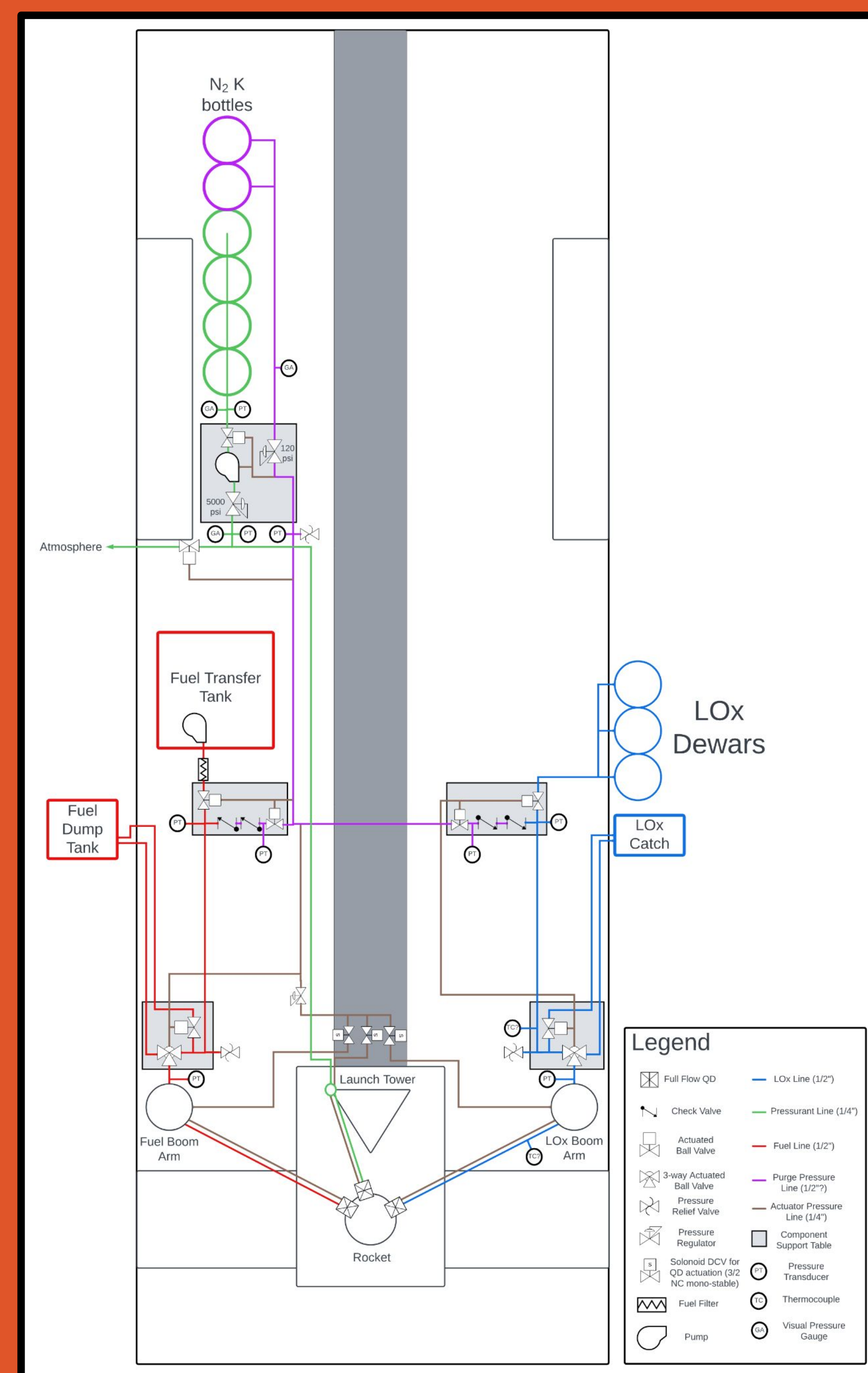


### Vertical Test Stand (VTS)

The VTS sub-team has the goal of designing and building a mobile launch and testing platform. VTS subsystems include:

