Operations and Flight Research at NASA's Kennedy Space Center

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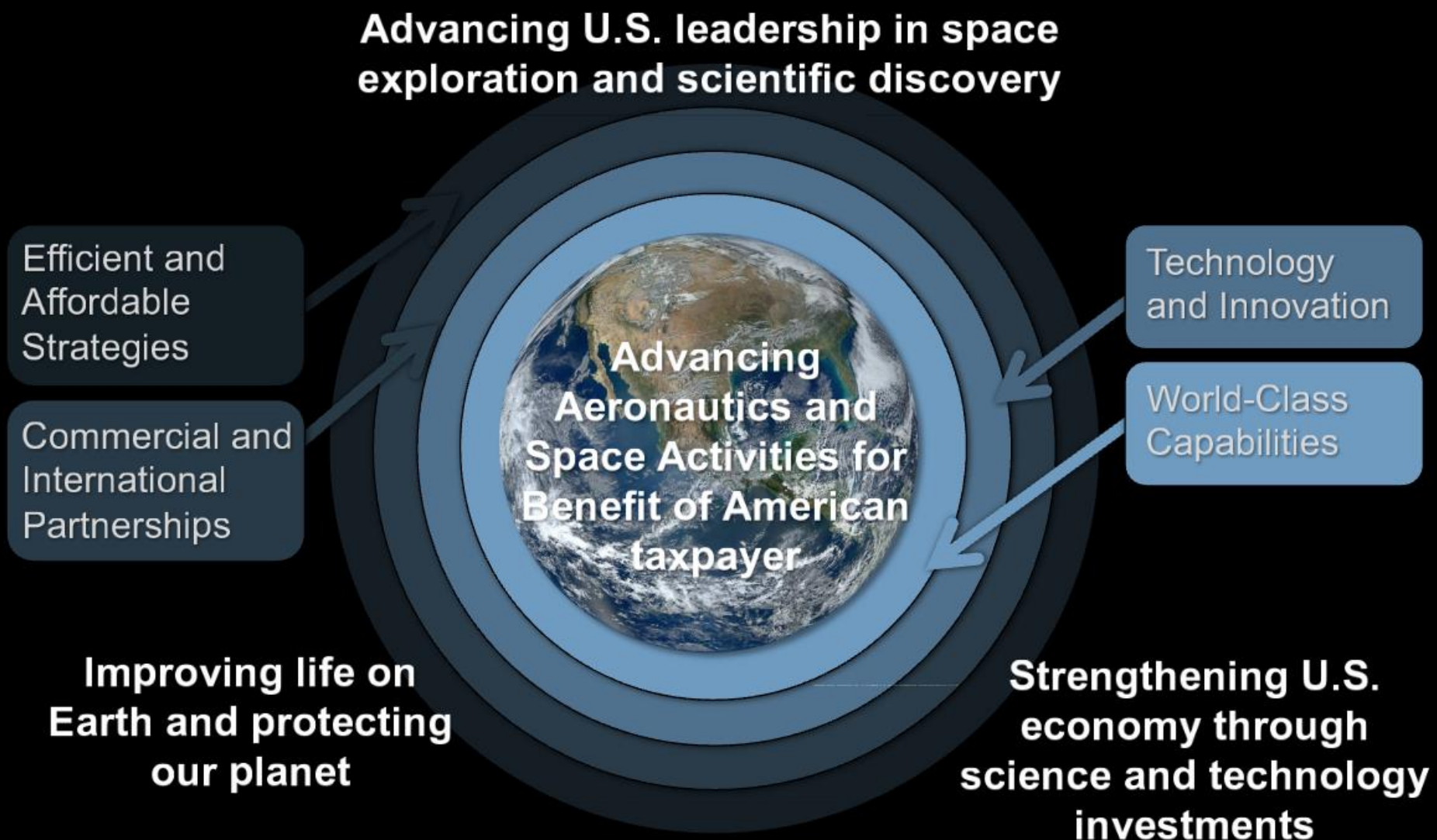
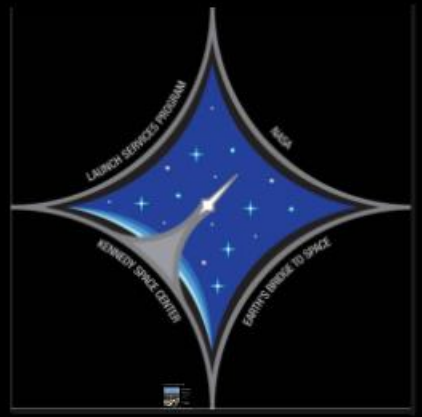
Public Benefits of NASA



