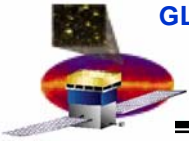


# **Mechanical Systems Mechanical / Thermal Hardware June 2004 Status**

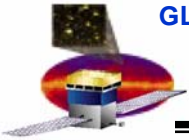
**Marc Campell, Subsystem Manager**



# Accomplishments

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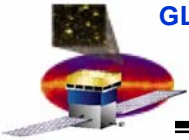
- **Accomplishments during July**
  - **Grid 1 - Spacecraft Interface Drilling Complete**
  - **Grid #1 in inspection prior to plating (next chart)**
  - **Grid #2 initial machining (after roughing) complete**
  - **3 way (Downspout, X-LAT & Radiator) heat pipe thermal joint trials complete**
  - **Process qualification tests for 1 of 3 top flange heat pipe samples complete**
  - **Radiator installation trials complete**
  - **Nader Farag started in Mechanical Engineer position**



## Tapemation Status

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- **Grid #1 in inspection**
  - Part looks good
  - There are true position out of tolerance conditions that are being evaluated. These should be acceptable based on fit checks with mating hardware or bonus tolerance available from maximum material condition dimensioning
  - Discrepancies will be reviewed prior to shipping to platers
- **Alodine shop (Sanford) is standing by**
  - QA survey complete
  - Grid handling fixtures will be provided to them by Tapemation
- **Brush Nickel shop (Platron) is also ready**
  - QA survey complete
  - Discussed drawing requirements changes with Platron to improve schedule
  - Drawing is being revised
- **Radiator Mount Brackets needed for next assembly machining**
  - Slightly behind schedule

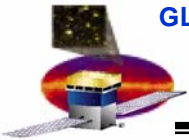


## Tapemation Status (con't)

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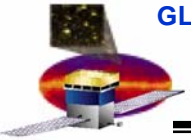
### Milestones

- **Grid inspection complete 8/2, ECD 8/5**
- **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**

