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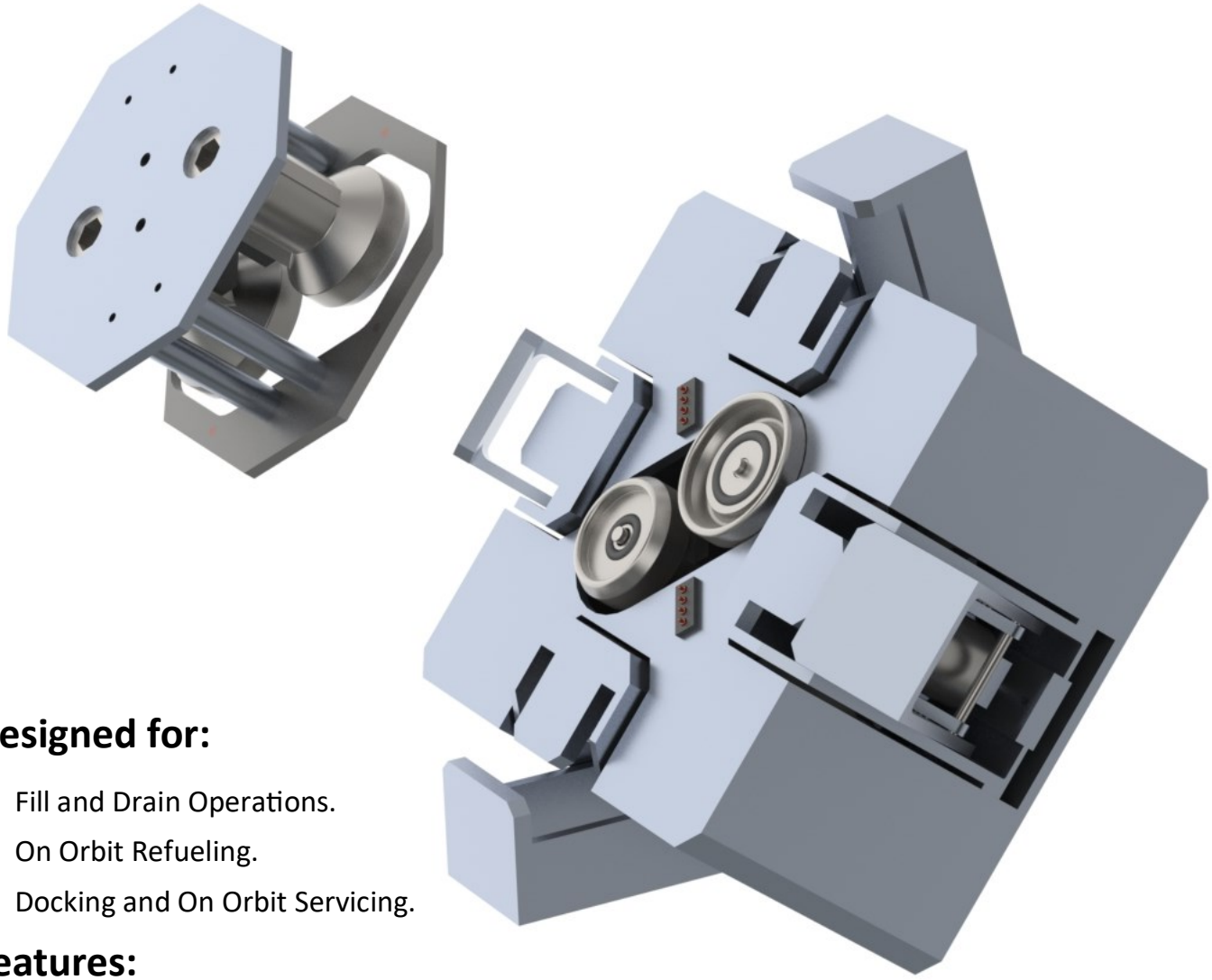
RAFTI

Rapidly Attachable Fluid Transfer Interface

Patent Pending

Satellite fill-and-drain valves combined with a simplified docking interface, enabling autonomous ground and on-orbit fueling.



