Software Task Priorities (In Play / In the Queue) - 3/10/08

Jim L.

1. 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.
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.
   d. f. **Inform Jim M. so he can do a separate reprocessing of L2.**
   e. 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)
   f. Change L0-L1 code to take corrections into account. (low priority)
1. Feedback on the skeleton of the CDF ESA L1 data file based on the IDL structure's content of the Jim's L0 code due to Thomas. due date 3/14
1. Add feedback suggestions from Andreas to Tohban Info and send to David for turnover to Jonathan. due 3/10.
2. Log File Processing (in progress) due 3/21
   a. Issue a log msg for any VC files which contain mixed SCIDs or otherwise invalid transfer frames.
   b. Each processing script should, at the very least, take a command-line option specifying a log file where sufficiently-important messages can be written.
   c. Log message format is TBD, but should probably include:
      1) wall clock date/time when the log message was generated
      2) A file or directory name identify the input data that provoked the msg
      3) A severity field (e.g. "info", "warning", "critical")
   d. Modify lzp_wrapper and process_lzp_dir scripts. BugzID=49.
   e. Clean-up current VC->L0 processing scripts temporary files. BugzID=50.
   f. Unexpected transfer frames time matched packet time yet in the past. BugzID=38.

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2. L1 SST changes - **coordinate with Jim M.**
2. thm_load_state changes to load L1 spin model cdf by default.
2. See Michael to make any changes required for despin development for efi.
2. 2007 Reprocessing for R-S errors (probably HKP not SCI)
2. L1 File definitions Document. BugzID=xx. **Awaiting word doc from Amanda/David.**
2. thm_cotrans changed to use spin model instead of current method of interpolating spin period. Code will be review with Hannes before testing begins. Once Jim completes his testing Hannes will be asked to QA new functionality.
2. Bfield mid-packet jumps.
3. Help out with Compression Flatsat Testing
3. L0 to L1 processing: look ahead to the next packet before processing the current packet. BugzID=67
4. FGM range changes in the mid packet. Post Proc maybe a solution to eliminate the spike. BugzID=44.
5. Provide Higher Cadence State Files - Spin period and spin phase - double precision. BugzID=91
6. Non Monotonic timestamps. BugzID=72

Jim M.

1. Mozaic Processing catching up. Catch-up expected by tbd? **On January 27th. Jim will talk with Tim about fast, new computer.** Verify the process works after catch-up.
1. MOM and FIT (Onboard) in separate L2 cdf, ESA L2 cdf with updated labels. Left to do:
    a. New test files for MOM, ESA and FIT test cdf's created, notify SPDF and QSAS. **Awaiting feedback.**
    b. Start reprocessing.
    c. User's Guide, Data Description list updates.
1. Reprocess all overview plot data
    a. Implement Moment Overviews - failure reported, analysis to be performed
    b. Start Reprocessing.
1. A separate paragraph or couple sentences on each L2 cdf's that are available to the public.

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1. SST L2 cdf upgrades - coordinate with Jim L. (L1 cdf changes)
1. thm_load_esa changes
   a. Add coord labels to thm_load_esa: Thm_load_esa should properly label the coordinate system of any 3-d data in the dlimits structure.
2. "th?_fgs_sigma" and "th?_efs_sigma" already in L1 CDFs per Jim L. and need to be copied into L2 cdfs.
2. L2 Reprocessing
   a. Of the 311(!) files that weren't processed, 292 were missed because there is no longer an L1 file present for the appropriate date and instrument. (There must have been files there at some point, though.)
   b. Of the those files, 18 are FGM files in the time period 2007-04-26 to 2007-05-01. The current L2 process ignores those dates, I believe, because there were issues with the coordinate transforms. I guess that I need to revisit this issue.
   c. The other one is thb_l1_esa_20071128_v01.cdf. This is odd -- since it had been reprocessed on 25-Dec, and nothing changed in the ESA code between then and this last reprocessing.
2. thm_load_mom changes
   ~~a. Add coord labels to thm_load_mom: Thm_load_mom should properly label the coordinate system of any 3-d data in the dlimits structure.~~
   ~~b. read mom l2 cdf's~~
   ~~c. thm_load_mom's datatype keyword should be implemented~~
   d. reconcile mods with Davin
2. Decouple display variable types in the 'Choose Data widget' from the valid data types in thm_load_*.
2. ESA and SST Tohban plots
3. Review Patches for CDF's to increase speed
3. Overview plot change: mode bar seems thick (nothing we can do easily - low priority)
3. Administrator's Guide, Virtual Machine
4. GUI Mods
    a. Save Ascii - fix precision, add header (with Pat for UCLA)
    b. button for postscripts (for Stephen Mende)
    c. thm_ui_config bug found by Davin
    d. No dialogue box appears for save ASCII, no file location in msg box
    e. See email with history file ...231920 abort.
    f. Upper flatfile button (for Vassilis, work with Kate / UCLA Splash)
    g. Add new coord transf options to SM, GSM and GEO into GUI
    h. buttons on overview plot sub widget for fgm, esa and sst Tohban plots

