

**Space Flight Systems Directorate**  
**Activities Report**  
May 3-16, 2009

**ADVANCED FLIGHT PROJECTS OFFICE**

**ISS and Human Research Project Office**

**Set up completed for sample four of BCAT-4 operations on ISS.** BCAT-4 continues operations on ISS with the set up for the fourth sample on May 12, 2009. Operations on this sample will continue until it is complete. The PI reports that the image quality is very good and sample 4 is a fast responding sample (compared to sample 3). BCAT-4 is on the voluntary science list for May 25, 2009 with operations starting on sample 5.

The crew reports that crystals are forming in sample 8-10 and have started using the higher resolution Nikon camera to capture the colors and structures. Mike Barratt has captured some of the crystal formation and he is continuing to work with the flash and camera angle to optimize the data collection.

We are working with the operations planners to complete BCAT-4 before the 2 J/A launch so we can move on to BCAT-5. Contact: MAH/Ronald Sicker, (216) 433-6498

**Tentative location identified for BCAT-5 in L-30 bench review for the 2 J/A launch.**

BCAT-5 completed a successful L-30 bench review for the 2 J/A launch scheduled for June 13, 2009. A tentative launch location was identified during the review, and we are proceeding with launch preparations. Contact: MAH/Ronald Sicker, (216) 433-6498

**Science Project Office**

**In-Space Propulsion Technology Project Office- Out Reach**

Dan Vento presented a rocketry program to 65 fifth graders at Canterbury Elementary School, Cleveland Hts. Ohio, on May 12, 2009. The program included a talk about rockets and propulsion. The students each received a rocket kit which was assembled as part of the program. There will be a launch day on May 26, 2009 at Canterbury Elementary. This program was a cooperative effort between Canterbury Elementary, NASA, the Canterbury PTA, and a local rocketry club. Contact: MAS/Dan Vento, (216) 433-2834

**Advanced Capabilities Project Office**

**Supportability Project: The Component Repair Experiment (CRE) – 1 team conducted a crew debriefing session with Astronauts Michael Fincke and Sandra Magnus on May 6 at Johnson Space Center.** The team provided the crew members with the results of an initial analysis of the returned circuit boards, and held an informative question-and-answer session providing information on specific crew activities and directions for further research and development. The results of this experiment have demonstrated that component-level repair of circuit boards is feasible given even limited training and a small number of additional tools. The crew specifically emphasized the value of having video procedures as a required reference for conducting such repairs. These efforts are a further step to developing a capability for crew members to perform electronics repairs during future missions. Earlier

work by the CLEAR team included the Soldering in Reduced Gravity Experiment (SoRGE) which looked exclusively at the soldering process. CRE-1 further demonstrated key physical processes of end-to-end component-level electronics replacement. These processes included conformal coating removal as well as component removal and replacement for both through-hole and surface mount component packaging. Activities such as SoRGE and CRE-1 are important for future ISS maintenance as well as a steppingstone to enable such capabilities for future lunar and Martian missions. CLEAR team members include Gary Gorecki and Peter Struk (GRC), John Easton (National Center for Space Exploration Research), and Eric Anderson (ASRC). Contacts: REC/Peter Struk, (216) 433-5948 and NCSER/John Easton, (216) 433-2643

**Cryogenic Fluid Management (CFM) Project: The GRC Flow Calibration Lab has initiated testing of the prototype Liquid Acquisition Device (LAD) channel.** The purpose of this testing is to quantify the pressure loss vs. flow rate across the screen and along the channel of a screen/ channel LAD using water as the test medium in preparation for testing later this year using liquid oxygen. The proposed configuration for the Altair Lunar Ascent Stage is that all liquid propellant flow, whether it is for the main engine, or reaction control system engines, will be through the LAD channel. Preliminary data is required to size pressure transducers for the liquid oxygen testing and to assess the viability of the proposed design. Initial data has been acquired and is being analyzed prior to proceeding to the next round of testing. Contacts: MAC/ Michael Doherty, (216) 433-6641, RET/John McQuillen, (216) 433-2876

## **SPACE OPERATIONS PROJECT OFFICE**

**Space Shuttle Support** (Project Manager - Carol A. Quinn):

Purge, Vent and Drain (PV&D) Sub-System

Contact: DEFO/Diana Centeno-Gomez, (216) 433-3259

- STS-125 PV&D Pre-Launch and Launch Operations Report. During the loading of STS-125, purge flow rates and temperatures were as expected with nominal system performance:

Fwd Circuit: 89 lb/min @ 85°F

PLB Circuit: 175 lb/min @ 61°F (flow rate was 190 lb/min prior to purge ramp

down) Aft Circuit: 107 lb/min @ 105°F

Due to having a Payload Bay purge spigot open for Hubble hardware, the purge flow rate was set initially at 190 lb/min and was ramped down to 175 lb/min prior to resuming the count at T-9 minutes.