

PSAS Electric Feed System Design Review Report

Design Review Meeting Summary

Our team met with our sponsor, PSAS, represented by Erin Schmidt. We discussed where we are in the development of the project: the end of the first prototype design and the beginning of fabrication and assembly. This puts us behind schedule. Consequently, the major outcome of the meeting is that our sponsor recognizes that we may only be able to hit the milestone of conducting one iteration of water testing, though there is still the possibility of conducting a second iteration. We recognized that the first prototype we are creating is well researched and designed and is likely to provide results and documentation that can inform future PSAS efforts on this pump system.

Key Client Requirements

1. A first prototype of an electric motor powered centrifugal water pump system will be created. This pump will be designed to reach the flow rates ($\sim 0.04 \text{ ft}^3/\text{s}$) and pressures ($\sim 375 \text{ psi}$) required by the actual LOX and IPA rocket pumps.
 - i. This requirement will be met if the first prototype is tested and is able to achieve pressure and flow performance similar to design values.
2. The design and testing of the prototype will produce documentation that can inform the design of future water or LOX/IPA prototypes.
 - i. This requirement will be met by providing well documented procedures and performance results from the first, and if possible, second water prototypes.
3. If possible, the redesign of the water pump for LOX and IPA compatibility should be conducted.
 - i. This requirement would be met if the team produced a redesign of the pump for LOX and IPA considerations.

Final Deliverables

1. Assembled and tested water pump.
2. Characterized water pump performance to inform next iteration of pump prototype for LOX and IPA pumps.
3. Design of LOX and IPA pumps.

Budget

Total expenditures so far are \$1,054.33 out of an anticipated initial budget of \$7,900. This \$1,054.33 represents much of the anticipated cost of the first prototype. Additional expenses for sensors, fittings, hardware and machining stock are expected before the first water test assembly is completed and tested.

If the project proceeds to the production of a cryogenic LOX pump, there is significant expense expected to procure cryogenic compatible valves, sensors (ex. flow meter), and seals.

For the sake of brevity, a bill of materials is not provided here, but the active BOM can be accessed on the [PSAS Github](#).