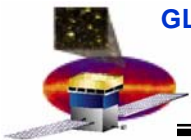


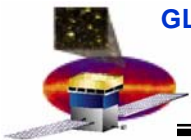
Mechanical Systems December 2003 Status

Marc Campell, Subsystem Manager



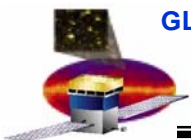
Accomplishments

- **Accomplishments during January**
 - **Successful Grid MRR in December**
 - **Tapemation given the “OK to Proceed” with the initial final machining operations on Flight Grid #1**
 - **Minor revisions to EMI shields, contractual paperwork in place, Tapemation has started programming**
 - **Tapemation given “OK to Proceed on rough machining billet #2**
 - **Technical evaluation of Tapemation cost proposal completed – processing of the P.O. change notice is in work (second grid and additional shields & shear plates)**
 - **Clear cutting of the MECH drawing tree is complete**
 - **Replanting is in progress to align with latest I&T integration plan**



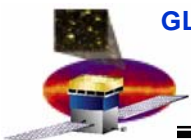
Accomplishments (Cont.)

- **LM Accomplishments during January**
 - **Successful Radiator MRR in December**
 - **Variable Conductance Heat Pipe (VCHP) fabrication has begun**
 - **Radiator Thermal Vacuum test planning kickoff meeting held**
 - **GLAST requested LM submit revised cost and schedule to align PCMS with the current forecasted delivery dates**
 - **LM has submitted their preliminary package including Basis of Estimate for the to go effort**
 - **BOE's have been reviewed and approved the MECH & IPO**



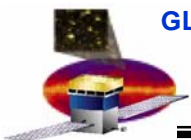
3 Month Milestones Jan - Mar

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Grid Box detailed stress analysis (Combined with below)	08/03/03	01/19/04	Final analysis report approved & released.	<i>Analysis complete. Draft report out 1/19/04</i>
Deliver 1 x 4 Grid to I&T	09/03/03	Mar 04	Complete 1x4 testing - static load test.	<i>Complete less report.</i>
			Modify Top Flange & cable chaseways	<i>Complete</i>
			Drill TRK interface after test.	<i>Pending resloution ofTKR-Grid interface design mods</i>
			Compare 1x4 & 4x4 models to determine if 1x4 can be reworked	<i>in progress</i>
X-LAT Plate MRR		Feb 04	Release of X-LAT Plate IDD	<i>Draft out for review ECD 1/30/04</i>
			Release of X-LAT spec	<i>Draft due 1/30/04</i>
			LM complete design	
			LM complete analysis	
Start Grid #1 production	11/15/03	01/23/04	Restricted OK can be given with release of the stress report	<i>Programming started</i>
Receive Grid #1, EMI skirts, details	03/30/04	05/20/04	Close MRR action items	<i>Revised Grid plating requirements to pull in date</i>
Start rough machining of billet #2 (Qual unit)	02/02/04	02/02/04	Provide Tapemation OK to rough machine	<i>OK given 1/22/04</i>
Grid #2 MRR & start machining	03/01/04	03/22/04	Sufficient progress on Grid #1	
Grid Heat Pipe bond process Qual	02/24/04	03/05/04		<i>manpower priorities</i>
Radiator Integration Demo	02/19/04	03/15/04		<i>manpower priorities</i>
Grid Assembly MGSE Design	02/04/04	03/15/04	define TRK interface requirements release Top Assy dwgs	<i>in work, need TRK IDD in work drafts available</i>



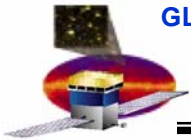
3 Month Milestones Jan – Mar (cont)

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Fab, assy & test TCS prototype	01/30/04			<i>ELEC responsibility</i>
Finalize TCS design & drawings	03/15/04			<i>ELEC responsibility</i>
Order TCS electronics components	01/30/04			<i>ELEC responsibility</i>
Design Heater Control Box	03/01/04			<i>ELEC responsibility</i>
Order TCS flight hardware Heaters, thermostats & thermistors	12/19/03	02/06/04	Update of LAT instrumentation plan	<i>Spreadsheet updated</i>
			Determine qual+ flight+spares qty for each component	<i>Gunther?</i>
			Get parts approved on EEE parts list	<i>Complete</i>



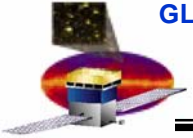
Drawing Release Plan

- **39 of 56 (69%) drawings released**
 - **These are all drawings required for the Grid Box machining at Tapemation**
- **Remaining hardware is needed for MECH assembly operations in May**
 - **Feb 5 planned**
 - **Mar 8 planned**
 - **Apr 4 planned**



