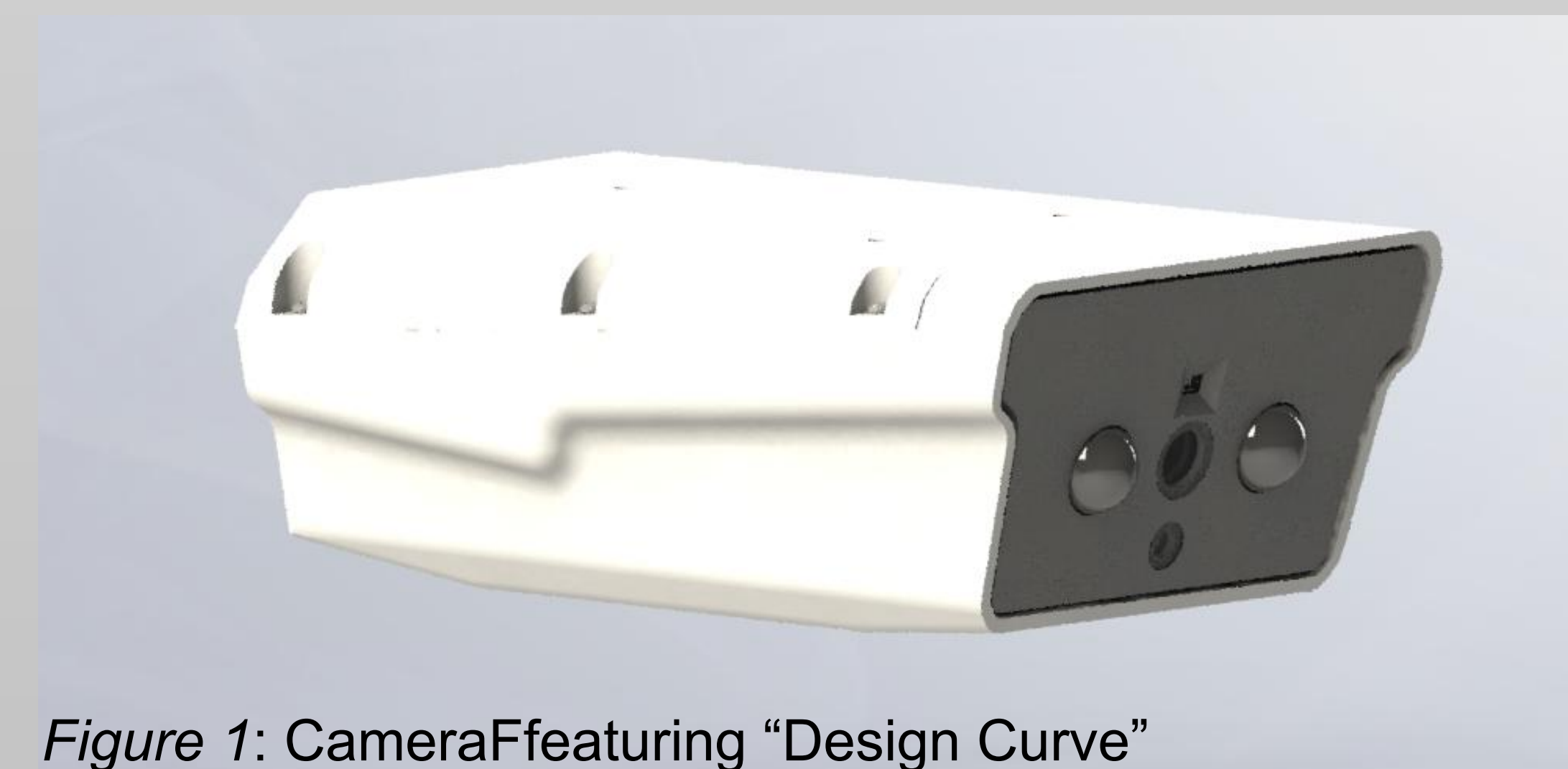
Figure 1: CameraFfeaturing "Design Curve"
