Themis Software Task Priorities (In Play / In the Queue) - 03/27/09

To Be Discussed - Top of Meeting

1. Data and Misc Issues
    a. ESA and SST Mode Changes
2. Jim McFadden
    a. Wiki Operational Changes (David to resend to Jim)
3. Davin
    a. Enhanced SST and MOM Instrument Web Pages (post code check-in)
4. Harald
    a. The THEMIS movies are now up to date and finished until 02-22 10:00. There will be a ~4 days delay because we wait with the mosaic generation until we are sure that all the station data have been transmitted.
    b. Mosaic reprocessing post-February 2008 (Full Resolution) on hold.
    c. RANK: Tim: I reprocessed the Rankin Inlet CDFs since July 08, and reprocessed the stacks up through 1jan09. I'm waiting to reprocess the 09 stacks until all of the ftSmith data is in.
    d. L2 ASI cdf's
    e. When L2 ASI available Quality Flags and History Status?
5. James Weygand (student) - Greenland data total magnetic field is only about 250 nT even if no baseline subtracted (from Harald). Waiting for student to have time.
6. John
    a. Enhanced EFI Instrument Web Pages (eta March)
    b. Wiki Operational Changes (eta March)
    c. QA analysis on changed results
7. Uli
    a. Enhanced FGM Instrument Web Pages (done)
8. Olivier
    a. Enhanced SCM Instrument Web Pages (done)
9. Chris Cully
    a. Enhanced FBK, FFT and FIT Instrument Web Pages (eta March 2009)
10. Chris Russell
    a. Enhanced GMAG Instrument Web Pages (talked to Chris 2/24 - no earlier than April)
11. Web
12. To be assigned
    a. J. Kissinger's cotrans routine (from GSE to SSE coordinates)

Tim

1. FGM Calibration files into production and reprocess Probe 'A' from 11/15/8 and 'E' from 2/7/9.
1. write-up ideas concerning Themis Data Download issue
1. Support Mirror Sites: a. Japan (ISAS) b. Austria c. France (**Rumi** - not always up to date for gmags)
   d. UCLA – mirror site set-up: Status: UCB sent 08T UCLA loaded 06T
   empty bricks - Tim working on getting next two ready
   UCLA will need to supply SSH key - RSYNC Key
1. Support gmag data remote sites:
   a. Augsburg (MACC's) - cdf generation
   b. Japan - made contact
   c. Alberta d. APL e. Greenland - cdf generation
1. U Alaska Netcdf's
2. ~~From Harald: The movie selection on the summary plots has only the options -10 and +10 minutes. Would you please also add the -1 and +1 hour options. That will make navigation easier.~~
2. Web related tasks:
   a. ASI and GMAG Site Maps with cursor positioning invoking chart info. Next Version completed
   Later Release: There was a request to make the links the same color as the icon/markers. The javascript was getting complicated enough with the new features and I decided to put that off for a later version. You can always click selections on/off to remind yourself what's what. Plus, just click on any icon and a pop-up will occur describing the site. Put onto official site (with Amanda) to new ASI web page.
3. Script to Create Greenland CDF's - awaiting Jim M IDL routine.
4. Inventory of Data Files available is being enhanced.
4. 20 Themis scripts review to optimize processing. (40% complete)
5. ~~Inventory of Products, monitoring and building new alarms for Production Data Processing. Draft document produced.~~ Next version with Harald's info as well. (On Hold)
6. Create checksum files for ~~gmag (completed)~~, ASI then Probe files.

Hannes

1. V03 State – Generate V03 cdfs. Job to be automated at UCB to run every two weeks.
   Job to create is running.
   Note: Maybe changes to V03 STATE calibrations after conference in Germany end of June.
1. New FGM offsets for tail season.
2. L2 State cdf
   a. See email concerning parms ("thx_sci_mode", "thx_hsk_issr_mode") sci_mode - know fast survey issr_mode - when IDPU thinks fast survey b. quality flag for FGM data - talk to Uli
3. Spin Axis offsets – Improve the new spin axis offsets calibration routine – In progress. A new technique has been developed for inside magnetosphere with high accuracy. Once complete a paper to be published. Sent data to Karl Heinz, included in the distribution.

Jim L.

