Themis Software Task Priorities (In Play / In the Queue) - 4/11/08

Tim

1. Reprocessing of all overview plots. Restart automatically for smaller time periods. **Will send David status.**
1. Mods to scripts to support Jim L.'s Log File Processing tasks #2b and #2c. **QA Prep**.
1. Reprocess Ascii-L1 State once Jim M and Jim L give the word. **QA Prep**.
2. Cron Monitor for VC Processing (to send VC processing warning msgs to Tim and THEMIS_Science_Support)

~~2. Inventory of Products, monitoring and building new alarms for Production Data Processing.~~
~~Draft document produced.~~ Next version with Harald's info as well. **Info from Harald available?**
Send latest copy to David

2. 2hr plots: fitmoms, and overviews [Note: people are using the DARTs site because of this feature; this small fix will make the main site more friendly]. **Once Jim M is completed**
2. Tohban's need ACE data downloaded. Implement ACE data structure to be same as the rest of the THEMIS data.
3. ~~12 ASI drives, 10 off-loaded, 2 still to be done~~. **Create list of Inventory.**
3. Show mosaics with a fourth web button. [Right now nobody knows about them]. Clearly identify that "hour" click brings out mosaic. Add "5minute" feature to advance backward/forward. Fix buttons so that they are clear and not jumbled.
3. Location of Ground Magnetometers (From Pat) displayed on web site.
4. 20 Themis scripts review to optimize processing. (10% complete)
5. GOES 10-13 data into repository. Vassilis will initiate discussion with Howard Singer at NOAA, Tim and Jim.
6. MACCS mag data and Themis

Hannes

~~1. Determine for all the probes for all the days from start of the mission when the fgl issue (as described in Jim Lewis's list) occurred and a program that can be run monthly to determine if it has occurred again. to be completed by 3/7.~~

2. V03 - L2 State cdf.
    a. definitive attitude info - in progress

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    b. See email concerning parms ("thx_sci_mode", "thx_hsk_issr_mode")
    c. quality flag for FGM data
    d. spin model data (talk to Jim Lewis)

Jim L.

1. FGL issue. We have learned that FGL data from probes C, D and E has a 0.25 sec timing error, starting in summer 2007, and continuing to the present (Feb 2008) time. We would like to fix these timestamps in the L1 CDF files. Process should be generic so future corrections can be easily handled. Steps or tasks:
    a. Detect dates for each probe all the back to start of mission (Hannes)
    b. after #a completed, finalize correction file, changes into prod.
    c. Reprocess prod L 1 with corrected times. ** Go for it **

~~1. Log File Processing (in progress) due 4/4. BugzID=96, 97, 102, 107-109~~

1.L1 Mods and L0 and L1 Reprocessing to QA for v4.0 **QA Prep**
    a. QSAS, L1 State Reprocessing by Jim M. and Tim
    ~~b. SKTEditor issues with SPDF (issuing attributes in SST L1 CDF. BugzID=110)~~
    c. Possible additional fgl reprocessing. (in case Hannes finds new time intervals).
    d. Tim's mods to scripts to support new log file processing
    e. Reprocess all L1 cdf's from launch to 3/31 into QA and let Jim M. know.
    f. Copy from QA to Prod
    g. Coordinate with Tim to flip the switch and process April 1 through current in Prod

2. Update v3.02 QA Test Scripts for front end processing to incorporate any changes made by Tim and Jim L.
2. Perform v4.0 QA testing.

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3. L1 SST changes - **coordinate with Jim M.**
3. thm_load_state changes to load L1 spin model cdf by default.
3. See Michael to make any changes required for despin development for efi.
4. L1 File definitions Document. BugzID=xx. **Awaiting word doc from Amanda/David.**
4. thm_cotrans changed to use spin model instead of current method of interpolating spin period. Code will be reviewed with Hannes before testing begins. Once Jim completes his testing, Hannes will be asked to QA new functionality. BugzID=100.
4. Compress and Decompress routines for MOMs. BugzID=81, for Fields. BugzID=81.
   ~~All probes have patch and results look good.~~ More extensive test awaiting completion of the tail season.
5. Bfield mid-packet jumps.
6. L0 to L1 processing: look ahead to the next packet before processing the current packet. BugzID=67
6. FGS sample times and values, showing repeated timestamps. BugzID=113 (BugzID=67 must be done first)
7. FGM range changes in the mid packet. Post Proc maybe a solution to eliminate the spike. BugzID=44.
8. Provide Higher Cadence State Files - Spin period and spin phase - double precision. BugzID=91
9. Non Monotonic timestamps. BugzID=72
10. Latest ESA modes not yet implemented (BugzID=4) **Done?**
11. bau_sunpulse_met assumes x86 endiannes (BugzID=13)
12. FGL issue. We have learned that FGL data from probes C, D and E has a 0.25 sec timing error, starting in summer 2007, and continuing to the present (Feb 2008) time. We would like to fix these timestamps in the L1 CDF files. Process should be generic so future corrections can be easily handled. Low Priority steps or tasks:
    a. create a flag for the affected L1 variables somehow, to prevent confusion about which corrections have or have not yet been applied. So each entry in the proposed correction file should have some sort of tag identifying what the correction is, which could be looked up in the CDF as a variable, variable attribute, or global attribute. (low priority)
    b. Change L0-L1 code to take corrections into account. (low priority)