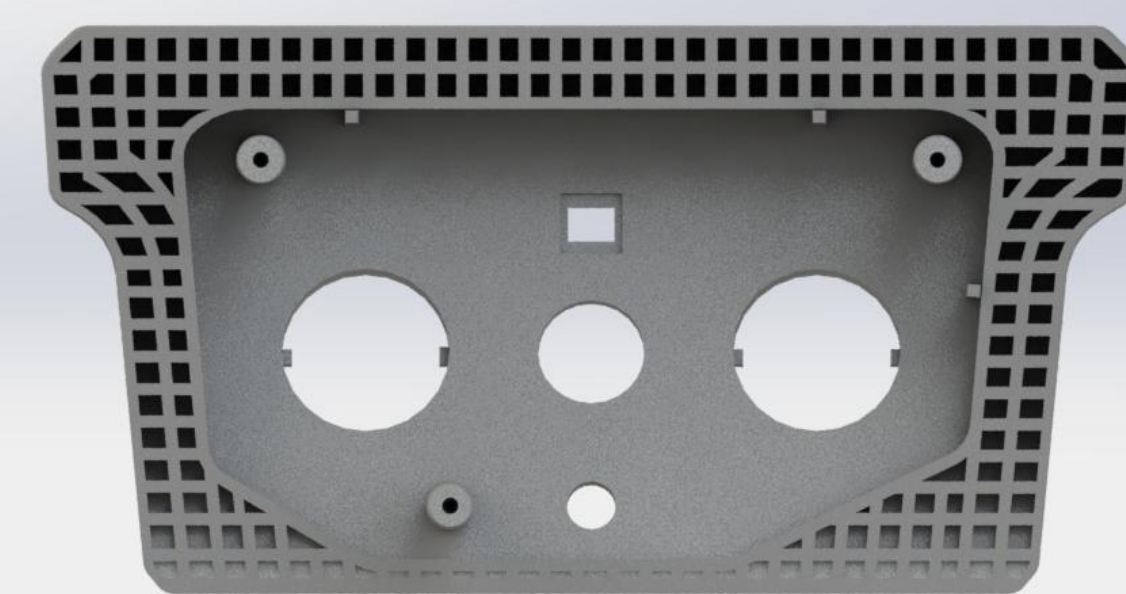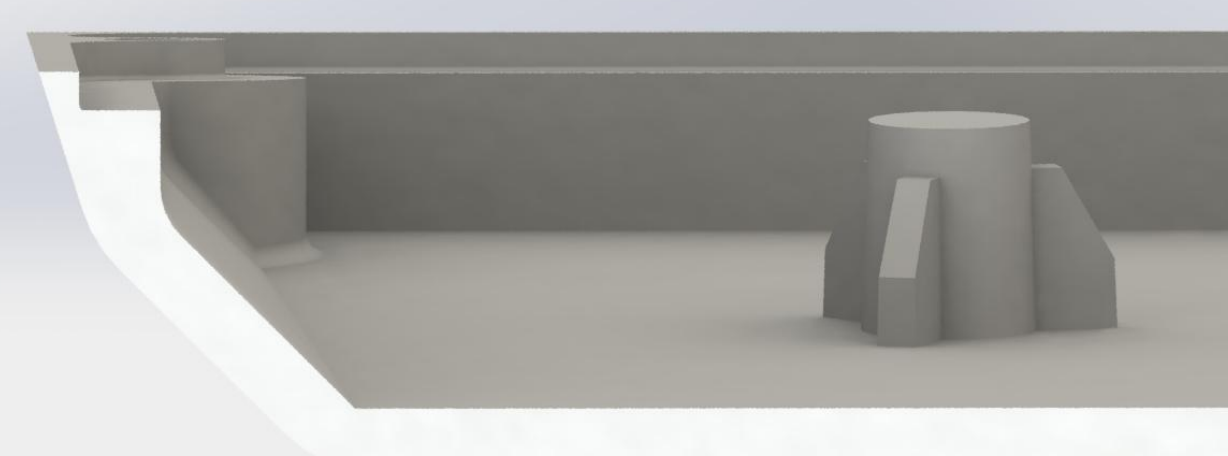
Waterproof Design & Testing

