CAPABILITIES

IMPLEMENTATION PARTNER FOR NASA/NIH BIOMEDICAL RESEARCH OPPORTUNITY

Aurora specializes in providing outstanding science and engineering services in support of spaceflight research.

Overview

- Aurora's Engineering Project Support encompasses all activities required for spaceflight experiments, including:
  - System requirements definition
  - Flight system design and fabrication- including mechanical, electrical, and software engineering
  - Acceptance and certification testing
  - Hardware integration and documentation
  - Experiment protocol development support
  - Ground / on-orbit crew training and procedures development
  - Ground processing and mission support
- Experienced staff who focus on project-specific success criteria.
- We seek the best and most cost-effective design solution for each project we undertake, focusing on delivering maximum science return.
- Widely diversified technology portfolio: aerospace, biotechnology, health care, clean energy, supply chain management.

Aurora delivers rugged, reliable hardware and software systems for use aboard the ISS

Spaceflight Hardware Currently On-orbit

SPHERES (ISS, 2005-)

Positive Pressure Relief Valve (All ISS pressurized modules, 1998-)

Biological/Life Sciences Research Payloads

Plant Growth Facility (STS-87, 1997)

Dynamic Load Sensor (STS-62, 1994)

Protein Crystal Growth-1,-2,-3 (Mir, 1989,1991,1994)

Spacelab Life Sciences-1,-2 (STS-40 1990, STS-58 1993)

Mental Workload Performance Experiment, IML-1 (STS-42, 1992)

Spacelab ATLAS-1 (STS-45, 1992)

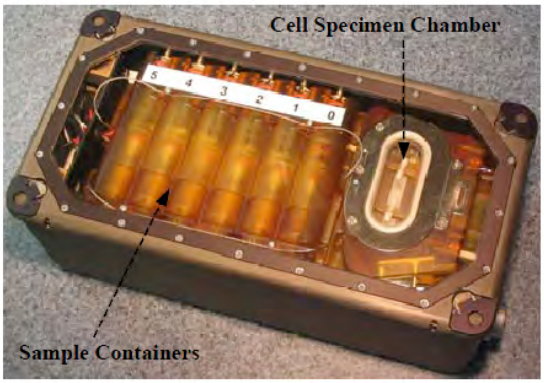
Middeck 0-Gravity Dynamics Experiment-1 (STS-48, 1991)

Spacelab D-1 (STS-61A, 1985)

Spacelab 1 (STS-9, 1983)

Cell and Tissue Culture Hardware Development

- Cell Culture Unit (Transitioned to SLCC project in 2004)
  - Designed for autonomous on-orbit operations,18 Cell Specimen Chambers (CSCs), 60 samples, 40x & 200x video microscopy.
  - Extensive testing with yeast, tobacco, euglena, mammalian cultures in prototype hardware.
- Single Loop for Cell Culture (SLCC)
  - On-orbit operations within a host incubator, 1 Cell Specimen Chamber (CSC), 6 samples.
  - Ten flight units delivered to NASA Ames Research Center in 2007.



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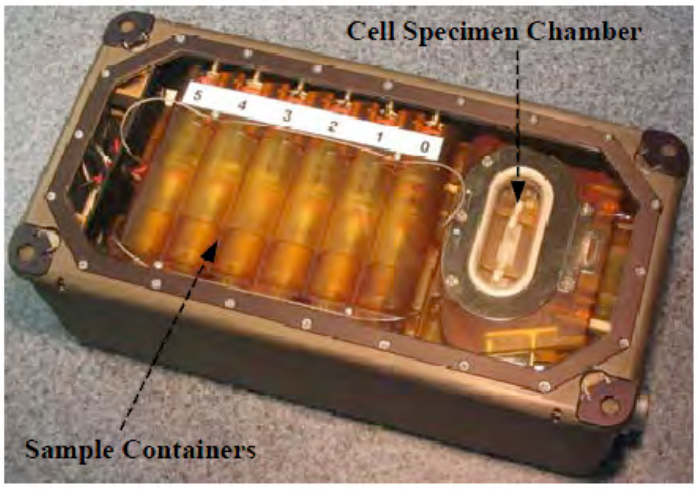
SINGLE LOOP FOR CELL CULTURE (SLCC)

Single Loop for Cell Culture (SLCC) is a self-contained, perfusion-based spaceflight cell culture system with capabilities for automated growth initiation, feeding, sub-culturing and sampling.

Each SLCC provides:

- 1 Cell Culture Perfusion Loop with a 10 mL Cell Specimen Chamber
- 6 Removable Sample/Inoculation Containers (provide containment of tox level 2 fixatives/additives)
- Fresh and Spent Media Bags
- CSC Stirring Capability
- Sample/Inoculation Container Mixing Capability
- Temperature and Humidity Data Recording
- In-line Bubble Trap
- External Viewing of CSC
- Autonomous Operations
- Gas Exchange
- Subculturing
- Crew Access



SLCC, Fully Assembled, top view

Power and environmental control provided by host incubator.

Designed for integration into:

Commercial Generic Bioprocessing Apparatus (CBGA)
(Developed by BioServe Space Technologies)

CGBA capabilities include:

- 2 SLCC units supported at a time
- Temperature control range: -16°C to 37°C
- Remote Commanding
- Data Telemetry

SLCC can also be integrated into host incubators providing both temperature and CO_2 control.

10 SLCC flight units:

Delivered to NASA Ames Research Center in 2007 - ready for flight.

Aurora can provide specialized hardware support for SLCC.

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