1. GOES 10-12 Test data: in progress - Jim L awaiting feedback from Howard. eta (except gui interface) 3/20
   a. ~~Set-up data directories and load data from NOAA~~ ~~b. Create script to read data and write L2 cdf~~
   c. create read to cdf routine so plots can be created -in progress d. load cdf routine
   e. master cdf fixes and reprocessing f. acquire ephemeris for each satellite master cdf g. gui interface
2. Tool - dump #407 packet
3. V03-L2 cdf STATE
   a. changes to tdas spin model routines to use spin phase offset provided by Hannes for V03 State.
   b. Work with Hannes to independently verify V03 QA State cdf's from reprocessed STATE files (#1c)
3. SCW Minima's - review back real data as of impact to compression bug (Compression issue analysis)
4. STATE Web Page (s)
4. L1 File definitions Document. BugzID=xx.
4. bad timing sun pulse times (early January 2009)
5. IDL v7.0 on the Mac
5. SKTEditor - issues with L1 cdf's. Will compile List
5. L1 Data Processing History Info: SCM, EFI, STATE
6. FGM range changes in the mid packet. Post Proc maybe a solution to eliminate the spike. BugzID=44.
   Bfield mid-packet jumps.
6. Refactor repeated CDF library code in CDF processing tools BugZid=50
7. L0 to L1 processing: look ahead to the next packet before processing the current packet. BugzID=67
7. Repeated timestamps and gaps in spin fit data BugZid=113 (#67 may fix this one as well).
8. Create a more efficient & productive prototype QA Instrument Command Line Script - first template (s)
   functional blocks then scripts for FGM, ASK, SCM, FIT, MOM, ASI, EFI, FFT, FBK, Gmag, State, SST, ESA
8. Separate E and B timestamps for spin fits
   a) make a revised V02 master CDF with E and B separated
   b) change thm_load_fit to support V01 and V02 of the L1 CDFs c) change the L0->L1 processing code
   d) change the L1->L2 processing code e) test the changes, then reprocess to create the V02 CDFs
   (keeping the V01 files around for a while to ease the transition) BugzID=45
9. FGS sample times and values, showing repeated timestamps. BugzID=113 (BugzID=67 must be done first)
10. Non Monotonic timestamps. BugzID=72
11. Latest ESA modes not yet implemented (BugzID=4) (Hold until sent to Probes)
12. bau_sunpulse_met assumes x86 endiannes (BugzID=13)
13. 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)
14. "Phantom packets" cause non-monotonic distribution times. BugzID=25, low priority.
15. Evaluate CDF compression algorithms BugZid=81, low priority.
16. Spin modeling during shadows BugZid=43. low priority.
17. Add "last processed" time to L1 (and L2?) CDFs BugZid=115, **low priority**
18. transforming one data point from SM coordinates to GSM coordinates. Low Priority from Christine

ct=time_double('2008-02-16/04:50:00') dipole=[[0],[0],[1]] v=[1,2,3]
store_data,'dipole_sm',data={x:ct,y:dipole,v:v} cotrans,'dipole_sm','dipole_gsm',/SM2GSM
cotrans,'dipole_gsm','dipole_gse',/GSM2GSE get_data,'dipole_gse',data=dipole_gse xdipgse=dipole_gse.y[0]
ydipgse=dipole_gse.y[1] zdipgse=dipole_gse.y[2] tilt=atan(xdipgse,zdipgse)

When I check the data for 'dipole_gsm', the values are 0,0,0. I'm not sure what they SHOULD be, but I know that their magnitude should equal 1. sqrt(x^2+y^2+z^2)=1

Jim M.

1. thm_load_fgm non graceful abort (multiple days - no fgl data second day)
1. Thomas ESA email - email sent awaiting reply from Thomas
2. Fix SNAP stack plots and let Tim know (how to fix-tplot issue-talk to Davin) Jim to sort out how big an issue?
3. MOM Quality Flags and MOM Processing History
3. SCM CAL File Processing Doc: text completed. Put into std document format and send to Olivier for review.
3. SCM L2 cdf - keep Olivier in the loop. In repository.
4. L2 Data Processing History Info Completed: ESA Still to be Done: SST, MOM, FGM, FBK, FFT, FIT
4. L2 cdf Quality Flags: Completed: ESA Still to be Done: MOM, SST
5. Alberta - At the moment the data files are from Dawson (daws), Churchill (fchu), Island Lake (isll) and Fort McMurray (mcmu). I will add Rabbit Lake and Taloyoak at some time but we have some issues with mag pointing at those 2 sites. If you recall, the agreement between Ian and Vassilis was that this data wouldn't be copied to become part of a mirrored archive like the existing data we provide. Instead, each file would be obtained from this site each time it is requested (using curl or some such). This means we can use our own logs to monitor data usage.

