

Lunar Assembly and Servicing by Autonomous Robotics (LASAR): A NASA Early Career Initiative (ECI) Project

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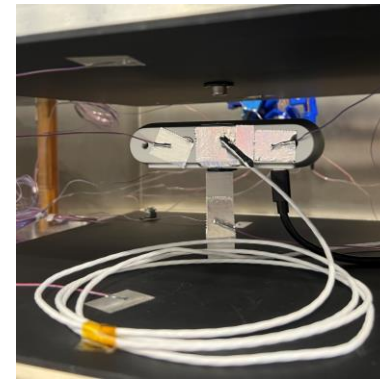


External Partners

Name	Role
Laserline	Laser Processing Partner
Motiv Space Systems	Robotics Hardware Partner
PickNik Robotics	Robotics Software & Autonomy Partner

- Develop a laser manufacturing platform positioned autonomously via robotic arm
- Initial demonstration by supervised autonomous laser beam welding (LBW) & repair of Snowflake (Tall Lunar Tower (TLT)-like) joints in thermal vacuum (TVAC) with inspection
- Agile project management approach with external partners embedded in sub-teams

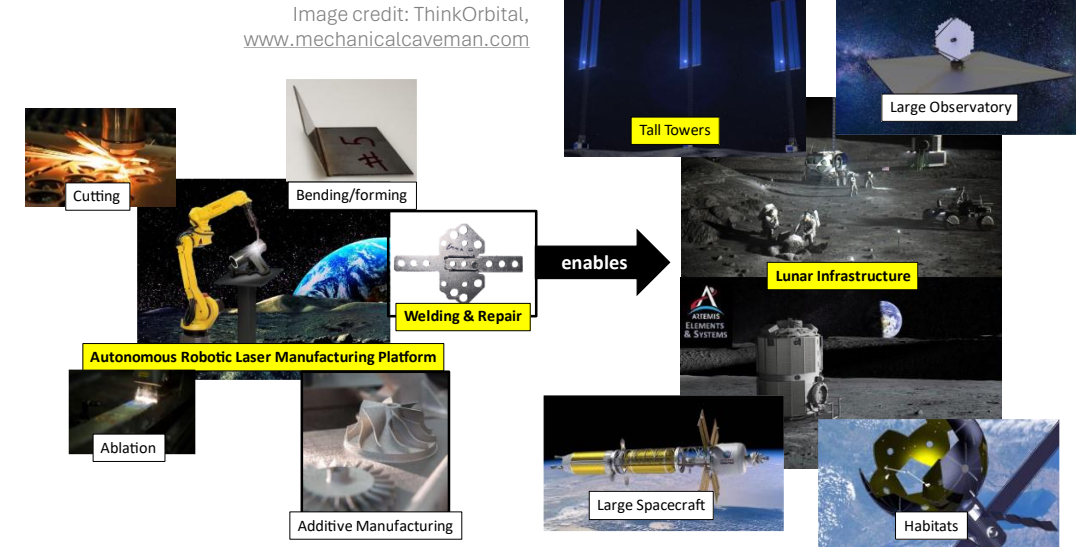
Laser processing sub-team



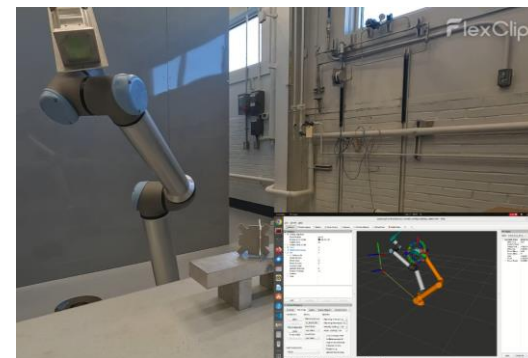
Testing commercial off-the-shelf (COTS) stereo video cameras in TVAC



Non-contact, non-destructive robotic weld inspection

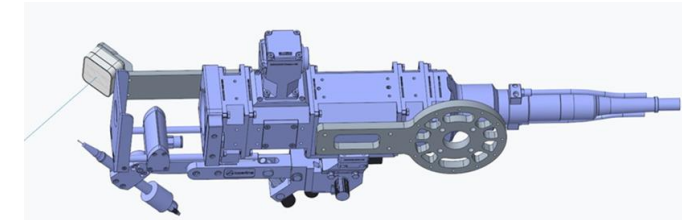


Robotics sub-team



Mockup laser optics on robotic arm along with concurrent Digital Twin

Structures sub-team



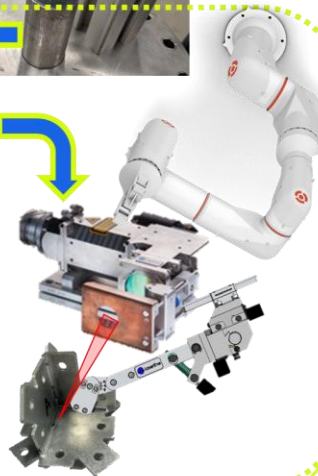
Design of robust end effector including laser optics, perception camera, and wire feeder

Notional depiction of integrated TVAC LBW demonstration with ruggedized optics on robotic arm



Weld repair after EMAT NDE

Credit: Laserline, Motiv Space Systems



Post-weld characterization:

- Metallography and chemistry
- Mechanical testing
- Assessment of TVAC compatibility



Components within dashed lines are within V-20 TVAC at MSFC (shown above)