ORBITFAB

RAFTI™

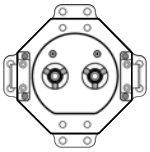
Rapidly Attachable Fluid Transfer Interface

Everything you need to make your spacecraft refuelable

Orbit Fab's Rapidly Attachable Fluid Transfer Interface (RAFTI) extends the life of your spacecraft by equipping it with on-orbit refueling capability. Dynamic Space Operations are now possible through refueling! Spacecraft can now make frequent orbit and altitude changes without regret. High value assets can be retasked to serve new purposes. By implementing RAFTI your spacecraft is now designed with docking and refueling activities in mind. During ground operations, the RAFTI Service Valve doubles as a reliable, cost effective fill/drain valve.

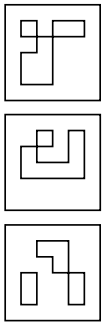
RAFTI consists of the RAFTI Service Valve and three Alignment Markers. Your spacecraft participates in the docking process by maintaining pointing and sharing state information. Orbit Fab's Fuel Shuttle handles soft capture and hard latch of the two spacecraft. The RAFTI refueling interface allows reliable propellant transfers in the harshest space environments, making it ideal for mission operations in LEO, GEO, and cislunar space.

The RAFTI System consists of:



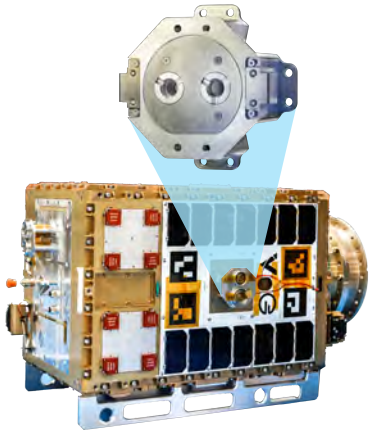
1x RAFTI Service Valve

A reliable & cost effective propellant fill/drain valve, comprising an octagonal grapple fixture and two valve cores.



3x Alignment Markers

Enable prepared and cooperative docking in both light and dark visibility conditions.

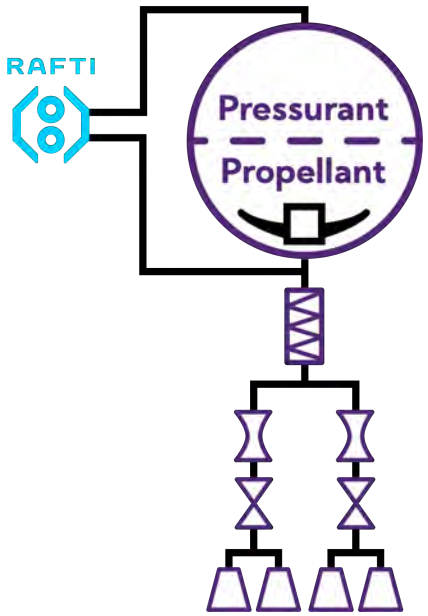


Tanker-001 Tenzing, flown June '21, and closeup of RAFTI Service Valve

Benefits:

- Allows your spacecraft to take advantage of **prepared, cooperative docking** and **refueling.**
- Compatible with most spacecraft designs.
- Supports satellite servicing operations.
- Available off-the-shelf with minimal lead times and order quantities.
- Supports a variety of use cases and mission profiles.

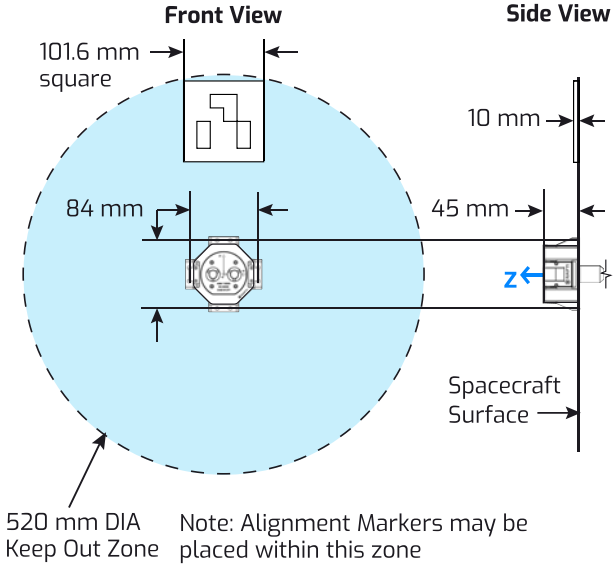
Integration:



Example of RAFTI in a Blowdown Monoprop System

A single RAFTI Service Valve supports the transfer of two independent fluids, for example propellant and pressurant. It can also be used in bipropellant systems.

A RAFTI Service Valve and a minimum of three Alignment Markers are surface-mounted at known coordinates. The RAFTI Service Valve Z-axis should lay within 10 cm of the spacecraft center of mass.



Features:

- The RAFTI System integrates easily with existing spacecraft configurations.
- Exceeds NASA Range Safety and MIL-SSC-S-016.
- Fail Safe & Safe to Fail spacecraft docking interface.
- Three inhibits against leaks on ground and on orbit.
- Passive retractable covers protect sealing surfaces.
- Accommodates docking misalignment on all axes.
- Alignment markers improve docking performance and reduce complexity of proximity operations.

Mechanical and Electrical Capabilities

Mass	500 g	
	Low Pressure	High Pressure
Flow Rate	4 L/min @20 psi ΔP	0.5 L/min @20 psi ΔP
Max Operating Pressure	650 psig	3,000 psig
Proof Pressure	975 psig	4,500 psig
Compatible Media	High-Test Peroxide, Hydrazine, MMH, UDMH, Water, Methanol, Kerosene, Green Monoprops, Isopropyl Alcohol, HFE, NTO, C_3H_6	Nitrogen, Helium, Xenon, Krypton, N_2O
Operational Life	15+ years LEO, 15+ years GEO	
Cycle Life	200 cycles	
Operational Temp.	-40 to 60 °C	
Survival Temp.	-80 to 80 °C	
Inhibits	3 inhibits mated and unmated	
Mated and Unmated Leakage	10^{-6} scc/s of Helium	
Random Vibration	NASA GEVS	
Pyro Shock	NASA GEVS	
Maximum Docking Misallignment	+/- 10 mm (X,Y), +/- 10 degrees (X,Y), +/- 10 degrees (Z)	