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HARDWARE

Space Flight Equipment is one of HUNCH's largest programs allowing us to create high quality hardware items for the International Space Station. With many different applications we create items from approved design projects to requested items from Crew Systems. Since these projects are likely to fly to the International Space Station, they need to be of the highest quality and meet the stringent tolerances applied to all hardware for the International Space Station.

Many of our most successful projects are items requested by the Astronaut Crew and developed through our Design and Prototyping program. Items such as the Galley Table help with crew comfort as well as other items providing maintenance solutions that keep the International Space Station running for a long time to come. With our largest project of Stowage Lockers of various sizes to hold experiments we are working at our highest quality, pushing students to produce the very best work possible.

Since most items are built to drawing specifications, they need to show the highest quality output possible from our schools. We teach students about quality assurance best practices so that they learn to expect quality from all the items they create. They are also shown proper safety documentation throughout the process making them more accountable for their output insuring tractability from start to finish. We want to ensure that all HUNCH products meet the highest quality standards possible so that student work has the best chance of reaching the International Space Station.

QUALITY

5

Quality Assurance of HUNCH Hardware



The HUNCH hardware is on par with any flight hardware we have seen produced by any vendor or the NASA manufacturing labs. NASA QA has audited the HUNCH quality system and control of materials, and they meet all requirements to produce flight hardware.”

– Larry Zielke, NASA QA

Single Stowage Lockers

Single Stowage Lockers – stowage containers used to house payloads, bolt directly into express racks, machined,

- Fabrication and Assembly
 - Door Assembly, Single Stowage Locker
 - Door Cover Plate Assemblies
 - Internal Close-Out Cover Assembly, Single Stowage Locker
 - Panel Assembly, Door, Single Stowage Locker
 - Hinge Assembly, Single Stowage Locker
 - Frame Assembly, Single Stowage Locker
 - Stud, Latch, Door, Mid-Deck Stowage Locker Assembly
 - Seals, Rear Plate, Assembly, Single Stowage Locker



Double Stowage Lockers

Double Stowage Lockers – stowage containers used to house payloads, bolt directly into express racks, machined, fabrication and assembled consistent with single stowage locker production

Both single and double lockers are available in sheet metal versions for training needs

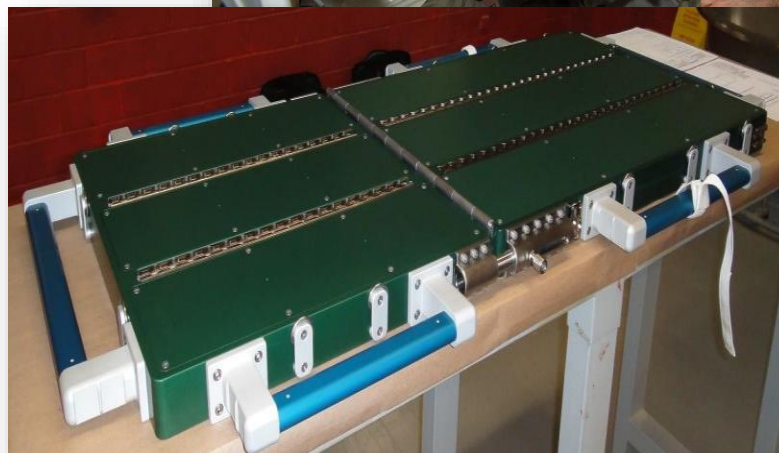
- Concept to Flight Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Galley Table System

Galley Table System – Gathering location for up to 6 crewmembers, located in Node I, machined,

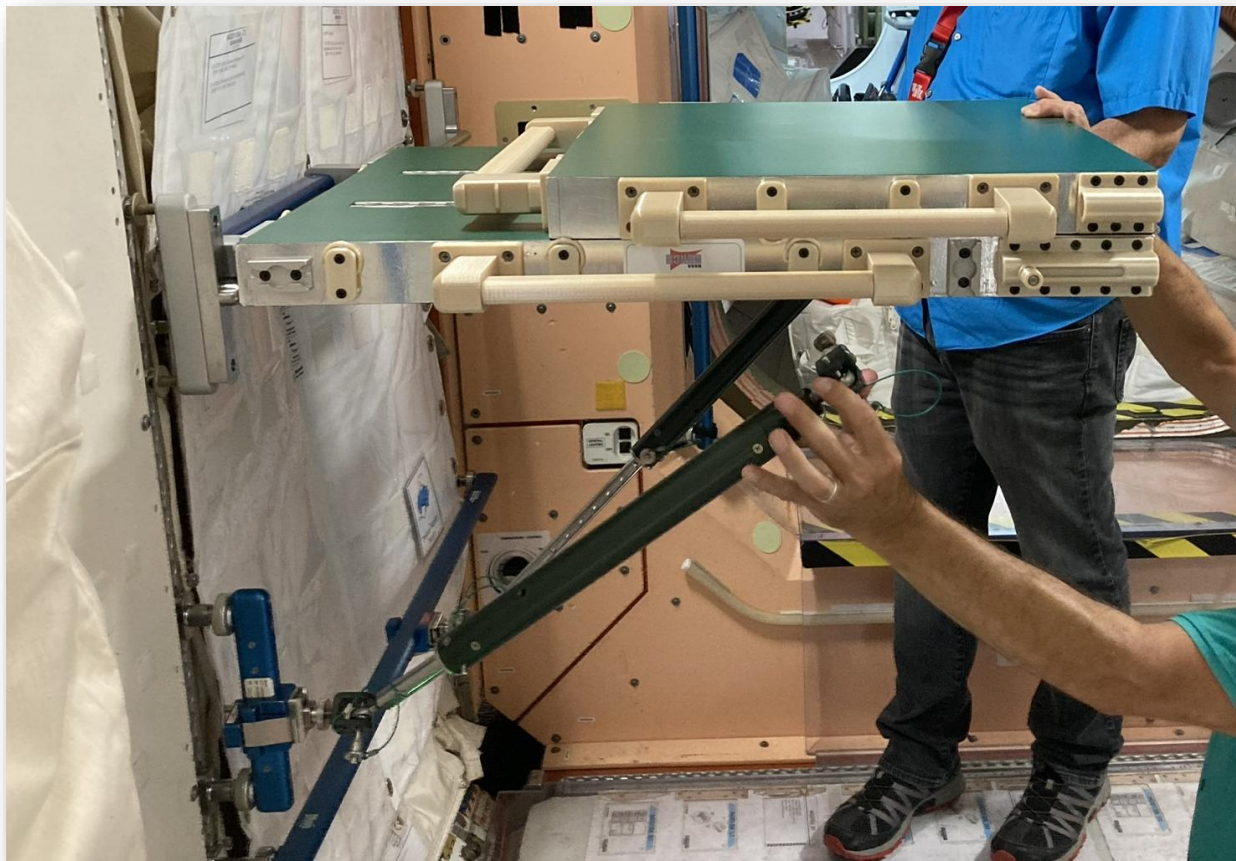
- Concept to Flight Hardware
 - Design Development to NASA Format
 - Drafting to NASA Format
 - Fabrication and Assembly
-
- Galley Table Bracket Assembly
 - Handrail Assembly
 - Galley Table Strut
 - Large Leaf, Galley Table
 - Small Leaf, Assembly Galley Table
 - Slide Bolt Assembly, Galley Table
 - CLEVIS



Light Weight Galley Table

Light Weight Galley Table- Training, mockup for training purposes,

- Design Development to NASA Format
- Fabrication and Assembly



EVA Tools

Acme Thread Cleaning Kit – EVA
tool set used to remove any debris or
metal shavings from the threads that
may cause an increase in torque when
the new equipment is installed.