Themis Software to be able to retrieve from Alberta

5. Data Description Paragraphs
5. Summary Plot mods
    a. Fix duplicate velocity units by removing 'km/s' from ytitle and maintaining 'km/s' in ysubtitle.
    b. Either make velocity labels into ('X','Y','Z') or make velocity labels into 'VX','VY','VZ'.
    So that the components are easier to distinguish.
    c. Modify ytitles on esa eflux and sst eflux so that they do not collide.
    (Insert '!C's or change setting to make tplot do this automatically).
    d. Set the scales on the zoomed out(24 hr) plots so that they are not autoscaled.
    Information on appropriate yranges should come from Vassilis.
    e. Change labels on temperature lines so that they are done in different colors
    (and possibly different linestyles).
    f. If necessary, Update the plot key so that it reflects any of the changes above. It'd probably be best to give this task to me, since I've done the past modifications of the plot key.
6. Orbit Plot on Summary Plot web page - on the right side, 3 plots vertically, each overview plot there would be orbit panels (coordinate with Harald).
7. Administrator's Guide
8. Themis Developers Guide
9. SCM Suite Crash: After Step 2. h. in the suite. I never got anything in the Data Loaded List Box. See David for Detail. v5.00 Task #384.
9. thm_load_mom: for quantities like velocity, the coordinate system isn't stored in the meta data, and none of the units are stored in the place we normally try to store them (from Pat - Vassilis concurs) Will take a look.
9. Thm_fgm_overviews currently loads the data out of the fit file. It should probably load the data out of the fgm file. Only needs to load from one data source. Jim M thinks the thm_load_fit can be deleted.
9. routine that streamlines the generation of gmag stackplots and a crib to show how to do this. (< than a day)
10. Once Jim McFadden completes his mods for n_3d_new_3 reprocess L2 cdf's - entire mission.
10. thm_load_mom changes - reconcile mods with Davin at an appropriate time.
10. AE Indexes Issue Jan 8-12, keyograms Jan 12-13, Stripes- Vassilis: minor nuisance - low priority
11. Overview plot change: mode bar seems thick (nothing we can do easily - low priority)
12. Extraneous scmcal directory under L1 products (from Jim L.) BugzID=98.
13. Mosaic Processing - permanent script needed (very low priority)

    L2 Product Status:

    Completed: ESA, MOM, FIT (onboard), FBK, FGM, SST (needs upgrades), GMAG, FFT (onboard)

    Yet to be done: SCM (Jim M), EFI (Michael), ASI (Harald)

Pat

1. Particle Instrument tasks. In Progress
   a. Plot generation for Vassilis - as required
2. Phase II GUI (50%) - tbd
2. High pass filter issues
   a. Fix bug where NaN is inserted into result accidentally.
   b. Generate warning notification if high pass filter is going to allocate an especially large array or take a very long time
   c. Provide an option for the user to select binning resolution.
2. Training on the day to day operations of the Summary Plots and Mosaics (2009)
3. An option in tdegap so that if you provide several inputs, it will interpolate the outputs onto the same time cadence.(Given time to do this, it should be a pretty straightforward change for me to make.)
3. Be able to plot ASI & GMAG observatory positions and GOES data on the same plots that are generated by executing thm_crib_trace.pro
4. wavepol.pro and twavepol.pro - Put Olivier's into the distribution, test
4. str_element does not add to embedded structures (BugzID=69)
5. Tplot enhanced crib - Davin should be involved and the cribs should not be too overwhelming. Possibly multiple cribs by functions.
6. boundary normal coordinates. On Hold. BugzID=59.
7. 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.
8. Error msg for when timestamps of data do not match in tvector_rotate, tdotp, and tcrossp.
9. Tplot auto scaling. BugzID=41.
9. invalid inputs to the version keyword
10. Clean-up of makepng and makegif
10. General Routine 'Add magnitude' vector - adding it's magnitude in its structure. 4 vectors, colors=BGRB.
11. GMAG L2 attributes error - from Pat (very low priority)