Designed for:

- Fill and Drain Operations.
- On Orbit Refueling.
- Docking and On Orbit Servicing.

Features:

- Peak power draw 10 W.
- 500 and 3,000 psi operating pressure.
- Flow rate of 1 L/min @ 15 psi delta-P.
- Fail Safe and Safe Fail spacecraft docking interface.
- Triple redundant external seal leakage during ground fueling.
- Intelligent electrical interface that supports secure inter-satellite handshaking.

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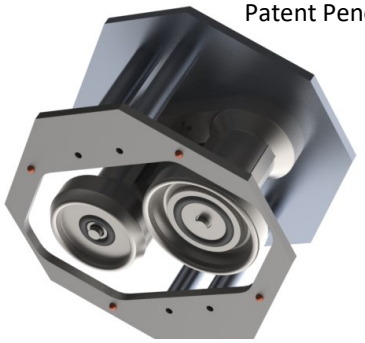
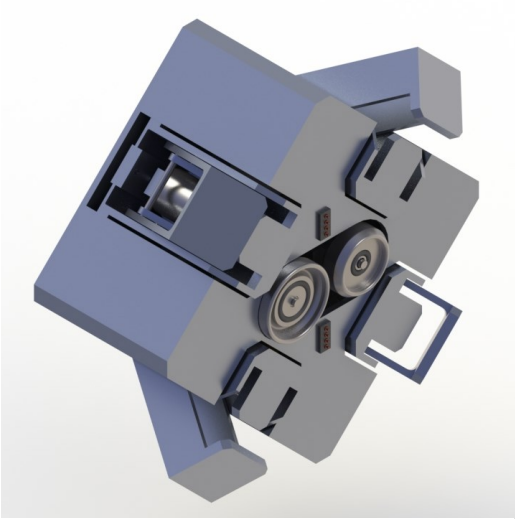


Fill and Drain

The Rapidly Attachable Fluid Transfer Interface (RAFTI) provides cost effective, reliable satellite fill and drain functions during ground operations. The service valve side is low profile, comparable to existing solutions. The rugged latching mechanism and triple seal design ensures a safe propellant transfer. RAFTI is designed for ease of use while exceeding industry range safety requirements. Redundant data logging allows for remote monitoring.

On Orbit Refueling

RAFTI is designed to allow reliable propellant transfers in the harshest space environments, making it ideal for mission operations at any orbit. High and low pressure variants are compatible with common modern propellants and pressurants with external leakages less than $1x10^{-6}$ scc/s. RAFTI is configurable to be normally-open or normally-closed in case of power loss, allowing for fail-safe and safe-fail operations for any mission profile.



Docking

RAFTI supports both primary docking or secondary attachment of two spacecraft. The double action latch mechanism accommodates significant misalignment on all axes during the docking process, allowing for self aligning operations without the need for complex robotic arms. High clamping force accommodates high pressure fluid connections and satellite body movements. Improved reliability by minimizing sliding surfaces and avoiding motors or gears.

Parameter	Low Pressure	High Pressure
Max. Operating Pressure	500 psig	3,000 psig
Proof Pressure	1,000 psg	4,500 psig
Internal Leakage (GHe)	< 1 $x10^{-6}$ scc/s	< 1 $x10^{-6}$ scc/s
External Leakage	< 1 $x10^{-6}$ scc/s	< 1 x10-6 scc/s
Cycle Life	>1,000 cycles	>1,000 cycles
Operating Temp Range	-40 to 120 ^{o}C	-40 to 120 ^{o}C
Weight (grams)	150 g (Service Valve) 500 g (Coupling Half)	200 g (Service Valve) 750 g (Coupling Half)
Size	0.25 U (Service Valve) 0.5 U (Coupling Half)	0.25 U (Service Valve) 0.5 U (Coupling Half)
Random Vibration	NASA GEVs	NASA GEVs
Pyro-shock	NASA GEVs	NASA GEVs
Media	MMH, UDMH, Water, H_2O_2, Methanol, Kerosene, Green Monoprops, N_2O_4	Nitrogen, Helium, Xenon, Krypton

(*) Designs, materials, weights and performance ratings are approximate and subject to change without notice based on industry and customer requirements.

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