Machined – Drafting to NASA Format,
Fabrication and Assembly

- Concept to Flight Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



IVA Handrails

IVA Handrails – IVA handrails assemblies used for hand and foot holds inside the ISS, attach to seat track, machined- Fabrication and Assembly

- Fabrication and Assembly



Tape Dispenser

Tape Dispenser - holds two rolls of tape such as Kapton or Grey and attaches directly to seat track, machined and 3D printed components, - Drafting to NASA Format, Fabrication and Assembly



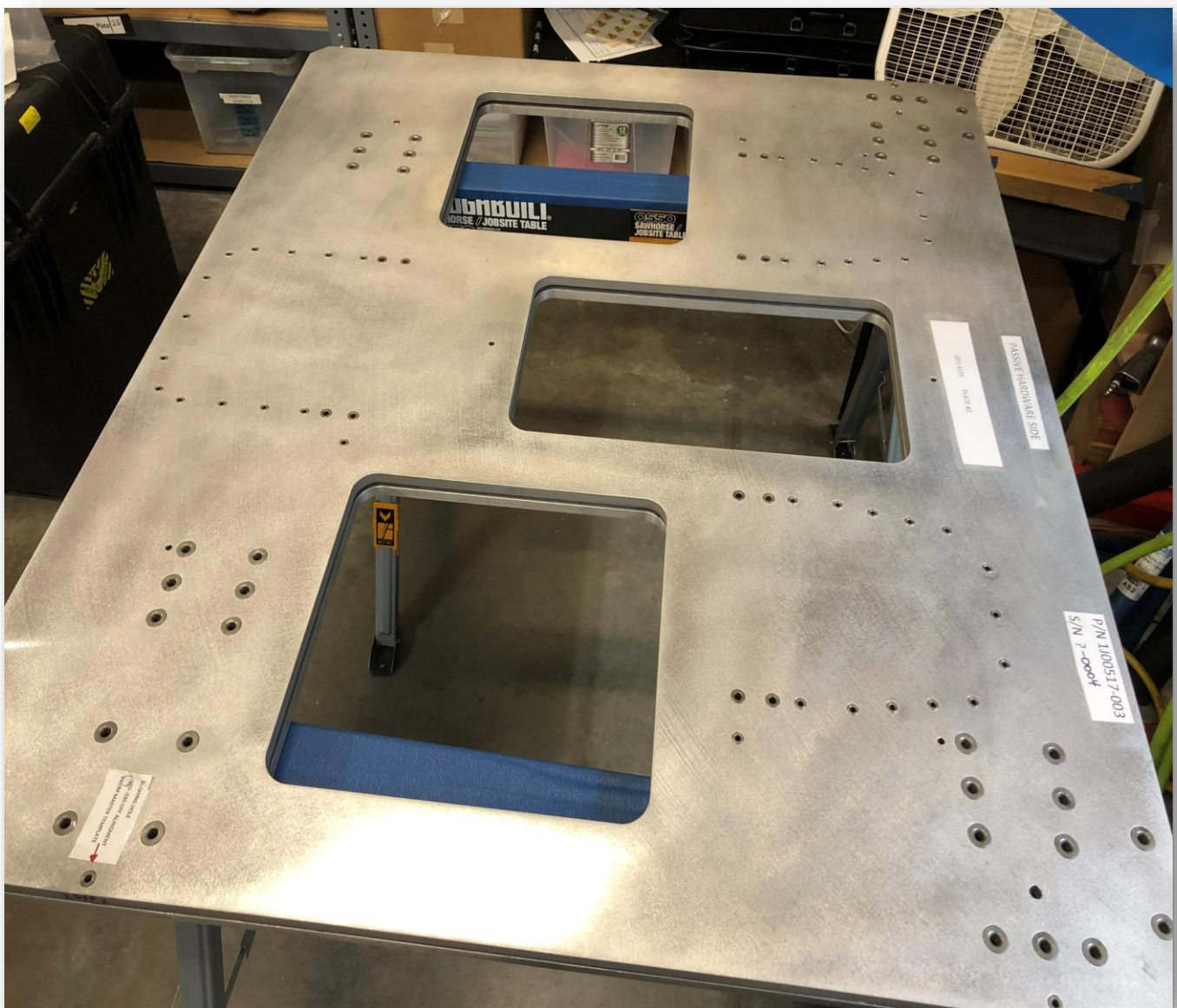
- Concept to Flight Hardware
- Drafting to NASA Format
- Design Development to NASA Format
- Fabrication and Assembly



Passive FRAM Drill Plates

Passive FRAM Drill Plates- Used for locating and drilling Class I, Passive FRAM for interfacing components, Drafting to NASA Format, Fabrication and Assembly

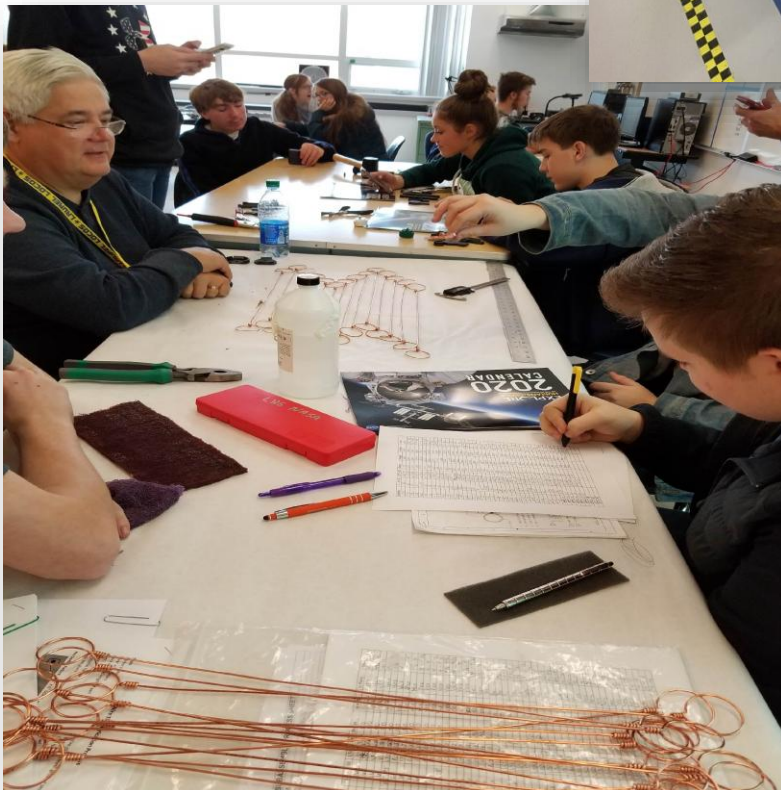
- Fabrication and Assembly



EVA Wire Ties

EVA Wire Ties – used for securing on items outside the vehicle during EVAs on ISS.

