



From the

**OFFICE of the DIRECTOR of ENGINEERING
NASA JOHNSON SPACE CENTER**

October 14, 2016

EA FALL PICNIC:

Join your fellow EA employees on October 18th from 4pm – 7pm at the Gilruth Live Oak Pavilion for pizza, beer, and great prizes!

PERSONNEL NEWS:

Congratulations to the following EA employees on their recent selection:

EP/Administrative Officer – Dottie Smithe

EA CPP ANNOUNCEMENTS:

NOTE: All jobs close at 10:59 pm CT on the date listed.

CM/Exploration Flight Dynamics Officer Group Lead
Closes 10/19/16 – Click [HERE](#)

IO/Information Technology Specialist (Network Services)
Closes 10/19/16 – Click [HERE](#)

NS2/Chief of Institutional Safety Branch
Closes 10/24/16 – Click [HERE](#)

EP/Battery Systems Technical Discipline Lead
Closes 10/25/16 – Click [HERE](#)

XM/Systems Engineering and Integration Lead for Asteroid Redirect Crew Mission
Closes 10/26/16 – Click [HERE](#)

EA NETS OPPORTUNITIES:

Go to [NETS](#) to get more information and apply for the following internal opportunities:

Detail – Space Vehicle Mockup Facility (SVMF) Mockup Manager,
Closes: 10/17/16

- CX14/Space Vehicle Mockup Facility Office, POC: Allison L. McIntyre x47115

Detail – Manufacturing Project Engineer, Closes: 01/16/17

- ES4/Materials and Processes Branch, POC: Daniel D. Petersen x38387

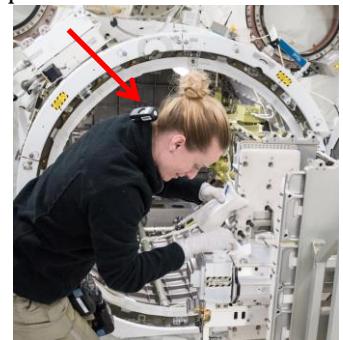
AED Battery Passes with Flying Colors



Once again Energy Systems Test Area (EP6) personnel successfully conducted the qualification, flight acceptance, and safety testing of the Consumer Off-The-Shelf lithium battery pack used in the Automated External Defibrillator (AED) deployed on the ISS. This test took place from August 30 to September 19. Previous tests were conducted in 2008 and again in 2015. While the AED device itself has remained unchanged since 2008, there was a change to the design of the battery protection circuit. This test demonstrated that the new design effectively protects the battery from inadvertent electrical over-stress. Qualification and acceptance tests consisted of vibration and vacuum leak checks with visual inspections and monitoring of physical and electrochemical characteristics throughout. Safety tests consisted of over discharging through the continuous repetition of a protocol that closely resembles actual battery discharge during AED operation. The performance achieved in these tests provided the rationale necessary for certifying the AED battery acceptance units for flight aboard the ISS. The EP6 team effectively implemented lessons learned from previous tests to minimize the stress on the battery packs resulting from interfacing with the test systems.

ISS Crew Adds An Accessory to Their Wardrobe

The ISS crew has been sporting a new wearable accessory lately, as the Personal CO₂ Monitor (PCO2M) payload has seen extensive use over the past four weeks. The PCO2M was one of the first class I-E projects at JSC developed, certified, and flown to ISS in a year under the 2x2015 initiative. The small clip-on sensor collects CO₂, humidity, and temperature readings in the immediate vicinity of the wearer, and automatically transmits that data to a custom iPad app for downlink. To date, 3 crewmembers have worn PCO2Ms in a variety of configurations, and the hardware has also been used for static environmental monitoring. As payload operations come to a close, the data collected and PCO2M system remains available for ground teams seeking to better understand the crew's CO₂ environment on the ISS.



Orion EM-1 Thermal Tiles Characterized

The Radiant Heat Test Facility completed thermal testing on a thermal tile that will be flown on Orion's EM-1 mission. The tile has a cylindrical cavity with thermocouples in the reaction cured glass surface coating to measure the temperatures within and around the cavity during reentry. This flight data will improve understanding of the heating within a cavity that may be produced by a micro meteoroid or orbital debris strike. To aid analysis of the flight data, thermal testing was performed to characterize the thermocouples by applying heat to the tile in a very controlled manner. A graphite plate with embedded thermocouples was placed just above the tile, heated up, and allowed to radiate to the tile and into the cavity. The graphite material is well characterized with known thermal and optical properties and can be modeled as an infinitely large planar boundary with a known temperature. Four thermal cycles were performed with the plate at constant conditions and a transient EM-1 guided profile. Subsequent testing is planned for characterizing the thermocouples of tiles with cavities that flew on Orion's EFT-1 mission.



