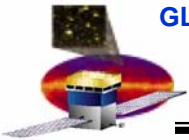


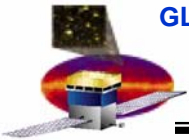
Mechanical Systems Mechanical / Thermal Hardware May 2004 Status

Marc Campell, Subsystem Manager



Accomplishments

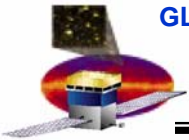
- **Accomplishments during June**
 - **Base Frame Assy – Grid Match Drilling Complete**
 - **Grid #2 MRR held – Tapemation given OK to proceed**
 - **Started Grid #2 machining**
 - **Grid #1 progressing (next chart)**
 - **3 way (Downspout, X-LAT & Radiator) heat pipe thermal joint trials 90% complete**
 - **Radiator installation trials 50% complete**
 - **Demonstrated ability to torque up fasteners within thermal adhesive pot life**
 - **LM released all X-LAT flight drawings**
 - **Thermal Control System E-box prototyping started**



Tapemation Status

- **Grid +Z & -Z surfaces machined flat per blueprint**
- **Grid side features put in**
- **Shear plate match machining completed**
- **CAL interface in process (896 inserts)**

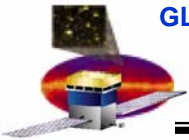
- **Workarounds in process or under evaluation**
 - **Modifying Grid Box Machining requirements & moving final inspection of EMI skirts assembled on Grid to SLAC puts delivery date at 9/15**
 - **Plan to reduce Grid inspection to 1 week is in work (tentatively agreed upon by Tapemation) puts delivery date at 9/8**
 - **Meeting with brush nickel vendor (Platron) to reduce plating times**



Tapemation Status (con't)

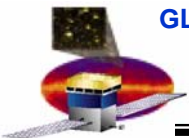
Milestones

- **Spacecraft interface drilling – target 7/7**
- **Machining complete (CAL & Tracker interfaces) 7/19**
- **Grid inspection complete 8/2**
- **Ship to plating vendors (alodine & brush nickel) 8/3**
- **Plating complete 8/23**
- **Grid Box Machining complete 9/3**
- **Final hardware installation 9/11**
- **Clean, inspect pre-ship review 9/13**
- **Ship to SLAC 9/15, possibly 9/8**



