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| Investigation: FIELDS |
| Progress accomplished this period: | May 2015 Reporting Period |
| 1. | Project Management |
|  | a. | Project Management* Extended contract mods to subs wrt the Phase D cost to complete proposals received in February.
* Supported reconciliation of the UNH contract value awarded in amendment #70 with actual costs through April 2014 plus ETC. A subsequent contract mod is now required to correct assumption errors in the Feb 2015 Cost to Complete Phase D proposal. The errors were limited to the computation of the UNH portion of the Phase A-D cost growth through Dec 2014.
* Submitted Phase E augmentation proposal.
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| 2. | FIELDS SE, Commissioning and Operations (Rau) |
|  |  | Observatory Commissioning Support (FIELDS)* Finished improvements to GSEOS display screens and commit to trunk
* Continued FIELDS commissioning with ADP Boom deployments and bias optimizations
* Supported OBS3 -Z ADP SN08 deployment anomaly investigation
* Supported on-orbit EDI high voltage testing
* Supported GDU power off for eclipse season
* Began remote support of future FIELDS commissioning activities
* Shipped ITF equipment from LASP to UNH
* Initiated weekly FIELDS operations planning meetings at UNH
* Continued data review of FIELDS data
* Continued support of daily commissioning planning meetings with SOC/MOC up till the eclipse break then weekly

FIELDS Status * OBS-1: FIELDS powered, Magnetometers deployed, ADP RE's deployed, ADP booms deployed, SDP booms deployed, EDI GDU's powered off
* OBS-2: FIELDS powered, Magnetometers deployed, ADP RE's deployed, ADP booms deployed, SDP booms deployed, EDI GDU's powered off
* OBS-3: FIELDS powered, Magnetometers deployed, ADP RE's deployed, ADP+Z Boom fully deployed, ADP -Z deployed 12m, SDP booms deployed, EDI GDU's powered off
* OBS-4: FIELDS powered, Magnetometers deployed, ADP RE's deployed, ADP booms deployed, SDP booms deployed, EDI GDU's powered off
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| 3. | EDI Commissioning (Dors) |
|  |  | * Scheduled commissioning activities are complete (EDI.001-EDI.018)
	+ All instruments are fully operational
	+ Skipped activities will not be performed
* Participated in MMS3 FPI.010.2 (Orbit 55)
	+ First time operation from ATS
	+ Recorded 500eV ambient measurements
* Added ambient data collection activities
	+ Utilized 12+ open opportunities in the commissioning schedule
	+ Data recorded from DSN contact to 4Re
	+ Measurements recorded during FLD.004 (Orbit 57)
	+ All 8 GDUs recorded concurrent ambient mode data in Orbit 59
* GDUs powered off for eclipse on Orbit 60
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| 4. | Science and Science Data Processing  |
|  |  | SWT and SWG (Torbert)* Participated in all science planning discussions.
* Participated at SWG and SWT meetings at LASP
* Continued participation in FIELDS and MMS commissioning and data processing activities
* Began preparing and submitting abstracts for upcoming conferences

Science data processing activities* ALL
	+ Looking at data
	+ Attend very productive SWT at LASP
	+ Several team members took SITL training
* UNH
	+ Continued working on sample timing
	+ Added EDI L1A ambient burst software
	+ Improved B and E Power Spectral Density software
	+ More scripts …
	+ FIELDS real time displays installed by ADP team
	+ Worked on EDI E field software
	+ Worked on combined E product software (with Cluster data)
* LPP
	+ Commissioning data analysis in progress: bug fixes, interferences investigation, SCM gain study.
	+ Quality factor improved for L1B and L2 data files.
	+ L1A data multiplied by -1 to take care of the wrong sign (see issues). Will be removed when issue is solved.
	+ Coordinate transformation from SCM123 (L1B) to GSE (L2) tested: bug fixes.
* UCLA
	+ Weekly Magnetometer Conference Webex telecons continue, every Wednesday. Start time changed to 8:30 AM Pacific Time. Participants include members of the fluxgate, search coil, and EDI teams.
	+ Most team members attended the Science Working Team meeting in Boulder. Very productive meeting. Major decisions made on content of calibration file. Various members of the team displayed their calibration parameter analysis tools. Examples include Earth field comparisons (Hannes Leinweber), and dynamic offset corrections (Ferdinand Plaschke, Werner Magnes, and Robert Strangeway). We were very pleased at how well the team worked together and the amount of calibration work and interference testing already done.
* GSFC
	+ Created IDL routine for generating AFG/DFG Quicklook plots.
	+ Transitioned to CDF version 3.6
	+ Began creating skeleton files for new format of calibration files.
	+ Got quotes for MMS data server and selected bid.
	+ Released version 0.3.2 of MMS Magnetometer Data Processing software
		- Fixes bug in mms\_fg\_l1b processing found by Mark when processing ‘brst’ files for the first time.
		- Installed at SDC.
* IRFU
	+ Made agreements about production of ACE data
	+ Improved DCE and Potential code
	+ Analyzing bias sweeps
* LASP
	+ Working on ADP software
	+ Analyzing bias sweeps
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| 5. | EDI Flight Software |
|  |  | * Updated Version Description Document
* Tested Electric Field Mode Telemetry: Packing Mode 1
* Fixed lookup of signal-to-noise ratio thresholds
* Enabled SOB task in Manual Mode to ensure Electric Field Mode has good defaults at startup
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| 6. Problems encountered and updates this period |