- Fabrication and Assembly



One Handed Seat Track Foot

One Handed Seat Track Attachment - auto-locking attachment device for attaching to seat track, machined, - Drafting to NASA Format.

- Concept to Flight Hardware
- Drafting to NASA Format
- Design Development to NASA Format
- Fabrication and Assembly

Shown with original plunger.



Shown with optional plunger designed to reduce movement.



HUNCH Utility Bracket

HUB - Replacement for the Bogan Arm, - Drafting to NASA Format, Fabrication and Assembly

This sturdy HUNCH Utility Bracket (HUB) attaches and releases quickly from seat track as a soft dock or can be locked into place with just a twist of the thumb wheel. This rugged utility bracket has two off the shelf ball heads and a Variloc locking hinge. The hinge allows for independent positioning and allows users to rotate and lock in the required position.

- Concept to Flight Hardware
- Drafting to NASA Format
- Design Development to NASA Format
- Fabrication and Assembly



EZ – Slide Camera Shoe

Camera Shoe - Auto-locking attachment device that captures the standard camera feet used on orbit, machined

- Concept to Flight Hardware
- Drafting to NASA Format
- Fabrication and Assembly



ARISS Fan Cover

ARISS Fan Cover - Holds cooling fans for the power supply, 3D printed. –

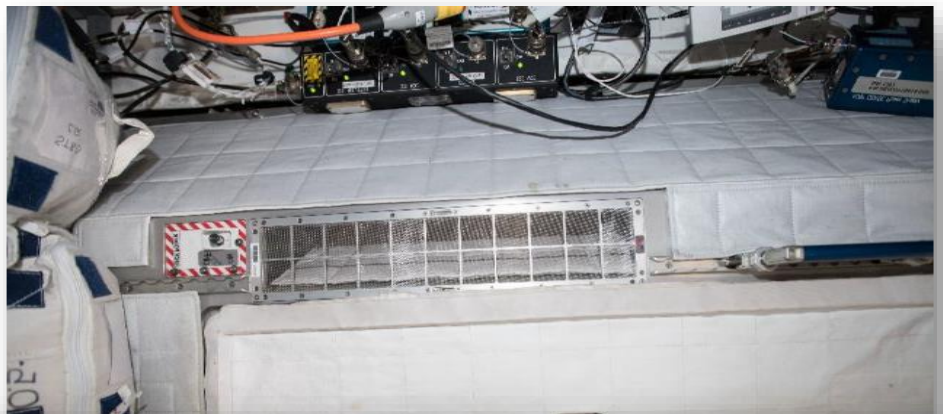
- Concept to Flight Hardware
- Drafting to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Crew Quarters Lint Catchers

CQ Lint Catchers - Lint from the module is pulled into the Crew Quarters clogs up the ducting and air flow sensors giving false indications of low air flow. HUNCH students designed and built grills to hold stainless steel mesh.

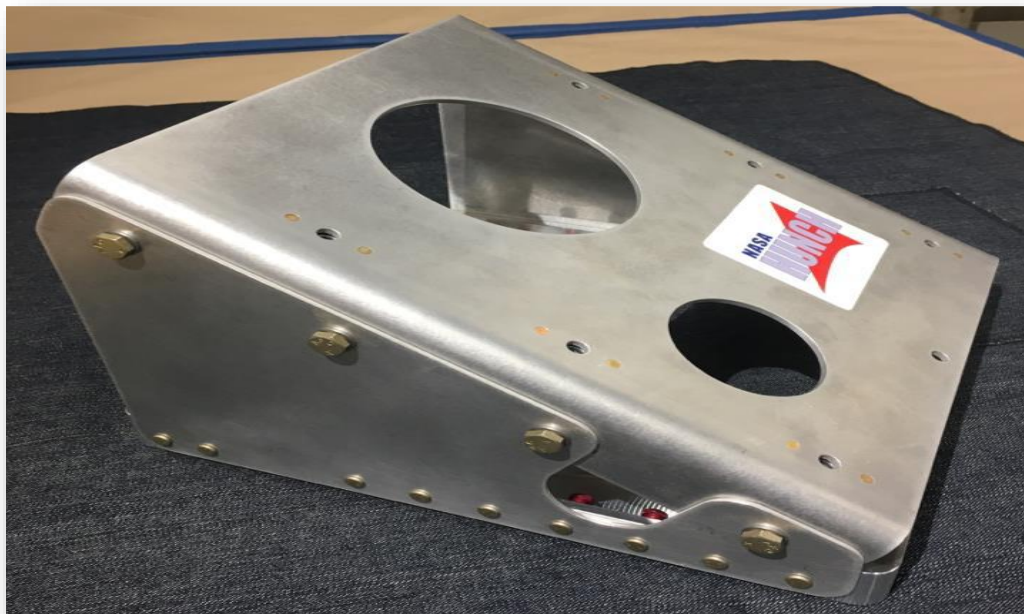
- Concept to Flight Hardware
- Design Development to NASA Format
- Fabrication and Assembly



Chinook Helicopter Flare Mount

Military designed Flare Dispensers are built to exacting precision to allow hot flares to be ejected from the helicopter and prevent heat seeking missiles from impacting our troops and missions.

- Fabrication and Assembly



Ball Clamp Monopod

Ball Clamp Monopod - Variable length pivoting arm that attaches to an IVA handrail with a 360-degree camera mount, contains seat track for attaching lights and camera equipment as needed, machined and 3D printed components. - Drafting to NASA Format, Fabrication and Assembly

- Concept to Flight Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly
- Camera Shoe
- Ball Clamp



Ball Clamp Foot Restraint

Ball Clamp Foot Restraint - adjustable foot restraint that attaches to IVA handrails using a Ball Clamp, machined and 3D printed components 3D printed and Machined, - Drafting to NASA Format

- Concept to Flight Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Rack Stands / Flat Frogs

Are your racks feeling tipsy or wobbly?

Need something extra heavy to make them safe for training?

