

ASCEND SPRING 2026 Glendale Community College

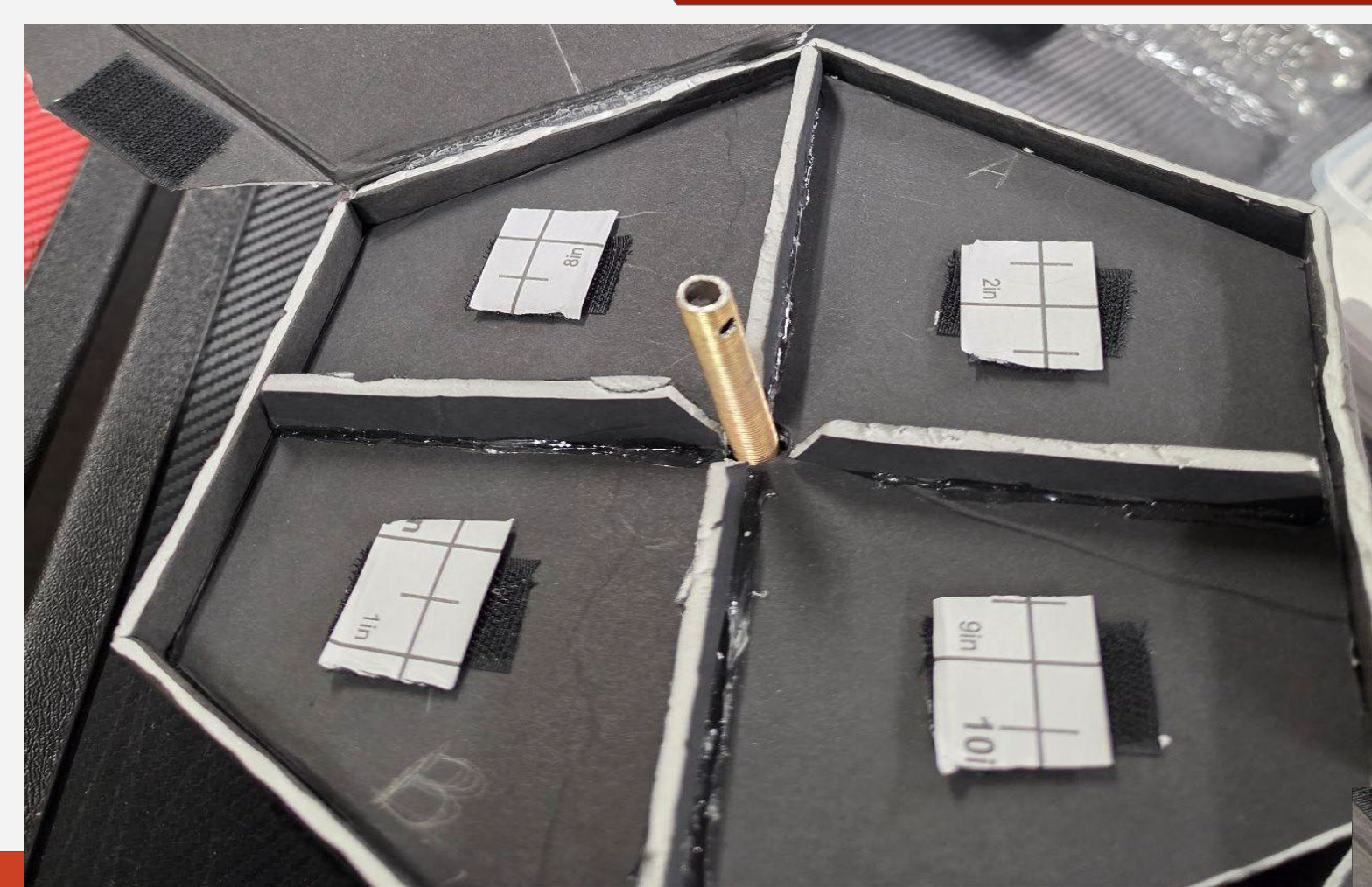


State Penitentiary

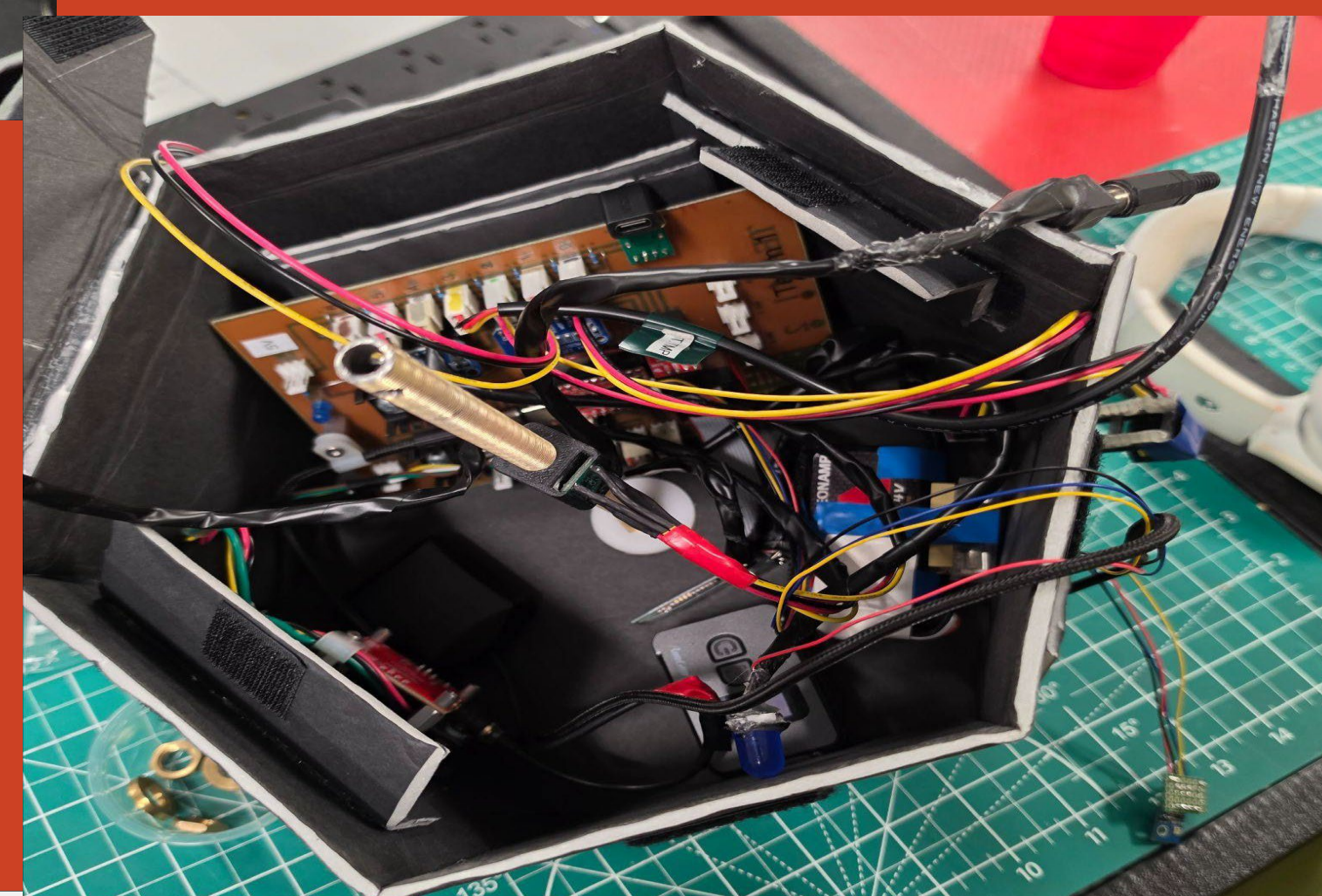
General Overview

Spring 2026 ASCEND retains the Fall 2025 ProMicro RP2040 payload design, analog pressure, X/Y acceleration, internal/external temperature, battery monitoring, and the foam enclosure. We added Bluetooth inter-payload communication, two analog UV sensors, an I2C AHT20 temperature/humidity sensor, and a GCC biology experiment. Bluetooth provided a data link that shared GNSS data that was then transmitted through an Iridium modem on the other payload. The AHT20 added humidity sensing and redundant temperature validation not present in the previous configuration.

