Monthly Mission Review

LAT System Commissioning

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Commissioning Task Force

- **Commissioning Task Force**
  - Established 6 Mar 2006
  - **Charge**: Complete LAT testing prior to shipment to NRL
  - **Members from DAQ, FSW, Online, System Eng**
    - Grove
    - Haller (DAQ systems), with Russell (FSW) and Thayer (DAQ h/w)
    - Claus (Online systems)
    - Hascall (Sys Eng), with Bright (NCR support)
  - **Supported by Resource Management Group**
    - Members from LAT management, SLAC management, INT, DAQ, System Eng, ISOC

- Team in place, with knowledge across LAT subsystems and authority to assign resources needed to get finish the job.
Process

Daily flow

- Resource management meeting
  - Status of testing/debugging
    - Active discussion of anomalies and plans for resolution
  - Define needs, assign personnel, update daily plan

- Test and debug
  - Active, direct participation from DAQ, FSW, Online, Offline, ...
    - Thanks to Gunther for leading the show in person most days
    - Large team in Bldg 33 every day, working the issues from acquisition to analysis
  - Anomalies lead to Commissioning JIRAs
    - Tool for communication, initial diagnosis, triage
    - Resolved to existing process for anomaly resolution
      » NCRs, FSW JIRAs, Online JIRAs, information, non-issue

- Daily summary and plan for tomorrow
  - Distributed every night among Comm Team, INT, ISOC
Commissioning JIRAs

- Commissioning JIRA list to coordinate early diagnosis of anomalies, list desired enhancements, and lessons learned during the commissioning phase
  - Consistent with I&T Operations Policy, which allows a period of time to determine whether an anomaly is an operator/script error or an NCR
    - Disciplined debugging process
    - Does not supplant existing process for anomaly resolution
  - Provides a central location to record recommended improvements to test methods or FSW. These are formalized in FSW or I&T JIRAs as appropriate
  - Provides a mechanism to tag items for ISOC information

- Systems and the Commissioner routinely review the list to determine items appropriate for NCRs
  - Key criterion is problem identification
  - Requires some preliminary correlation of data gathered
  - All Commissioning JIRAs will be closed out at end of Commissioning phase

- As anomalies arise
  - First reported as COM JIRA
  - Initial diagnosis leads to disposition
    - Hardware problems become NCRs (none yet)
    - FSW bugs become NCRs and FSW JIRAs
    - FSW feature requests become FSW JIRAs
    - Ground sw bugs and feature requests become Online or Offline JIRAs
Commissioning status

- Progress since 1 March
  - Hardware
    - Detector and DAQ integration complete
    - Full complement of EPUs, SIUs installed and in use after return from RAD750 NCR work.
      - See Gunther’s summary
    - FSW upgrades
      - Three releases: B0-6-4, B0-6-5, B0-6-6
      - Successfully collecting LAT data from LPA (physics runs) and LCI (charge injection calibration)
  - Ground software
    - LICOS test executive in use
      - Scripts for test cases
      - Basic housekeeping alarming
    - Offline event reconstruction, science analysis

- Issues
  - No hardware failures
  - Current issues are software
Status of Commissioning JIRAs

- 38 Commissioning JIRAs opened since 6 Mar
  - 10 open and under study or review
    - 6 of these are “improvements” or lessons learned
      - Ex. Improvement: COM-18 Need streamlined power-down
      - Ex. Lesson learned: COM-25 Disable unpowered trigger inputs
    - Remaining 4
      - Unknown
        » COM-35 PIG register dump unreadable
      - Likely dataflow:
        » COM-37 Erroneous timestamps on telem packets
        » COM-28 ACD LCI data corruption in AcdVetoCal
        » COM-08 LCB errors in muon runs
  - 24 resolved and/or closed to NCRs and/or FSW JIRAs, as appropriate
  - 4 under early NCR work
    - COM-29 = NCR-851 EPU reboot on exception
    - COM-19 = NCR-859 Bug in CAL data compression algorithm
    - COM-10 = NCR-855 LATC verify failure for registers other than CRC
    - COM-09 = NCR-854 ACD header parity errors observed
Issues: **COM38 = NCR 863**

- **Anomaly Description**
  - LCI script TkrNoiseAndGain causes the LAT to enter a state of continuous Busy. Livetime stops incrementing, and all TREQs are discarded.

- **Investigation**
  - Similar tests work on LAT via LATTE
  - Preliminary investigation shows that a TEM is Busy, with corresponding TKR and CAL contributing to Busy. Monitoring of VSC FIFO flags shows no evidence that downstream pressure is contributing to the Busy state.
  - Preliminary determination: Data rate is too high, coupled with a known error setting TKR timeout (existing FSW JIRA)

- **Resolution**
  - Reduce the rate of data collection
  - Modify TEM settings during LCI runs to minimize/eliminate susceptibility to overrun.
Issues: COM-10 = NCR 855

- **Anomaly Description**
  - Intermittent LATC verify errors, indicating that the registers are not set up properly

- **Investigation**
  - All instances have been readout controller (RC) registers
  - LATC verify report bug fixed to allow visibility into problem
  - Last 2 events provided some clues that are being investigated off line

- **Resolution**
  - Testing has been moved to the Dalek
  - LAT is being monitored with a plan to use LATTE to capture LAT state if the problem repeats
Commissioning goal

- Before shipment from SLAC, demonstrate flight and ground processes for:
  - Instrument health and safety monitor
    - LHK, alarming
  - Subsystem performance monitor
    - Detector CPTs, LPTs
      - CPT dry runs completed (with two exceptions)
    - T&DF “CPT”
      - Not yet demonstrated, scripts under development
    - Baseline requirement verification
  - Calibration
    - Electronic calibration (LAT07x)
      - Not yet demonstrated, but CPTs contain abbreviated versions of the same processes
    - Ground analysis of LCI not yet demonstrated
      » Full system won’t be in place prior to shipment to NRL
      » Process will rely on conversion to old data format (LDF) until then
    - Particle calibration (LAT70x, LAT71x)
      - Dry runs completed
    - Calibration exists and is in use (collected under LATTE)
  - S/C interfaces
Conclusion

- Commissioning team is in place
  - Large group from subsystems, DAQ, FSW, ..., Offline working together in Bldg 33
    - Gunther is leading the current DAQ commissioning
  - Actively communicating
    - COM JIRAs and daily status/plan

- Current issues
  - No hardware failures
  - Software issues are being worked