Flat Frogs are produced by our students near Marshall Space Flight Center. Our students do it all. Everything from the cutting and welding of the heavy steel bars, machining of stainless-steel brackets to flight rack standards and then painted by our auto shop students.



Each rack stand comes complete with the safety tape

- Concept to Flight Hardware
- Design Development to NASA Format
- Fabrication and Assembly

Caution and Warning Panel Covers

Caution and Warning Panel Covers - clear polycarbonate panels used to protect switches, machined

- Fabrication and Assembly



Orion Cursory Control Device Mount

Cursory Control Device Mount - Orion Crew Training, wedge plates, 8020 Mount plates, CCD mount plates for the RPL lab, 3D printed and machined.

- Concept to Flight Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Orion DU-Back Plates

DU-Back Plates - Orion training, adjustable mounting device for monitors

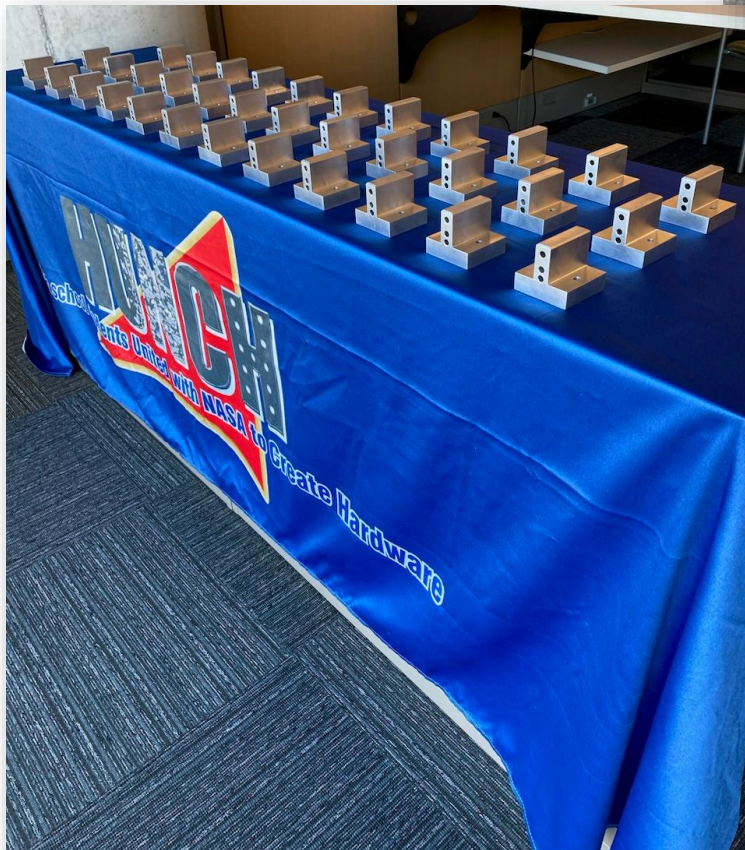
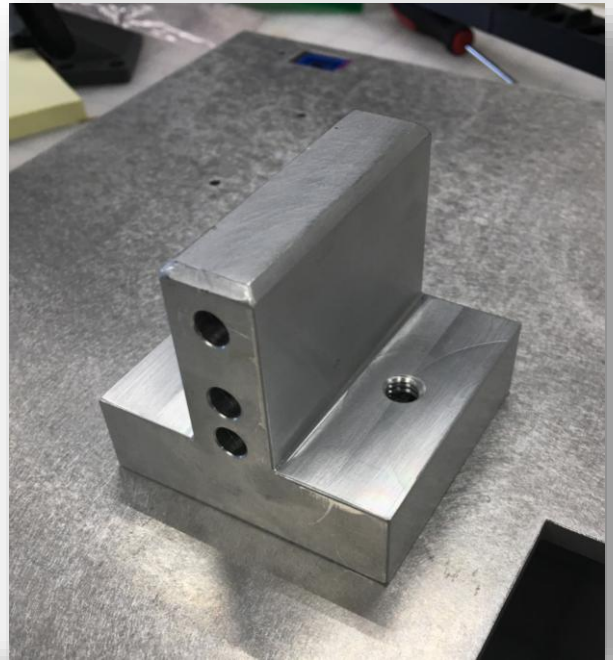
- Drafting to NASA Format
- Fabrication and Assembly



RPL Swivel

RPL Swivel - Orion training, adjustable mounting device for monitors.

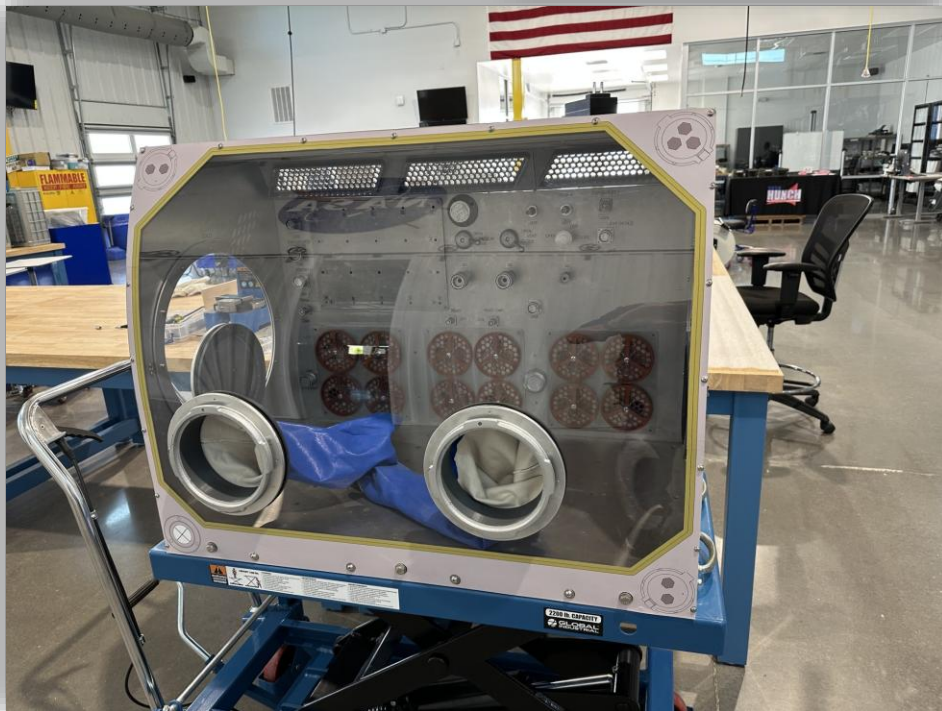
- Concept to Flight Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Micro-Gravity Sciences Glove Box

