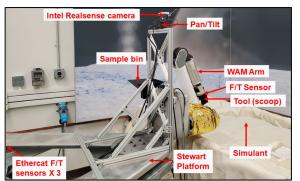
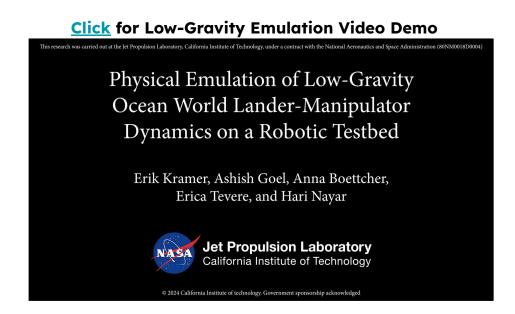
# Erik Kramer | Ocean World Lander Autonomy Testbed

Project → A lander and robot arm sampling testbed to evaluate the performance of user autonomy algorithms Tasks → Non-earth gravity dynamics emulation, motion planning algorithms, development of user features/sequences



### **Software Simulation and Hardware Operation**







## Erik Kramer | Ocean World Lander Autonomy Testbed

### **Objectives**

- → Develop a mode to emulate non-earth gravity dynamics through torque offloading with software
- → Solve kinematics issues causing Cartesian motion planner to find bad trajectories that result in faults
- → Add user features and sequences as needed by autonomy teams

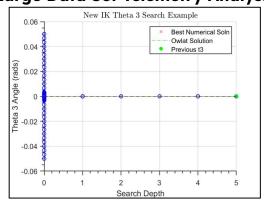
#### **Process**

- → Analyzed telemetry with MATLAB to find root cause of robot faults
- → Wrote new and updated old C++ code in a multi-author repository
- → Utilized MATLAB, in house simulator, and hardware testing to verify methods

#### Results

- → Demonstrated non-earth gravity dynamics through torque control
- → Implemented a new motion planning optimizer that finds smooth trajectories and is 30% faster
- → Added sequences such as radial scooping and features such a ROS interface for an autonomy subsystem

### Large Data Set Telemetry Analysis



**<u>Click</u>** for Scooping Sequence Video Demo