Jim M.

1. Mozaic Processing catching up on April 1,2008 as of 4/8/8. Verify the process works after catch-up.
1. MOM and FIT (Onboard) in separate L2 cdf, ESA L2 cdf with updated labels. **QA Prep** Left to do:
    a. New test files for MOM, ESA and FIT cdf's created, SPDF and QSAS notified. **Awaiting feedback**.
    ~~b. Generate test data for all L2 cdf's for David Sibeck for 11/7/7 that covers 1100-1200 UTC.~~
    c. Start reprocessing.
    d. User's Guide, Data Description list updates.
1. QSAS - Missing attribute **QA Prep**
    a. update master cdf's b. coordinate with Tim to reprocess Ascii-L1 Processing (2 processes)
1. L2 electron densities issue - **awaiting meeting with Davin and Jim McFadden**
1. **QA Prep**, IDL Geopack in V4.0, L2 QA Processing, L1 State reprocessing
1. QA Testing
2. GMAG Stack Plots - In progress few more Spikes, limits changed, reprocess. Add gmag 20 stations. BugzID=86. Due 4/11
2. 2hr plots: fitmoms, and overviews [Note: people are using the DARTs site because of this feature; this small fix will make the main site more friendly]. **Coordinate with Tim**

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3. A separate paragraph or couple sentences on each L2 cdf's that are available to the public.
3. Extraneous scmcal directory under L1 products (from Jim L.) BugzID=98.
3. FFT (onboard) L2 cdf
3. Decouple display variable types in the 'Choose Data widget' from the valid data types in thm_load_*. - Partially done.
3. Variable units – generic solution
   thm_load_spin.pro, thm_load_state.pro, thm_load_hsk.pro, thm_load_sst.pro
   thm_load_esa.pro, thm_load_bau.pro, thm_load_fgm.pro, thm_load_fbk.pro
   thm_load_fft.pro, thm_load_fit.pro, thm_load_scm.pro, thm_load_efi.pro
   thm_load_trg.pro, thm_load_asi.pro, thm_load_gmag.pro, thm_load_ask.pro
   thm_load_mom, thm_load_esa_pkt
4. If requesting 1 hour of data using timespan, then load data using one of our load data routines. Recommend if there is a fix at the load cdf level.
4. Themis SCM CAL File Processing - produce table of contents and assign sections with Patrick R. Turnover from Ken
5. Administrator's Guide
5. Themis Developers Guide
6. thm_load_mom changes
    a. reconcile mods with Davin at an appropriate time.
6. SST L2 cdf upgrades - coordinate with Jim L. (L1 cdf changes)
6. Overview plot change: mode bar seems thick (nothing we can do easily - low priority)
7. Extraneous scmcal directory under L1 products

L2 Product Status:
Completed: ESA, MOM, FIT (onboard), FBK, FGM, SST (needs upgrades), GMAG
Yet to be done: FFT (onboard), SCM, EFI, ASI (Harald)

