



Enhanced Dynamic Load Sensors (EDLS-ISS) Operational Feasibility for ARED

Problem Statement

- Exercise countermeasures improve adaptation to long duration spaceflight missions
- 6-DOF force/moment sensors allow improved exercise effectiveness and tailoring to individual crewmembers, and visual force feedback
- EDLS-ISS intended for use with the Advanced Resistive Exercise Device (ARED) onboard ISS
- Parabolic flight will reduce risk by demonstrating operational feasibility in microgravity
- NASA is potential user

Technology Development Team

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- Phase I COTR: NASA/GRC, Mr. Aaron Weaver, aaron.s.weaver@nasa.gov.

Proposed Flight Experiment

Experiment Readiness:

- System will be ready for testing by Nov 2014.

Test Vehicles:

- Parabolic aircraft.

Test Environment:

- The relevant environment is microgravity to support the operational feasibility testing of using EDLS-ISS sensors on ARED onboard the ISS.

Test Apparatus Description:

- Two sensor systems (sensor unit w/electronics module) plus display unit – functional prototype shown below
- ARED interface hardware.
- ARED platform simulator.
- GSE (calibration h/w & weights, restraint frame).



Technology Maturation

- Currently TRL 4
- TRL 6 after parabolic flight. Requires:
 - Finish prototype design & fabrication.
 - Prototype ready Nov 2014.
- TRL 7 after launch to ISS. Requires:
 - Flight system fabrication & integration.
 - Flight system calibration & test.
 - Flight system ready for ISS operations May 2016.

Objective of Proposed Experiment

- Objectives
 - Verify microgravity operation and impact on calibration.
 - Determine microgravity impact on sensor-ARED interface approach.
 - Assess operational feasibility with ARED in microgravity.
- Data
 - 6 DOF force/moment data under static & dynamic loading.