Payload Enclosure



Upper level compartment reserved for biology experiment



Lower level compartment for housing FDR, sensors, camera, and battery

Bio Experiment

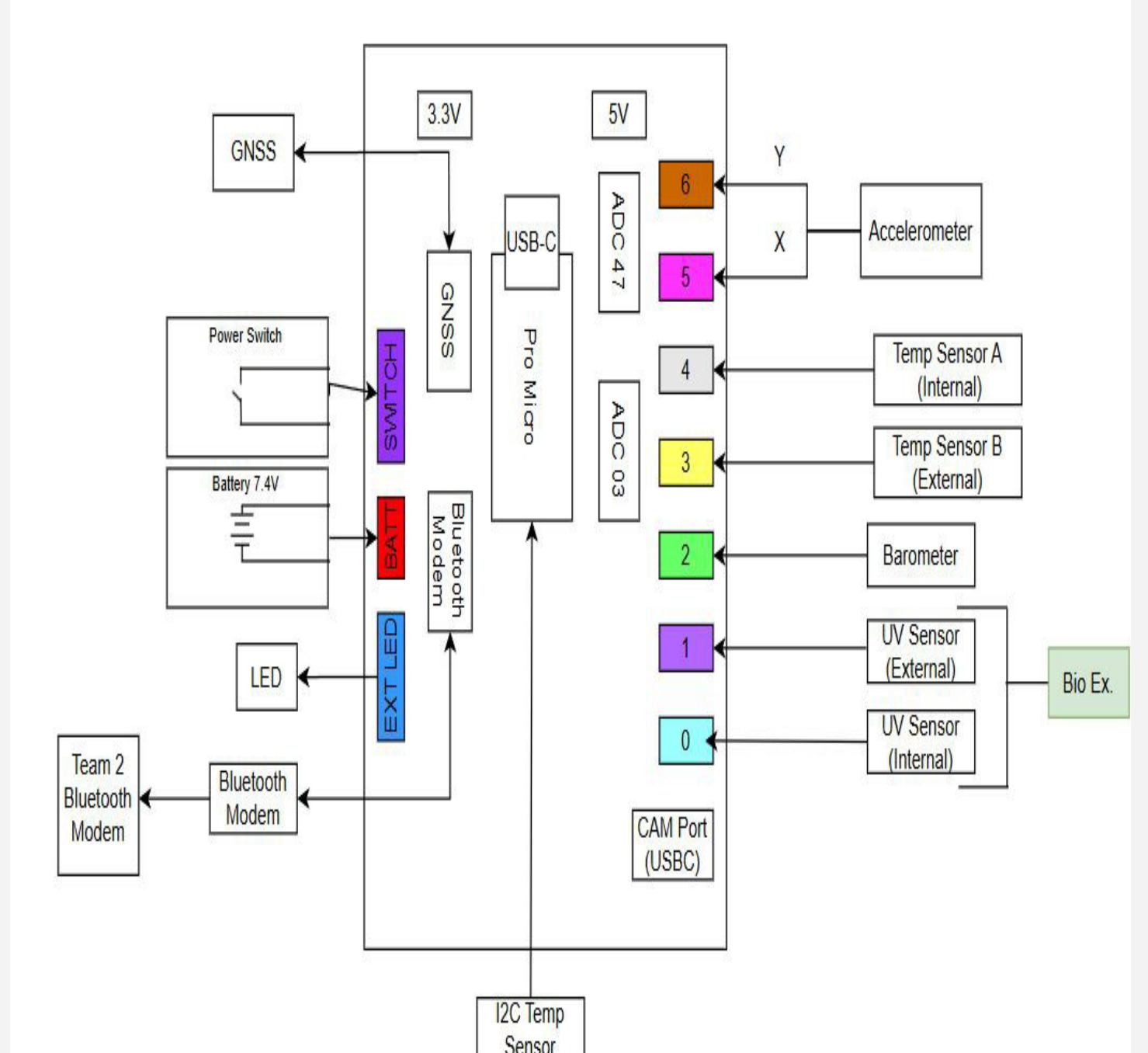
- New mission element focused on a **biological exposure study** using *Deinococcus radiodurans* (a type of bacteria).
- The payload enclosure was modified with **top and side access points** to support the biology hardware.
- **Seven desiccated samples** were placed at different locations in the payload to expose them to different **UV radiation conditions** during flight.
- After recovery, the samples are **rehydrated** and evaluated through **colony count growth analysis**.
- Biological results will be compared against recorded **UV, temperature, and altitude** data from the payload.
- Goal to show the **resistance** of this bacteria **under stressor conditions** unlike ground level.
- Final biological results are **still pending**.



Findings

- The payload was recovered after a flight reaching **about 65,000 ft** with **minimal enclosure damage**.
- Usable data was successfully collected from the **two UV sensors, internal temperature sensor, pressure sensor, and I2C humidity/temperature sensor**.
- UV measurements increased from about **UV index 2** at the start to a peak near **UV index 25**.
- Pressure decreased from **14.69 PSI** to **1.45 PSI** at altitude.
- Internal payload temperature ranged from **-18 °C** to **47 °C** during the mission.
- External temperature data ranged from **-49 °C** to **34 °C**.
- Relative humidity started at **26%**, peaked at **65%**, and ended at **23%** at recovery.
- The **battery monitor** indicated consistent power, with **voltage ranging from 7.9 V** to **6.9 V**.
- Several subsystems underperformed during flight, including the **GNSS, accelerometer, and external temperature sensor**.
 - One of the **analog to digital converters** had a failure and resulted in a constant value of 600mV leading to inaccurate data for the accelerometer's x axis.
 - The **ground wire** connected to the **analog external temperature sensor** failed to produce data due to **bad pin connection**.

System Block Diagram



For Future Reference

- The main weakness in the project was **insufficient testing** prior to flight.
- Future testing should include **logged datasets, plotted results, and trend review** rather than only real-time checks.
- Early graph-based analysis is necessary to catch **sensor faults, drift, and integration issues** before flight.