- Used maximum adhesive surface area on all seal surfaces, such as in the ribbing shown in *figure 2*

Figure 2

- Straight ledge design for gluing the gasket into the enclosure top (*figure 3*)
  - Allows gasket to be die cut with the top remaining injection moldable
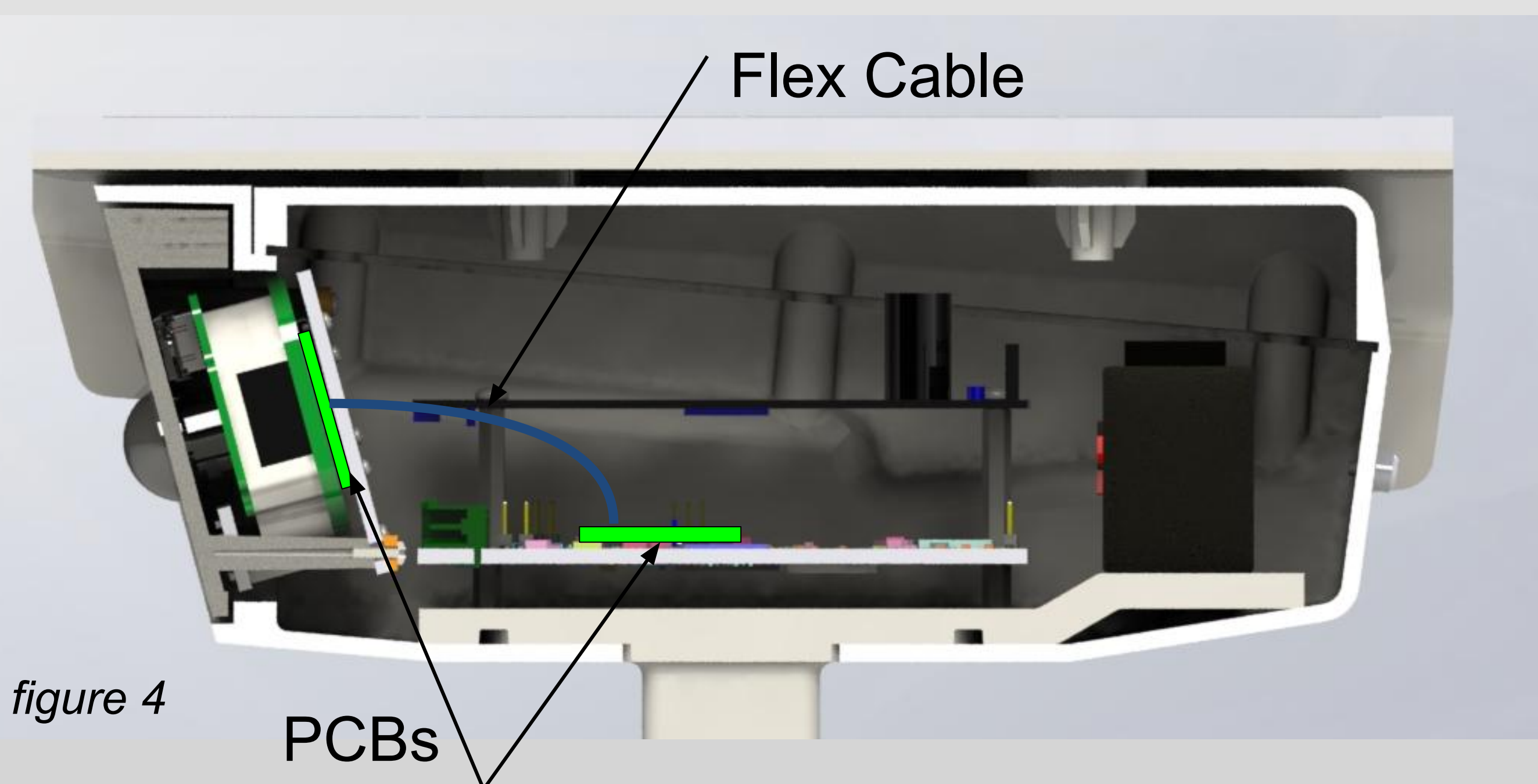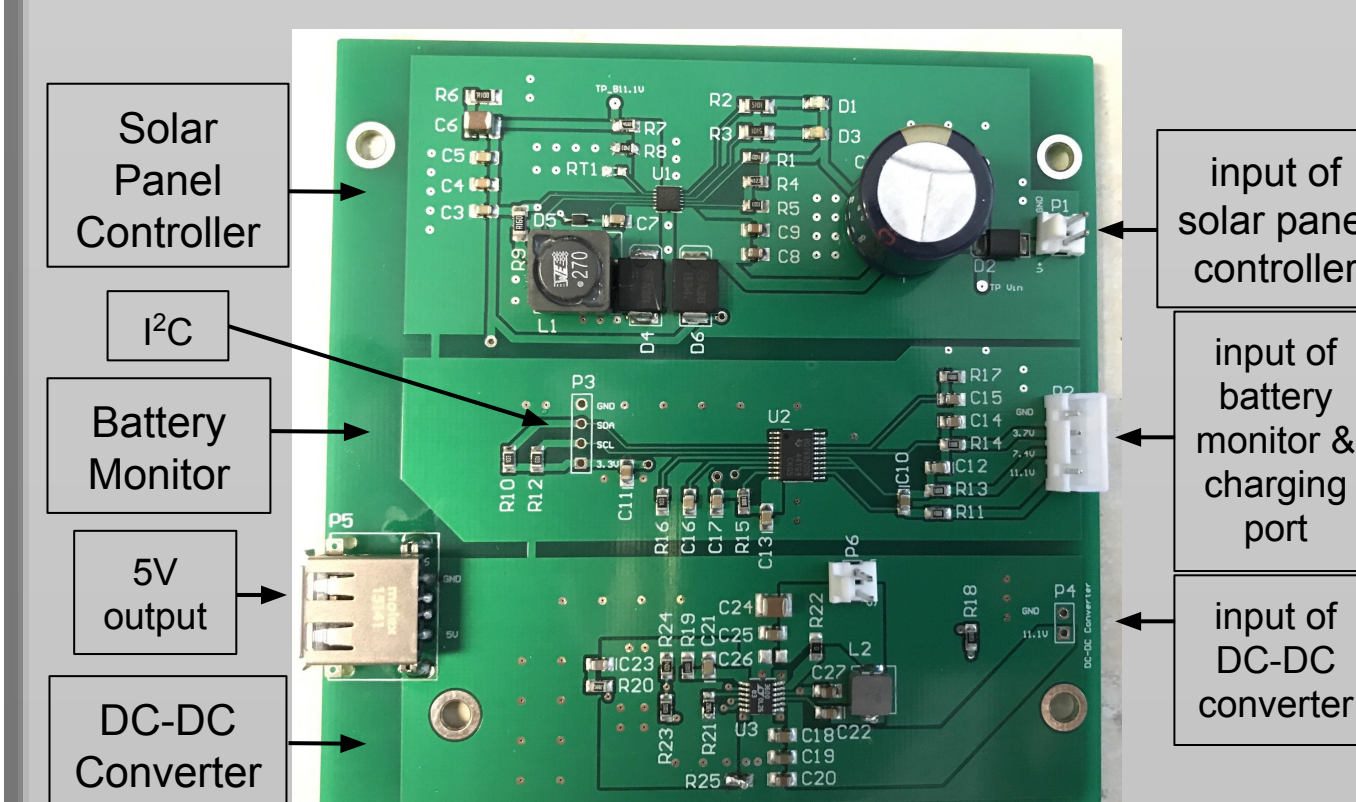
Figure 3

