

*Notes taken by: Owen Kaufmann*

*Number of people in attendance: 23*

**For new members:**

Overview of sprint backlog

Overview of nozzle cooling methods

New member project!

Text resources for learning rocket engine theory: See the Resources folder inside Liquid

Propulsion>Resources

**Engine 1 Tasks:**

**Fiber winder (Patrick R):** Set up- we have been trying to get it running but no fully successful wind yet.

**Bulkhead manufacturing (John G.)** will begin in next few days.

**Engine 2 Tasks:**

**Nozzle strain (Nick D):** Need radius as a function of length, but analysis is 80% done. Export points from Solidworks file.

**Film cooling (Zach L):** Ran sim using multiphase flow, however dynamic mesh has been hitting 512k cell limit enforced by Ansys student. How do we analyze supercritical methane injection? May have to go forward with testing instead of computational.

\*New member task: 3D print a film cooling test setup.

Send John Evans an email re Ansys student cell limit?

Looking into alternative CFD tools other than Ansys, specifically SU2.

**Volute:** New problems regarding meshing. Once these are sorted out, will be able to run simulations.

**COPV Sourcing (Owen K):** Got a quote from Steelhead Composites - \$1460 for N2 tank, \$1610 for each of the larger tanks. Should have quote from SamTech by tomorrow, they were supposed to have it to us by today.

Going to run calculations on what our performance is going to be with 105L SamTech tanks.

**Test Stand Mounting Solution (Patrick R):** Preliminary analysis ongoing, two good options. Will come back after parts ordering to figure out specifics.

**Insitron Testing (Patrick R):** Material tests pushed to next week.

**Valve Alignment (Jordan G):** Might be postponed/canceled. Jordan not at meeting to discuss progress.

**Jalapeno Computer (Ian F):** Around 10% done, basic control scheme together, design a separate power supply for servos to avoid overloading Arduino? Room for an extra sensor perhaps.

\*New members may be able to hop on this project and help.

### **New Member Project: Fuel Valve Actuation**

- Reaper engine main propellant valves need to be actuated very rapidly.
- Pneumatic actuator is very likely the ideal solution.
  - COTS parts are bulky, expensive, low pressure. In-house design would be preferable.
- Integrates well- high pressure nitrogen is already onboard (~1600PSI from the regulator)
- Rack and pinion mechanism for valve turning?
  - Need opening and closing capability.
- Important considerations:
  - Need another valve to turn on/off air source. Compact solenoid valves?
  - How to seal gas inside pneumatic actuator?
  - How to relieve pressure inside actuator? 3-way valve?
  - Failsafe for emergency shutdown

**Time frame:** Expecting a complete design, manufacturing, and testing cycle. Will get back to team members on a concrete time frame.

### **End of meeting discussion:**

- Once a week, brief the team on the theory that each team member has been working with.
- Probably going to change Thursday meeting time to after the full team meeting.
- Going to pin link to Drive folder, everyone should be able to access it with their student email account.