Pat

1. Plots for Vassilis using the plotxyz routine.
    a. Write a routine that will generate a scalar field of average moment quantities over long periods of time. (1 month to the length of the mission) in progress
    b. Write a routine that will generate a gradient from this scalar field.
    c. Write a routine that calculates an instantaneous gradient by looking at differences between satellites when they pass close to each other and averages this gradient over long periods of time. (1 month to the length of the mission).
1. Probe = 'f' testing some bugs with Andreas. Mod made the thm_load_mom (On hold)
1. **Review existing QA Test Scripts and Suites**. Coordinate new scripts and suites with other IDL programmers.
1. v4.0 QA testing
2. IDL v7.0 - April when Release 4.0 of the Themis Software is QA'd.
2. Temporary IDL Geopack Cribs update (maybe **final awaiting** completion of Wind init routines).
2. executable crib for standardized Themis mapping ala plot below. thm_map_crib.pro
   Keywords[default]:trange[timespan],centerMLT[6:30],centerLAT[65deg], equatorial[0],neutral[0], probe['all'],gmags['all'],model['t89'],input=[2(kp=2)],fieldlines[1]
   Note: equatorial also shows equatorial trace, neutral also finds and plots neutral sheet
2. fix "makeps". Attached is a "fixed" version which plots what user sees on screen without much reshaping. This is good for publications.
   Also, plotxy and plotxyz bug fixed for postscripts yet postscript issues with plotxyz.
3. wavepol.pro and twavepol.pro - When cribs from Chris Cully, Bob Strangeway, and others received, condense cribs and add to the distribution.
    ~~a. Check in Kaori's crib~~ **b) What to do with what Olivier sent?**
3. add a function to the distribution called tdexists(varname(s),startime,endtime) It would return true if there was data on the interval and false if not.
3. VMO Deliverables: data product description files (only L2 data goes to VMO)
   a. Review FGM SPASE numerical data and instrument files for all probes - Initial review completed. Will revisit to confirm correctness.
   b. Review Ephemeris SPASE numerical data instrument files for all probes - Initial review completed. Will revisit to confirm correctness.
   c. Draft of the esa numerical data file, ~~the esa instrument file, and a person file for James McFadden.~~ The two esa files are for Themis A, but I think because the other spacecraft data types are very similar it will be easy to generate the other spacecraft after the first. Mods to be made to data file based upon VMO feedback. Second draft generated and **awaiting feedback**. Then generate one file per probe.

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   d. Review Observatory files for all probes and the person file for Themis.
   e Generate an instrument file for Thermal Plasma measurements(Moment Temperature) then numerical data files for this quantity for each probe, repeat this process for other moments.
   f Generate an instrument file for EFI or SCM and corresponding numerical data files for each probe.
4. Mini language to operate on tplot variables - first provide concept write up
5. boundary normal coordinates. On Hold. BugzID=59.
6. Christine's code to rotate the XY coord's along Earth direction was very effective. Also it was used by others. We need to streamline it, and it’s very similar to the others you've already written.
6. Tplot auto scaling. BugzID=41.
6. invalid inputs to the version keyword
7. Clean-up of makepng and makegif
7. General Routine 'Add magnitude' vector - adding it's magnitude in it's structure. 4 vectors, colors=BGRB.

VMO Product Status:
Completed: FGM, State, ESA (second draft - one probe)
Yet to be done: MOM, FIT (onboard), FBK, SST, GMAG, FFT (onboard), SCM, EFI, ASI

Bryan

1. ~~Add normalize keyword.~~ Update crib.
1. Fix bug found by Wen Li that doesn't plot angle/energy plots when only 1 energy channel selected.
1. Updates to QA Test Scripts and Test Suites.
1. v4.0 QA Testing

~~2. Diagnose zeros at angle range boundaries of peer pitch angle plots 4/2~~

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3. Tplot issue with angle mode changes. Since tplot only works with square arrays, it can't plot a time range that contains an angle mode change in which the number and distribution of the angles (y-axis) changes. The user is forced to limit the timerange that contains only the angle mode in which they're most interested. 4/3
4. Overplotting of not just lines and spectra, but also spectra over spectra. This means that the gap would be filled if another plot is below it. This way the data would not have to be merged, just tplot has to account for gaps and plot them as true gaps. (Submitted by Vladimir)
   Due date to be determined after consult with Vassilis.
6. thm_load_state - phase I
   a. hardcode (units = "km/s" or "km", or "deg") b. finish "no_update" loading option (consult with Davin)
   c. Finishing the coordinate transformation of the thm_load_state data at input, to include transformation of spinaxis attitude, need to determine keyword switch, implement the rotation of the spinaxis elevation/azimuth from gei to arbitrary coordinates (consult with Pat, Vassilis and Ken)
   d. minor bug found by Pat (email of 2/15/08)
7. thm_load_state - phase II (consult with Ken)
   a. For STATE CDF files, the following variable attributes should be defined, consistent with they way they are defined in the L2 FGM file: units, coordinate_system (consult with Jim L.)
   b. Once defined in the CDF, thm_load_state should take the values from the dlimits.cdf.vatt to set the metadata for the tplot variables: dlimits.data_att.units, dlimits.data_att.coord_sys
   c. For thm_load_state, the suffix gets added to support data, but support data is not transformed: if you call thm_load_state, coord='gse', suffix='_gse', /get_support_data only the pos and vel get transformed, but all get the _gse suffix.
   d. in thm_load_state, the code to delete support data that was loaded for coordinate transformation should be just del_data, '*_state_temp' e. THC braid photoelectrons
8. upgrade thm_load to work with probe assignments
9. move functionality of thm_load_state2 into thm_load_state and delete thm_load_state2
10. Multiple enhancements concerning keywords, valid_names and thm_load routines