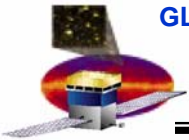
Grid #1 Shear Plates Matched Machined



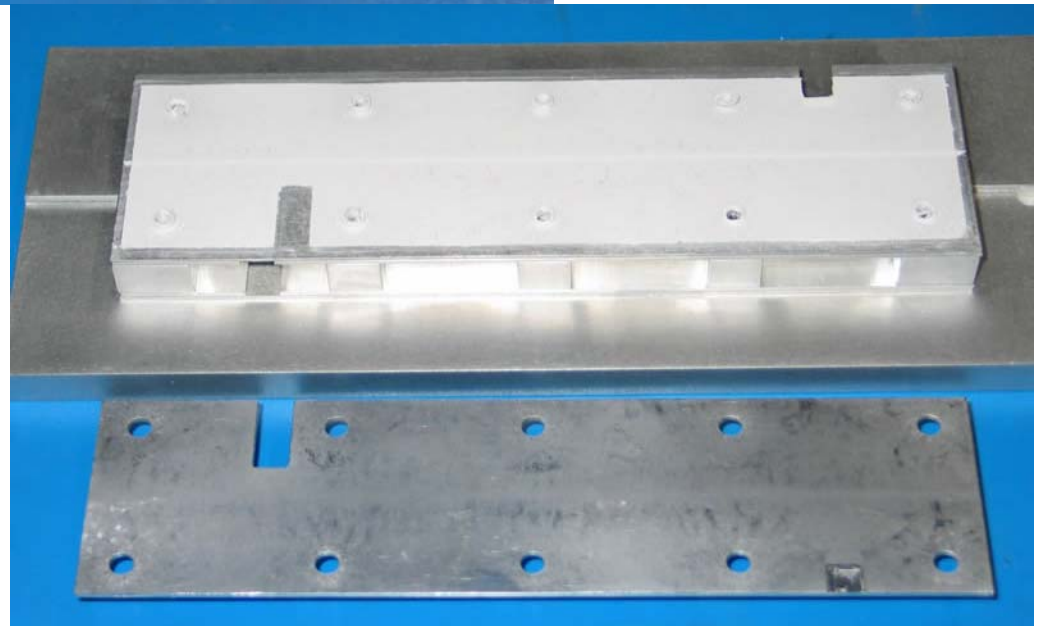


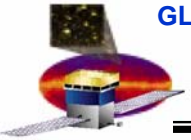
Base Frame Assy – Grid Match Drilling



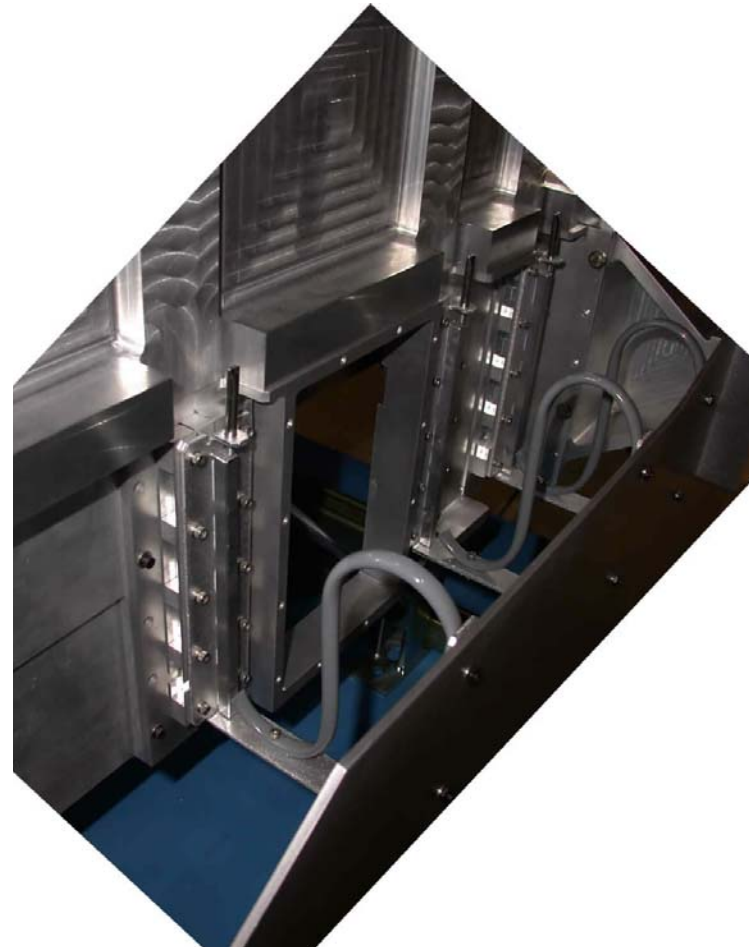


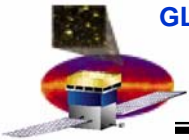
3 way Heat Pipe Thermal Joint



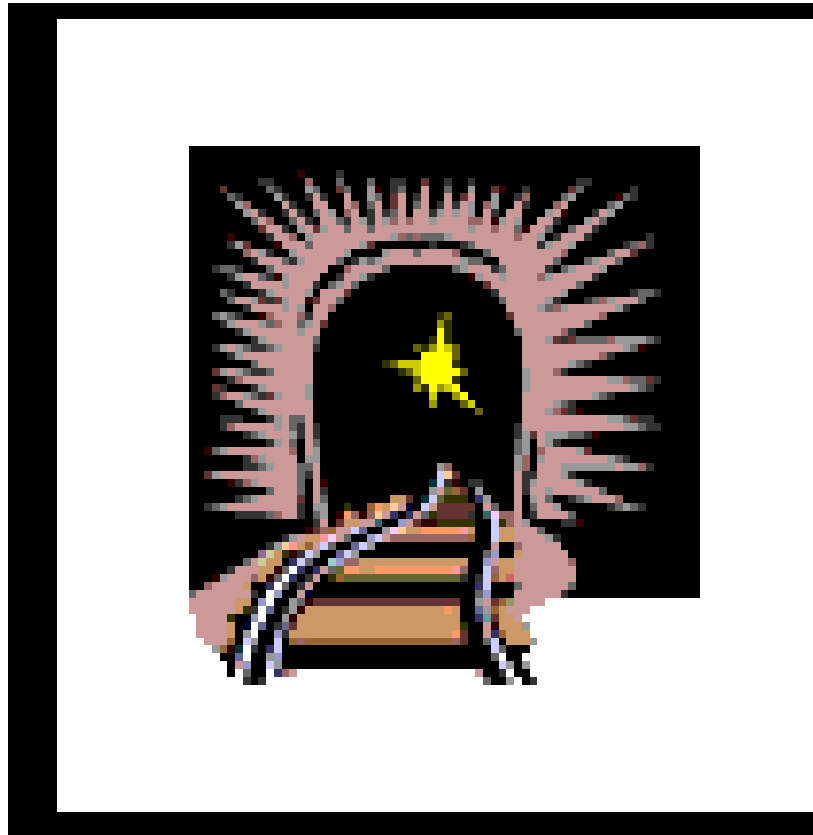


Radiator Installation Trials





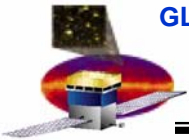
Light at End of Tunnel





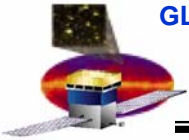
3 Month Milestones June - August

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Receive Grid #1, EMI skirts, details	03/30/04	09/08/04	Grid inspection	<i>Inspection plan in workECD 7/6/04</i>
			resolve grid plating issues	<i>meeting with vendor</i>
Grid #1-BFA match drilling	01/27/04	06/15/04	complete	
Grid #1-S/C interface drilling		7/7/2004	Release procedure	<i>in release cycle</i>
Grid #2 OK to proceed	03/01/04	06/11/04	complete	
Grid #2 start machining	03/01/04	06/30/04	started	
Release Grid Box Assy Procedures	04/15/04	07/16/04	Need to hire ME	
Procure Grid Assembly MGSE	05/17/04	07/14/04	finalize design	
Grid Heat Pipe bond process Qual	02/24/04	07/16/04		<i>manpower priorities</i>
Radiator Integration Demo	02/19/04	07/02/04		
Design Heater Control Box	08/19/04	08/19/04	in work	
Order TCS electronics components	01/30/04			<i>activity started</i>
Order TCS flight hardware Heaters, thermostats & thermistors	12/19/03	06/30/04	Update of LAT instrumentation plan	<i>Spreadsheet updated</i>
			Get LM RTD's, thermistors & heaters approved & on EEE parts list	<i>complete</i>
			LM procured TCS components	<i>parts on order</i>
			Grid heaters	<i>ordered</i>
				<i>parts in house now</i>
			Grid thermostats	<i>Qual test pending</i>
			MECH thermistors	<i>received</i>
Other Subsystem thermistors	<i>ELEC - PO LAT level?</i>			



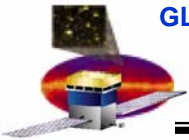
Drawing Release Plan

- **58 of 64 (91%) drawings released**
- **5 new parts (shims, misc. details) required for Grid Box & I&T assembly operations were added to plan**
- **Remaining hardware is needed for MECH assembly operations in Sept**
- **Known drawing revisions**
 - **July – 15 planned (X-LAT & Radiator IDD's, Grid Box Machining, EMI skirts)**



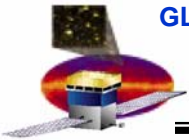
Concerns

- **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).**
- **X-LAT plate & Radiator delivery schedule have no float remaining due to late starts and manufacturing has just begun**



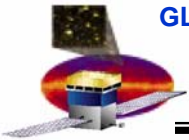
Open Flight Design Issues