KSC Programs and Projects

Ground Systems Development and Operations Program



Launch Services Program

Commercial Crew Program

ISS Ground Processing and Research Project Office

Advanced Exploration Systems

Space Technology

Ground Systems Development and Operations Program - GSDO

Vehicle integration and launch

Ground Processing

Command and Control

GSDO - Preparing KSC for the Future

Move Operations with Crawler Transporter

Vehicle Access and Servicing via Mobile Launcher

Launch Operations at Pad 39B

Integration and Check-out Operations in VAB

Support to Small Class Vehicles

Launch Services Program - LSP

Launch broker

Acquisition and program management

Flight design and trajectory

CubeSat Launch Initiative

Commercial Crew Program - CCP

Facilitate access to International Space Station

Drive private sector innovation

Reduce reliance on foreign systems

International Space Station - ISS

Ground Processing support

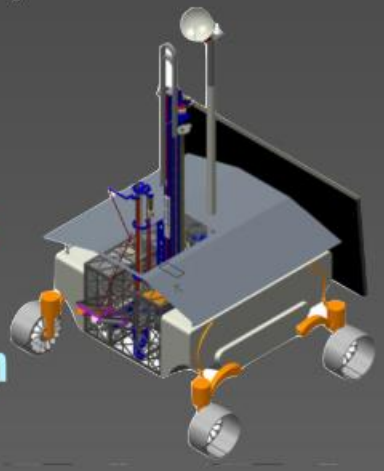
Research Project Office

Payload Development and Processing

NASA Technology Area Roadmaps

Resource Prospector Mission Payload

Development of the Regolith and Environment Science & Oxygen and Lunary Volatiles Extraction (RESOLVE) payload



A miniature drilling and chemistry plant packaged onto a medium-sized rover to collect and analyze soil for volatile components

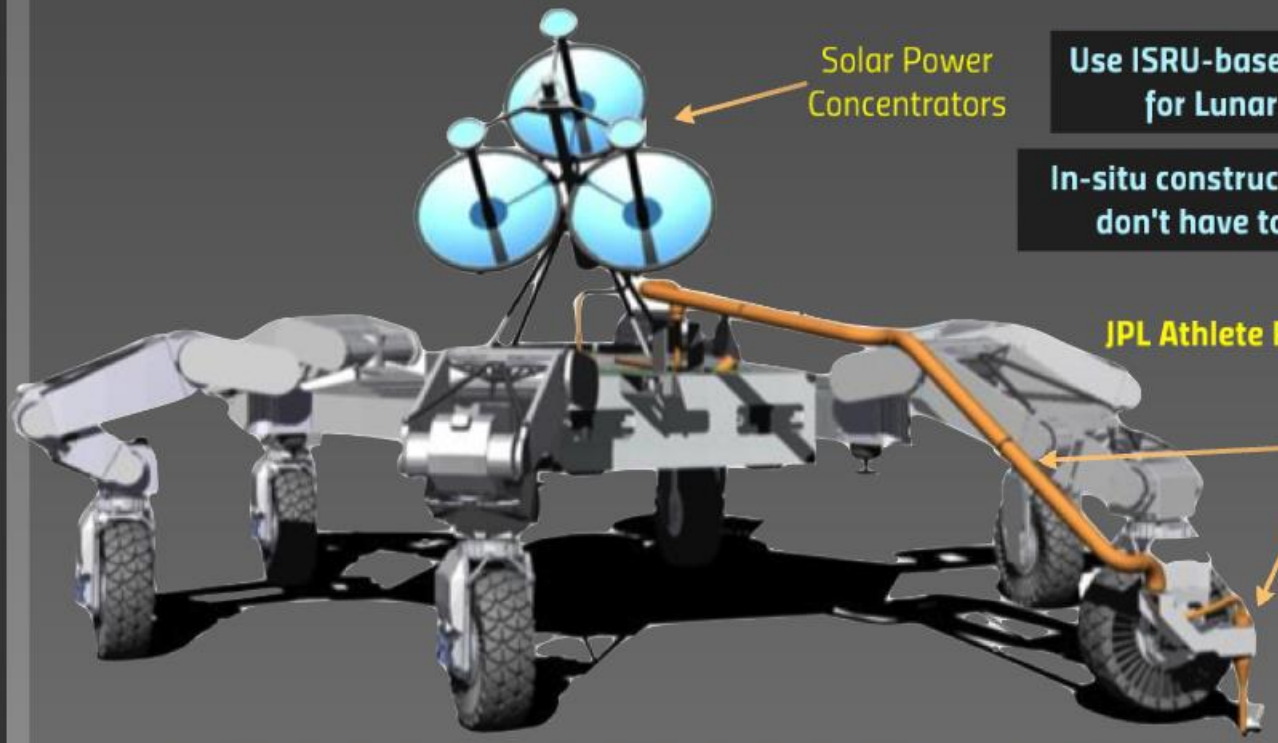
Near IR Spectrometer analyzes surficial water and mineral content

