

**A ROBOTIC ARM AND GENERIC PAYLOAD INTERFACE FOR THE LUNAR SURFACE.** C. S. Dickinson<sup>1</sup>, S. Tuohy<sup>1</sup> and C. Scarpelli<sup>1</sup>, <sup>1</sup>MDA Space (18050 Saturn Ln #200, Houston, TX) cameron.dickinson@mda.space.

**Introduction:** As the Artemis permanent lunar base takes shape, it is readily evident that the use of highly capable robotic systems will be required to fulfill a variety of tasks. MDA has developed a low-mass commercial robotic arm and payload interface that is able to withstand the harsh lunar surface environment and offer critical capabilities required for a sustained lunar presence by enabling science/payload/tool handling and infrastructure development.

**Light Exploration Robotic Arm (LERA):** Early use cases for the lunar surface will require low-mass solutions, but with a high degree of capability. The MDA LERA arm is a 3-meter robotic manipulator with 4 or 6 Degree of Freedom (DOF) variants, providing up to 70kg of payload capacity.



Fig 1: Image of LERA demonstrating trenching capabilities

The arm is designed to last for 10 years on the lunar surface, and can be used for both precision manipulation (including payload deployment or instrumentation placement) and regolith excavation from either a lander or a rover. The arm weighs <70kg for the 4DOF arm variant and <95kg for a 6DOF arm and has a keep alive power of 10W.

**Latching Payload Interfaces:** The latching payload interface system is a robust grapple system fit for operations in space or in the harsh lunar environment. Its small packaging and high strength properties make it an ideal technology to be used as either a general purpose payload interface system on mobility rovers and orbital platforms or as part of MDA's Regolith Tolerant End Effector (RTEE). This system also includes a connector interface that supports both power

and data transfer between the host platform or robotic manipulator and the payload.

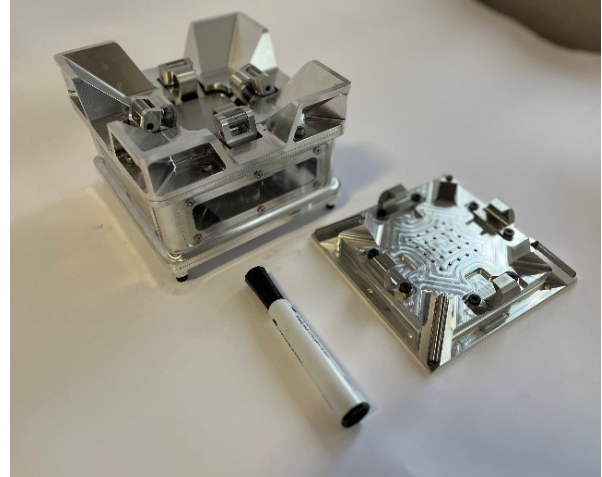


Fig 2: The payload interface system is a compact payload grapple mechanism

This means that it can be used as both a manipulator end-effector and as a payload mounting system on host platforms for the same mission, giving a consistent end-to-end interface system for payloads, instruments, and equipment. The interface system supports both power and data transfer from the host platform to the payload or end-effector to the payload.

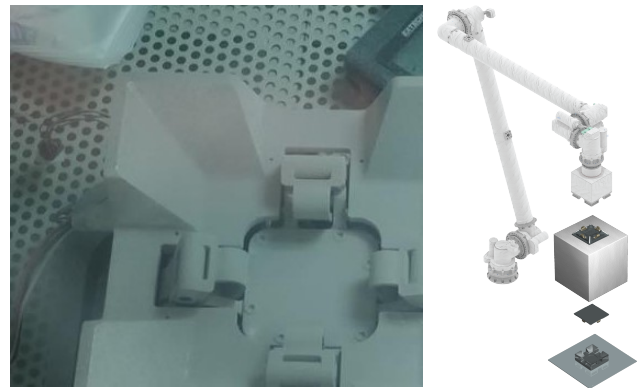


Fig 3: (left) Prototype of interface undergoing dust testing, (right) LERA and interface System arm-payload-host capability.

**Conclusion:** MDA has developed robotic arms for over 40 years from shuttle to ISS, and now from Gateway to the lunar surface. LERA and its associated interface system represent the first of many innovative capabilities for use on the lunar surface and beyond.