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# Swift FSW Systems Manager's Status

*582 Monthly Status to ISD*

John Ong, Code 582  
Swift Software Systems Manager





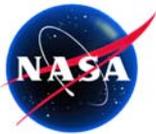
# Swift Observatory Status



- **Key Milestones**

- FDC Peer Review Finally Held on May 5
  - Reviewers included Dave Ward (chair), Kequan Luu, Mike Bay, Erik Andrews, Ron Zellar
  - 19 RFAs generated
  - Key RFA was lack of top-down failure analysis & associated FDC document (Spectrum does bottoms-up analysis).
  - Plan to close all RFAs prior to PSR
- Thermal Vac Testing Completed June 22
  - Ran “day-in-the-life” & abbreviated integrated systems tests (i.e., SFF) as oppose to CPTs. No major show-stoppers found.
  - 13 **NEW** Quality Assurance Records (QARs)
    - Past QARs that re-surfaced were not written up (e.g., UVOT Ada hang ~once per day, causing UVOT to go to SAFE mode and requiring ground commanding back to normal operations (IDLE) mode)
    - Bad solder joint between oscillator A and up/downlink card A caused ~1 sec/minute drift, requiring h/w fix & mini-T/V regression test.
    - DB found to contain I&T commands (which were inadvertently sent during T/V)
    - BAT DM2 power-on problem (this DM was not suppose to be used)
    - BAT safing table not correct
    - Figure of Merit requested slew before target not longer constrained
  - 21 Test Discrepancies (lower form of QAR)





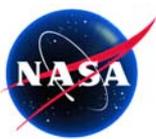
# Swift Observatory Status (cont'd)



- **Key Milestones**

- Finally Ran & Completed 72 Hour Test at Observatory on June 6
  - MRD Req: *The observatory shall be capable of carrying out a normal sequence of science Observations without ground commands for 72 hours.*
  - First attempt encountered ACS “constraint trap” condition where ACS did not have safe slew path out. Test aborted & restarted, successfully completing 72 hours without commanding.
  - No formal post-test debrief. No formal analysis by instruments performed, aside from no significant realtime event showing a problem.
  - I’ve emphasized that since this test should’ve verified autonomous normal operations over 72 hours, that we ought to validate science data products to some form (or at least document what was validated).
- Flight Ops Readiness Review July 7-8
- Pre-Ship Review Scheduled for July 13-14
- Ship to Cape July 26
- Current Launch Date: October 7, 2004





# Peer Review RFAs

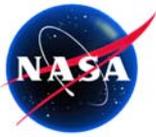


Swift Spacecraft Peer Review RFAs

STATUS DATE: 18May04

Peer Review	Date of Review	RFA#	Concern (see reports for details)	Assigned To:	Planned Closure	Project Closure Date	Comment	Response to Originator	Originator Closure Date
ACS/C&DH/FSW	29-Jan-04	1	Simulations with IRU glitches	Igor	PSR				
ACS/C&DH/FSW	29-Jan-04	2	Buffer sizing analysis - Safehold	Tom Shaeffer	PSR				
ACS/C&DH/FSW	29-Jan-04	3	Document Fault Tree/FMEA	Jordan/Rad	PSR	13-May-04	See Fault Pro RFA-1		
ACS/C&DH/FSW	29-Jan-04	4	Document FSW release process	Tom Shaeffer	PSR	17-Mar-04	See Email from John Ong	13-May-04	14-May-04
ACS/C&DH/FSW	29-Jan-04	5	RW near upper speed limit ok?	Jordan	PSR				
ACS/C&DH/FSW	29-Jan-04	6	Sufficient TLM to diagnose Safehold	Jordan	PSR		see Fault Pro RFA-12		
ACS/C&DH/FSW	29-Jan-04	7	In TVAC run off both 1553 A/B	Baker	TVAC		Confirm in AIST		
ACS/C&DH/FSW	29-Jan-04	8	ARM/IEM cross-strapping	Jordan	TVAC		Document for closure		
ACS/C&DH/FSW	29-Jan-04	9	Why idle mode?	Igor	PSR				
ACS/C&DH/FSW	29-Jan-04	10	Allow Ephem updates during slew	Igor/Jordan	PSR				
ACS/C&DH/FSW	29-Jan-04	11	Identify items from 1553 ICD & TCMD ICD for OBS VM	John Ong	PSR		Setup mtg to Update OBS VM		
Fault Protection	5-May-04	1	Top down check against FP	Jordan	PSR				
Fault Protection	5-May-04	2	Eliminate UC3	Jordan	PSR		UC3 to be eliminated		
Fault Protection	5-May-04	3	Update FMECA/FMEA - provide to FOT	Jordan	PSR				
Fault Protection	5-May-04	4	10 Frames SOH ok?	Mark E.	PSR				
Fault Protection	5-May-04	5	Must have contingency proc for UC3	Jordan	PSR		UC3 to be eliminated		
Fault Protection	5-May-04	6	Review GLAST ARM changes	Jordan	PSR				
Fault Protection	5-May-04	7	Stored CMD processor enabled after fault	Jordan	PSR				
Fault Protection	5-May-04	8	Review driving Arrays after fault	Jordan	PSR				
Fault Protection	5-May-04	9	Consider Add'l gyro fault tests	Jordan	PSR				
Fault Protection	5-May-04	10	Test RTSS in Flight Configuration	Jordan	PSR				
Fault Protection	5-May-04	11	Verify faults during fast slews	Jordan	PSR				
Fault Protection	5-May-04	12	Provide Fault Pro telemetered data to FOT for evaluation	Jordan	PSR				
Fault Protection	5-May-04	13	Put Fault Pro RTS under formal CM	Mark E.	PSR				
Fault Protection	5-May-04	14	Rationale for RTS 19 disabling ant. Switching	Jordan	PSR				
Fault Protection	5-May-04	15	Include OB heater power off for UC1	Jordan	PSR				
Fault Protection	5-May-04	16	Correct CARD to allow RAM pointing during transitions to Safehold	Bundas	PSR				
Fault Protection	5-May-04	17	Solar Array Deployment Inhibit Diagram		PSR				
Fault Protection	5-May-04	18	Document non-RTS Fault Pro Responses		PSR				
Fault Protection	5-May-04	19	Put Fault Pro RTS under formal CM		PSR				