Michael

1. Updates to QA Test Scripts and Test Suites.
1. v4.0 QA Testing
2 Incorporate the new *satellite-dependent* EDC offsets (E12 and E34 only -- E56 is not needed) into the calibration files. In progress.
3. Make code to read time-dependent calibration files (in progress).
4. Make calibration files time-dependent. I will need these numbers from J. B., or instructions/code for producing them. (needed to allow user to use #3)
5. Get voltage offsets from J. B. (he has to pull bench-testing data).
6. Get EAC offsets from J.B. -- this *cannot* be done until AC-coupled data is taken.

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6. **Talk to John for next phase of tasks**
7. Currently the GUI has the load SCM routine applied with the option without cleanup. As a first step we need to perform the calibration as default at the time of introducing the data, with the command thm_load_scm, such that the default output will be in dsl, calibrated data, with full cleanup. The defaults are provided.
   Olivier to check defaults. This would make it compatible with FGM.
8. Build an informational widget.
   a) (From Jim M.) Break THM_UI_SHOW_DLIM.PRO out of THM_GUI.PRO to use as a stand-alone routine. - Make the name of the displayed sub-structure(s) a parameter. (low priority)

Hithesh

1. Moments triggering off of the density and pressure for the day side. - the following tests have been run (will be patch v4b):
   a. Check if the moment start address was moving along 212Bytes.
   b. Check the data in the moment packets. check the ion density in the Trigger table.
   c. Vary the ESA pulser and look for changes in ion density in the trigger table.
   d. Repeat test on Flatsat once again
   e. Analyze actual flatsat data for anomalies. John M. will check the plots.
2. Setup for v5 of the FSW with the following patches to date and test on Flatsat:
   patch 42 - patch bkg module for fgm sample timing change
   patch 43 - add etckicker to the code
   patch 44 - software to fix huffman compressor (256-byte was compressed not raw)
   patch 45 - patches version 4.5 software to correct moment tracking software.
   patch 46 - modify the ion density trigger function
   patch 47 - improve command clock transfer timing
   improve command responsiveness in compression
   improve sc potential calculation timing
   patch 48 - improve sc potential calculation timing (pfr-810)
   remove false triggers (pfr-812)
   remove orphan wave bursts (pfr-815)
   patch 49 - improve 1m bps telemetry (pfr-818)
   patch 4a - new compression algorithms 441,443,453 (pfr-820)
   new sst attenuator calculation (prf-819)

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3. Discuss with Peter the next set of tasks for the FSW training.
4. Discuss any questions with Peter - ongoing

Cindy

1. GUI Mods to be included in v4.0 (to be committed on 4/9)
    a. Save Ascii - add checking code after return from tplot (in progress)
    b~~. No dialogue box appears for save ASCII, no file location in msg box, add progress msg~~
    c. Add a pop-up to allow people to set the xsize and ysize for the postscript output. This can be implemented in the same manner that we do the window size pop up in thm_ui_call_tplot.pro. Then the xsize and ysize parameters can be added as keywords in the popen call in the plotting block. Allow inout in centimeters.- testing in progress
2. Updates to QA Test Scripts and Test Suites, GUI Help Tutorial, Themis Users Guide
3. v4.0 QA Testing

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4. Button for Multi-Probe B field panels
4. Currently the GUI has the load SCM routine applied with the option without cleanup. As a second step we need
   to fix the GUI to allow the user to tweak the calibration options. Before introducing the SCM data a window should pop up, that has all the options below listed, with their defaults inserted. The user would then either click OK, or modify the calibration options before clicking OK. Then the user can click the button to introduce the data.
5. Develop functionality of Splash into Themis Gui
6. Gui Mods - Mac (David Sibeck's machine from Ken)
    a. The time span entered on the main window should be the default time span for tplotting. Specifically, if you change the timespan on the main window, the tplot timespan is unchanged.
    b. tlimits does not work from the cursor when run from the GUI.. tlimits with the cursor works from the command line.
    c. when selecting data, L1 and L2 can be selected at the same time and the result was confusing. since the low-level commands can only load one or the other, the GUI interface should enforce the same restriction.
    d. the script output does not match the standard crib sheets: e.g. you don't see thm_load_fgm anywhere in the script. so you need a new document to describe to people how to modify scripts made with the GUI...or you need to change the GUI to follow the crib sheets...or just live with it..
7. Additional GUI Mods - Phase II
    a. See email with history file ...231920 abort.
    b Upper flatfile button (for Vassilis, work with Kate / UCLA Splash)
    c Add new coord transf options to SM, GSM and GEO into GUI
    d. buttons on overview plot sub widget for fgm, esa and sst Tohban plots
8. Additional GUI Mods - Phase III
    a. current plot window - tell you which one (for UCLA)
    b. Lower flatfile button (for Vassilis / Chris Russell)
    c. Label S/C Position button (GSE or GSN - default) (for UCLA)
    d. De-Gap widget add units
    e. DP - Delete or Overview Plot or Clear History - warning message
    f. Long Variable Names truncated in IDL-D