Neutron Spectrometer looks for sub-surface hydrogen or water ice

Lunar Advanced Volatiles Analysis Subsystem (LAVA) determines type and quantity of volatiles/ gasses evolved from heated regolith

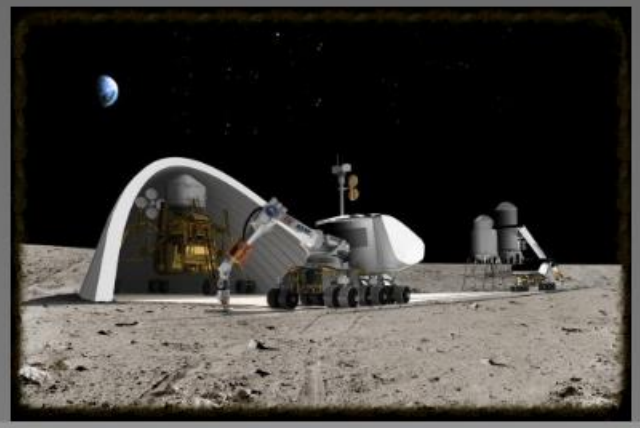
Honeybee Drill Subsystem is used to auger or core sample down to 1[m]

Additive Construction using Regolith



Use ISRU-based robotic construction techniques for Lunar and Martian infrastructures

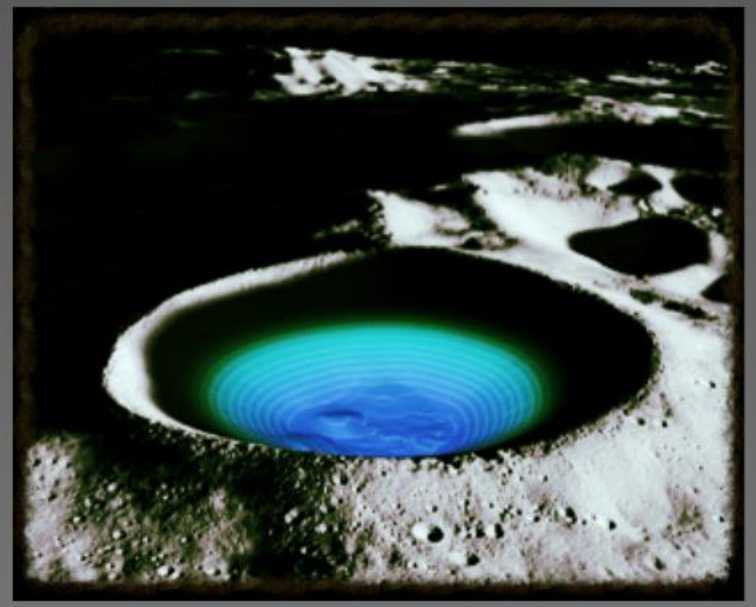
In-situ construction with regolith so materials don't have to be transported from Earth



Extreme Access and Lunar Ice Mining in Permanently Shadowed Craters

Development of a very light micro excavator ISRU prospector free flyer to mine water ice in the regolith autonomously, delivering volatiles, ice and regolith samples to the ISRU Mother-Ship lander