- **TCS – location of Grid heaters, thermostats, RTD's and associated wiring needs to be finalized (top assembly drawing)**
 - **Grid thermostats will operate at 35V & 1A; 42V failure mode**
 - **Qualification testing of parts will be performed**
 - **Watching PRT contamination issue discovered by ACD; LM is buying same part for Radiator**
- **TCS validation vs. LM modified Radiator Thermal Vacuum & Balance plans**
 - **TCS test requirements being developed with Tom McCarthy**
 - **TCS risk assessment and Qual test plan requested by GSFC**
- **Define GBA Static Load test requirements & plans**
 - **Interface loads developed**
 - **Detailed load cases & STE being developed**
 - **Plan to hire Mechanical Engineer for this task**



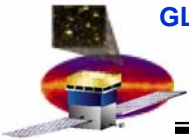
Open Flight Design Issues (cont)

- 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 has been quoted by LM
- X-LAT plate needs 0.5” radius in some locations that may violate 00040 drawing stay clears near S/C interface – **Closed - smaller radius OK, waiver will be submitted for very minor envelope encroachment**
- X-LAT MLI blanket billowing will violate stay clear
- Radiator MLI blanket violates stay clear
- LM will use -6dB pre & post acoustic tests to verify Radiator instead of low level sine sweep
 - Low level sine sweep to 150 Hz may be required anyway to address Delta II concern
 - Investigating twang or tap tests on Radiator as alternate
 - Radiator very stiff in Z axis (direction of Delta II mode)



MECH Qualification Program

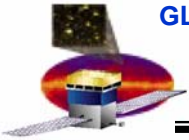
Qual Test	Status	ECD
Grid-Top Flange Heat Pipe bond process qual	Ready to go	July 04
Grid Box Assy Static Load test	Planning in work. Perform on Grid #2	Feb 05
Grid Box Assy Thermal Cycle test	Plan to delete test	
X-LAT Plate Thermal Vac test	at LMMS	Nov 04
Radiator Variable Conductance Heat Pipe new extrusion	Passed burst test, heat capacity test after charging	July 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



PMCS

- Lockheed Martin current period cost variance **-\$223K** and
- Lockheed Martin cum cost variance **-\$163K**
 - Due to over accrual input into system
 - Will correct next month

- Mech Sys (SLAC only) current period schedule variance **-\$83K** and
- Mech Sys (SLAC only) cum schedule variance **-\$133K**
 - Driven mainly by TCS prototyping late start (did start in June) and late procurement of assembly fixtures (details being finalized with vendor – order in early July)



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**
 - **Grid design changes and cost of work arounds to improve schedule**
 - **Interdependencies with DAQ for fab, assy & test of TCS**