Aaron

1. VMO file generation - sort out issue with checking in files
2. Magnetometer Tasks
2. Phase II GUI (80%) - tbd

Bryan

1. Phase II GUI (50%) - tbd
1. Think about making 2D slices through distribution. See medical imaging code in IDL demo."
   a. 2D first migrate code into crib - in progress b. 2D with med imaging code c. 3D slices
2. Check Pri with Vassilis after GUI:
   a. It looks like there's a bug that limits specplot's ability to handle short timespans of data when setting the DATAGAP. Until we can get a fix out, you should be able to get the output you want by using the options command to set the 'overlay' to 1 options, 'tha_ffp_??_*', 'overlay', 1. then you might have too reset the color bar with the zlim command: zlim, 'tha_ffp_??_*', 10e-14, 10e-5
   b. thm_part_moments2 so that it properly handles single-angle energy spectra when pitch/gyrophase constraints are requested by the user.
3. 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
   f. 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)
4. From Hannes:
   a. Provided is the most common plot used by scientists that look at magnetic field data. Four panels Bx By Bz Bt and the position X Y Z as variables. Often the radial distance R is another variable. It would be great if someone enters e.g. tplot,'tha_fgs_gsm' such a useful default plot would appear. I am currently not able to produce such a plot using tplot. Another useful plot would be instead of one trace per panel, 5 traces per panel. One for each spacecraft and 5 sets of positions as variables at the bottom. For example: tplot,'th?_fgs_gsm' could produce such a plot. Also some standard plots that combine ground and spacecraft data could be useful. Notes from Vassilis: define keyword /positions default 'none', allow GSM X Y Z, R Lat Long,.....
   b. The level 2 CDF files at http://themis.ssl.berkeley.edu/data_download.shtml should contain position in various coordinate systems as well. Preferably in the same resolution as the data. Otherwise Scientists need to get the position from another source. Notes from Vassilis: option to introduce the data in RE with keyword (one RE =6,478 kilometers ???). Like thm_load_fgm /pos_units= 'RE'. Also thm_load_state keyword out_coord = 'GSM', 'GSE',...etc.
   c. If one loads fgm data from probe 'a' and let's say there are no data for the chosen interval. The variables tha_fgl and tha_fgl_gsm etc. should all be empty. It could be those variables still contain data from the previously loaded interval.
5. Variable units – generic solution - thm_load_spin, _state, _hsk, _sst, _esa, _bau, _fgm, _fbk, _fft, _fit, _scm, _efi, _trg, _asi, _gmag, _ask, _mom, _esa_pkt
6. 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.
7. upgrade thm_load to work with probe assignments
8. move functionality of thm_load_state2 into thm_load_state and delete thm_load_state2
9. Multiple enhancements concerning keywords, valid_names and thm_load routines

Hithesh

1. 11hz noise
   Analysis - how does the noise react when entering and leaving solar shadows. (waiting for next season)
   Awaiting for specific dates from Derron (receive appx. end of January) - Hithesh will ping Derron who will talk to Sabine. Wait until length of shadow is determined. Awaiting shadowing tools (March 31/April 1)
1. Trigger Filter Bank Data - spikes , emailed Chris Cully
2. Peter wrote code to reset ETC Kicker (1/8 or 1/9) after hang-up.
   Put together a simulation of ETC VHDL Design.
   Working with Robert and may need MODELSIM software.
   First learn VHDL - in progress and almost complete. Look at the ETC VHTL programs and understand them.s
3. Logic Analyzer - get quote
4. Review FSW Specifications document for v5 changes.
   Waiting review by Peter of last two paragraphs – in progress
5. ESA – investigate invalid configs from Survey to burst mode in IDPU scripts.
   Talk to Jim Lewis and / or Jim McFadden to acquire details of the problem.
   Did this occur before or after v4.0? How important is the problem?
6. Check recent overviews from the dawn sector, you will see that the FBK data have a lot of periodic noise. They seem to correlate with EFI spikes. Tai Phan sent me the attached showing FBK spikes in time series. Perhaps Tai has more information on the origin of this SCM noise; I think it's from the EFI bias current when the sphere is shadowed but it would be nice if Olivier can verify. Awaiting reply from Olivier.
7. Run the CPT tests for the following four modules - in progress and **On Hold**
   a) SCI & SCI2 - 12 (3 done successfully) c) CMP - 4 d) EEPROM - 18
8. Review FSW code of all 24 modules and the CPT tests for each (ongoing)
9. Watch engineering is going along, tools for plotting (ongoing)
10. Review scripts and/or macros with Michael Ludlam (ongoing)
11. Leftover 512 burst packets

