|  |
| --- |
| Investigation: FIELDS |
| Progress accomplished this period: | April 2015 Reporting Period |
| 1. | Project Management |
|  | a. | Project Management* Supported review of the Phase D cost to complete proposal submitted in February. Contract mod is now in place.
* Prepared Phase E augmentation proposal (submitted 7 May)
* Compiled and submitted first round of “lessons learned” as requested
 |
| 2. | FIELDS Commissioning (Rau, Needell) |
|  |  | Observatory Commissioning Support (FIELDS)* Continued improvements to flight GSEOS display screens
* Continued FIELDS commissioning with SDP deployments and bias optimizations
* Began ADP Boom deployments
* Supported ADP SN08 deployment anomaly investigation
* Continued data review of FIELDS data
* Supported on-orbit EDI high voltage and FSW uploads
* Continued support of daily commissioning planning meetings with SOC/MOC

FIELDS Commissioning Status * OBS-1: FIELDS powered, Magnetometers deployed, ADP RE's deployed, SDP deployed to 57m, EDI HV tests proceeding nominally
* OBS-2: FIELDS powered, Magnetometers deployed, ADP RE's deployed, SDP deployed to 57m, EDI HV tests proceeding nominally
* OBS-3: FIELDS powered, Magnetometers deployed, ADP RE's deployed, SDP deployed to 57m, ADP+Z Boom fully deployed, ADP -Z deployed 12m (see issues), EDI HV tests proceeding nominally
* OBS-4: FIELDS powered, Magnetometers deployed, ADP RE's deployed, SDP deployed to 57m, EDI HV tests proceeding nominally
 |
| 3. | EDI Commissioning (Dors) |
|  |  | General* Refined commissioning plan with focus on 500eV (science-driven) and increased instrument operations by utilizing ATS.
* Generated, tested and delivered the scripts required for new commissioning activities up to and including EDI018.
* Supported all commissioning activities & processes related to EDI.
* Supported meetings including:
	+ Observatory Tactical Planning Meetings
	+ Observatory Strategic Planning Meetings
	+ IS Planning Meetings
	+ Activity Walk-Throughs

Status* All instruments are fully operational.
	+ Electron beams emitted, tracked, detected & decoded by all 8 GDUs.
	+ Instrument operations continued after contacts until 4Re HV safing.
	+ All engineering and science data is nominal.
* FSW build 8 loaded on all observatories.
* All observatories have completed EDI013.
* Some activities will not be performed on all observatories.  Not rescheduled -- no impact on commissioning or instrument characterization.
	+ MMS4 EDI009 (1keV): Comm Lock
	+ MMS2 EDI011 (1keV): Comm Lock
	+ MMS1 EDI012: Contact given to ADP
 |
| 4. | Science and Science Data Processing  |
|  |  | SWT and SWG (Torbert)* Participation in all science planning discussions.
* Post launch on-site participation at SOC in FIELDS and MMS commissioning and data processing activities

