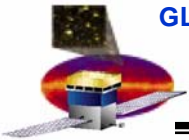


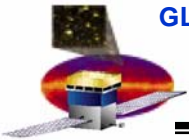
Mechanical Systems Mechanical / Thermal Hardware October 2004 Status

Marc Campell, Subsystem Manager

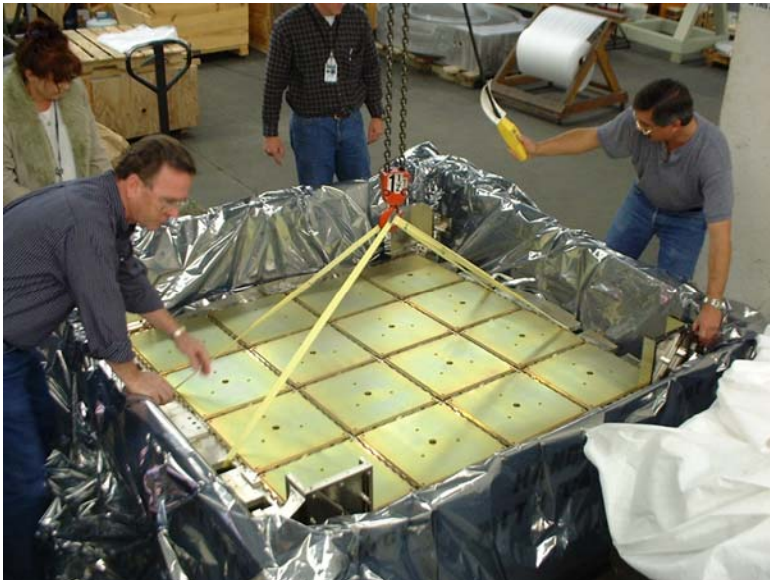
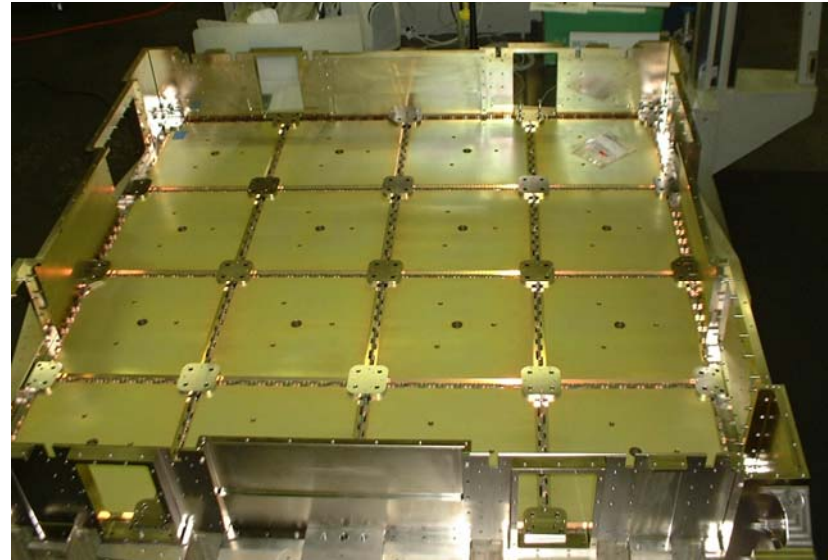
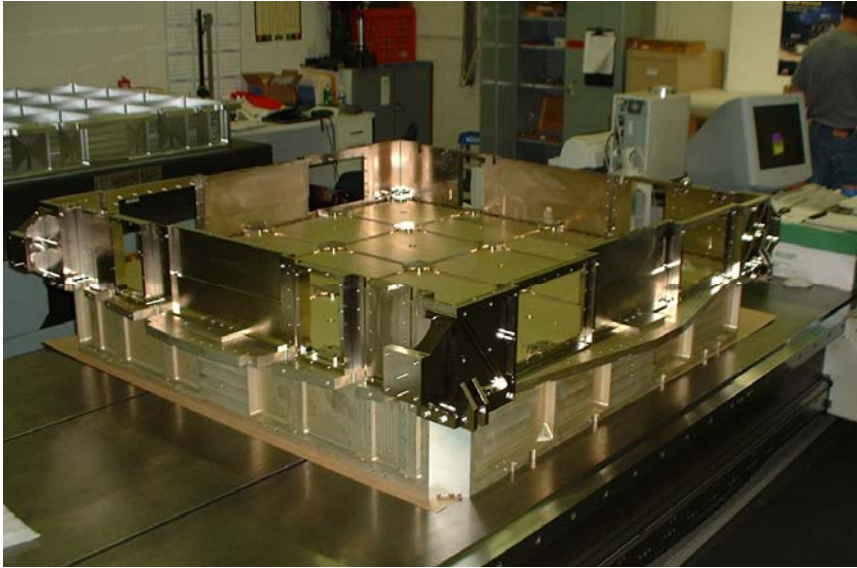