Vladimir

~~1. Solar Wind IDL. Make modular.~~

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2. Tony Lui asked to review Solar Wind code.
3. Larry Kepko asked to review Outlier Removal code and Transformation to the boundary-normal coordinates.

Davin

1. Pressure calibration issue - factor of 100 difference between ps?f_density and ps_m_density for all probes.
2. Sun Pulse Contamination not removed. Low Priority

Scientist IDL Code Review

1.. get_sw_data.pro (Vladimir) - Jennifer reviewed?

Harald

1. Validate Tsygenko work from Pat **(March 2008)**

Andreas

1. L2 File Definitions Document - awaiting L1 document to be completed to use as template.

UCLA

1. Clean-up the power ripples from the FGM data. (Krishan). Awaiting new programmer

Christian Jacquey and Thomas Moreau

1. Converging toward our primary goal, i.e., to interface the THEMIS data with the CL software. It is almost finish for the ESA data, some details are now being fixed and then we will go to the SST data.
   a. Themis data are correctly interfaced with the CL software which is now performing similar plots as tdas products, for both ESA and SST sensors. We're currently analyzing different data collection period and cross-checking with the tdas results in order to fully validate CL reliability.
   b. We're also analyzing the pertinence of the particle measurements together with the spacecraft potential that is done within the L2 CDF files. We'll let you know about these exams.
   c. In middle terms, we plan to study the combination of both SST and ESA data for -maybe- producing data or visualization products using both instrument. Vassilis made us aware that similar effort is underway on your side. We will communicate with you when it will be started.
2. L1 ESA CDF and thm_load_esa
   a) define and write a new skeleton cdf file that would be use as a data model for producing the new CDF ESA L1 files. This task needs to reconstruct entirely the skeleton of the CDF ESA L1 data file based on the IDL structure's content of the Jim's L0 code.
   b) submit skeleton together with a text file listing all items contained within the new model to Jim Lewis for feedback and validation. **Done.**
   c) Develop the code assigned to create and read L1 ESA cdf files. 3-4 weeks should be sufficient.
   2-c. This task is in wait of the validation of the skeleton. Reading code will be written right after getting confirmation of the content of the skeleton. We hope to clear up some of these tasks status.
   d) From Jim L. ESA packet loading routines use depreciated spinmodel.txt BugzID=101

Software Tasks To Be Discussed (TBD) / To Be Assigned (TBA)

1. TBA - Data contain engineering, deployment, maneuver, and science data are in the same stream.
   From the data description, only maneuver flag state_man is provided. Do you provide information about the time intervals when the data are on, say, engineering level? This data, though valuable in many respects, may be confusing if interpreted as science data. To provide such information, it is possible, for example, to add some bits to existing state_man flag. (from Vladimir)

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2. TBA - Tplot User's Guide (David and Vassilis to talk further)
3. TBD - print, dprint, msg continue, verbose options for a standard
4. TBD - Mini Language to operate on tplot variables
5. TBD - Tplot FAQ's (Amanda) Maybe replaced by #1
6. TBD - Mull over: Allow Tplot: overplot color spectra, multiple angles, variable angles.
7. Hold - Spin modeling during shadows (BugzID=43)
8. Hold - Separate E and B timestamps for spin fits (BugzID=45)
9. Hold - Refactor repeated CDF library code in CDF processing tools (BugzID=50)
10. Hold - Bugzilla enhancements: Graphical charts and graphs don't work (BugzID=7)
    Extend Platform/OS options (BugzID=73)
11. Hold - str_element does not add to embedded structures (BugzID=69)
12. Hold - TDAS does not use L1 spin model cdf by default, yet available via thm_load_state (BugzID=99)