

KSC Status

ISS Logistics Support



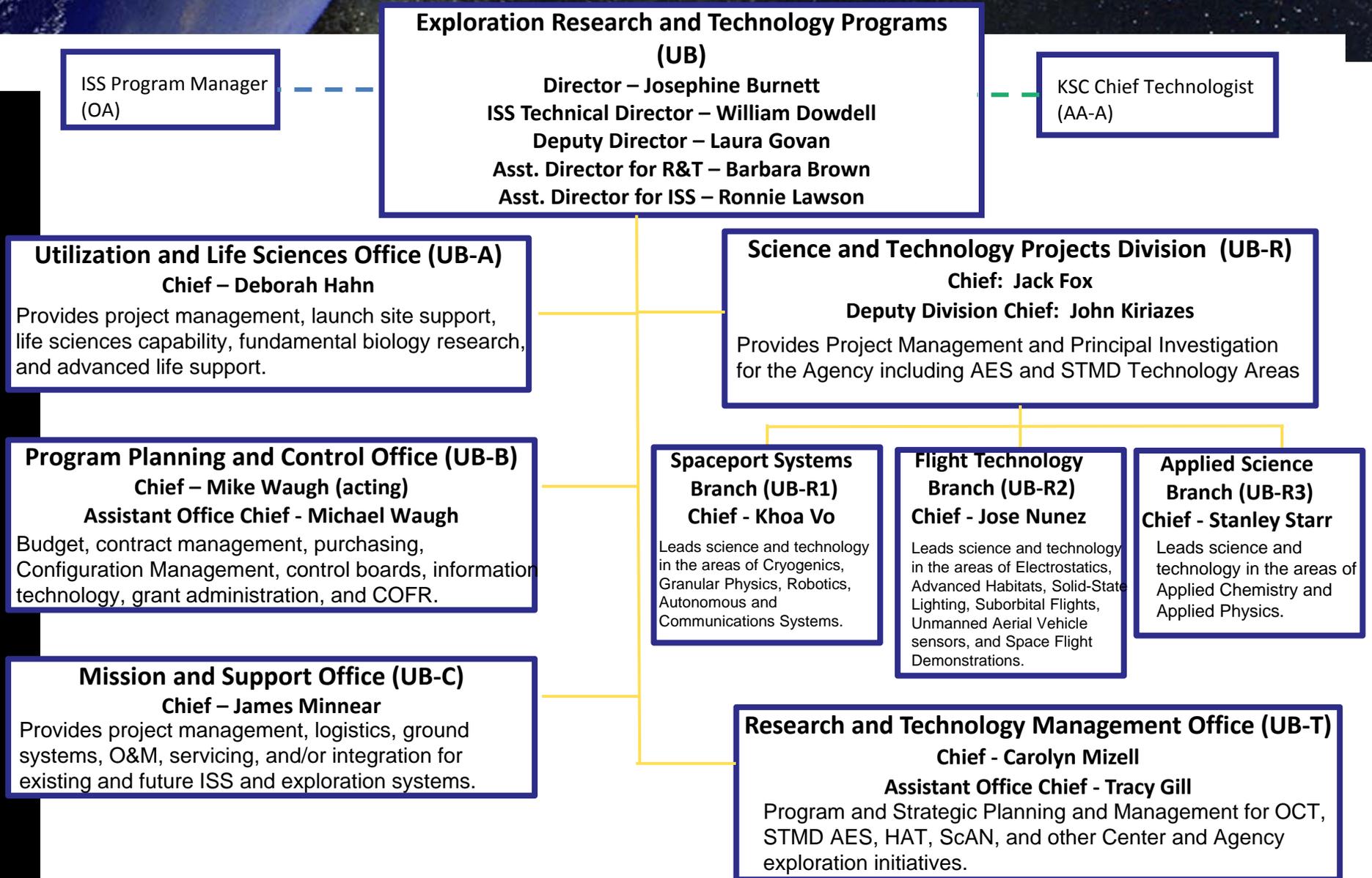
Skip Swaney/NASA-KSC Logistics
Multilateral L&MCP
June 15 - 18, 2015



KSC Status

- To meet the challenges and opportunities in this new era of human space exploration, KSC has taken the bold step to establish the **Exploration Research and Technology Programs organization**
- It combines the talented people having many years of experience in ground processing of Space Shuttle and International Space Station payloads and flight experiments with the scientists and engineers having many years of experience in conducting research and technology development projects on Earth and in space
- The result will be a powerful team having the knowledge to enable ISS and conduct research & technology development projects more focused on human space exploration needs and provide a clear pathway for applications at ISS and exploration destinations beyond