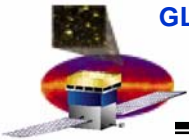
Accomplishments

- **Accomplishments during November.**
 - Grid #1 was delivered to SLAC on 11/8/04.
 - Grid #2 finish machining 85% complete.
 - Procedures & Job Hazard Analyses (JHAM) were released for the B/33 operations.
 - Grid Box Base Assembly drawing revision was released.
 - LM completed panel bonding (facesheets to honeycomb) of both Radiator panels (discrepancies noted)
 - LM has completed all in-process testing of the X-LAT Heat Pipes (XLHP).



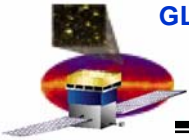
THE GRID IS HERE!





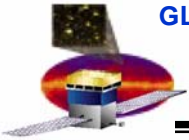
3 Month Milestones Nov - Jan

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Complete Grid Box Base Assy ops	07/22/04	12/23/04	All parts + MGSE in house	<i>Complete</i>
			Procedures in place	<i>complete</i>
			Hold MRR	<i>complete</i>
Grid Heat Pipe bond process Qual	02/24/04	11/15/04	write test report	<i>ECD 12/10/2004</i>
Design Heater Control Box	08/19/04	11/12/04	release drawings	<i>in release cycle</i>
Fabricate Heater Control Box	10/28/04	12/17/04	procurement cycle	
Test Heater Control Box	12/13/04	02/18/05		
Order TCS electronics components	01/30/04	12/17/04	release drawings of using assemblies	<i>activity started</i>
Order TCS flight hardware Heaters, thermostats & thermistors	12/19/03	11/30/04	LM procured TCS components	<i>parts on order</i>
			Grid thermostats	<i>Qual test complete report in review at GSFC</i>
Receive Grid #2, EMI skirts, details	11/15/04	03/22/05	EMI skirts & details	<i>complete</i>
			Grid final machining & inspection	<i>ECD 2/2/05</i>
			Grid plating	<i>ECD 2/25/05</i>
			grid box machining & hardware installation	<i>ECD 3/18/05</i>
Grid #2 Static Load Qual Test	12/16/04	02/28/04	Load case analysis	<i>prelim eval complete</i>
			in-house vs out-house analysis	<i>ECD 12/17</i>
			SOW, RFP & vendor selection	<i>Dec</i>
			MGSE & test fixture design	<i>Jan</i>
			MGSE & test fixture fab	<i>Feb</i>
			Test Readiness Review	<i>Mar</i>
Receive X-LAT plate	12/09/04	02/14/05	Complete X-LAT heat pipe fab	<i>Complete</i>
			Complete X-LAT plate assy	<i>Jan</i>
			Complete Thermal Vac testing	<i>Feb</i>



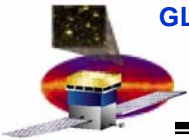
Drawing Release Plan

- **57 of 81 (70%) drawings released**
 - **18 MLI drawings have been added to MECH drawing list**
 - **4 unreleased parts not needed until I&T operations**
 - **In check**
- **Known drawing revisions**
 - **Dec – 2 planned**
 - **X-LAT (in check) & Radiator IDD's**



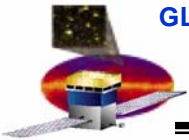
Concerns

- **Lockheed Martin - X-LAT plate & Radiator delivery schedule**
 - **Manufacturing progress is slower than expected**
 - **LM has been requested to provide an estimated cost at completion**
 - **Each step of the way there have been problems typical for a first article build**
 - **Need to reduce the time it takes to resolve these problems from weeks to days**
 - **-Y panel has disbonded core near reservoir from shop aid that did not provide adequate pressure during cure, and**
 - **-Y panel has core improperly trimmed out from design error**
 - **LM developing a repair method for these**



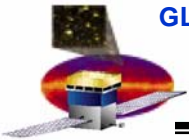
Concerns (cont)

- **Grid to I&T delivery date – schedule continues to compress.**
- **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).**
- **GSFC does not want to ship S/C flexures for static load test unless ITAR plans to their satisfaction are in place.**
 - **ITAR czars Bill Brown, GSFC and Steve Williams, SLAC to resolve this issue.**



