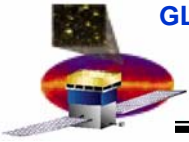


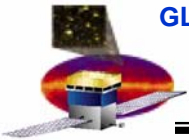
Mechanical Systems March 2004 Status

Marc Campell, Subsystem Manager



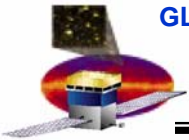
Accomplishments

- **Accomplishments during April**
 - Tapemation has completed 80% of final machining operations on Flight Grid #1
 - Tapemation has completed the rough machining and heat treatment of billet #2
 - Released 10 drawings per plan
 - Including Rev 03 of Grid drawing
 - Approved Lockheed's revised cost and schedule proposal
 - align PCMS with the current forecasted delivery dates
 - Passed Variable Conductance Heat Pipe qualification Burst test
 - Kicked off Radiation Thermal Vacuum test planning meetings (March)



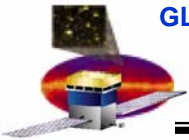
3 Month Milestones Apr - Jun

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Deliver 1 x 4 Grid to I&T	09/03/03	Apr 04		Complete
X-LAT Plate MRR		5/27/04	Release of X-LAT Plate IDD	released
			Release of X-LAT spec	released
			LM complete design	in work 50% complete
			LM complete analysis	in work 80% complete
Receive Grid #1, EMI skirts, details	03/30/04	08/04/04	Close MRR action items	Revised Grid plating requirements to pull in date
			Stop changing the design	TRK mods & wing mods for Radiator installation proposed
			resolve grid plating issues	vendor quote received
Grid #1-BFA match drilling	01/27/04	05/08/04	BFA and Grid available	early May window
			Release procedure	Final draft in review
Grid #2 OK to proceed	03/01/04	05/29/04	Sufficient progress on Grid #1	
Grid #2 start machining	03/01/04	05/29/04	Sufficient progress on Grid #1	
Grid Heat Pipe bond process Qual	02/24/04	05/28/04		manpower priorities
Radiator Integration Demo	02/19/04	06/15/04	Receive parts	ECD 5/15
Grid Assembly MGSE Design	02/04/04		release Top Assy dwgs	in work - drafts available
Order TCS electronics components	01/30/04			activity started
Order TCS flight hardware Heaters, thermostats & thermistors	12/19/03		Update of LAT instrumentation plan	Spreadsheet updated
			Get LM RTD's, thermistors & heaters approved & on EEE parts list	all approved
			Grid heaters	working w/ vendor; ECD 4/30
			Grid thermostats	on order, due 5/04
			MECH thermistors	received
			Other Subsystem thermistors	ELEC - PO LAT level?
			LM procured TCS components	started



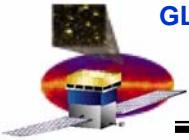
Drawing Release Plan

- **53 of 59 (90%) drawings released**
- **Remaining hardware is needed for MECH assembly operations in May**
 - **April – 10 released (9 planned)**
 - **May – 2 planned**
 - **June – 4 planned**
- **~6 new parts (shims, misc. details) required for Grid Box & I&T assembly operations will be added to plan next month**
- **Known drawing revisions**
 - **April - 1 planned (Grid)**
 - **May – 2 planned (X-LAT & Radiator IDD's)**



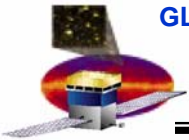
Concerns

- **Tapemation Grid #1 delivery schedule**
 - **Difficult to press vendor as we keep making design changes**
- **Grid to I&T delivery date – schedule continues to compress.**
- **Coordination of MECH assembly plans and LAT I&T integration plans.**
 - **Late delivery of Grid to SLAC drives whether work will be performed prior to or after delivery to I&T**
- **Tapemation Grid #2 delivery schedule**
 - **Start of Grid #2 on hold until we complete Grid #1 machining**
- **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).**
- **X-LAT plate & Radiator delivery schedule have no float remaining due to late starts and manufacturing has just begun**



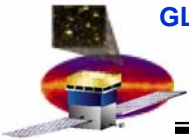
Open Flight Design Issues

- **Grid-TRK interface definition RE-OPENED**
 - Bushings into grid are back
- **Best assembly level to match drill ACD to Grid.**
 - Grid to Base Frame Assy (BFA) now, or
 - ACD to LAT after ACD delivery to I&T
- **X-LAT ground cooling heat transfer media CLOSED**
 - Inert liquid selected (safe for electronics)
 - Final design of cooling pipes in work
- **TCS – location of Grid heaters, thermostats, RTD's and associated wiring needs to be finalized (top assembly drawing)**
 - Grid thermostats are rated to 30V & 2A for 200,000 cycles
 - Planned operation at 35V & 1A
 - Vendor has some test data at 35V up to 2000 cycles
 - Nick Vermani to review test data
 - Only qualified thermostat available with 3 deg on-off differential (power concern)
- **Define GBA Static Load test requirements & plans**
 - Interface loads developed
 - Detailed load cases & STE being developed
 - Plan to hire Mechanical Engineer for this task



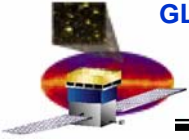
Open Flight Design Issues (cont)

- **New request for 200 node thermal math model for launch vehicle thermal analysis**
 - **Need requirements from LV**
- **TCS validation vs. LM modified Radiator Thermal Vacuum & Balance plans**
 - **What are TCS test requirements?**
 - **TCS risk assessment and Qual test plan requested by GSFC**
- **Radiator integration sequence**
 - **Grid modified to allow installation using pure translation**
 - **Wet joint trials underway. Disassembly a concern**
- **Radiator level EMI test was deleted**
 - **Engineering test at this level under investigation by LM**
- **RFA's closure**
 - **working with Pat Hascall**
 - **X-LAT RFA's to close by MRR**



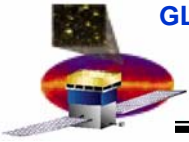
MECH Qualification Program

Qual Test	Status	ECD
Grid-Top Flange Heat Pipe bond process qual	Parts in fab	May 04
Grid Box Assy Static Load test	Planning in work. Perform on Grid #2	Feb 05
Grid Box Assy Thermal Cycle test	Plan to delete test	
X-LAT Plate Thermal Vac test	at LMMS	Nov 04
Radiator Variable Conductance Heat Pipe new extrusion	1st article tests planned	Apr 04
Radiator Acoustic	at LMMS	Nov 04
Radiator Thermal Vacuum	at LMMS	Mar 05
TCS-Radiator Thermal Balance	Scope is changing. Need to define requirements	Mar 05



CUM Schedule

- **CUM Schedule Variance -\$225K**
 - **\$184K Flight thermistors just received in April. Variance will correct next month.**
 - **\$24K for late EM testing**



Program Threats

- **Top threats to maintaining schedule**
 - **Grid delivery from Tapemation**
 - **Grid design & fabrication are occurring concurrently**
 - **Highly compressed, success oriented schedule**
 - **LM X-LAT & Radiator delivery have no float and manufacturing has just begun**
 - **Grid Box will be pathfinder for Flight hardware operations in B33**
- **Top threats to staying within cost**
 - **Staying on schedule**
 - **Interdependencies with DAQ for fab, assy & test of TCS**