Extreme Access Hexacopter Flying Platform with mini bucket drum tool, flown from a mockup lander to a sampling location in the KSC Regolith Test Bin, preparing to collect a sample of BP-1 regolith



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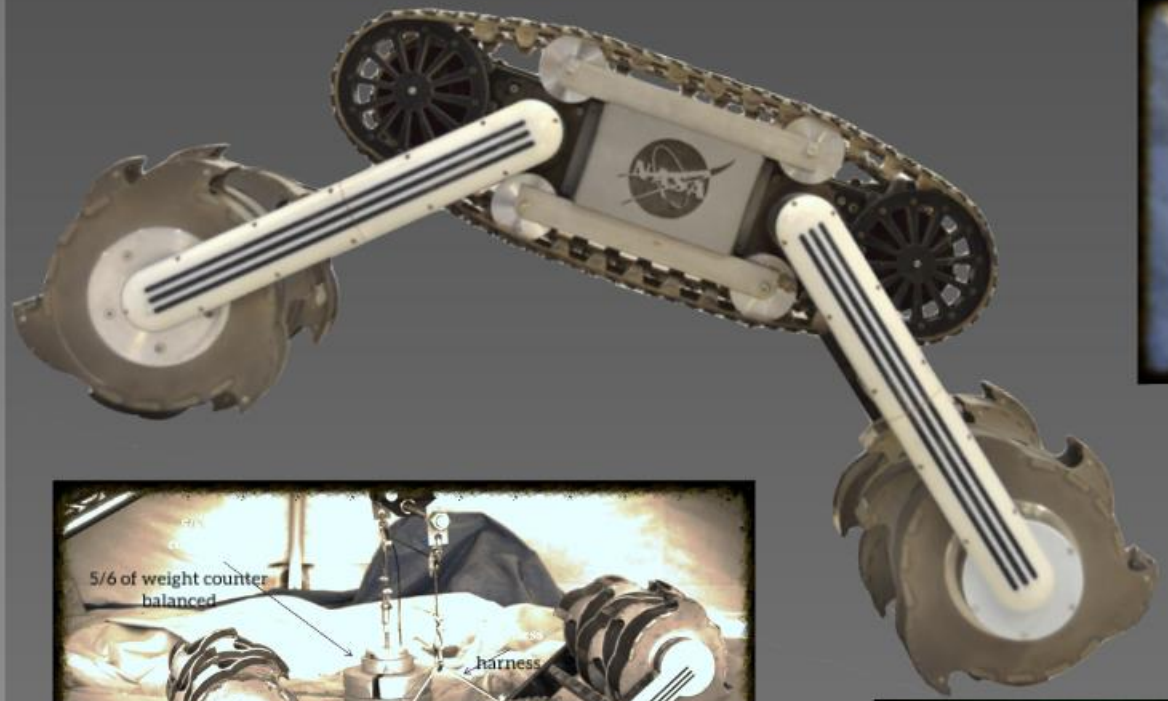
Regolith Advanced Surface Systems Operations Robot (RASSOR)

Development of a lightweight (<100kg) excavator for mining in reduced gravity to deliver regolith feedstock to a separate chemical plant, which extracts oxygen from the regolith or water from ice.



Trenching in dry, ambient temperature BP-1 regolith simulant

Gravity-Offload setup in frozen BP-1

Trenching in cryogenically frozen BP-1

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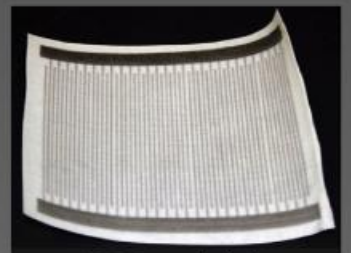
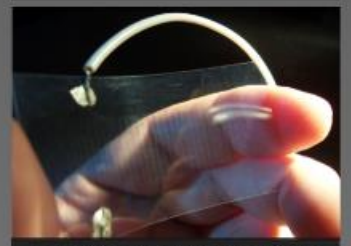
Dust Mitigation

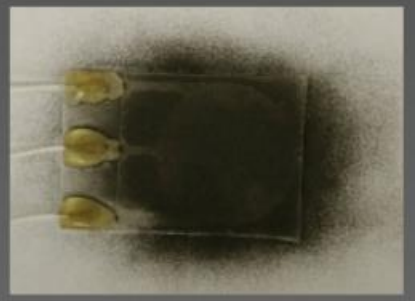
Development of active dust mitigation technologies that minimize dust accumulation on surfaces for such applications as solar panels, optical systems for instrument packages, thermal radiators, window/viewports and space suits.