Jim M. (continued)

5. GUI Mods
    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

Tim

1. Email U. Alberta:
    a. What is the status of the other station's cdf's (other than the 5 they are sending) UCLA gmag format.
    b. Status of KUJJ and SNJQ
1. Review Mirror site processing - see if Austria can get there data for mirroring from France. **Austria awaiting direction from UCB.**
1. 20 Themis scripts review to optimize processing.
1. Review with Jim M. Themis processing and recommend new hardware. Discuss with Jon Loran by 3/21 and discuss 3/25.
1. When Jim M. finishes his part install Moments Overviews (from Pat) link on the web site – Select Type on the Summary Web Page drop down Menu (ESA Ground MOMS, ESA Onboard MOMS)
1. Inventory of Products, monitoring and building new alarms for Production Data Processing.
1. 12 ASI drives, 10 off-loaded, 2 still to be done.

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1. Support Amanda with Web Page updates as follows:
    ~~a. update the beta web site to be identical to the official web site if they are currently not in sync.~~
    b. Making a change to the beta site
    c. Transfer mod from the beta site to the official site
2. High Pass filter function few tweaks left to do.
2. tsmooth2 needs to accept a time keyword (say, seconds) rather than # of points. (for Vassilis, Davin)
3. GMAG Stack Plots - In progress few more Spikes, limits changed, reprocess. BugzID=86

Pat

1. Structure V not defined. **Awaiting** direction from Vassilis whether to check out Cotrans code.
1. VMO Deliverables: data product description files
   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 datatypes are very similiar it will be easy to generate the other spacecraft after the first.
   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.
   g. *Cease doing VMO for a bit.*
2. 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

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2. IDL v7.0 - April when Release 4.0 of the Themis Software is QA'd.
2. Mini language to operate on tplot variables - first provide concept write up
3. boundary normal coordinates. On Hold. BugzID=59.
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~~
4. 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.
4. Tplot auto scaling. BugzID=41.
4. invalid inputs to the version keyword
4. Clean-up of makepng and makegif

Bryan

1. Add ability to calculate pitch angular spectrum
   a. incorporate fac_matrix_make and tvector_rotate
      ~~1. Copy fac_matrix_make to new file, thm_fac_matrix_make, and modify to handle DSL coordinates for FAC-Xgse matrix generation and rotation~~
      2. Re-code thm_part_moments2 to calculate pitch angle spectra using theta spectra algo. due 3/13
         Add ability to calculate gyro phase angular spectrum (in parallel with pitch angle development)
         Fix a bug that causes the code to bomb when a phi range is specified for theta spectrograms.
   b. allow angle bins to be broken down into smaller (user defined) sub-binsdue 3/11

~~2. Finish modifying thm_fac_matrix_make to handle DSL coordinates for Rgeo, Ygeo, and Ysm options.~~

2. Add demonstration of thm_fac_matrix_make to thm_crib_fac. due 3/14

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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.
   Need info from Davin.
3. Add ability to convert to GSM coordinates (requested by Kaori)
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)
4. 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)
4. 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
4. upgrade thm_load to work with probe assignments
5. move functionality of thm_load_state2 into thm_load_state and delete thm_load_state2
6. Multiple enhancements concerning keywords, valid_names and thm_load routines