New Organization

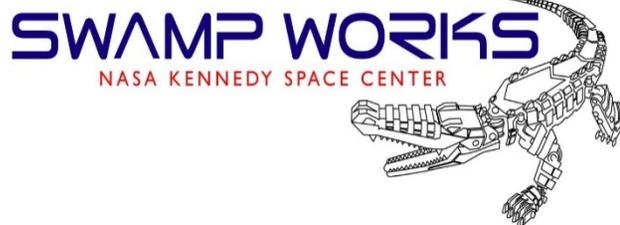


KSC Status

“Exploration Research and Technology Programs”

- ISS ORU Processing
- ISS Payload/Experiment Utilization
- ISS Operations
- Asteroid Retrieval Return Mission

- Space Life & Physical Sciences



- Advanced Exploration Systems
 - RESOLVE
 - Advanced Propellant Loading
 - KaBOOM

Space Technology

- Game Changing
- Technology Transfer
- CIF



KSC ISS ORU Processing

- Exploration Research and Technology office provides management oversight of KSC ORU processing for the ISS Program

Nitrogen, Oxygen Recharging System (NORS)

- KSC Performs NORS Rechargeable Tank Assembly (RTA) filling and integration, transport to launch site and re-flight processing
- Current manifest has an O2 RTA flying on SpaceX 7 also there is an N2 RTA flying on SpaceX 8

ORU Processing

- International Docking Adapter (IDA) delivered to SpaceX for launch on SpaceX 7
- Delivered Galley Rack to Japan for launch on HTV 5

Future Work

- Transport of Li-Ion Batteries to Japan for launch on HTV 6, 7, 8 and 9



KSC Utilization Processing

- Exploration Research and Technology office provides management oversight of KSC Utilization Processing

Payload Processing

- Performed testing of the Rapid Scat Payload and delivered to SpaceX 4
- Stratospheric Aerosol Gas Experiment (SAGE 3) testing was completed at KSC in preparation for launch on SpaceX 10

Future Work

- Multiuser System for Earth Sensing (MUSES) to be tested and delivered to SpaceX
- Space Test Program Houston 5 (STP-H5) to be tested and delivered to SpaceX

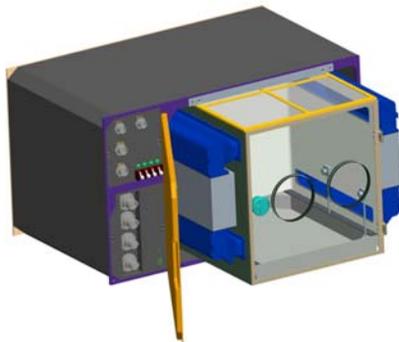
KSC Research and Technology

- Research Experiments:
 - Advanced Plant Habitat (APH)
 - Biological Research In Canisters (BRIC)
 - Veggie
 - Advanced Biological Research System (ABRS)
 - Rodent Research

KSC ISS Research and Utilization

- Exploration Research and Technology office supports the Space Life and Physical Sciences Research and Applications (SLPSRA) program in Washington D.C. and the ISS-R Project Office in Houston, TX by developing hardware research platforms, developing experiment-unique equipment, and supporting investigators involved in spaceflight and ground research

Advanced Plant Habitat – Designed at KSC, to be built by Orbitec



Scientific Merit: Plant, Microbial, and Animal Growth/Physiological Research.

Technical Description: Large, enclosed, control chamber utilizing science carriers.

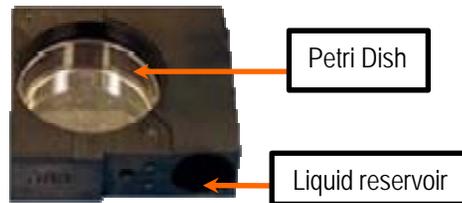
Physical Description: Quad-Locker payload mounted in a standard Expedite the Processing of Experiments to Space Station (EXPRESS) Rack.

Objectives: Increase the study the effects of microgravity on Plants and Microbials in a large environmentally controlled chamber up to 90 days.

KSC ISS Research and Utilization

Biological Research in Canisters-Petri Dish Fixation Units Additional Flights

Designed and Manufactured at KSC



Scientific Merit: Experiments with living plant, animal, and bacterial cells

Technical Description: Implements rapid turn around of biological experiments

Physical Description: PDFU Canisters hold 5-6 Petri Dish Fixation Units in a small volume. Nutrient, fixative, or other solutions delivered to the experiment with straightforward crew processes via a liquid delivery system in the PDFU

Objectives: Doubles the number of rapid turn-around flight series for flying multiple, peer-reviewed science investigations. Specific PI objectives to be determined in proposals.

KSC ISS Research and Utilization

VEGGIE

Designed by NASA & Orbitec, Manufactured by Orbitec



Scientific Merit: Study microbial-plant systems in long-term life support systems.

Technical Description: Provides LED lights and cabin air flow for plant specimens.