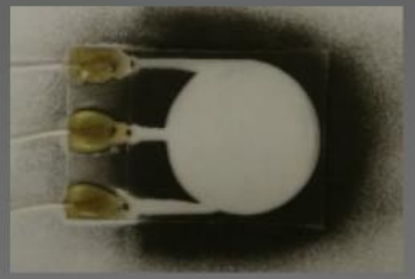


EDS on fabric



EDS on flexible film





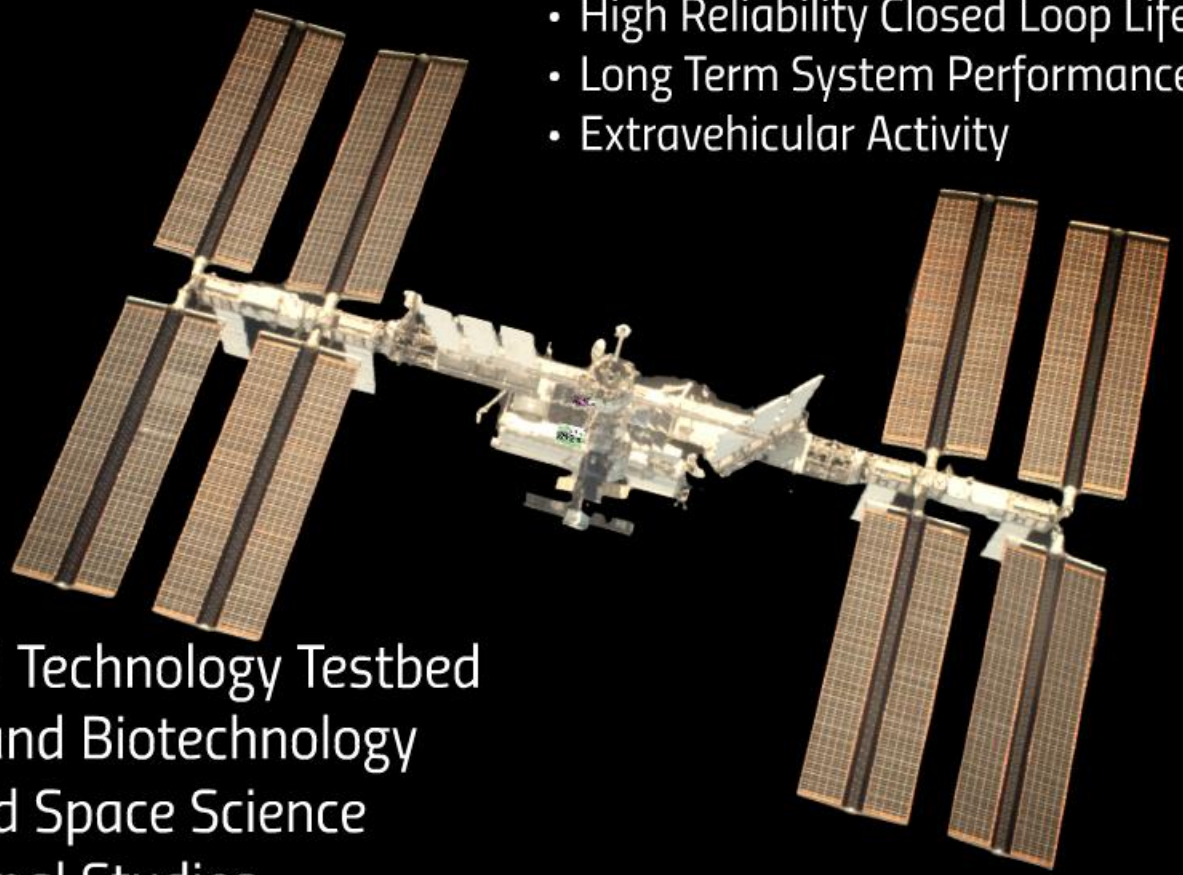
Electrodynamic Dust Shield (EDS) Technology uses alternating electric fields acting through a grid embedded in a material such as flexible film, cloth, glass or metal to dislodge, carry and deposit dust particles off and away from surfaces.