MSG - Crew Training units

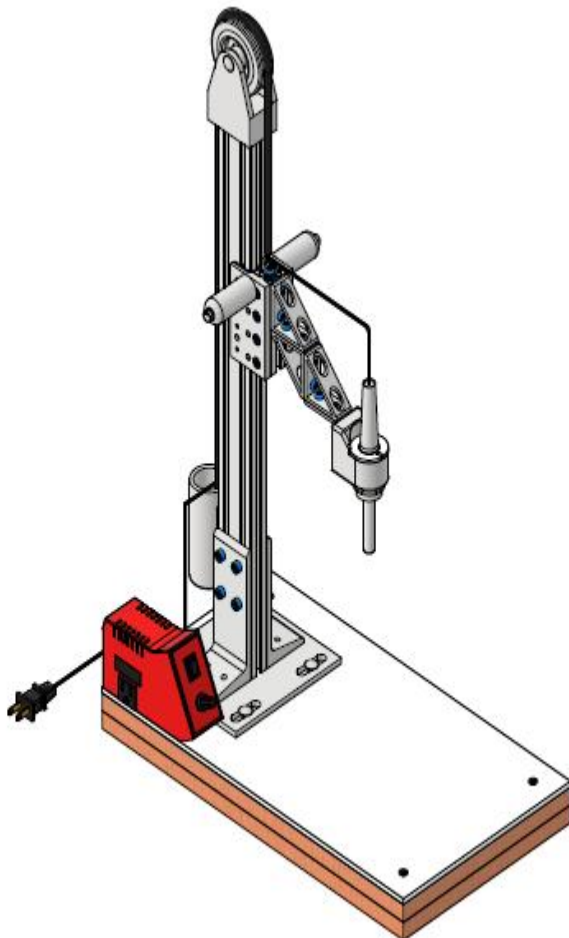
- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Heat Staking Tools

Heat Staking Tools - Device to insert threaded inserts into 3D printed parts.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly
- Additive Manufacturing Aid



ARED Cable Cover

ARED Cable Cover - Protects a cable that is suspected of being damaged by contact with astronauts' feet as they exercise,

- Design Development to NASA Format
- Fabrication and Assembly



Handrail Flex Clips

Handrail Flex Clips – Multi-armed tool and utility holder attaches to IVA handrails, 3D printed.

- Design Development to NASA Format
- Fabrication and Assembly



72" Seat Track

72" Seat Track – Seat Track is an aerospace grade aluminum channel bolted to the walls and equipment of the International Space Station and used for attaching equipment to the walls and racks.

- Drafting to NASA Format
- Fabrication and Assembly



is



Gateway Locker Server Enclosure

Gateway Locker Server Enclosure- Locker enclosure and server hardware for use on Gateway.

- Design Development to NASA Format
- Fabrication and Assembly



Alpha Magnetic Spectrometer Brackets

Alpha Magnetic Spectrometer Brackets- brackets for EVA and vibration test at CERN.

- Additive Manufacturing
- Fabrication and Assembly



Starlab Payload Rack

Starlab Payload Rack- mockup of payload racks with detachable lockers for human factors testing in Starlab.

- Design Development to NASA Format
- Redesigned for manufacturability
- Fabrication and Assembly



Service Racks

Service Racks- mockups for use in Starlab.

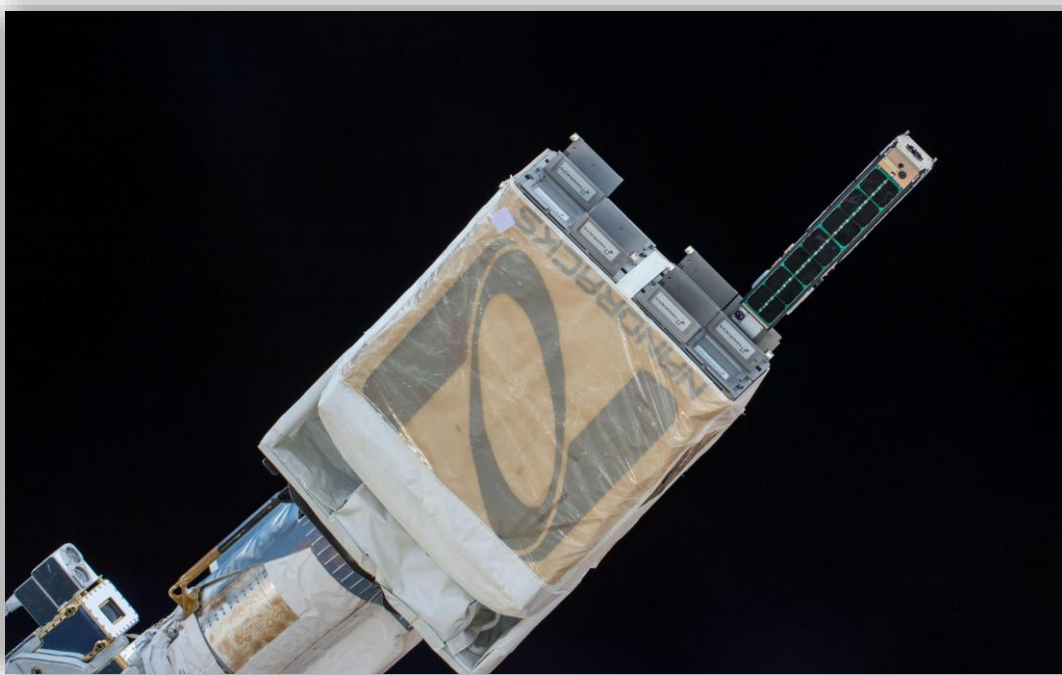
- Design Development to NASA Format
- Redesigned for manufacturability
- Fabrication and Assembly



Single and Double CubeSat Deployers

Single and Double CubeSat Deployers- deployers for ejecting CubeSats on the ISS.

- Fabrication and Assembly



HUNCH Utility Desk

HUNCH Utility Desk- clear desk to be used by ISS crew as needed for IVA activities.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Payload Locker Extender and Hardware

Payload Locker Extender and Hardware- extension that interfaces with standard ISS payload locker front frame geometry to extend the usable internal envelope.

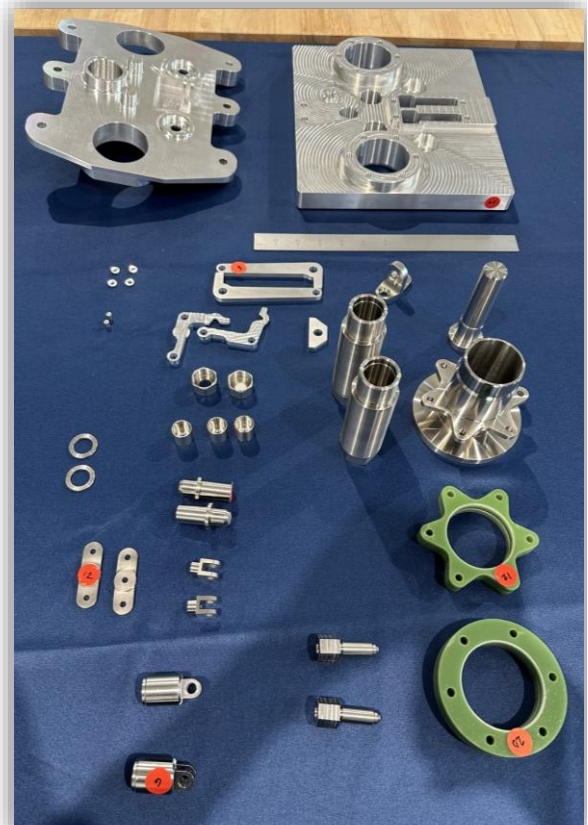
- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



AVIO Quick Disconnect

AVIO Quick Disconnect- automatic quick disconnect for use during launch.