Michael

1. efi load bug

1. The 1 Hz bug fix (noted by John Bonnell) is in progress thm_efi_despin. In progress
    a. Periods selected for 30-40 periods for Probe 'C'.
    b. Run the SDT Calibration. Plots have been regenerated for Probe 'C' and sent to John, Forrest and Vassilis for review. Sorting out questions from John. **Awaiting feedback Forrest (has been pinged).**
    c. Steps #a-#b will need to be completed for the other four probes as well.
    c1. Probe 'E' c2. Probe 'D' c3. Probe 'A' c4. Probe 'B'
    Installed new calibration formula and testing with data that has the new parameters.
2. There is an interface task for the High Frequency Calibration of wave burst data. This is something that Bob Ergun and an associate have just finished (as I understand), and John is now reviewing their code. This code takes care of gain vs. frequency calibration and phase shifts. John would like me to integrate it into our distribution.

2. Alter calibration formula in thm_cal_efi and thm_get_calpers, update calibration files – in progress.

2. The poor despinning bug fix in thm_efi_despin (awaiting completion of 1hz bug fix)

3. Larry Kepko and efi offsets – emailed John with comments for his review. **Awaiting John's comments**.

3. FBK Frequencies
    a. ~~Resolve conflict bet C. Cully and John B's bin center values. Conflict resolved. John agrees with Chris.~~
    b. ~~Derive bin centers from CDFs (currently the bin centers are hard coded).~~
    c. Make sure that bin center assignment from L2 works with any changes that Jim M. makes.
    John wants to calibrate by signal source – thm_cal_fbk

4. Get EAC offsets from J.B. -- this *cannot* be done until AC-coupled data is taken.

4. EFI L2 cdf

5. EFI CAL Document

6. "Case-by-case" calibration parameters ("short-term" high accuracy corrections).
    involves generalizing some code from Chris C. as a tool for the general user. The tool will look at short time ranges, and pass out high-resolution calibration parameters in a structure. We envision that this structure will be passed into THM_CAL_EFI disabling those parameters that are normally gotten from the calibration files. LASP is working on this and when done would be incorporated in the tdas software.

7. deconvolution, any other tasks to have a working load and cal efi.

8. The EFI program headers should include what inputs are valid for each keyword.

9. thm_load_efi - allow multiple coord's to be entered. Do not overwrite plot variables.

10. efs data deleted when thm_load_fit run twice, second time only fgs data requested

10. Modify THM_CAL_FIT to treat efs datatype - Install E12/E34 conditional based on th?_fit_code TPLOT variable. If E12 switched to E34 software needs to be revised to handle (low priority).

11. Correlate to onboard spin fits using EFP data. Look at FGM. Talk to Jim L.

12. Add the DATATYPE kw to KYOTO_AE_LOAD , and load only AE data by default (low priority).

13. Get the downloader (KYOTO_AE_DOWNLOAD based on the new version of FILE_HTTP_COPY) working (low priority).

14. Build an informational widget.
    a) (From Jim M.) Break THM_UI_SHOW_DLIM out of THM_GUI to use as a stand-alone routine. - Make the name of the displayed sub-structure(s) a parameter. (low priority)

The following recommendations have been made by Jim McFadden and need to be reviewed and prioritized by John Bonnell:

1. The baseline offsets seem not to be sufficiently accurate, therefore spintone residuals remain in the data. It may be that only an on-the-fly calibration (a la SDT) will work, and that the EFI code would need to be modified from its current list-style calibration.

2. We should have code that duplicates the on-board spin fits in order to understand why the ground and on-board fits are different. I do not know if such code exists -- we should run this question by John Bonnell.

Cindy

1. Phase II GUI (90%) - tbd
1. ARTEMIS (10%)
    a. Evaluation of ARTEMIS science
        1. ~~Get lunar orbital data (moon centered).~~
        2. ~~Create plots for when P1/P2 are in the Lunar Wake, Solar Wind, and Magnetotail (show distribution).~~
        3. Get lissajous orbital data (moon centered).
        4. Create plots of lissajous data (wake - combine lunar/lissajous data, solar wind and tail - separate plots).
        5. Validate lunar orbits (lunar orbital plots shows unexpected distribution, look at position of P1 vs P2).
2. Routine to transform state data into RE in the GUI. There is already a routine in the distribution that does this, but it is not currently part of the gui. Add a button, call to the transform routine, and put some checks into place. 2 days to implement.
3. Add an additional button and a call to IDL's save routine. A day at most to implement.
4. An IDL crib sheet has been provided that generates magnetic field and position data with the same resolution. Scientists very often like to have a set of dayfiles of magnetic field data and position. So the crib sheet could be called inside a loop and for each day an output ASCII file could be produced. An option could be all 5 spacecraft merged with only one time column. Additionally a desired resolution could be another option From Hannes.

