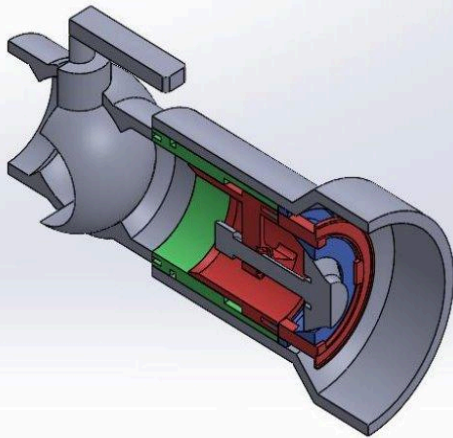
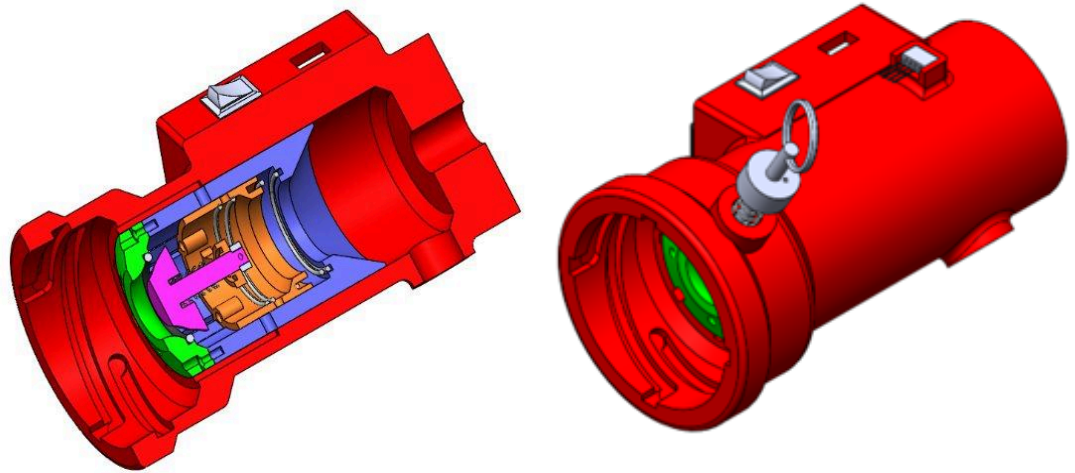


Dust Tolerant Cryogenic Connector:

MSU Denver's IEEE Robotics Club is building a smart, Dust Tolerant Cryogenic Connector capable of transferring fluids in a lunar environment in support of the Artemis mission, which is to establish a human presence on the Moon by 2028.



Key Features: Final Design (*above*):

- Spring actuated plunger valve for quick and dry-disconnect
- Twist & Lock coupling design
- Embedded Sensors for monitoring the fluid transfer properties such as interior pressure.
- Designed to be ergonomic and manufactured using 3D printing.
- Capable of ejecting debris from the interior of the connector.

Key Features: Preliminary Design (*left*)

- Spring actuated plunger valve for quick and dry-disconnect
- Twist & Lock coupling design
- Additional, manually actuated Ball Valve.
- Designed to be manufactured using 3D printing.

Requirements for Final Design:

- ☒ Rugged and protected Interior.
- ☐ Housing can be purged to avoid icing when de-mated and clear debris.
- ☒ Scalable and Modular
- ☒ Ergonomic – requires minimal pressure to open and close with EVA gloves.
- ☒ Cannot be unintentionally opened.
- ☐ Design Lifetime: >15 years.
- ☒ Shall be compliant with Standardized NPT hose connections.
- ☐ Design shall have a sealed connection with little to no leakage.
- ☒ All actuations shall be mechanical and self-actuating.
- ☒ Shall be capable of monitoring interior pressure.

Final 3D printed prototype was tested in the following categories:

- ☒ Ergonomic Test
- ☐ Water Leak Test
- ☐ Debris Ejection Test

