

LUNAR ROBOTICS & INTERFACES

Space
Resources
Roundtable

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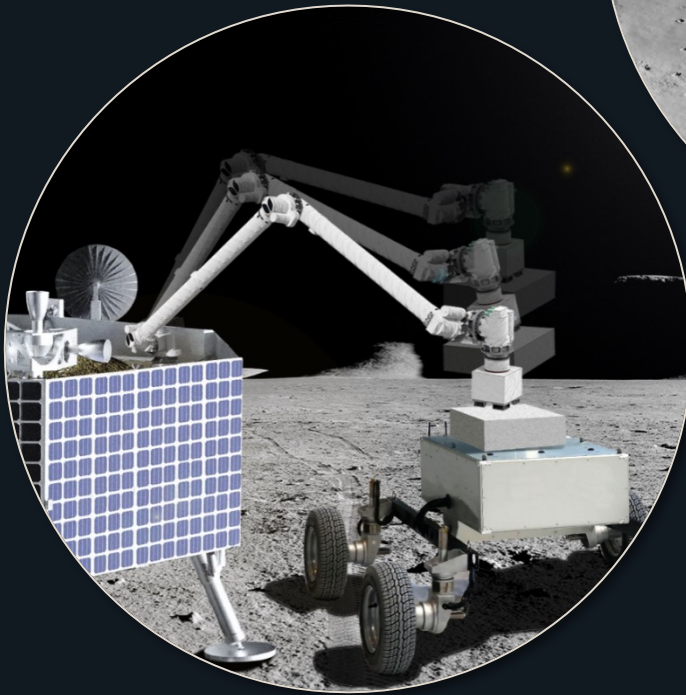
MDA SKYMAKER

LUNAR ROBOTICS OVERVIEW



The SKYMAKER Lunar Arm is a four to six degree of freedom (DOF), 3m-class robotic manipulator that is capable of operating in the harsh environment on the lunar surface and in cis-lunar/GEO orbits.

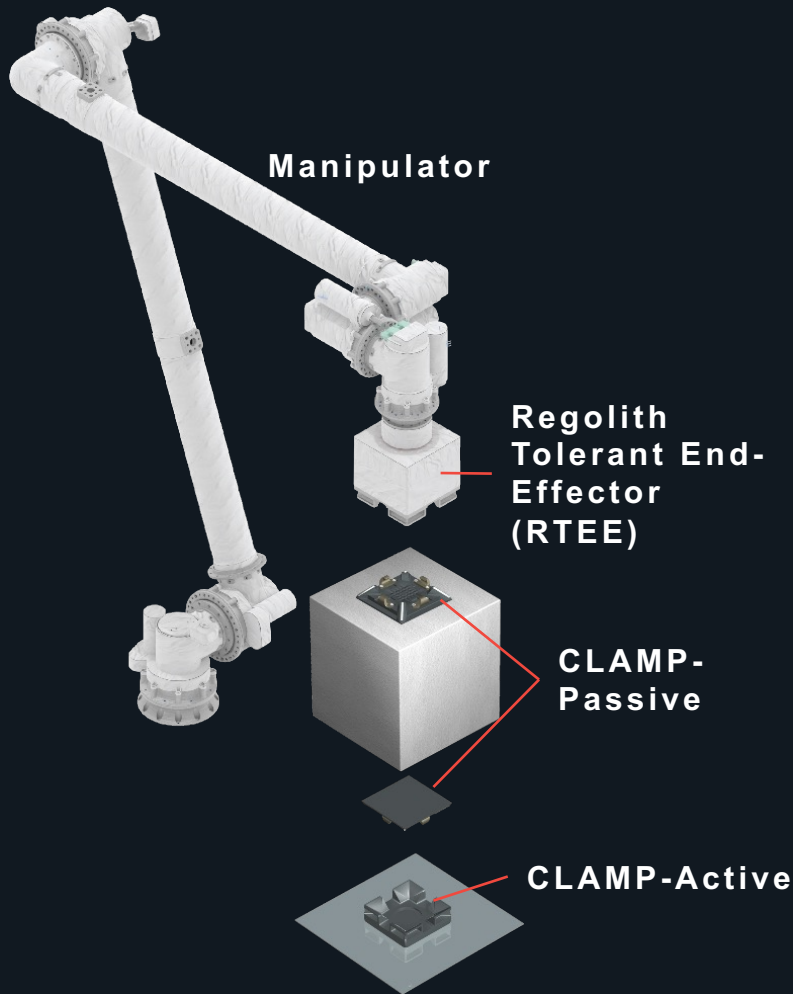
USE-CASES



- Lunar Rover & Lander payload deployment, relocation, placement, and retrieval ops.
- Lunar surface scooping/trenching, sample transfer to science instrumentation, and drilling ops.
- Precision positioning and/or pointing of instruments.
- In-orbit persistent platform/station ops.
- Payload/Vehicle free-flyer capture, maneuvering, and berthing.