- Water Deluge System
- Quick Disconnect System
- Static Fire Testing Mount
- Fuel Line Plumbing
- LOx Line Plumbing
- Pressurant Plumbing
- Support Structures
- Hydraulic System



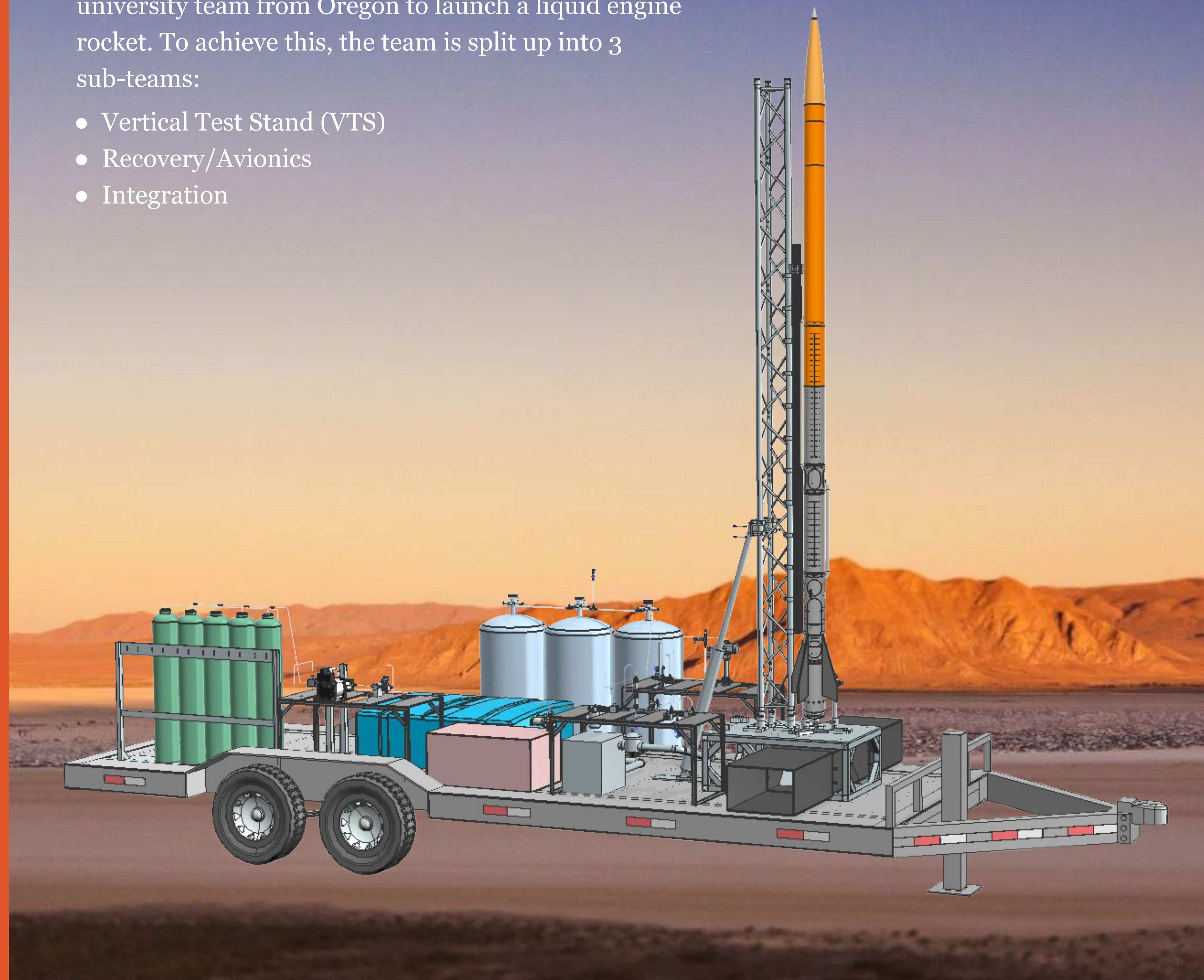
Piping & Instrumentation Diagram (P&ID) for the VTS fluids system (LOx, fuel, pressurant)

# High Altitude Liquid Engine

The High Altitude Liquid Engine Team (HALE) is an Engineering Capstone team made up of 14 students with the goal of successfully launching and recovering a single stage liquid bi-propellant rocket to the Kármán Line, 100 km above ground level. HALE is competing in the Base 11 Space Challenge, with more than 40 university teams reaching for the same goal.