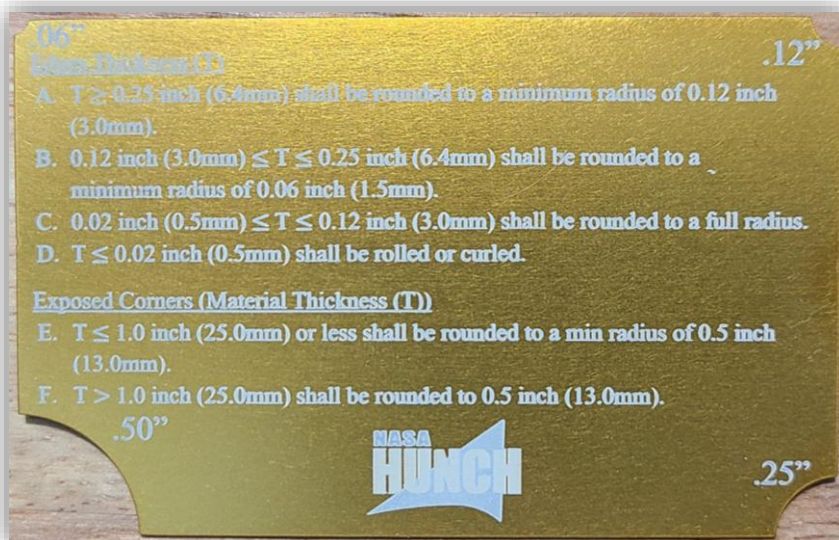
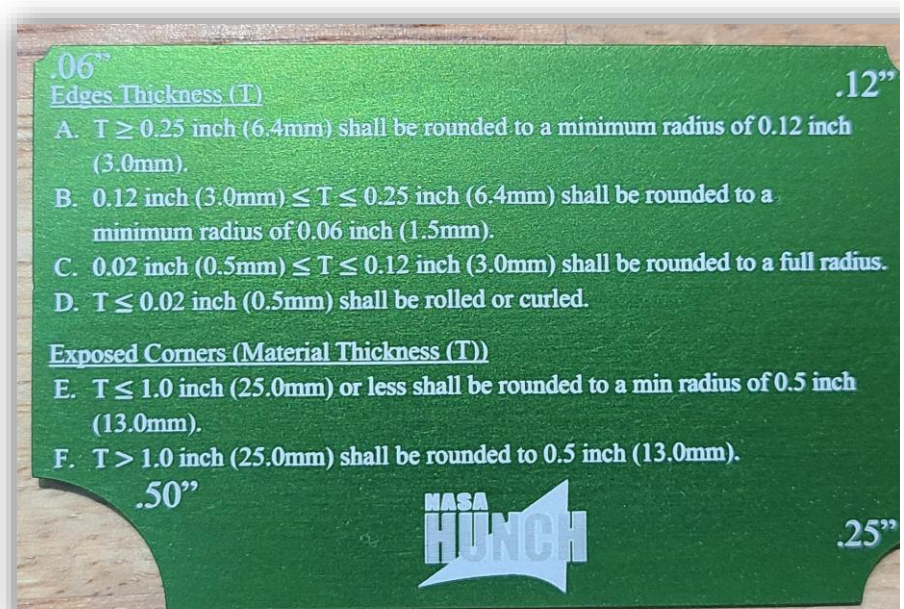
- Fabrication and Assembly



Human Factor Radius Gauge

Human Factor Radius Gauge- laser engraved radius gauge card with NASA standardized radius and requirements.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Amateur Radio on the International Space Station RF Filter Enclosures

Amateur Radio on the International Space Station RF Filter Enclosures-
Ultem 9085 3D printed RF filters enclosures.

- Additive Manufacturing
- Fabrication and Assembly



Lunar Tripod

Lunar Tripod (in development) – to be used for livestreaming/recording of lunar surface activities. Consists of the tripod, ball joint, and camera housing.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly
- Ball joint
- Camera Housing
- Fabrication and Assembly



HUNCH Sewn Flight Articles, also known as Softgoods, is a program using fabric and other soft materials to create goods requested by different NASA centers as well as the International Space Station Astronaut Crew. This can range from redesigning the crew pantry to creating kits for the Crew's personal items. Softgoods provides a unique design opportunity using various materials to keep the crew not only safe but clean and comfortable aboard their stay.

These products range from items we've designed through Design and Prototyping and had flown up to the International Space Station as well as items that already exist aboard the International Space Station such as Cargo Bags. This range of items allows schools with different skill levels to all participate so that no one is denied the chance to create.

Since most items are built to drawing specifications, they need to show the highest quality output possible from our schools. We teach students about quality assurance best practices so that they learn to expect quality from all the items they create. They are also shown proper safety documentation throughout the process making them more accountable for their output insuring tractability from start to finish. We want to ensure that all HUNCH products meet the highest quality standards possible so that student work has the best chance of reaching the International Space Station.

US Hygiene Kit

US Hygiene Kit - fabric modular kit with pockets for Astronaut toiletries, sewn.

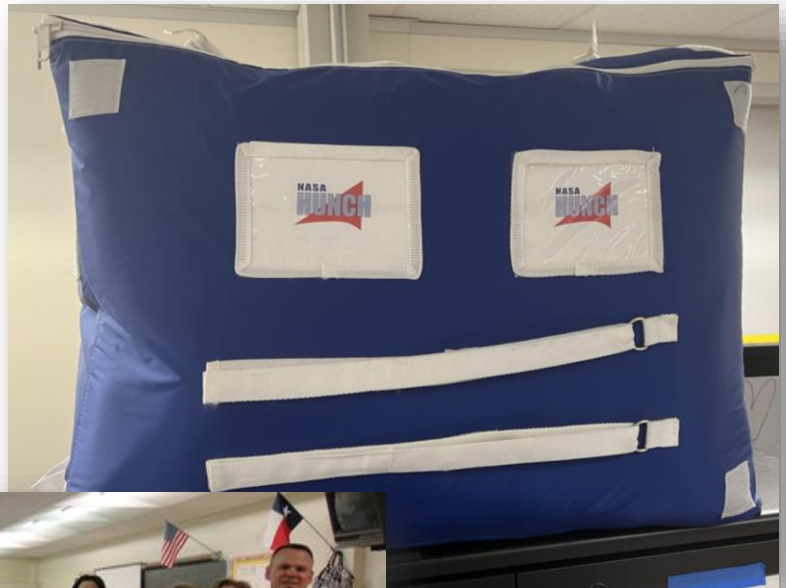
- Drafting to NASA Format
- Fabrication and Assembly



Cargo Transfer Bags (Training & Flight)

Cargo Transfer Bags (CTBs) - are the primary containers used by NASA to send cargo to the International Space Station, sewn.

