

STAARK ROBOTIC ARM SYSTEM

PRODUCT DESCRIPTION

STAARK is an affordable, modular, and easily customized robotic system designed for various on-orbit robotics applications.

A manipulator made with highly modular joints and links allows easy customization of dexterity and length to address mission requirements and spacecraft stowage volume constraints.

The manipulator's standardized tool flange allows accommodation of various end-effectors produced by third parties or the use of Redwire-made grippers.

A vision sensors suite with visual servoing system allows recognition and tracking of objects based either on fiducials or infrared signature of the object and provides grasping knowledge for capturing and berthing operations.

The manipulator's high accuracy provides a level of repeatability required to perform in-space assembly operations.



STAARK's flight software enables operating system via different modes of autonomy: teleoperation (L1), assisted operation (L2), or supervised autonomy (L3).

Planning tools allow users to check and avoid path collisions and achieve optimal planning to perform a given task.

STAARK's flight stack runs on the Redwire-developed Robot Control Unit, but can also be uploaded to a spacecraft's on-board computer.

A kinematically similar terrestrial version of STAARK allows for testing of robotics operations without additional gravity offloading.

STAARK uses both carefully screened consumer off-the-shelf (COTS) components and military-grade components to provide an optimal balance between performance and cost.

Redwire constantly upgrades the STAARK robotic arm family to address broader and more complex robotics operations.

APPLICATIONS

- + Inspection (customer spacecraft or self-inspection)
- + Capturing and berthing
- + Short-range rendezvous support
- + In-orbit assembly (large structures, orbit replaceable units)

PARAMETERS

1M VERSION (MINIMUM LENGTH)

- + **Dexterity**
6 DoF
- + **Total Extended Reach**
0.92 meters (without end effector)
- + **Communication**
AN/RS-422, Ethernet (if vision included)
- + **Voltage**
28V DC unregulated
- + **Stowage volume**
685 mm x 274 mm x 700 mm
- + **Mass**
18 kg (manipulator, HDRMs + Robot Control Unit)
- + **EEE**
Selective components up to <30 krad total ionizing dose

2M VERSION (MAXIMUM LENGTH)

- + **Dexterity**
6 DoF
- + **Total Extended Reach**
1.92 meters (without end effector)
- + **Stowage volume**
1100 mm x 655 mm x 275 mm
- + **Mass**
32 kg (manipulator, HDRMs + Robot Control Unit)

FLIGHT TESTING LEVELS

VIBRATION

- + **Quasi static loads**
25 g X,Y,Z
- + **Sine loads**
25 g X,Y,Z 0-100Hz
- + **Random loads**
15.3 Gmrs. X,Y,Z 0-2000Hz

TVAC

- + **Qualification**
-30C to +50C 6 cycles
- + **Acceptance**
-30C to +50C 4 cycles

EMI/EMC

MIL-STD-461

OTHER FEATURES

- + Customized manipulator
- + HDRM-1, HDRM-2, Passive-HDRM
- + Harness fixtures for end effector
- + Heaters
- + Robot Control Unit
- + Flight software
- + Vision system
- + Planning tools

This product is export controlled. Contact Redwire for more information.



HERITAGE + INNOVATION

Redwire is a new leader in mission critical space solutions and high reliability components for the next generation space economy. With decades of flight heritage combined with the agile and innovative culture of commercial space platform, Redwire is uniquely positioned to assist its customers in solving the complex challenges of the future space missions. For more information, please visit www.redwirespace.com

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