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|  |  | ADP Update* The -Z ADP boom on MMS-3 remains 97% deployed
* A +20°tilt maneuver is planned to warm the tip plate and, hopefully, fully extend the boom (8 Jun).
* A delta-V neutral maneuver within nominal operational thrusting limits is planned if needed during the tilt to attempt to “shake” the boom free (9 Jun).
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| 7. Issues and Concerns |
|  |  | Science Data Processing Issues* LPP
	+ Wrong sign on SCM L1A data: still under investigation.
	+ SCM data seems to be 10% lower than AFG/DFG data. [update] It seems it’s not always the case.
	+ Working with UNH and LASP to try to understand these two features. Currently looking into both at the DSP/SCM hardware level.
* GSFC
	+ Update: need to follow up with FDOA to see if they are done with commissioning and ready to discuss issues with definitive attitude (jitter and uneven sampling rate).
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| Activities planned for next reporting period |
| 1 |  | Management |
|  |  |  | * Support modification of contract value given errors identified in the Feb 2015 proposal and, subsequently, amendment #70.
* 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 operations, data processing and E-Field Conference activities.
* Support FIELDS operations and data processing teams as needed.
* Compile list of FIELDS team lessons learned (2nd round)
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| 2 |  | FIELDS SE, Commissioning and Operations (Rau) |
|  |  |  | * Support OBS3 -Z ADP deployment anomaly investigation and "There And Back Again" maneuver to attempt to free the boom
* Support Van Allen Probe to MMS alignment activities
* Swap AFG and DFG sample rates for a week
* Perform DFG DEC 64 test
* Perform SDP penumbra sweeps and eclipse SCM cals
* Support CIDP FSW reset and FIELDS 16Hz noise test during power up
* Resume daily commissioning and operations planning discussions with SOC
* Continue FIELDS data review
* Continue general FIELDS SE and operations support
* Continue EDI support as needed
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| 3 |  | EDI Commissioning |
|  |  |  | * VAP Conjunction participation: Orbit 92, June 12
* IS.007 Recovery from eclipse: Orbit 100, June 20
* FPI.010.2 Participation: Orbit 102, June 22
* FSW build 9 upload & verification
* Background instrument operations from ATS (ambient and electric field modes)
* Validation Campaign activities (Interference & Cross-Calibration)
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| 4 |  | Science |
|  |  |  | SWT and SWG (Torbert)* Continue support of FIELDS and MMS commissioning and data processing activity
* Participate in all science meetings
* Continue preparation of abstracts and papers for upcoming conferences

Science data processing plans (Chutter)* ALL
	+ Support SODAWG
* UNH
	+ Automate SCM L1B and L2 data production at SDC
	+ Continue working on timing
	+ Continue to explore interference issues and yet to be explained glitches
	+ 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
	+ Continue working on error and warning management
* LPP
	+ [in progress] Analyze commissioning data: bugs, interferences, coordinate transformation tests.
	+ [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.
	+ 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.
	+ [new] Study of how to include interference information (quality factor? caveats? separate file?)
* UCLA
	+ Continue developing in-flight calibration procedures
	+ 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.
	+ As part of the next calibration file release include extended parameter set, consisting of temperature coefficients for gains, reference temperature, coupling matrix, and offsets in nT. Also retain calibration parameters as angles for trending purposes
	+ 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
	+ Release v0.3.3 of MMS Magnetometer Data Processing software with fix to automatically smooth the spin phase information.
	+ 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.
* IRFU
	+ Implement correction for the disturbance caused by the ADPs shadowing SDP probes.
* LASP
	+ Continue improving DCE software
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| 5 |  | EDI Flight Software (Vaith) |
|  |  |  | * 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
* Implement improved burst mode telemetry for Electric Field Mode
* FSW Acceptance Test
* Generate and test load scripts for next FSW upload (build 009)
* Upload FSW build 009
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