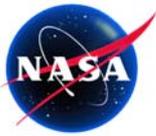


# Software Systems Manager Status (GSFC)



- Status
  - Mainly Watchdog for Project With Limited Authority & Visibility (Contractual Drivers)
    - Over-extended GSFC systems team (led by Dave Bundas)
    - Constant feeling of being “out on a branch”
  - FSW Sustaining Engineering Plan Signed April 29 (Kris Naylor & John Ong)
    - Currently working recommendations & risks identified in plan with Lou Parkinson/Mission Ops Readiness Lead. Many incomplete testbed - 8 FSW testbed configuration after launch.
    - FSW sustaining engineering estimates provided to Neil Gehrels/Swift PI
  - FSW CCB In Place (Software Systems Manager is CCB Chair)
    - Primary responsibility are following through Project CCB approved CCRs involving all FSW changes
- Top Issues
  - Overall program proceeding at break-neck speed & doesn't allow for thorough assessment of tests (before & after). Still true with T/V and 72 hour tests.
  - Insufficient manpower on my part (just me) to cover all areas, so I'm focusing on prioritized set (e.g., FDCs, verif program, implementing FSW CCB)
  - Validation of instrument data products not formally performed, primarily due to limited manpower on instrument teams.
  - Lack of Instrument Module lead on GSFC side (management & systems)
  - PI FSW sustaining engineering are 23%-38% of estimates, presenting risks (esp. BAT)





# Spacecraft Status (Spectrum-Astro)



- Status

- FDC Peer Review Held May 5
- FSW Version “J” To Be Loaded July 13 (Just Prior to Ship)
  - Fix to reply code for moon constraint
  - Fix heaters failure to turn off during eclipse
  - Possible change to correct for “constraint trap” condition
  - Other changes are TBS
- Star Tracker FSW To Be Updated July 16 to Fix Problem Found During GLAST’s Night-Sky Testing
  - Spike anomalies affected quaternion output by order of magnitude

- Top Issues

- FDC Top-Down Analysis Does Not Address FDC Validation
  - All FDCs shown to be addressed (e.g., by test vs. analysis, at subsystem vs. at observatory, which FDCs were enabled/disabled during testing)
- At This Point, GSFC Systems Does Not Fully Understand S/C FDCs to “Buy Off” On Design/Concept (If GSFC Were Asked).
  - Not sure if this will change after top-down analysis is performed
- Lateness of FSW Version “J” Load Could Introduce Unforeseen Problem





# BAT Status

(GSFC / LaNL)



- Status
  - Build 4.2.2 To Be Loaded/Tested After Observatory Moved Back to SCA
    - Fix autonomous instrument safing actions
    - Load 2 science scripts (1<sup>st</sup> one modified, 2<sup>nd</sup> was missing)
    - Couple of database changes
  - BAT FSW ADP Near Completion (Mike Blau/582)
  - BAT FSW RVMs Near Completion (Louise Bashar/582, Ed Fenimore/LaNL)
- Top Issues
  - BAT Has Very Limited Runtime With Flight H/W & Flight-Like Settings
    - Background rates is usually ~800 events/sec on ground vs. ~12-18K events/sec in flight
    - Tweaking of science FSW parameters shown to effect overall system dynamics
  - BAT Sustaining Engineering Manpower For FY05 at 0.83 vs. Est. of 2.3 FTEs (~38%)





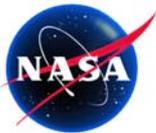
# UVOT Status

## (PSU, MSSL)



- UVOT/ICU Status (MSSL)
  - Performed High-Voltage (HV) Test May 12 With Release 8.1.1
  - ICU Rls 9 Loaded ~June 8 (12 Fixes)
    - Fixed problem found during 1<sup>st</sup> HV test
    - Ada kernel fix for Ada task hang problem (successfully supported 72 hour test)
    - Misc. enhancements (some safety related)
  - HV Test To Be Repeated After T/V With Release 9.1.1 (HV enabled, Flight RTSs)
- UVOT/DPU Status (PSU)
  - DPU Build 6a1 – no issues
- Top Issues
  - Pattern Has Been 10-20 UVOT/ICU (Ada) FSW Changes ~Every 2 Months
    - Problems found during HV test
    - Many enhancements but significant number deem safety related
  - UVOT Team Has Not Formally Validated Science Products Due to Manpower Issues
    - UVOT cannot generate valid science data at observatory but unclear as to what level of validation of science data products has been performed





# XRT Status (PSU)



- Status
  - Build 8.7 Loaded May 10
    - Restored inadvertent deletion of single LOC which altered Large Data (Science) Product format
- Top Issues
  - Team Has Not Formally Validated Science Products
  - PSU Does Not Have Resources To Support FSW Sustaining Engineering At PSU
    - All FSW expertise is at SwRI
    - Scientist who typically verifies FSW changes will not be at PSU post-launch