Michael

1. Develop a prototype version of the EFI calibration (gain, offset, and despinning) algorithm from Chris Cully's v.2 code. To become a subset of THM_CAL_EFI.PRO
   a. Write a working version that generates diagnostic plots per J. Bonnell's specs.
      v.2 of this (plots and code). One change that Michael will talkto John about. **Need clarity with John whether complete..**
   b. Determine if the SCM generic despin routine should be used for efi.
      i. Compare and contrast SCM and C. C. despin, stepping through Ken's code in progress. 3/10 to complete. One item to verify and **C.C. despin algorithm will be used.**
      ii. **Review results to John. B/others to get a decision**.
   c. Incorporate subtraction/correction code into LOAD/CAL suite. Will be worked later after prototype has reached some level of maturity. (**Awaiting John's direction to start)**
2. Modify existing EFI calibration routines.
   a. Document offsets and corrections in data attributes structure. Additional changes in progress. BugzID=106.
      ~~1. Required subtask: Fill the new attributes from EFI calib. files via THM_GET_EFI_CAL_PARS.PRO (modify passed structure).~~
      ~~2. Req. subtask: Introduce "probes" param., and FILE_RETIEVE() mechanism to THM_GET_EFI_CAL_PARS.PRO.~~
      3. Minor modifications to make on THM_CAL_EFI.PRO and/or THM_GET_EFI_CAL_PARS.PRO and then John will approve all changes together for #2a.
   b. Implement time-dependent EFI calibration parameters. **Awaiting John. B.'s request to start**.
3. ~~Req. subtask: replicate cal. files for each satellite~~. Unique manual generated calibration files to be setup for each probe. **See #2a.**
4. Investigate Ez=0 and E dot B=0 sections of THM_CAL_EFI.PRO for correctness.
5. Correlation and dynamic correlation code: include these 2 routines and make a wrapper that works with tplot variables (and possibly interpolation if necessary). Scientist - Vassilis, Peer Review - Jim M. and David
5. 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)
5. Vladimir Help Request
   a. fit efs data as zeroes for the dates 2007/3/21 - 28. Isn't it better to put there fill values if you do not have measurements?
   b. It would be good to be consistent with the fill values and use the same everywhere - NaN or 0 or 1.e31. Generally, it is better to use a number as this is a standard everywhere else.
5. SVD-FIT instead of POLY-FIT - from Vladimir

Hithesh

1. Discuss any questions with Peter - ongoing
3. Moments triggering off of the density and pressure for the day side. - In progress - Sorting out task. For 3/14 generate list of sub tasks and an estimated date for completion.

Vladimir

1. Solar Wind IDL _ Make modular.
1. Magnetopause Coordinates
   Zero order step to create pre-processed solar wind data
      Awaiting Vassilis's review of Solar Wind crib and code
2. Shue MP routine
3. Outlier Routine awaiting Vassilis Review
3. Help Requests from Vladimir
   a. fit efs data as zeroes for the dates 2007/3/21 - 28. Isn't it better to put there fill values if you do not have measurements? - assigned to Jim McTiernan
   b. It would be good to be consistent with the fill values and use the same everywhere - NaN or 0 or 1.e31. Generally, it is better to use a number as this is a standard everywhere else. (Jim M.)
   c. 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. -assigned to Bryan

Davin

1. Pressure calibration issue - factor of 100 difference between ps?f_density and ps_m_density for all probes.
1.. thm_load_sst issue - update the code when data not available. Jim M to email date and probe.
3. Sun Pulse Contamination not removed.
4. Calibration of 'D' and 'E' extra 10-30% ESA MOM's.
5. SST Attenuator - ???

Vassilis

1. Check out Outlier routine, LMN and Solar Wind crib and code from Vladimir.
2. See Christian Jacquey #3

Harald

1. Validate Tsygenko work from Pat (Feb-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 by 1/22.
   2-a and 2-b. We're still iterating over the skeleton of the L1 ESA CDF data file, and hope to converge sooner (we're waiting for the Jim's feedbacks after delivering a new version of skeleton).
   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.

Ken

1. thm_cal_scm bug using a special Fmax error msg Variable undefined F2.
2. Send David list of GUI bugs
3. Themis SCM CAL File Processing - produce table of contents and assign sections with Patrick R.
4. Themis System Administrators Guide
5. Themis Developers Guide
6. If requesting 1 hour of data using timespan, then load data using one of our load data routines, the load Recommend if there is a fix at the load cdf level.

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

1. TBD - print, dprint, msg continue, verbose options for a standard
2. TBD - Mini Language to operate on tplot variables
3. TBA - Tplot FAQ's (Amanda)
4. TBD - Test Suite to test despin - from Science Team
5. 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)