KSC-ESPL
Apollo Sample

ISS Enables Long Duration Exploration for Mars

Capabilities

- Docking System
- High Reliability Closed Loop Life Support
- Long Term System Performance
- Extravehicular Activity



System and Technology Testbed

- Biology and Biotechnology
- Earth and Space Science
- Educational Studies
- Human Research
- Physical Sciences

Slosh Payload Experiment on the ISS

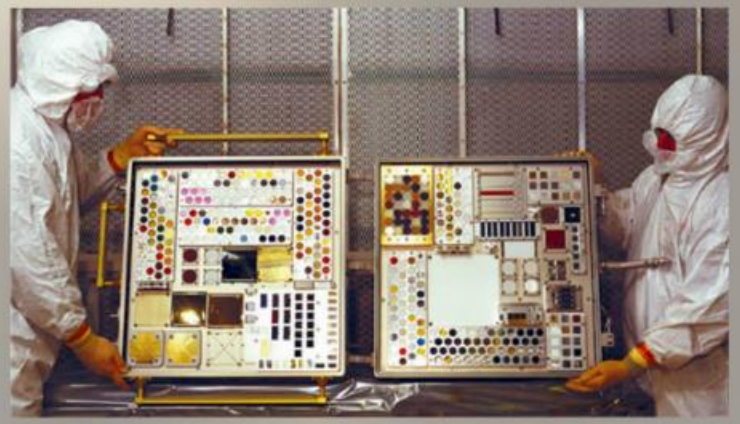
KSC with support from MIT and FIT developed a payload experiment for acquisition of long-duration, low-gravity slosh data for calibration of CFD models of coupled fluid-to-vehicle behavior.

Launched from Wallops Island, VA on January 9, 2014.

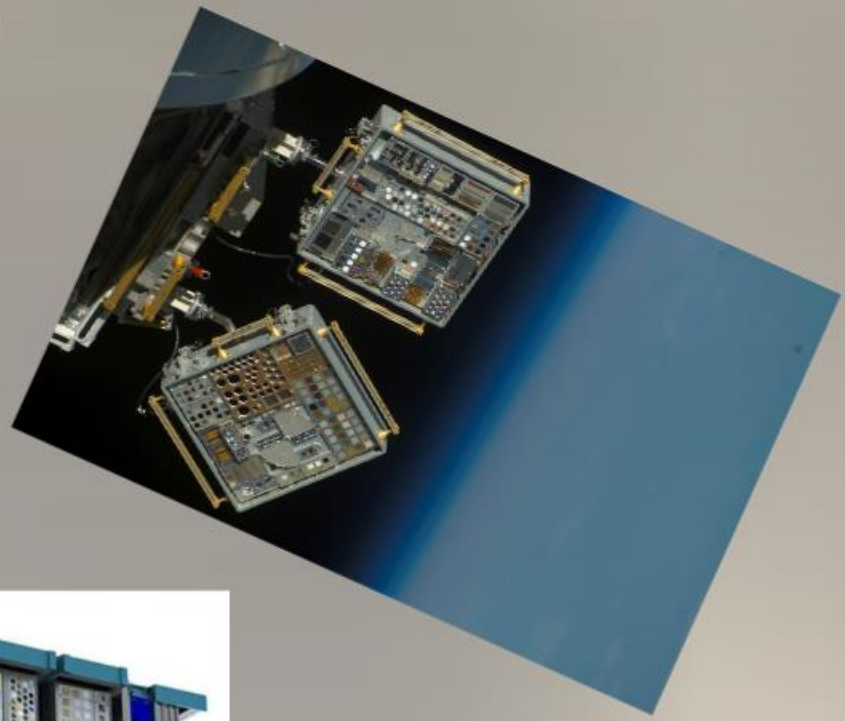
The current inability to accurately predict fuel and oxidizer behavior can result in unnecessary caution, requiring extra propellant to be added along with additional helium for tank pressurization. A better understanding of fluid slosh could not only decrease this uncertainty, but increase efficiency, reduce costs and allow additional payloads to be launched.

Plant Growth Chambers Aboard ISS

MATERIALS INTERNATIONAL SPACE STATION EXPERIMENT (MISSE)



MISSE



MISSE-FF

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