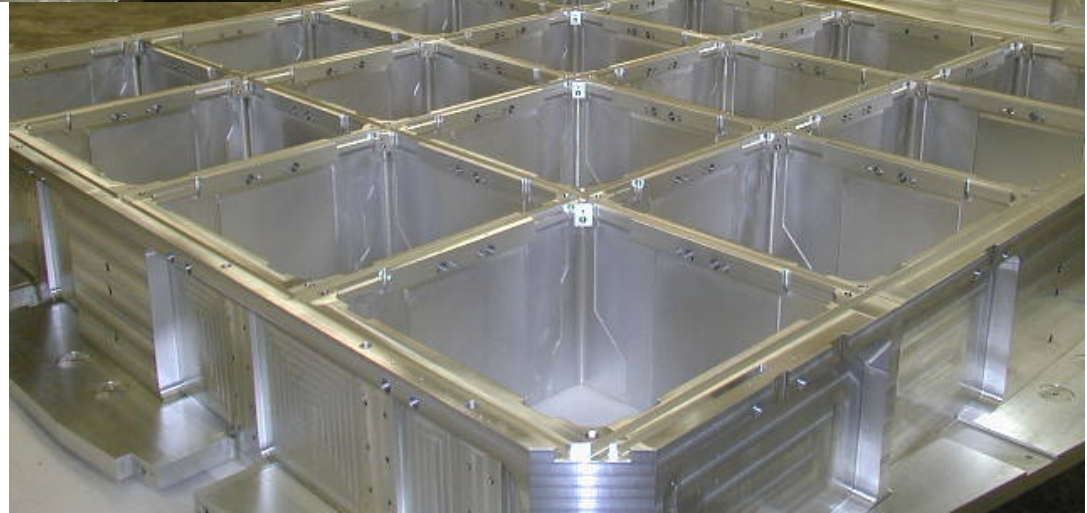


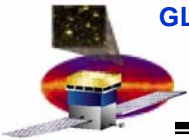
# Grid #1 Inspection





# Grid 1

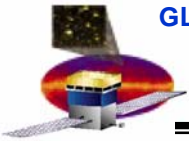




# 3 Month Milestones July - Sept

## Near-term Milestones July - Sep

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Deliver Grid to I&T	07/22/04	09/15/04	All parts + MGSE in house	on order
			Procedures in place	in work
			Hold MRR	ECD 8/24/04
Receive Grid #1, EMI skirts, details	03/30/04	09/08/04	Grid inspection	
Grid #2 start machining	03/01/04	06/30/04	started	
Release Grid Box Assy Procedures	04/15/04	07/16/04		in work
Procure Grid Assembly MGSE	05/17/04	07/14/04		on order
Grid Heat Pipe bond process Qual	02/24/04	07/16/04		testing started
Design Heater Control Box	08/19/04	08/19/04	in work	
Order TCS electronics components	01/30/04			activity started
Order TCS flight hardware Heaters, thermostats & thermistors	12/19/03	06/30/04	LM procured TCS components	parts on order
			Grid heaters	ordered
			Grid thermostats	parts in house now Qual test pending

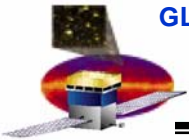


## Drawing Release Plan

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- **58 of 64 (91%) drawings released**
  - **Parts needed during I&T operations**
- **Known drawing revisions**
  - **July – 13 released (Grid Box Machining, EMI skirts)**
  - **Aug – 3 planned (X-LAT & Radiator IDD's, Grid plating)**

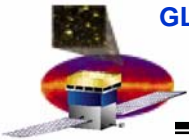




## Concerns

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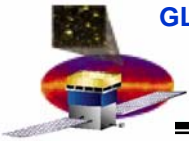
- **Grid to I&T delivery date – schedule continues to compress.**
- **Grid thermal control components & Downspout Heat Pipe to Grid thermal joint are not verified until LAT T/Vac test. Difficult to access these components at this level (remove Radiators & ACD).**
- **X-LAT plate & Radiator delivery schedule have no float remaining due to late starts and manufacturing has just begun**



## Open Flight Design Issues

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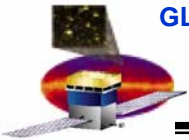
- **TCS – location of Grid heaters, thermostats, RTD's and associated wiring needs to be finalized (top assembly drawing)**
  - **Grid thermostats will operate at 35V & 1A; 42V failure mode**
  - **Qualification testing of parts underway**
  - **Watching PRT contamination issue discovered by ACD; LM 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**
  - **Hired a Mechanical Engineer for this task**



## Open Flight Design Issues (cont)

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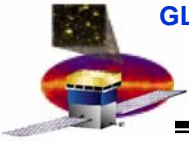
- Radiator integration sequence
  - Wet joint trials underway.
  - Disassembly facilitated by use of mold release agent
- Radiator level EMI test was deleted
  - Engineering test of coupon will be performed
- X-LAT MLI blanket billowing will violate stay clear
- Radiator MLI blanket violates stay clear
- 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

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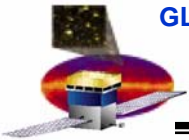
<b>Qual Test</b>	<b>Status</b>	<b>ECD</b>
<b>Grid-Top Flange Heat Pipe bond process qual</b>	<b>In work</b>	<b>Aug 04</b>
<b>Grid Box Assy Static Load test</b>	<b>Planning in work. Perform on Grid #2</b>	<b>Feb 05</b>
<b>Grid Box Assy Thermal Cycle test</b>	<b>Plan to delete test</b>	
<b>X-LAT Plate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



## PMCS

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- Lockheed Martin current period cost variance \$191K and
- Lockheed Martin cum cost variance \$27K
  - Due to over accrual input into system last month
  - Corrected this month
  
- Mech Sys (SLAC only) current period schedule variance -\$177K and
- Mech Sys (SLAC only) cum schedule variance -\$290K
  - Driven by late receipt of Grid #1



# Program Threats

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- **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**