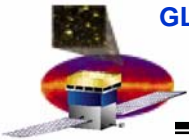
Open Flight Design Issues

- **TCS validation vs. LM modified Radiator Thermal Vacuum & Balance plans**
 - TCS test requirements being developed with Tom McCarthy
 - ~3 additional TCS cases proposed
 - Cost & schedule impacts will be evaluated
 - TCS risk assessment and Qual test plan requested by GSFC
- **Define GBA Static Load test requirements & plans**
 - Detailed load cases & STE being developed
 - 1st draft complete – loads have gone down and many test cases will be deleted or combined
 - Stress to perform another iteration on the load cases, then
 - Test in-house vs out of house decision can be made



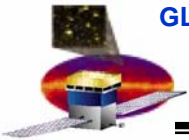
Open Flight Design Issues (cont)

- Radiator wiring nomenclature (closed for Mech, track in Sys Engr)
 - The temp sensors going to the Spacecraft are labeled #1 - 6 but they go to VCHPs #0 - 5.
 - Likewise the primary & redundant heater leads from the Heater Control Box to the reservoir heaters are labeled #1 - 6, but go to reservoirs #0 - 5.
 - This means that heater #1 & temp sensor #1 are on VCHP 0. This will surely cause confusion down the line.
- Current status
 - Radiator wiring will be labeled 0 – 5, IDD to be revised
 - CR will generated to change the Spacecraft ICD & labeling on Spacecraft to Radiator harness drawing to 0 - 5
 - PDU, SIU & Heater Control Box will remain unchanged (1 -6) with a plan to use a mapping table (per G. Haller)
 - Flight software counts VCHP's +Y 0 – 5 & -Y 0 – 5 get renamed 0 - 11
 - Instrumentation spreadsheet will be updated



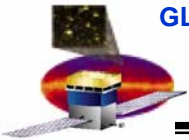
Open Flight Design Issues (cont)

- Radiator integration sequence
 - Coupon testing of repeated make & break of joint in process
 - Disassembly facilitated by use of mold release agent
- X-LAT MLI blanket billowing will violate stay clear
- Radiator MLI blanket and wiring violates stay clear
 - Working issue with LM & Spectrum Astro
 - S/C to LAT MLI design options in work with Spectrum Astro
 - Spectrum will not support MLI design effort at this time
- Radiator vibration requirements
 - Current proposal is pre & post low level sine sweep, sine vibe and Acoustic testing
 - Working with GSFC & LM to minimize & finalize requirements
 - Preliminary design of vibration test fixture complete.
 - Design concepts for Acoustic test fixture due 12/13/04



MECH Qualification Program

Qual Test	Status	ECD
Grid-Top Flange Heat Pipe bond process qual	Complete report in work.	Dec 04
Grid Box Assy Static Load test	Planning in work. Perform on Grid #2	Mar 05
X-LAT Plate Thermal Vac test	at LMMS	Feb 05
Radiator Variable Conductance Heat Pipe new extrusion	Passed burst test, heat capacity test after charging	Comp
Radiator Acoustic	at LMMS	Mar 05
Radiator Thermal Vacuum	at LMMS	May 05
TCS-Radiator Thermal Balance	Scope is changing. Need to define requirements	May 05

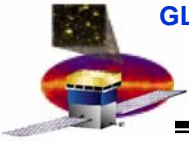


PMCS

- **Mech Sys (SLAC only) current schedule variance -\$250K**
 - **Driven by Static Load Test did not start**
- **Mech Sys (SLAC only) cum schedule variance -\$823K**
 - **Driven by late receipt of Grid #1, Grid #2, TCS hardware and Static Load Test did not start.**

- **Mech Sys (LM only) current cost variance -\$467K, and**
- **Mech Sys (LM only) cum cost variance -\$504K**
 - **LM is behind schedule and not on their headcount profile**
 - **18+ EM profile expected for next several months**
 - **Cost variance will grow at ~\$600K per month for those months**

- **Need to implement scope reductions presented in Face to Face meeting to contain these overruns**
 - **Radiator Vibe test**
 - **X-LAT Thermal Cycle vs Thermal Vac**
 - **Add consider deleting Acoustic Test**



Program Threats

- **Top threats to maintaining schedule**
 - **Grid Box is a pathfinder for Flight hardware operations in B33**
 - **Highly compressed, success oriented schedule**
 - **LM X-LAT & Radiator delivery have no float and LM manufacturing is not maintaining their schedule**
- **Top threats to staying within cost**
 - **LM staying on schedule**
 - **LM maintaining headcount profile, esp. planned roll-off**
 - **SLAC staying on schedule**
 - **Interdependencies with DAQ for fab, assy & test of TCS**