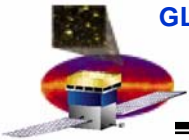


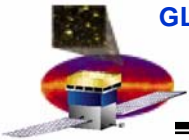
Mechanical Systems Mechanical / Thermal Hardware September 2004 Status

Marc Campell, Subsystem Manager

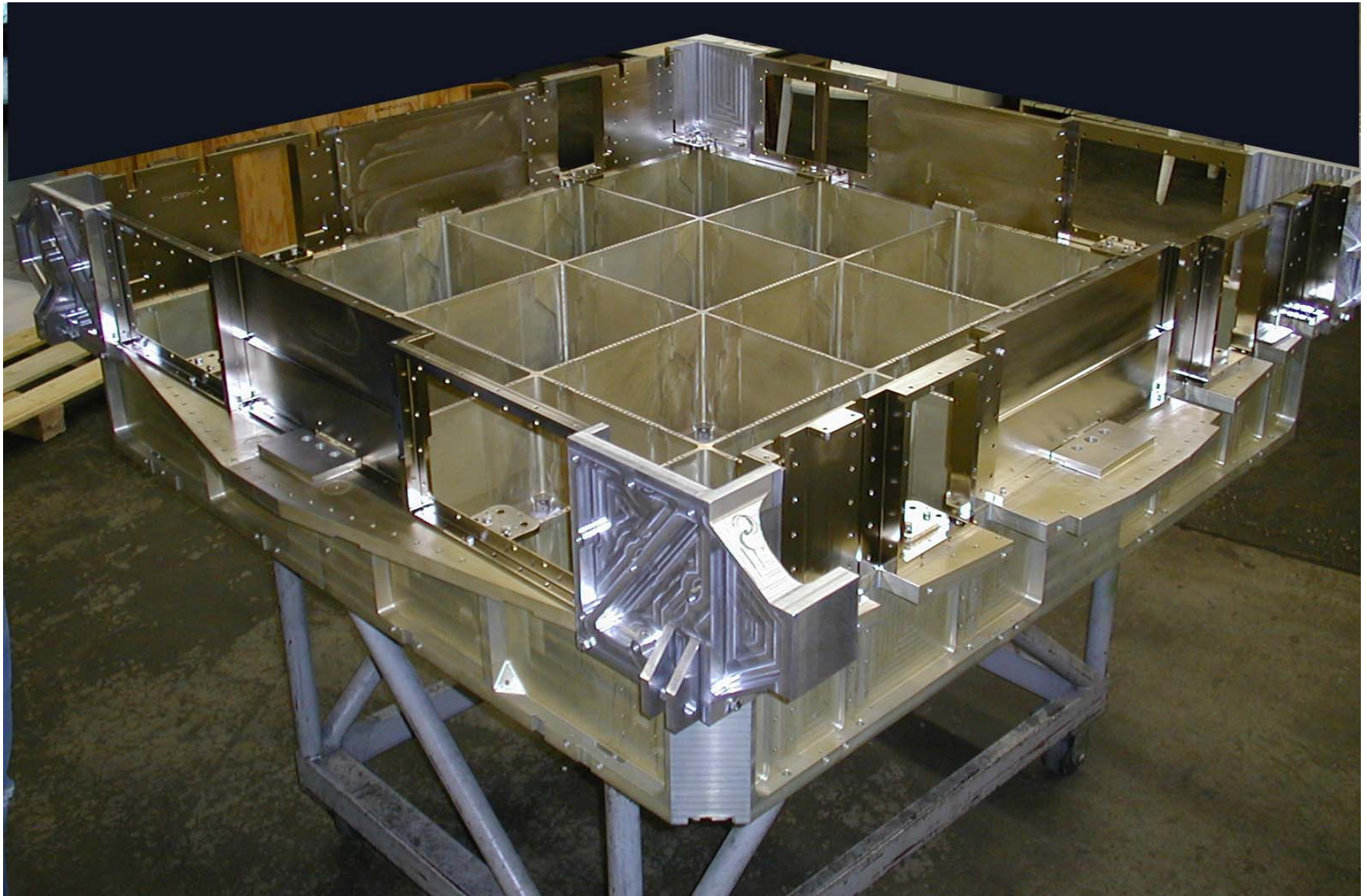


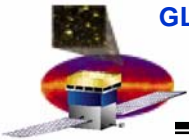
Accomplishments

- **Accomplishments during October.**
 - **Grid #1 - Grid Box Assembly machining operations complete**
 - **EMI and Radiator Mount Brackets successfully fit checked on Grid #1**
 - **Grid #2 finish machining 85% complete**
 - **A Manufacturing Readiness Review was held for the Grid assembly operations to be performed in B33. 15 action items were assigned, but in general we are ready to proceed pending SLAC's return to work.**
 - **LM completed bonding of the Variable Conductance Heat Pipes (VCHP) to the facesheets for both Radiators.**
 - **LM has completed bending, proof pressure testing and charging of the X-LAT Heat Pipes (XLHP).**
 - **Engineering EMI test of Radiator coupon completed**
 - **LM presented results to Fred Blanchete and Dave Nelson**
 - **Results were acceptable**
 - **Qual testing of thermostats completed 30,000 thermal cycle test – data under evaluation.**