This year's goal was to design the subscale launch vehicle, and to design and manufacture the vertical test stand to conduct launches and test fires from. The subscale rocket aims to test HALE's 2,000 lbf thrust MIRA II engine with a launch to an altitude of roughly 30,000 ft, resulting in HALE becoming the first university team from Oregon to launch a liquid engine rocket. To achieve this, the team is split up into 3 sub-teams:

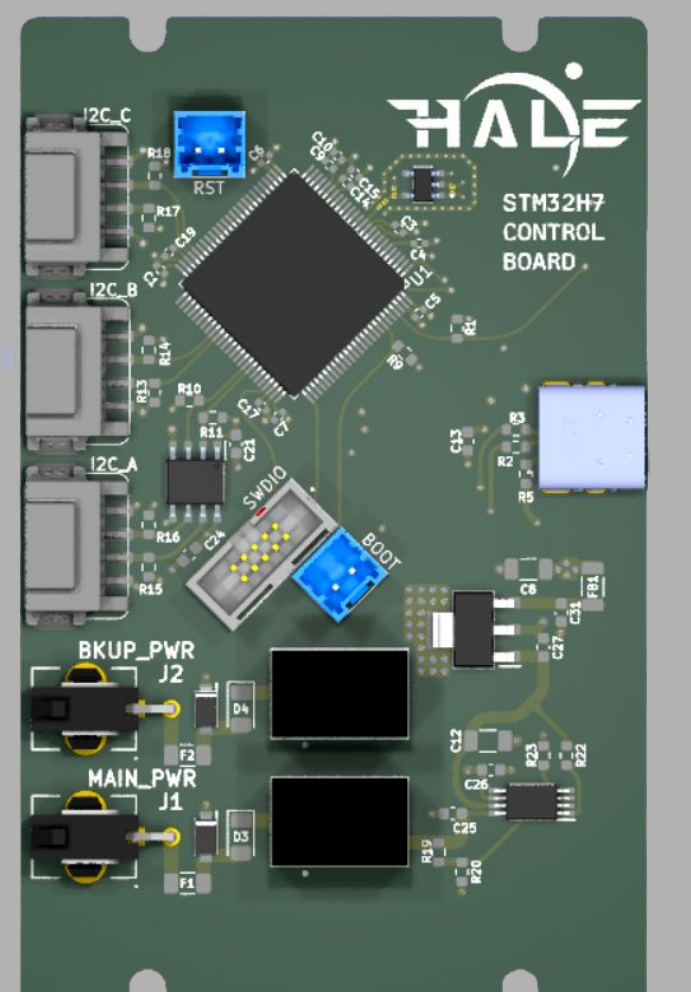
- Vertical Test Stand (VTS)
- Recovery/Avionics
- Integration



### Recovery/Avionics:

The Recovery/Avionics sub-team has the goal of developing a full recovery system in addition to designing, building, and testing custom flight computers. Subsystems include:

- Pneumatic Piston Ejection System
- Parachute/Shock cord sizing
- Fully Custom Flight Computers
- Recovery Hardware Spec'ing
- Sub-subscale rocket



### Integration:

The Integration sub-team has the goal of fully designing the subscale launch vehicle. Integration subsystem projects include:

- Fuel and LOx tank plumbing
- Airframe, fin, & nosecone integration
- Internal Structural Components
- Main Valve system
- Engine Mounting
- Pressurant System

