Gerstenmaier Discussions

UF-2 Process Improvements & Lessons Learned

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Process Improvements & Lessons Learned Carried Into UF-2 Flow

- **Hardware Familiarization**
  - A KSC UF-2 Utilization Overview package was prepared and presented to the Test Team prior to Hardware arrival

- **Stowage & Hardware Benchreview Process**
  - The Bench Review process was streamlined so that hardware could arrive as late as possible
  - A New Standard Bench Review procedure decreased delays and personnel coverage
  - Stowage Delivery POC's minimized the amount of time the hardware spent in receiving
  - A Utilization Familiarization was given to the stowage community to facilitate quicker routing of utilization hardware deliveries and just-in-time on dock need dates
  - The JSC Stowage Hardware Audit was better attended by KSC
  - New EXPRESS Stowage Drawer and Contents weight and CG OMRS was implemented
  - Software CDs are now properly labeled, packaged and routed for KSC for stowage

- **Hardware Turnover Process**
  - KSC Standard Practices and Procedures (SPP) for Integration Data Packages (IDPs) and SSP 52000-PDS were updated to better document the Turnover process, clarify the Turnover terminology, and include important software configuration that was previously omitted
  - Shipping and receiving delays were decreased by improving the shipper guideline instructions and related information on the 1149/shippers

Process Improvements & Lessons Learned Carried Into UF-2 Flow

- **FEC Process**
  - The FEC process and related signature requirements were updated to get FEC's through the the system quicker and reduce paper load
- **OMRS Process**
  - OZ PE&I was added to the OMRS development, baseline, and waiver processes
  - SRDS PDL screens were updated to incorporate lessons learned from previous missions
- **FOD Inspection Process**
  - Supported new M&P final inspections of all Racks for FOD. Found and resolved the MSG foam FOD with M&P.
- **KSC Security**
  - Due to security concerns, Customers traveling to KSC have placed identification nametags on all their items (briefcases, bags, etc .) and did not to leave them unattended
- **KSC Quality**
  - Proper level of Software QA coverage to witness software loads at KSC was implemented

Issues and Concerns Identified During UF-2 Flow

- **Tight Schedules and Communication Breakdowns**
  - The amount of work that had to be completed at the launch site in such a limited amount of time combined with the communications breakdowns challenged the people, the policies, as well as the processes throughout the Program.
  - The KSC/MSFC MSG/JSC Payloads Office test team was required to deal with a very unique and extremely late processing flow. The existing available tools for tracking test configuration were barely adequate to manage this challenging flow in which hardware and software items were in a nearly continuous state of change until the very end of the flow.

- **Test Configuration Related Items**
  - A suspected lack of configuration control of the MSG flight hardware test configuration during Payload Test and Checkout System (PTCS) testing drove an audit of the entire MSG hardware delivered to KSC.
    - Questions arose mainly due to inconsistencies with cable labeling and flight qualification status of MSG hardware.
    - The audit revealed a clear paper trail with proof that all MSG hardware, with the exception of the MSG Laptop Computer (MLC) and the W205 serial data cable were tested in PTCS in their final flight configuration. An exception to the MSG OMRSD requirements (ref. EKP10213) was approved to document that the MLC interfaces were verified with a flight equivalent unit.
    - MSG conducted a successful standalone test of the flight MLC post PTCS testing. The W205 serial data cable required re-clocking of the back-shell following PTCS testing but retest of the cable was not required due to the nature of the repair.

➢ ***Post-online processing face-to-face discussions were held between KSC, MSFC, and OZ at which time initial discussions of UF-2 lessons learned were kicked off and relationship healing began.***

Process Improvements & Lessons Learned Being Carried Forward From UF-2 Flow

- **Part Marking**
  - Incorporate Station cable IMS labeling into the part marking and test documentation process in addition to part numbers and serial numbers
  - MSFC has a long history of making dash numbers optional per MSFC STD 555. KSC to develop a process that can deal with these optional dash numbers

- **Hardware Transfer**
  - For complex rack level payloads with extensive stowage like MSG, initiate and maintain a new "Hardware Transfer Log" similar to the Cable connect/disconnect log and similar to the test configuration maintained for PTCS in the PM046 log for higher level items
  - Standardize the off-nominal transfer steps and related details for non-IDP transferred items on KSC WADS like PRs, TAPS, TPSs, and Deviations. IDP transfers are already well documented and are consistent

- **Test Configuration**
  - KSC is looking into starting a Mission Test Configuration Verification TPS (per Randy Galloway suggesting) and/or OMRS General Requirement Instruction (per PUB Chair Dawn Schaible) to document the test configuration and any variances

- **Drawing Deliverables**
  - KSC to require timely Interconnect Drawings from the Customer before on-line operations

Process Improvements & Lessons Learned Being Carried Forward From UF-2 Flow

- **Open Verification Documentation**
  - A number of MSG verification requirements, affecting stowage hardware, remained open well after turnover to KSC.
  - KSC and MSFC are in the process of proposing to the Payloads Office an update to this process as follows:
    - Open Verifications are already part of the Integration Data Package, but the wording shall be clarified by further defining "that affect KSC Integration" by addressing specifically "constraints to KSC Operations and/or final stowage"
    - For items without IDPs such as late stowage items, the shipping instructions already ask for "open items that affect KSC Integration", but will be further clarified by having the customer provide on the shipping document and certify via signature one of the 3 following statements:

      1. This hardware is flight ready with no open items and is visibly clean.

      2. This is flight hardware. The project manager along with the ISS Utilization Payloads Office (OZ) (provide name of OZ interface) have reviewed all items for this hardware and can certify that there is no open item constraining KSC final stowage. This hardware is visibly clean.

      3. This is flight hardware with open items that are a constraint to KSC final stowage (or some other processing activity/milestone). This hardware is visibly clean.

    - To achieve better visibility by the KSC Utilization Team, late stowage hardware delivered with open items constraining final stowage will have problem reports opened on them in the UT-ISS-(MISSION)-CARGO EICN category rather than the SS-CARGO category and Utilization Mechanical Engineering will be involved.

Process Improvements & Lessons Learned Being Carried Forward From UF-2 Flow

- **VITT Protocols**
  - KSC, VITT and EXPRESS Rack Office (ERO) updated the Sharp Edge OMRS to more clearly document the pass/fail criteria
  - KSC plans to set up a splinter between VITT and EXPRESS Rack Office (ERO) to obtain a better understanding of late breaking VITT requests/requirements for items like tool fit checks, sharp edge etc.

- **Late Manifesting**
  - KSC still being required to react to late manifest changes such as G-Limit, PCG-STES, and INSPACE Coil demanifested, while ARCTIC and MEPS are added in the last month.

- **Repetitive Hardware Exceptions**
  - The manifesting of ARCTIC and MEPS required Exceptions to not perform required UF-2 testing and instead accept UF-1 and 8A related testing. The Payloads Office has accepted a KSC proposal to update OMRS wording for all future payloads to avoid Exceptions if the Payload Hardware and Software have not changed since the last flight and if non-tested Flight Backup hardware is identical to the tested Flight Prime Hardware

- **KSC Security**
  - Post Sept 11th, KSC has a new challenge in the badging and escorting of foreign nationals