Science data processing activities* ALL
	+ Looking at data
* UNH
	+ Continued working on sample timing
	+ Added EDI L1A E Field software
	+ More automated processing now running at SDC
	+ Wrote scripts for reprocessing of data
	+ FIELDS real time displays updated for bias optimization
	+ Worked on EDI E field software
	+ Worked on combined E product software (with Cluster data)
* LPP
	+ Quality factor included in L1B and L2 data files
* UCLA
	+ Louise Lee continues to improve MagPy (Python based magnetic field analysis program). Now has same functionality as previous Unix-based programs
	+ Weekly Magnetometer Conference Webex telecons continues, every Wednesday at 8:00 AM Pacific Time. Participants include members of the fluxgate, search coil, and EDI teams
	+ Release of an update to the calibration files (version 0.3.0)
	+ Strangeway presented paper at the Measurement Techniques in Solar and Space Physics conference [“Magnetic Field Measurements on Spinning Spacecraft,” R. J. Strangeway, C. T. Russell, H. Leinweber, D. R. Pierce, K. M. Rowe, D. Leneman]. Included MMS magnetometer data in the presentation
* GSFC
	+ Created a routine to update CDF calibration files with results from the Orthogonalization process. Refined the format of the intermediate files that record the deltas.
	+ Bug fixes to OrthogonalizeFFT process: incorporated Hannes’ fix to the bug that was causing problems with second spin harmonic fits.
	+ Released first set of on-orbit AFG/DFG cal files.
	+ Released version 0.3.1 of the MMS Magnetometer Data Processing software and installed at SDC.
		- mms\_fg\_caldump utility to create formatted ASCII version of the CDF cal files.
		- Simplified interface to mms\_fg\_find\_files function (finds latest version for a files in a given timespan in directory hierarchy)
		- Spin phase smoothing.
	+ Validated spec for new MMS data server to be ready to get quotes.
	+ Worked on definition of new cal file that includes temperature corrections.
* IRFU
	+ Automated processing of L2\_ScPot and QL\_DCE at SDC.
	+ Implemented automatic sweep analysis.
* LASP
	+ Working on ADP software
 |
| 5. | EDI Flight Software |
|  |  | * Updated HK limit tables to allow higher LED currents on Gun deflectors
* Updated correlator table for determination of code clock dividers from magnetic field strength
* Refined Ambient Mode telemetry based on first results from Ambient Mode execution on all four observatories
* Generated load scripts for update of RTEMS and TABLES to build 008
* Loaded RTEMS build 008 and TABLES build 008 on all four observatories
* Executed Electric Field Mode on the observatories
* Ran Flight Software Acceptance Test
 |
|  |  |  |
| 6. | SDP (KTH, UNH) |

|  |  |  |
| --- | --- | --- |
|  |  | * Completed successful commissioning activities.
 |

|  |
| --- |
|  |
| 7. Problems encountered and updates this period |

|  |  |  |
| --- | --- | --- |
|  |  | ADP* ADP -Z boom on OBS-3 is not fully deployed and locked in position. Science performance is excellent. LASP and ATK are investigating in cooperation with all involved MMS parties.
 |

|  |  |  |
| --- | --- | --- |
|  |  |  |
| 8. Issues and Concerns |
|  |  | Science Data Processing Issues* LPP
	+ [new] Wrong sign on SCM L1A data: under investigation.
	+ [new] SCM data seems to be 10% lower than AFG/DFG data.
	+ Working with UNH and LASP to try to understand these two features. Currently looking into both at the DSP/SCM hardware level.
* GSFC
	+ Unresolved: No method to determine the latest version of a given file at SDC: everyone currently needs their own tool to determine latest version. Bromund will ask SOC to put this item on the DSWG agenda.
	+ I (Bromund) expect definitive attitude will come under a lot of scrutiny this upcoming month – I don't think it is as smooth as everyone is hoping it will be.

EDI* Comm lock concern has been alleviated with the focus on 500eV operations.
 |

|  |
| --- |
| Activities planned for next reporting period |
|  |  | Management |
|  |  |  | * Extend contract mods to subs wrt the Phase D cost to complete proposal submitted in February.
* Submit and support review of the FIELDS Phase E augmentation proposal (submitted 7 May)
* Continue weekly FIELDS Team meetings. Weekly forum remains useful for team tag-up. Agenda now focuses on commissioning and data processing activities.
* Support FIELDS commissioning and data processing teams as needed.
 |
| 1 |  | FIELDS Commissioning |
|  |  |  | * Continue improvements on flight GSEOS display screens for commissioning
* Continue FIELDS commissioning activities with ADP boom deployments
* Continue supporting daily commissioning planning discussions with SOC
* Continue FIELDS data review
* Continue general FIELDS systems engineering support
* Continue EDI support as needed
 |
| 2 |  | EDI Commissioning |
|  |  |  | * Complete EDI commissioning activities prior to eclipse break.
* Perform additional ambient mode measurements as schedule allows.
* Participate in FPI010 (MMS3 ambient mode operations from ATS).
* Prepare ATS commanding for autonomous operations following eclipse break.
 |
| 3 |  | Science |
|  |  |  | SWT and SWG (Torbert)* Continue on site participation in FIELDS and MMS commissioning and data processing activity at SOC
* Attend the SWG and SWT meetings

