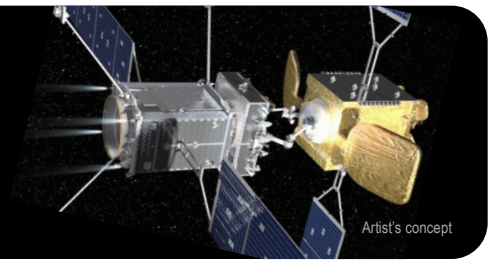
Robotic Servicing of Geosynchronous Satellites

INTERFACE FACT SHEET



Structural, Power, and Data Port (SPDP)

Overview

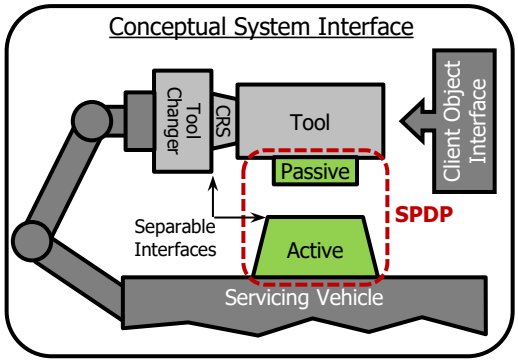
- Designed as a launch restraint, storage location, and power/data port for on-orbit separable items
  - Supports launch loads for payloads up to 8.25 kg with first mode frequency > 200 Hz
  - Larger masses can be attached and detached on-orbit
- Consists of active & passive units which can be mated, locked together, and later de-mated
  - Designed to secure and release repeatedly, over 1,600 times in ground testing and 400 times on orbit
  - Supports up to 29 electrical power and data connections across mated interface
- Enabler for on-orbit upgrade capability
  - Launching a spacecraft with an active unit allows later on-orbit installation of additional or upgraded spacecraft functionality
- Development Status: TRL 8, Qualified Design, Flight Unites Integrated with the Robotic Servicing of Geosynchronous Satellites spacecraft for launch in 2026

Active Unit

- Typically integrated into the power and data system of a host vehicle
- Includes both the launch restraint system and the separable item locking mechanism
- Provides telemetry to indicate device state: ready-to-lock, locked, unlocked, or fault

Passive Unit

- Structurally & electrically integrated into a separable item, such as robotic tool or avionics unit
- No moving parts



SYSTEM FEATURES:

- Active & passive mating halves
- Independent mechanical & electrical connections, with telemetry feedback
- Lock fault protection
- Designed for GEO radiation and low electromagnetic interference
- Mechanical mating alignment features, with visual alignment and state indicators
- Heritage stepper gear motor

Product Specifications

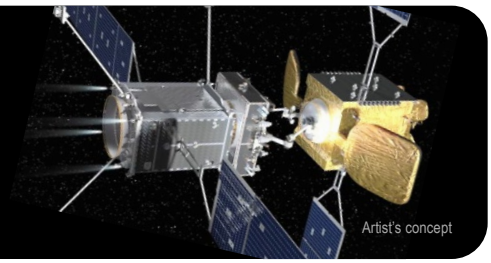
	Active		Passive	
	U.S.	**SI**	**U.S.**	**SI**
Mechanical				
Envelope dimensions	10.3 in x 8.6 in x 5.5 in	261 mm x 217 mm x 139 mm	1.42 in x Ø4.8 in	36.1 mm x Ø121 mm
Mass (including cables)	13.56 lb	6.15 kg	1.27 lb	0.575 kg
Load Capability (at launch)	18.19 lb[1]	8.25 kg[1]	[1]With CG offset of ~5 in from passive to active mating plane	
Time to Lock / Unlock	15 seconds Lock / 15 seconds Unlock			
Life	1600 cycles in air, 400 cycles in vacuum / 8 years in GEO			
Electrical				
Gearmotor type	2-phase, 1.8° stepper + 42.8:1 reduction gearbox			
Voltage	29.5 to 33.0 Vdc			
Resistance	27.7 Ω ± 2.8 Ω			
Power, nominal	34 W (18.7 W for launch lock release)			
Power, pass-through	2 survival heater feeds, @30 W avg (48 W peak) 2 operational power feeds, @50 W max (50 W combined, if using both simultaneously)			
Sensor, temperature	2x Platinum RTD 2,000 Ω @ 0 °C			
Pass-thru harness	29 connections, including 6 Power pairs, 4 digital signal pairs, 3 analog signal pairs			
Thermal				
Operating temperatures	-13°F to + 140°F	-25°C to +60°C	-76°F to +185°F	-60°C to +85°C
Nonoperating temperatures	-58°F to +158°F	-50°C to +70°C	-76°F to +185°F	-60°C to +85°C

Information provided is current as of September 2025. Interested parties should contact the manufacturer for up-to-date information.