FEATURES AND CHARACTERISTICS



KEY FEATURES	<ul style="list-style-type: none">Dust-tolerant actuators for long life on lunar surface.Up to 70 kg payload capability for payload maneuvering.High-heritage software for mission-critical operations.Scripting for autonomous operations.Single fault tolerant.Configurable DOFs, power and/or data connection, tools upon request.
LENGTH	Scalable from 2-4m
MASS*	<70 kg for 4 DOF manipulator, <95 kg for 6 DOF manipulator (includes EE)
PAYLOAD CAPABILITY**	70kg @ 1m workspace 35 kg @ 2.5m reach
VOLTAGE	28 VDC
MISSION CLASS	MDA robotics products carry all safety/hazard control features required for Human Space Flight and can tailor the EEE parts Class to match mission needs.
ENVIRONMENT	Lunar Surface, LEO, GEO, EML 1/2, Lunar Orbit
LIFE	10 years

* Both baseline and high-capacity arm masses shown, respectively.

** Payload capability for fully configured 6 DOF arm, including end effector, in lunar gravity.

CLAMP INTERFACE

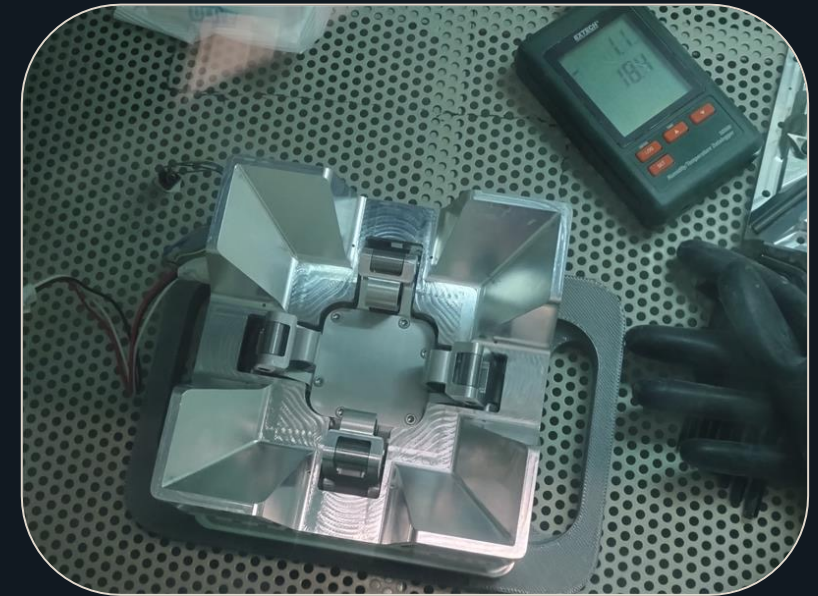
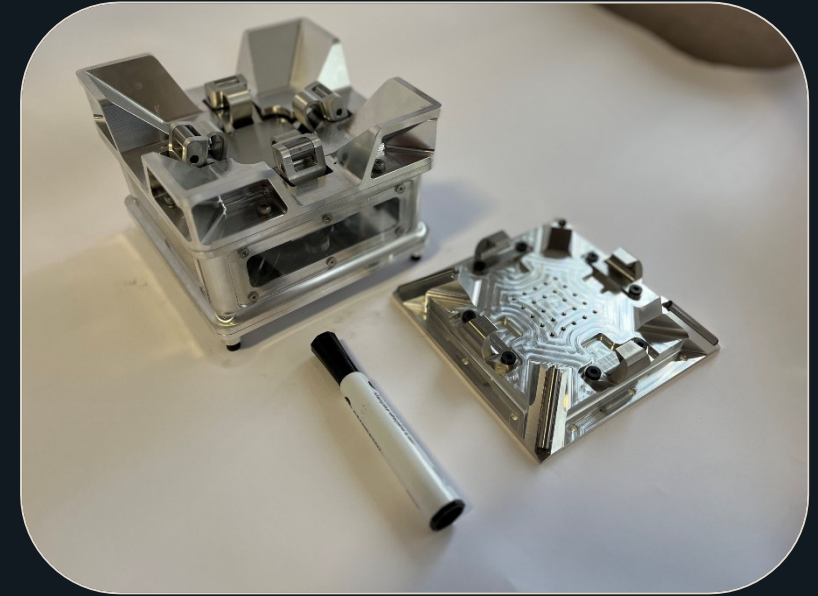
Compact Latching electro-Mechanical interface for Payloads

The MDA CLAMP is a robust grapple system fit for operations in the harsh lunar environment and in space. It's small packaging and high strength properties make it an ideal technology to be used as both a payload interface system on planetary rover and orbital platforms as well as integrated into MDAs Regolith Tolerant End Effector (RTEE).

CLAMP also includes a connector interface that supports both power and data transfer between the host platform or robotic manipulator and the payload.

Key Features:

- Flexible design, capable of operations on the lunar surface and in orbit
- Can be used as both a robotic end-effector and as a payload mounting system on host platforms, giving a consistent end-to-end interface system for payloads, instruments, and equipment.
- Supports both power and data transfer from the host platform to the payload or end-effector to the payload.





DEVELOPMENT STATUS



- PDR Review May 2024
- Arm Bread Board Prototype & Harness Routing Mockup (right)
- CLAMP Prototype regolith simulant testing (below)



INITIAL DEPLOYMENT OF ROBOTICS + INTERFACE



NASA has awarded a Lunar Terrain Vehicle Services (LTVS) contract to the Lunar Dawn team, led by Lunar Outpost as the prime contractor along with its principal partner Lockheed Martin and teammates General Motors (GM), The Goodyear Tire & Rubber Company, and **MDA Space**.

<https://news.lockheedmartin.com/2024-04-03-Lunar-Dawn-Team-Awarded-NASA-Lunar-Terrain-Vehicle-Contract>