- Fabrication and Assembly



US Sleeping Bag Liners

US Sleeping Bag Liners - soft material against the crew member inside the sleeping bag. Designed to facilitate a hygienic environment by periodic replacement with a new, clean liner. The liner consists of a thin material that attaches to the sleeping bag shell via Velcro, sewn.

- Fabrication and Assembly.



Foot Pads

Foot Pads - Shoe like pads to protect the top of the foot from pressure when utilizing railing to maintain location, sewn.

Replacement in development to incorporate from feedback after flight.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Payload Pantry

Payload Pantry - Modular shelving system with inserts to accommodate research supplies. Patterned after the Food Pantry, sewn.

Replacement in development from crew feedback after flight.

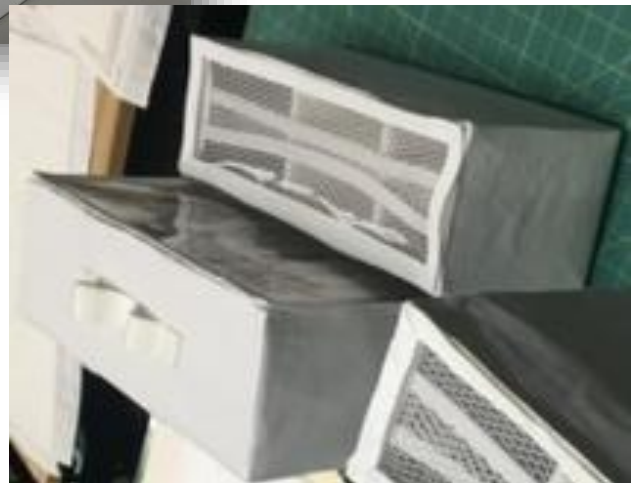
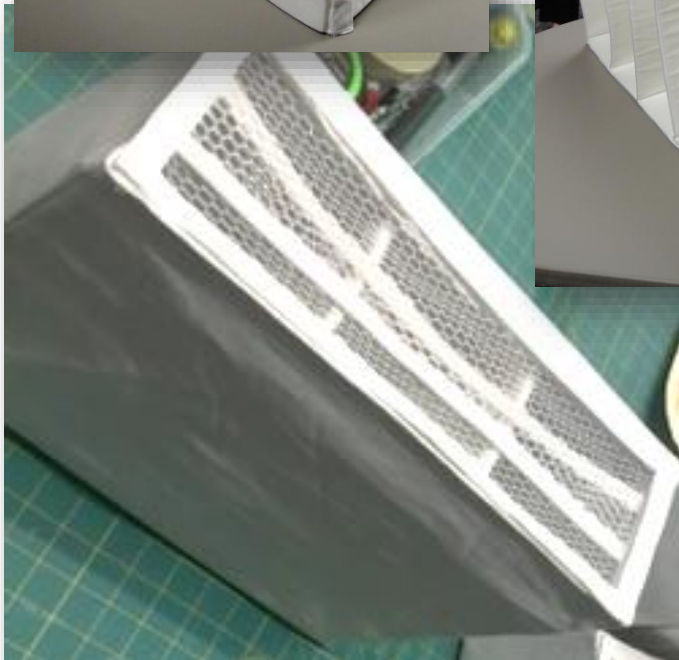
- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Food Pantry

Food Pantry - Modular shelving system with inserts to accommodate food and condiments, sewn.

- Fabrication and Assembly



Privacy Curtain

Privacy Curtain - Cloth panel designed to provide privacy during hygiene activities aboard the ISS, sewn.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Emergency Bags (Training & Flight)

Emergency Bags - Bags designed to for use during emergencies for ISS crewmembers, sewn.

Emergency Mask Bag / Ammonia Cartridge Bag / Emergency CTBs

- Fabrication and Assembly



Jettison Stowage Bag - JSB (Training & Flight)

Jettison Stowage Bag – for dry trash disposal, sewn.

- Fabrication and Assembly



ATV CTBs (Training & Flight)

ATV CTB - are the cargo containers used by ESA to send cargo to the International Space Station aboard the Automated Transfer Vehicle, sewn.

- Fabrication and Assembly



Crew Quarter Organizer

Crew Quarter Organizer - Fabric modular kit with pockets for Astronaut personal items in Quarters, sewn.

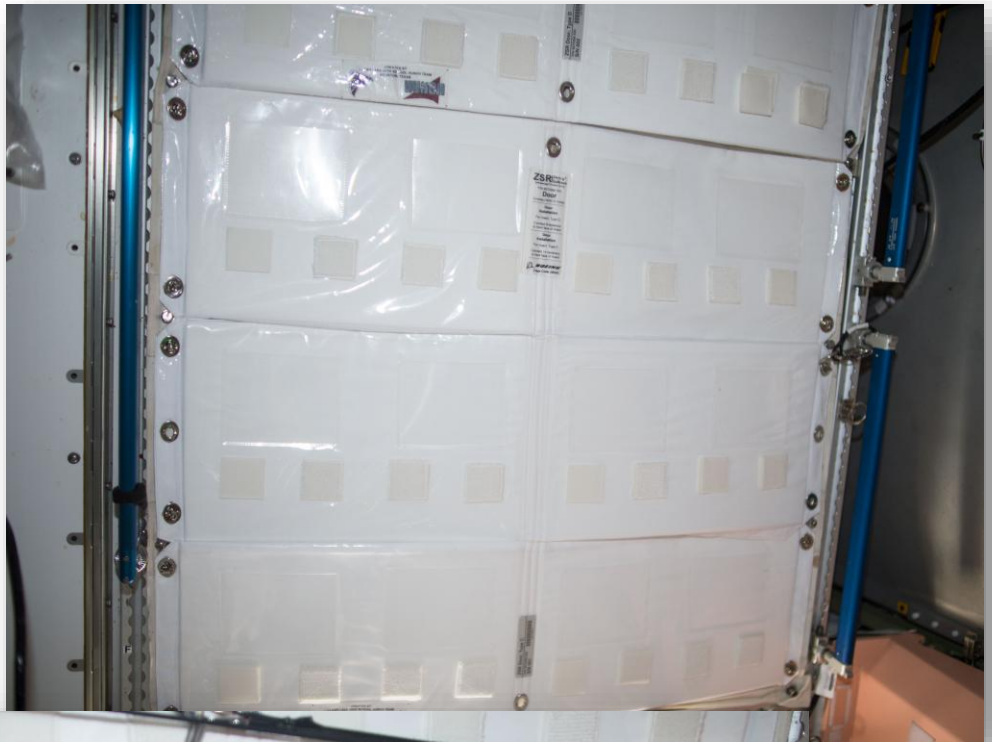
- Fabrication and Assembly



ZSR Covers

ZSR Covers - Fabric panels that closeout the front of ZSR racks with integrated Teflon to lessen staining from food in the Galley module and increase the cleanability of the surface closest to the galley table, sewn.