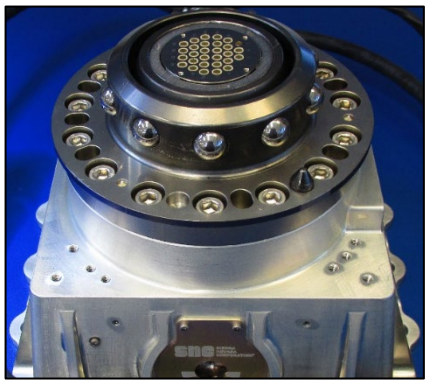
This research was developed with funding from the Defense Advanced Research Projects Agency (DARPA)
Approved for Public Release, Distribution Unlimited

Robotic Servicing of Geosynchronous Satellites

INTERFACE FACT SHEET



Structural, Power, and Data Port (SPDP)



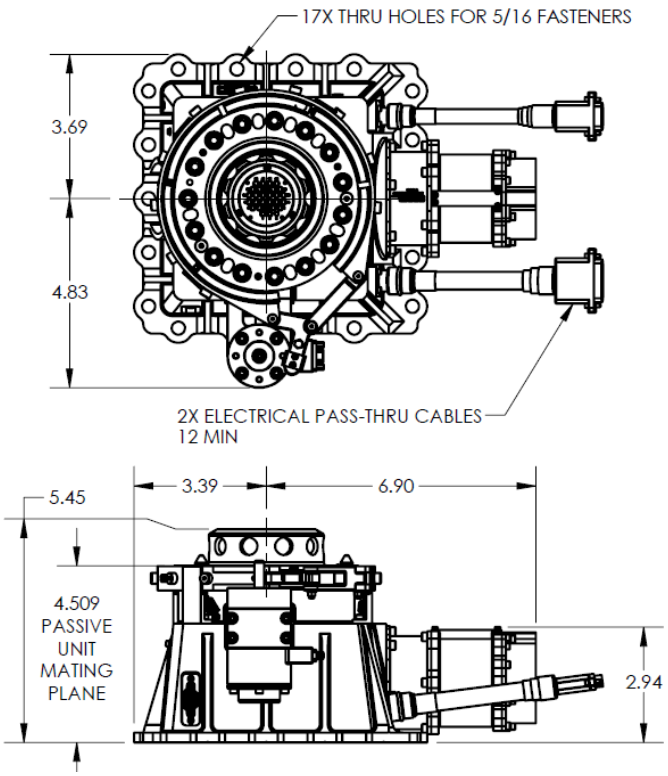
Active Unit
(Engineering Model)

MANUFACTURER:

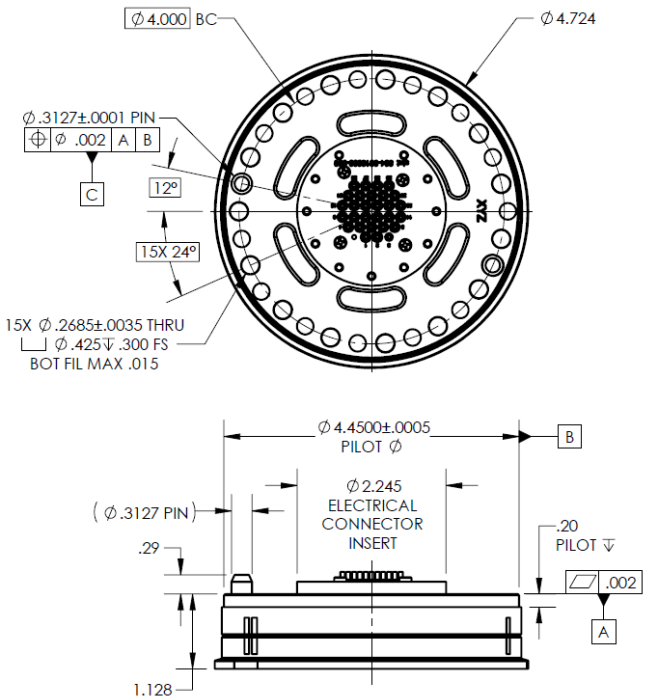
Sierra Space

1030 Swabia Court, Suite 100 Durham, NC 27703

Jamie Coker
Program Manager
(919) 595-6821
Jamie.Coker@sierraspace.com



Active Unit



Passive Unit

Information provided is current as of September 2025. Interested parties should contact the manufacturer for up-to-date information.

This research was developed with funding from the Defense Advanced Research Projects Agency (DARPA)
Approved for Public Release, Distribution Unlimited