Science data processing plans * ALL
	+ Support SODAWG
* UNH
	+ Continue working on EDI E Field interfaces
	+ Work on RunEst software (for E Field and mag spin axis calibration)
	+ Continue work on scripting to control processing
	+ Continue L0 to L1 software updates as necessary
	+ Continue working on combined E and B products
	+ Work on error and warning management
* LPP
	+ [in progress] Analyze commissioning data.
	+ [in progress] Include CDF version number computation (vX.Y.Z):
		- [done] X: software version (increment with used software version)
		- [done] Y: calibration file version (increment if calibration changes)
		- [to do] Z: dataset version (0 is the default, increment if same vX.Y.Z already exists). Get the latest Z number from SDC. This has to be implemented in SCM software.
	+ L1B data will be delivered in both SCM123 and OMB reference frames as decided on the data processing group meeting, Iowa, March 2014
		- Option 1: At first, L1B will be delivered in SCM123 frame only. In case of misalignment, the transformation matrix from SCM123 to OMB will be used and data will then be delivered in OMB only in order to provide less disk space consuming files. So far, this matrix is set to identity: SCM123 and OMB are supposed to be the same reference frames.
		- Option 2: With the use of data compression inside the CDF files, we could save disk space even if SCM123 and OMB are the same: test CDF compression.
		- [in progress] We will start with option 2. If necessary, option 1 will be implemented during commissioning regarding flux gates data compared to SCM data.
* UCLA
	+ Continue developing in-flight calibration procedures – to be discussed at SWT
	+ Release further updates to the calibration files, including earth field comparisons, and updated orthogonalization parameters
	+ Complete end-to-end data flow from SDC to Mag team home institutions and back to SDC.
	+ Continued discussion on parameters to be included in future revisions of the calibration files. Specific discussions on the inclusion of thermal coefficients
	+ Continue data analysis software activities, including development of CDF to flatfile utility for MagPy program
	+ Complete installation of dedicated computer and disks for MMS magnetometer data processing
* GSFC
	+ Augment L2pre software to handle data overlap, fine timing corrections and/or filtering, temperature correction.
	+ Look into potential problems with sun pulse phase algorithm (pointed out by Tomas Nilsson). Find out if I can use sunpulse\_uniq. Assuming that the current DSS vs STS debate doesn’t make all this completely obsolete.
	+ Implement versioning scheme for L1B, QL, L2pre that is aware of changes in the calibration file input, in order to roll the ‘Y’ version number.
	+ Update appropriate documentation regarding more solidified decisions RE timing corrections, uncertainties and temperature correction coefficients.
	+ Investigate how to smooth attitude data, with LANL and FDOA.
	+ Attend SWT meeting in Boulder.
	+ Get quote for MMS data server and put in purchase order
* IRFU
	+ Implement correction for the disturbance caused by the ADPs shadowing SDP probes.
* LASP
	+ Continue improving DCE software
	+ Write the software that gives the calibration factor for a given bandwidth in order that Mark Chutter can calibrate E spectra.
 |
|  |  |  |  |
|  |  | EDI Flight Software |
|  |  |  | * Update Version Description Document
* Investigate effects seen in data from the observatories
	+ - Ratio of quality 0 to quality 1 data in Electric Field Mode
		- Initial time-of-flight variability after Electric Field Mode startup
* Test Electric Field Mode Telemetry: Packing Mode 1
* Fix lookup of signal-to-noise ratio thresholds
* Enable SOB task in Manual Mode to ensure Electric Field Mode has good defaults at startup
 |
|  |  |  |  |
|  |  |  |

\*\*\* end \*\*\*