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<https://oasis.jsc.nasa.gov/orgs/EA1/pages/home.aspx>

Reassignment – Visiting Vehicle
Engineer – H-II Transfer Vehicle
(HTV)/HTV-X Integration
Operations, Closes 10/31/16

- NE4/ISS Operations & Visiting Vehicle Branch POC: Deborah L. Cleary x30683

ORION BACKSTAGE:

Scientists and engineers at JSC are working hard to mitigate radiation exposure to the crew on Orion with the Hybrid Electronic Radiation Assessor warning system and shelter planning.

[Orion Radiation Protection](#)

UPCOMING EVENTS:

63-P Undock & Disposal:
Oct 14, 2016

OA-5 Launch:
Oct 16, 2016

Orion EM-1 Inert AM Casting:
Oct 17, 2016

EA Fall Picnic
Oct 18, 2016

OA-5 Berth:
Oct 19, 2016

48-S Launch:
Oct 19, 2016

CPAS CQT 4-2 Airdrop Test:
Oct 19, 2016

47-S Undock & Return:
Oct 29, 2016

49-S Launch:
Nov 15, 2016

SpaceCom2016
Nov 15-17, 2016

OA-5 Undock:
Nov 18, 2016

Orion ACM Casting:
Nov 21, 2016

65-P Launch:
Dec 1, 2016

Pumps & Pipes:
Dec 5, 2016

HTV6 Launch:
Dec 9, 2016

EBOT Completes CDR Kickoff



The EVA Battery Operations Terminal (EBOT) team completed the Critical Design Review (CDR) Kickoff Meeting for the battery charger hardware. EBOT is replacing the Battery Charger Assembly/Battery Stowage Assembly in the ISS Joint Airlock avionics rack. EBOT is responsible for charging and discharging the US EVA batteries: the EMU Long Life Battery, the Lithium-ion Rechargeable EVA Battery Assembly, and the Li-ion Pistol Grip Tool Battery. Also, it will provide storage of all EVA batteries maintaining them for EVA readiness. The 3 new chargers will be able to connect up to 15 batteries and charge 3 of them simultaneously. The chargers will send telemetry to Mission Control for monitoring and facilitation of go/no-go for EVA decisions. With the successful completion of the CDR, the EBOT team will begin the construction and testing of flight hardware with an expected on-orbit delivery by the end of 2018.

JSC Heading to Suborbital Flight

The Multiphase Flow Experiment for Suborbital Testing (MFEST) team successfully completed power functional and interface checkout testing at Virgin Galactic's Mojave, California facility on September 14. MFEST is JSC's pathfinder payload for testing on SpaceShipTwo, which can provide up to 4 minutes of microgravity at suborbital altitude. MFEST is a joint project with the Engineering Directorate (EC, ES, and EV), the JSC Office of the Chief Technologist, the NASA Flight Opportunities Program, a commercial company Advanced Cooling Technologies Inc. and academic partners at Texas A&M University. The experiment includes a microgravity vortex separator and an ultrasonic sensor system for management of the water and air inventory within the separator. The experiment was originally proposed as a water processing experiment for testing on the Space Shuttle. Post-testing actions are underway in preparation for flight in 2017.



UIA Qual Testing Going Well

The Umbilical Interface Assembly (UIA), currently going through a redesign, is the interface between the ISS Joint Airlock and the Extravehicular Mobility Unit for the transfer of consumables such as oxygen, feed water, and waste water, cooling water circulation, and power and data, and for the hard line communications from the airlock to the suit via the umbilical. The UIA includes controls and displays necessary for servicing the suits during pre-breathe, egress, ingress, and maintenance activities. The redesign has upgraded various components within the UIA and has also added in a separate oxygen line and interfaces that will allow future space suits to use the UIA. The certification unit is in the middle of its environmental qualification tests. The unit is going through vibration testing this week and has already successfully passed its first round of electrical testing at UTC Aerospace and fluid testing in the Space Suit System Lab. The flight units are planned to launch in 2017.

Geocam Battery Testing Nearing Completion

A total of 54 Class I Geocam batteries made by Inspired Energy were delivered to the Energy Systems Test Area for Acceptance, Qualification, and Safety Testing. The Geocam cameras on ISS allow on-orbit digital still images of Earth with the correct geo-location. A total of 45 batteries (44 flight and 1 qualification) have undergone pre-test charge/discharge cycling, vibration testing, and thermal cycling as part of acceptance and qualification testing and are currently in post-test charge/discharge cycling. The remaining 9 batteries were downgraded to Class III for engineering level safety tests, subjecting 3 batteries each to over-charge, over-discharge, and external short tests. Safety testing has already been completed on all of the batteries.