Vladimir

What's cooking?

Kate

What's cooking?

Andreas

1. Awaiting review of Kyoto DST2plot code.
2. L2 File Definitions Document - awaiting L1 document to be completed to use as template.
3. Support VWO - Shing Fung with wave data.

UCLA

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

Christian Jacquey and Thomas Moreau **(updated 9/5/8)**

1. It seems that particles are in course of reprocessing from your side. I guess that the calibration parameters have been changed and that the saturated sectors of SST have been managed in the processing. We have no time right now to check that, but we'll do it as soon as possible.

Concerning the study of the ESA/SST response, our student has performed a statistical analysis of quiet plasma sheet crossings based on L2-data with -preliminary- results. These ones need to be checked through more detailed analysis. It appeared clearly however that the particle pressure (including all contribution, i.e., ions and electrons from both ESA and SST) is underestimated. For now, we have note reliable enough results to state on the origin (SST versus ESA) of this underestimation.

Software Tasks 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)
   Quality flags (for each instrument to be added to L2 State cdf).
2. TBA - Tplot User's Guide (David and Vassilis to talk further)
3. TBA - print, dprint, msg continue, verbose options for a standard
4. TBA - Tplot FAQ's (Amanda) Maybe replaced by #1
5. TBA - SM coord transformation in thm_cotrans does not work: fixing that would be too drastic a change for a patch release, because it might break a lot of existing code. The issue is: if the in_coord parameter is not explicitly specified, and the dlimits structure also does not specify the coordinate system, do we want to try to figure it out from the "in_suffix" argument (current behavior, doesn't work for SM coords), or just fail with a message that a coordinate system must be specified with either the in_coord argument or dlimit structure (probably a better solution, but might break existing code).

Non GUI Future Release Mods

1. Many of the data processing routines that are tested here do not inherit the plotting options from the tplot variable that they take as input. For data processing routines that I've written Vassilis has had me modify them so that they inherit these options. It shouldn't be very hard to do this, but whether we do it or not depends on whether we think these data processing routines are useful only for the gui or for the command line user as well. (from Pat).
2. Load routines to all support keywords suffix and relpathnames_all.
3. tplot does not fail gracefully after illegal margin set. In this case: tplot_options,'xmargin',[100,100], tplot does not fail gracefully after illegal margin set. In this case: tplot_options,'xmargin',[-1,-1]
-tplot does not fail gracefully after illegal margin set. In this case: tplot_options,'ymargin',[100,100]
5. fac_matrix_make: do a better job putting the inputs into the correct coordinate system.
6. minvar_matrix_make documentation is a little sparse, so it couldn't hurt to improve the function header.
7. With a pre-mission and future dates, thm_gen_overplot does not exit gracefully. The user sees a lot of "Remote file not found messages", but is not offered any indication that the date requested is before the mission began. It would also be useful to have a check for when DATE plus DUR is greater than the current date, and then ignore the requested days beyond the current.
8. There's a possible bug thm_gen_overplot when an illegal device is set with the DEVICE keyword. The code doesn't check to make sure if the graphics device is valid. It passes the test script because thm_gen_overplot has its own catch error statement embedded in the code. The catch statement does report, "Graphics device not available: a", but only after data have been loaded and tplot vars have been created. If a long time range is requested this could be a significant waste of time to the user.
11. NO_DOWNLOAD keyword missing from thm_load_fbk.
12. a. When thm_load_fit is called requesting a single data type it will also return some auxiliary data types. For example: thm_load_fit,probe='b',datatype='fgs' returns: 1 thb_fit_code 2 thb_fit_npts 3 thb_fgs (low priority load bug or test script bug) b. The relpathnames all keyword is broken. (low priority bug)
13. THM_LOAD_MOM doesn't recognize the datatype keyword for L1 data. (It does for L2).