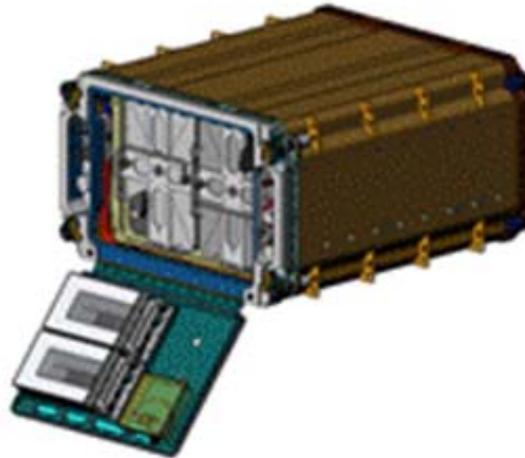
Physical Description: VEGGIE growth area = 0.15 m² (1.6 ft²) with a growth height that is adjustable from 5 cm to 45 cm (2 inch to 18 inch) which gives a maximum growth volume of 0.068 m³ (2.4 ft³).

Objectives: Provide the capability to understand the issues associated with growing large plants in the space flight environment.

KSC ISS Research and Utilization

Advanced Biological Research System (ABRS)

Designed and Manufactured at KSC



- ABRS is a single middeck locker equivalent system with two independently controlled chambers.
- It is utilized with the Expedite the Processing of Experiments to Space Station (EXPRESS) rack.
- The ABRS may be utilized to grow plants, microorganisms, and small arthropods (i.e. insects, arachnids, etc...).
- The individual ABRS chambers can provide atmospheric contaminant scrubbing, temperature control, carbon dioxide control, relative humidity control, generic top-down imaging, power, and data services.



SSPF Science Annex

Operational Overview



NASA Animal Care Facility adjacent to the SSPF for ISS Rodent Research

- Purpose built for rodents to meet the AAALAC International accreditation standards
- Class 100K Aseptic Barrier Facility to meet NASA Specific Pathogen Free (SPF) requirements
- 5 ea. Animal Holding rooms (AHR) with independent environmental control set points
- Two AHR may be reconfigured to negative pressure for Bio-Safety Level 2 (BSL-2)/Quarantine
- Flight Hardware Integration Room
- Procedures Room
- Surgical Suite

- Fully redundant power and automated environmental control systems, monitored 24/7
- Positive pressure with 12-15 fresh air changes per hour
- Leadership in Energy & Environmental Design (LEED) Silver certification



Logistics Launch Site Services

Off-loading Transportation	Depot, Shops and Labs
Load/offload coordination, transport to the assigned Facility and required services at KSC point of entry	Provide emergency shop support for failure analysis, alignment table, fabrication/repair of customer flight/GSE hardware
Arrange for cleaning of vehicle and shipping container before clean work area entry	Calibration, Proof load, cleaning / decontamination and other preventive maintenance support
Transport Flight Elements and GSE between KSC and/or Cape Canaveral Air Force Station (CCAFS) and local off-site facilities	Material Management
Coordinate aircraft/ship/truck fueling for Flight Element and GSE arrival/departure	Provide bench stock consumable items such as plastics, foams, adhesives, wipes, and cleaning materials
Receiving / Shipping	Issue loan-pool equipment including tools, headsets, and clean-room/anti-static/protective garments
Provide Receiving Count and Condition, report any damage to the proper office(s).	Procurement
Plan/prepare Flight Hardware and GSE for shipments from/to KSC, including building of specialized container	Provide minor (<\$1,000) procurement of material for KSC Customers
Facilitate customer interface with U.S. Customs (import or export)	Technical Training
Warehousing / Storage	Plan, develop, implement and maintain a Technical Training and certification program, Provide Area Access Courses
Controlled storage of hardware, equipment and material, including specialize containers	Property Management
Provide Kitting support for customer hardware	Asset tracking of customer hardware

Provide Logistics Launch Site Services to ISS Missions and other customers at KSC.

KSC Customer Support

- **KSC/ISS Logistics Operations will continue to provide Payload and ORU Processing support to the ISS Program and IP Partners.**
 - Support mission processing of HTV and Russian missions as needed
 - Provide Logistics Host Role services to ISS Missions and Commercial Re-supply Services(CRS) Launches SpaceX and Orbital
 - Continue to support ISS OEM deliveries to KSC (In partnership with KSC Boeing 10K)
- **KSC/ISS Logistics Interfaces:**
 - James Minnear, UB-C Mission and Support Division Chief, 321-867-3690
 - Greg Meeks, Logistic Lead 321-867- 6419
 - Ewing (Skip) Swaney Mission Support/Transportation 321-867-6076
 - Katie Zajdel Utilization Support 321-861-6459
 - Rick Rodriguez Warehouse/Depot Support 321-867- 6576