



Accumulator Overview:

- 28 LiFePO cells connected in series that amount to ~96 V
- 4 segments, max 24V each
- AMS consisting of 1 pack manager/computer (PacMan) + 2 segment managers (SegMan) + 7 cell managers (CellMan) per segment
- 100% isolation of the high voltage in the pack with an additional garolite enclosure
- Grounded aluminum frame

Charging Procedure

- The charge relay is located on the SegMan
- Individual charging of segments
- Two charging Anderson ports on the pack
 - One for each segment
- Cells will be actively balanced during charging

TSV Display:

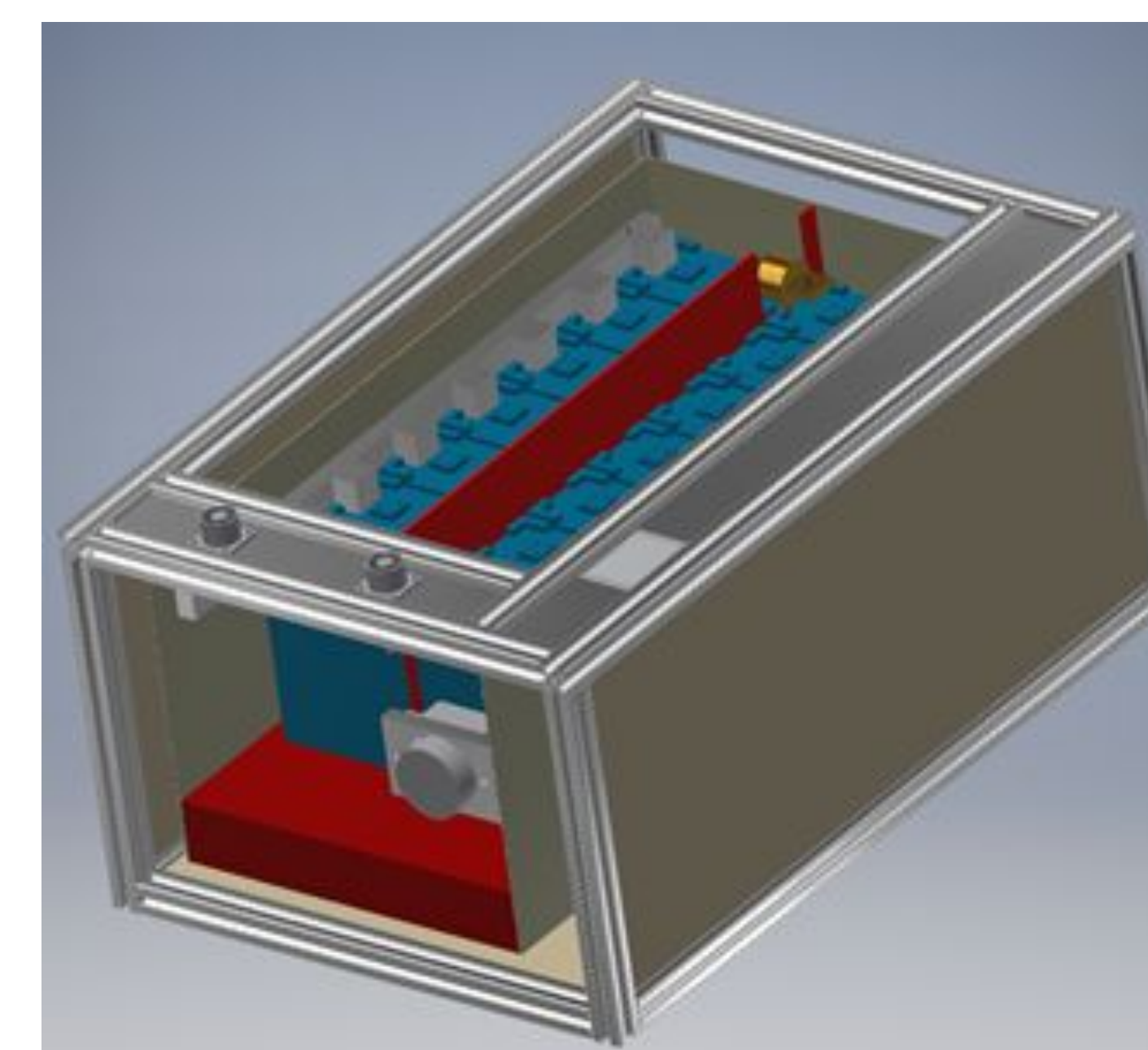
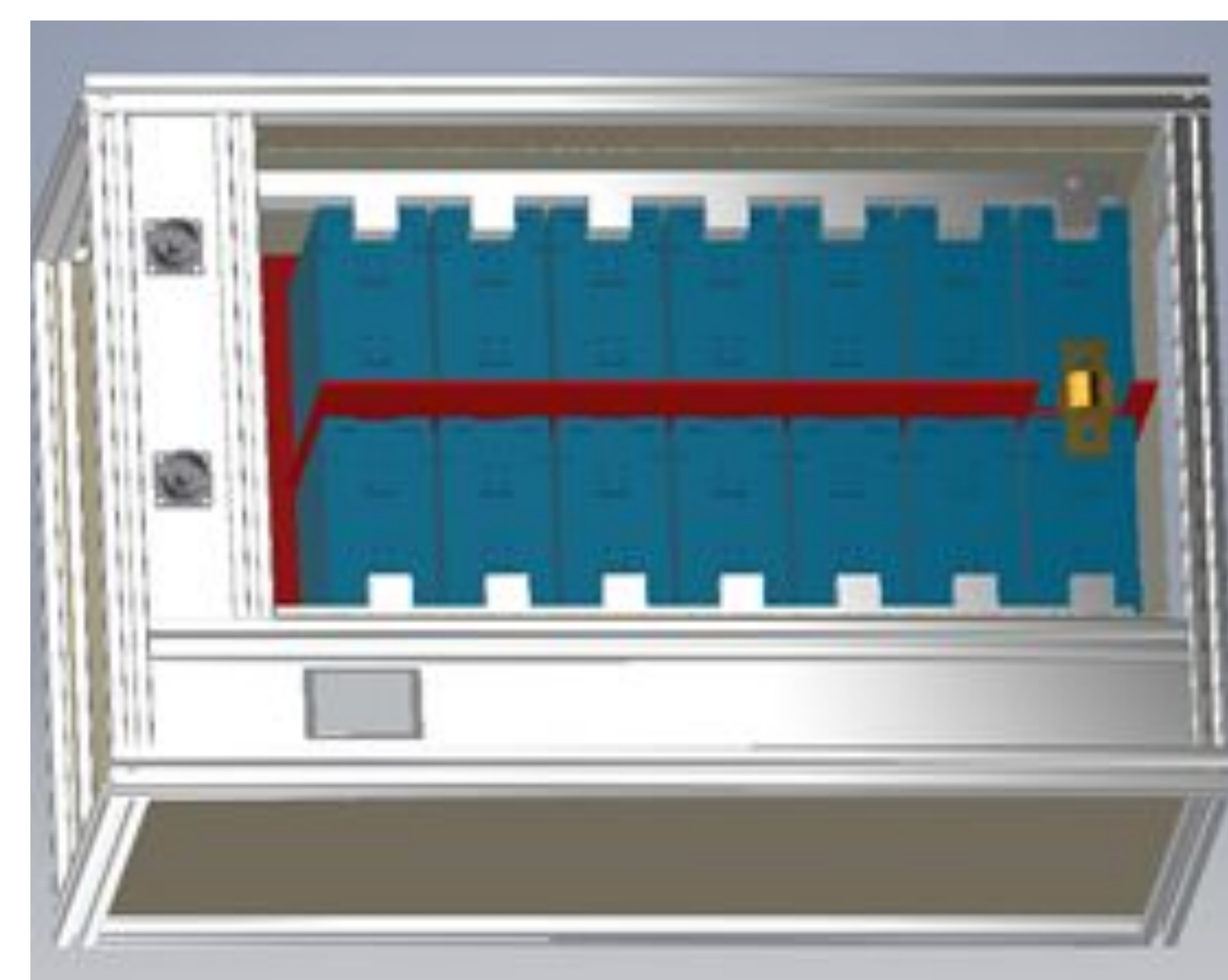
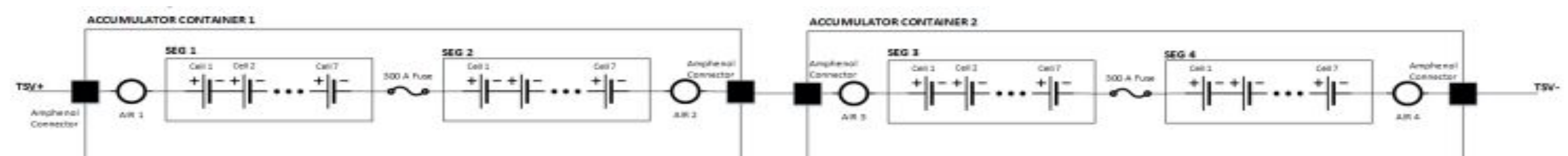
- Configurable parameters
- Segment voltage and segment current reading
- Cell temperature reading
- Cell voltage reading
- Cell discharge rate
- Pack state of charge

