V . O . L . C

Valve Operated Low-Leakage Cryogenic-Connector

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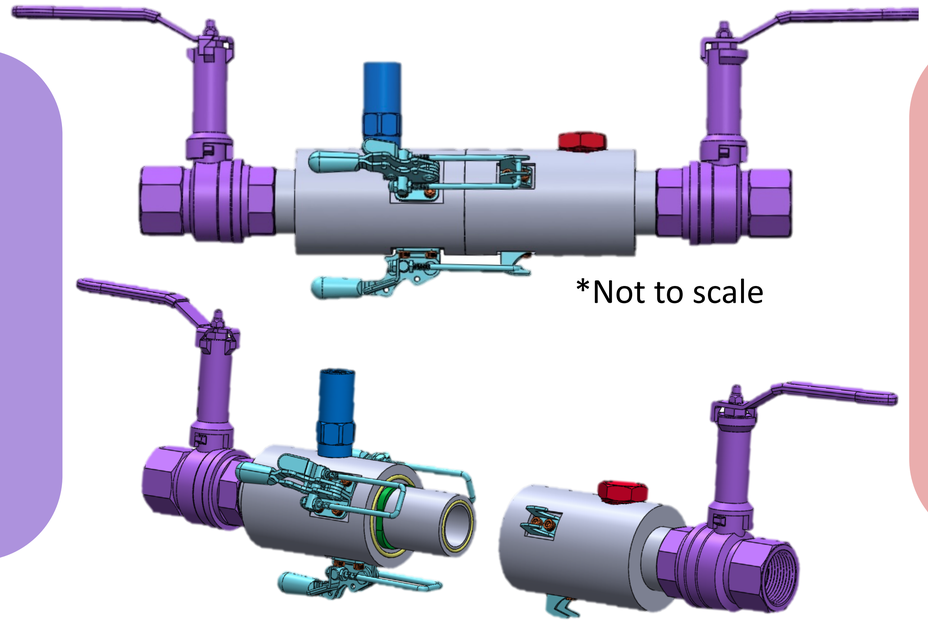
Objective

Design, build, and test a cryogenic connector interface with a focus on the seal/joint design for refueling to support future missions on the moon.

Key Goals

- Refuel Rocket Ship
- Versatility in Application
- Operable without Machinery
- Low Loss of Fuel
- Ergonomic for Astronaut



*Not to scale

Targets

- Connector Diameter: $1.00 - 1.20\ in$
- Volumetric Flow Rate: $0.100\ \frac{in^3}{min}$
- Leakage: 1% of flow
- Activation Force: $< 48\ N$

Testing

Test 1: Valve Activation Force Check

Test 2: Gaseous Helium Leak Check

Test 3: Cryogenic Nitrogen Flow

Test 4: Assembly Cycle Testing

Design Components

AVCO Ball Valves

Boil Off Pressure Relief Valves

Breather Vent

Quick Disconnect Latches and Hooks

Kel-F O-ring

Stainless Steel Piping

Future Development

- Mitigate Solar Radiation
- Mitigate Regolith Contamination
- Design Efficient Shipping Container
- Design Mass Production Assembly