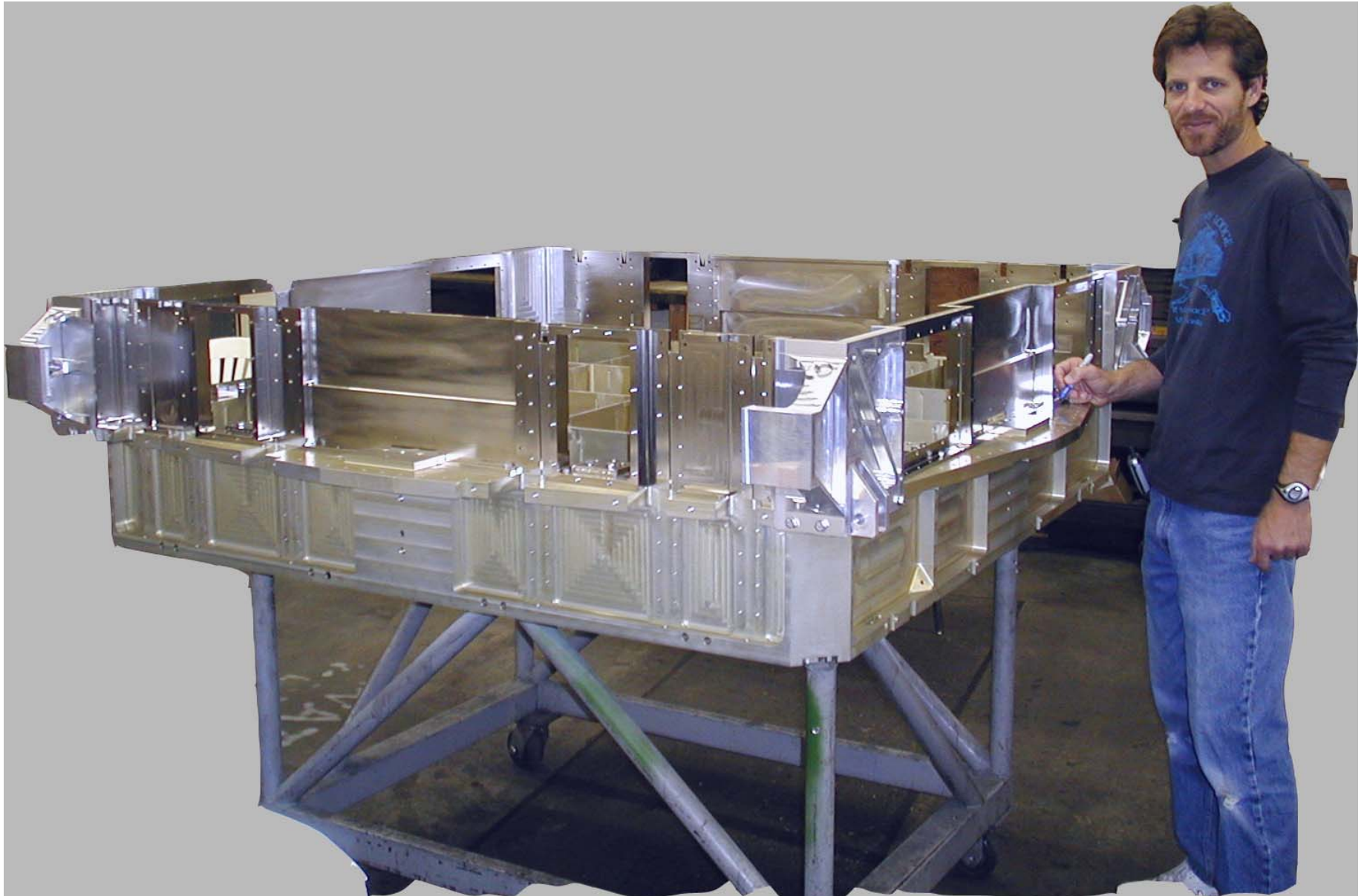


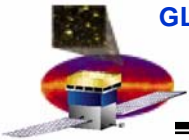
Grid Box #1 Fit Check





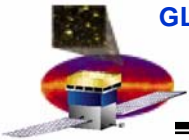
Grid Box #1 Fit Check





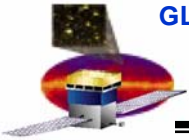
X-LAT Heat Pipes





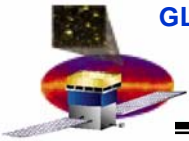
3 Month Milestones Oct - Dec

| Milestone Description | Original Date | Current Date | Major Reqmnts to Achieve Milestone | Notes |
|---|---------------|--------------|--------------------------------------|--------------------------------|
| Receive Grid #1, EMI skirts, details | 03/30/04 | 11/03/04 | pre-ship review | |
| Complete Grid Box Base Assy ops | 07/22/04 | 12/03/04 | All parts + MGSE in house | Complete |
| | | | Procedures in place | complete |
| | | | Hold MRR | complete |
| Procure Grid Assembly MGSE | 05/17/04 | 09/14/04 | | Complete |
| Grid Heat Pipe bond process Qual | 02/24/04 | 11/15/04 | write test report | |
| 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 | parts on order |
| | | | Grid thermostats | Qual test complete need report |
| Receive Grid #2, EMI skirts, details | 11/15/04 | 12/17/04 | Grid plating & grid box machining | EMI skirts complete |
| Grid #2 Static Load Qual Test | 12/16/04 | 02/28/05 | Load case analysis | prelim eval complete |
| | | | in-house vs out-house analysis | ECD 11/12 |
| | | | SOW, RFP & vendor selection | Dec |
| | | | MGSE & test fixture design | Dec |
| | | | MGSE & test fixture fab | Jan |
| | | | Test Readiness Review | Jan |
| Receive X-LAT plate | 12/09/04 | 01/15/05 | Complete X-LAT heat pipe fab | Complete |
| | | | Complete X-LAT plate assy | Dec |
| | | | Complete Thermal Vac testing | Jan |



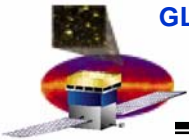
Drawing Release Plan

- **57 of 78 (73%) drawings released**
 - **15 MLI drawings have been added to MECH drawing list**
 - **4 unreleased parts not needed until I&T operations**
 - **Work started on these in Oct**
- **Known drawing revisions**
 - **Nov – 3 planned**
 - **X-LAT & Radiator IDD's**
 - **Grid Box Base Assembly**



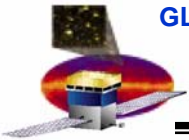
Concerns

- **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).**
- **X-LAT plate & Radiator delivery schedule**