MIPI Flex Cable

Flex Cable

figure 4

PCBs

Two boards were designed to support a MIPI flex cable interface between the THOR board and the two cameras (figure 4). This allows us to mount the camera in front, while heat-sinking the THOR board from below.
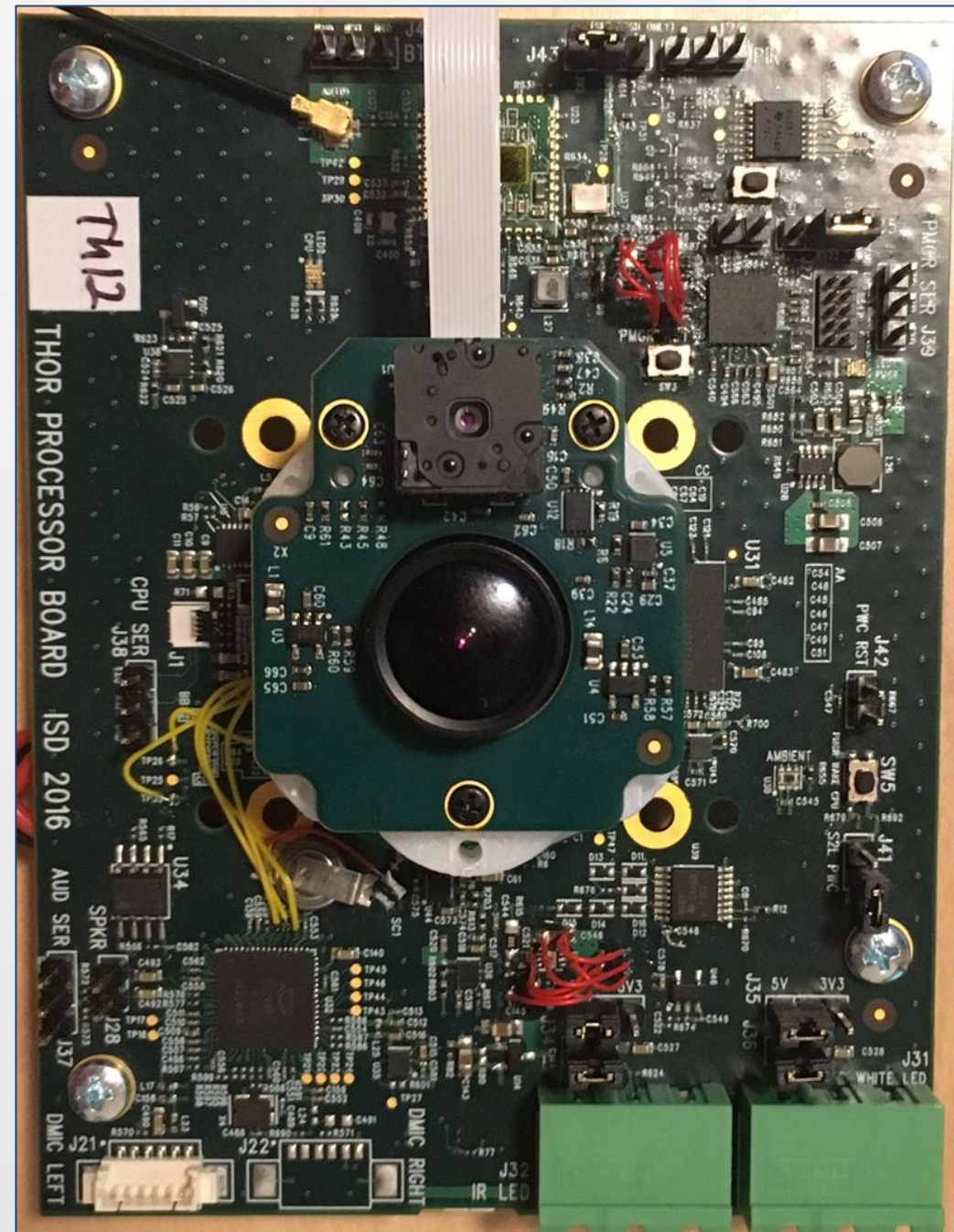
Solar Panel Controller

Solar Panel Controller

I²C

Battery Monitor

5V output

DC-DC Converter

input of solar panel controller

input of battery monitor & charging port

input of DC-DC converter

The solar panel controller is designed to take a 0–42V input voltage range and output a maximum 600mA current at a constant 12.6V

Thor Board

- FLIR-provided board responsible for onboard power management via MCU, sensor communication, and video encoding
- Powered by ARM Cortex A9 CPU and BusyBox OS
- SD card and Wi-Fi support
- Remote login with multiple devices via SSH, FTP, or web

Interrupt Controller

- The PIR sensor detects heat images within its FOV
- When a threat is detected, the MCU sets the interrupt GPIO pin high for the CPU
- Helios begins recording only upon active edge through an interrupt
- The recorder subroutine prunes the SD card filesystem and recording remains active while a threat is still present

Accessibility

- The Android app and website allow the user to view recorded and live video with a few clicks or taps
- Common Gateway Interface provides standard protocol for devices accessing the web server
- An alert message is sent from the Helios to the Android app upon recording
- Complete RTSP and VLC plugin support

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