- Fabrication and Assembly



SHREC Strap

SHREC Strap – Used to limit the rotation of the ARS rack, sewn.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Desiccant Bag

Desiccant Bag – Used to hold desiccant to absorb moisture, sewn.

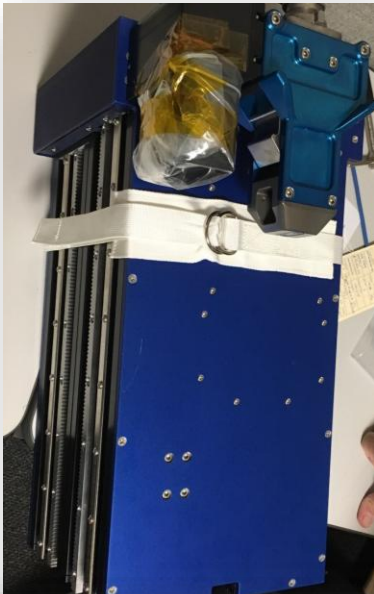
- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



MISSE Retention Straps

MISSE Retention straps –
Custom Launch Stowage strap for the MISSE payload.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Algae Growth Kit Bag

Algae Growth Kit Bag - custom payload stowage bag for collecting and returning Algae Growth samples, sewn.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly



Odor Control Jettison Stowage Bag

Odor Control JSB - Stowage Bag which has an added layer of activated charcoal fabric to lessen odor presence, sewn.

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format



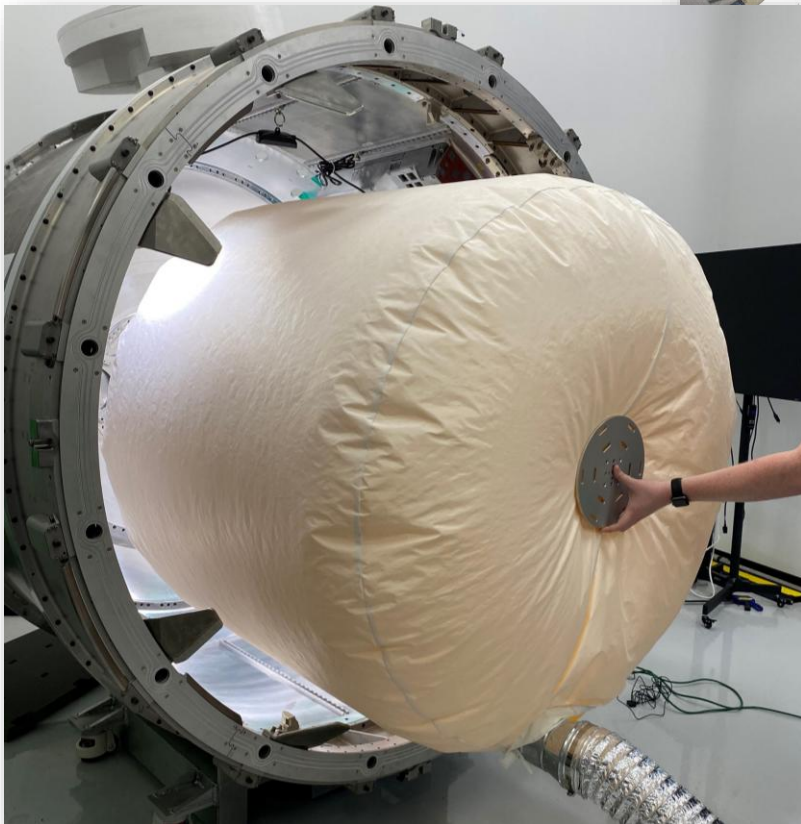
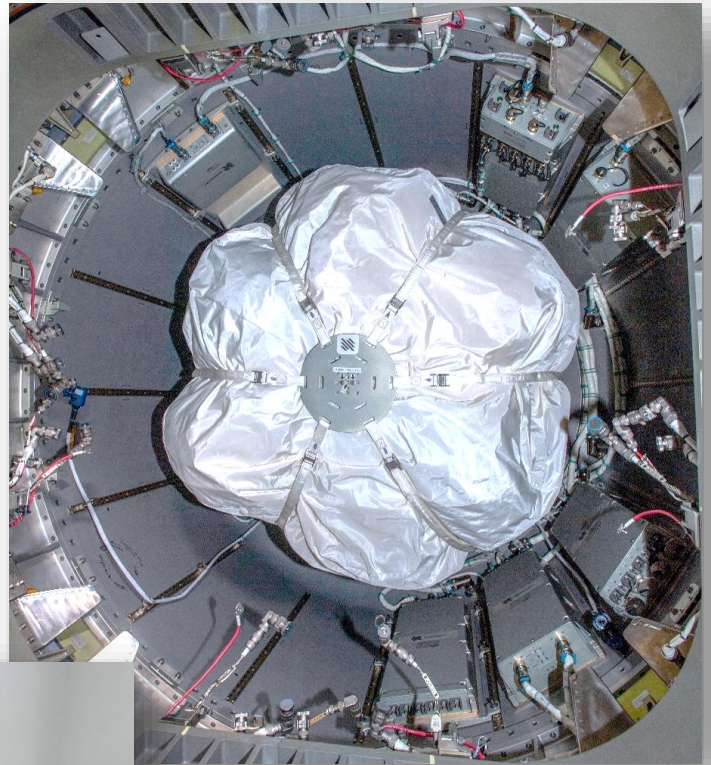
- Fabrication and Assembly



Airlock Trash Bag

Airlock Trash Bag - Specially designed trash bag for the Bishop Airlock on Station. Once filled it is then launched from the airlock. Includes strapping required for deployment.

- Fabrication and Assembly



Hygiene Covers

Hygiene Covers- cloth panel designed to protect cargo in areas utilized for crew member hygiene activities.

Rack Hygiene Cover

Bay Divider Hygiene Cover

- Concept to Hardware
- Design Development to NASA Format
- Drafting to NASA Format
- Fabrication and Assembly