 - **Ramp up in manufacturing progress is slower than expected**
 - **LM has been requested to provide an estimated cost at completion**



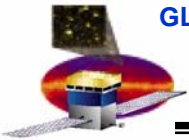
Open Flight Design Issues

- **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



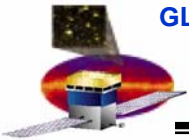
Open Flight Design Issues (cont)

- Radiator wiring nomenclature (new)
 - 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.
- 2 options
 - fix the wiring nomenclature
 - Affects labeling on several harness drawing
 - May affect PDU & SIU connector labeling on drawings
 - Affects Spacecraft ICD & labeling on Spacecraft harness drawing
 - Affects Instrumentation plan
 - Or – change the VCHP numbering from 0 – 5 to 1 – 6 to match current drawing
 - Affects LAT numbering document and others
 - Affects Radiator IDD
 - Affects Flight Software
 - Will contradict with existing thermal analyses and models



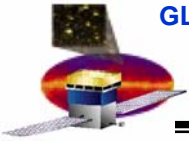
Open Flight Design Issues (cont)

- 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
- 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



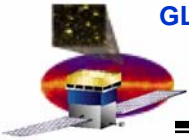
MECH Qualification Program

| Qual Test | Status | ECD |
|--|---|---------------|
| Grid-Top Flange Heat Pipe bond process qual | Complete report in work. | Nov 04 |
| Grid Box Assy Static Load test | Planning in work. Perform on Grid #2 | Feb 05 |
| 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 | 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) cum schedule variance -\$573K**
 - **Driven by late receipt of Grid #1, Grid #2 and TCS hardware**
 - **Delivery of Grid #1 in Nov and Grid #2 in Dec will remove ~ half of this**



Program Threats

- **Top threats to maintaining schedule**
 - **Grid delivery from Tapemation**
 - **Highly compressed, success oriented schedule**
 - **LM X-LAT & Radiator delivery have no float and LM manufacturing not maintaining schedule**
 - **Grid Box will be pathfinder for Flight hardware operations in B33**
- **Top threats to staying within cost**
 - **Staying on schedule**
 - **LM staying on schedule**
 - **Interdependencies with DAQ for fab, assy & test of TCS**