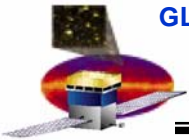
Issues & Concerns

- When will we be ready to cut Grid chips – current est. 2/2/04
 - Provisional “OK to Fab” given, but need to close MRR actions
 - Waiting to get on machine
- Grid to I&T delivery date – schedule continues to compress.
- Grid Box Assy Static Load test will be performed on Grid #2 after start of I&T on flight unit. This increases risk.
- Grid thermal control components & Downspout Heat Pipe to Grid thermal joint are not verified until LAT T/Vac test. Difficult to access these components at this level (remove Radiators & ACD).
- ELEC & MECH schedules are not tied for TCS design & fab in PCMS
- X-LAT plate & Radiator delivery schedule due to late starts.
- Details of how, where & who for Grid Box Assembly work needs to be coordinated with I&T
- 1 x 4 Grid delivery date to I&T.
 - Need to implement modified Grid – TRK interface
 - Meeting planned to examine the best way to verify flight interfaces and support beam test



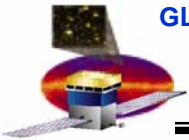
Open Flight Design Issues

- **Grid-TRK interface - define Grid datum & TRK interface**
 - Working group in progress
 - Evaluating if TRK interface can be put into Grid by Grid Vendor
 - Impacts MECH Assy fixture design
- **Define GBA Static Load test requirements & plans**
 - Prelim plan presented at Peer Review
 - Working group meetings with Spectrum and GSFC started
 - Interface loads being developed
- **Baseline is no thermal cycle test for Grid Box Assy prior to I&T**
 - Need to develop risk assessment & trade study.
 - Submit waiver (8 vs. 12 thermal cycles) if required
- **Coordination of MECH assembly plans and LAT I&T integration plans.**
 - LAT assembly plans shows Downspout Heat pipes coming off.
 - DSHP to Grid thermal joint not verified until LAT T/Vac



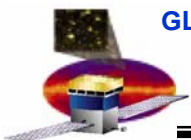
Open Flight Design Issues (cont)

- Radiator integration sequence
 - Study complete – shows that current design works, but may not be practical. Looking at 2 work arounds
- Radiator VCHP Helium leak rate may impact ACD PMT's
 - How to evaluate this? LM can substitute another inert gas, but it impacts ground performance (not on-orbit). LM given the “OK to Fab” the VCHP's up to the charging operation.
 - ACD He sensitivity may be decreased?
- RFA's closure
 - RFA's addressed at Grid and Radiator MRR's – no show stoppers
 - working with Pat Hascall



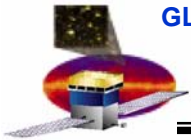
Open Flight Design Issues (cont)

- TCS – location of Grid heaters, thermostats, RTD's and associated wiring needs to be finalized (top assembly drawing)
 - Layouts started
- TCS validation vs. LM modified Radiator Thermal Vacuum & Balance plans
 - What are TCS test requirements? Is this a TCS Qual test?
- U shaped X-LAT heat pipes can be deleted
 - Updated thermal analysis shows that failure of X-LAT Heat Pipe can be tolerated (within ATP limits)
 - Close issue with GSFC and proceed



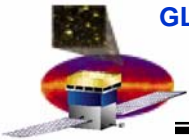
MECH Qualification Program

Qual Test	Status	ECD
Grid-Top Flange Heat Pipe bond process qual	Parts in fab	Apr 04
Grid Box Assy Static Load test	Planning in work. Perform on Grid #2	Aug 04
Grid Box Assy Thermal Cycle test	Plan to delete test	
X-LAT Plate Thermal Vac test	at LMMS	
Radiator Variable Conductance Heat Pipe new extrusion	1st article tests planned	
Radiator Acoustic	at LMMS	
Radiator Thermal Vacuum	at LMMS	
TCS-Radiator Thermal Balance	Scope is changing. Need to define requirements	



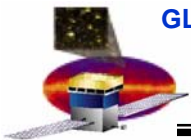
CUM Schedule

- **Budgeted Cost Work Scheduled** **\$6.846M**
 - **Budgeted Cost Work performed** **\$6.614M**
 - **Schedule Variance** **\$231K**
-
- **\$184K Flight thermistors not received in Dec**
 - **\$36K for late EM testing**



Program Threats

- **Top threats to maintaining schedule**
 - Grid delivery from Tapemation
 - Highly compressed, success oriented schedule
 - Better coordination with ELEC on TCS fab and wiring
 - Closure of open items for Grid manufacturing
 - LM X-LAT & Radiator delivery dates
- **Top threats to staying within cost**
 - Interdependencies on ELEC for TCS
 - TCS costs
 - Prototype may require PDU, SIU & GASU boards



Actions Required to Stay On Schedule

- Replan TCS design & development activities including prototype
- Replan Heater Control Box design, fab, assembly, test (including Qual)
- Compress MECH assembly plans again
 - Some tasks may be performed after delivery to I&T
- Release X-LAT spec & IDD