TSV Enclosure:

Orange, fully shielded 2/0 and 3/0 cables are used to deliver TSV to the motor controller and motor. Amphenol connectors are used to secure these high voltage cables and provide mechanical strain relief. The packs are separated on the inside into high and low voltage sections in order to comply with TS/GLV isolation rules. Part of this isolation is an extra internal garolite enclosure that secures and isolates the high voltage sections. The cells are one of the major components in these garolite enclosures. There are individual slots for each cell and then the cells will be secured from the top. There is a divider in the middle of the pack to separate the two segments. The fuse will be in between the two segments and will serve as the TSV segment disconnect.

Accumulator Management System:

The AMS will contain only one processor (ESP-WROOM-32) that is powered by 3.3 V and has a 160 MHz clock. This system will actively balance a segment of cells (7 cells / ~28 V), control the safety loop, and communicate to other subsystems using the CANBus set up by VSCADA. Each cell has a cell manager (CellMan) that monitors and communicates the cell voltage and temperature to the segment manager (SegMan). The SegMan receives information about the cell optimal charge from the pack manager (PacMan) through an isolated serial peripheral interface (ISO-SPI). The SegMan then determines whether to discharge a cell or not. Additionally, the SegMan also relays cell information to the PacMan through ISO_SPI.



Further Information:

Project website: sites.lafayette.edu/motorsports/tsv
Faculty Advisors: Prof. Chris Nadovich, Prof. John Nestor

