



Mechanical Systems Mechanical / Thermal Hardware July 2004 Status

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The logo features a stylized satellite or space station component in the foreground, with a colorful, multi-layered circular graphic behind it, possibly representing a heat pipe or a similar thermal system. The colors include red, orange, yellow, and blue.

Accomplishments

- **Accomplishments during August**
 - **Grid #1 inspection prior to plating complete**
 - 15 issues found
 - MRB approved disposition of these items
 - **Grid #1 alodine operations complete**
 - Brush Nickel operations started
 - **Grid #2 finish machining in process**
 - **Process qualification tests for 2 of 3 top flange heat pipe samples complete (I&T techs performing)**
 - **Variable Conductance Heat Pipe (VCHP) qualification complete**
 - Burst, heat capacity and shut off testing
 - **All flight VCHP's charged and leak tested**
 - **X-LAT Heat Pipe bonding trials successfully completed**

Grid #1 Alodine Processing



The logo for the GLAST LAT Project, featuring a stylized satellite or probe with a yellow and red circular base and a black rectangular top section.

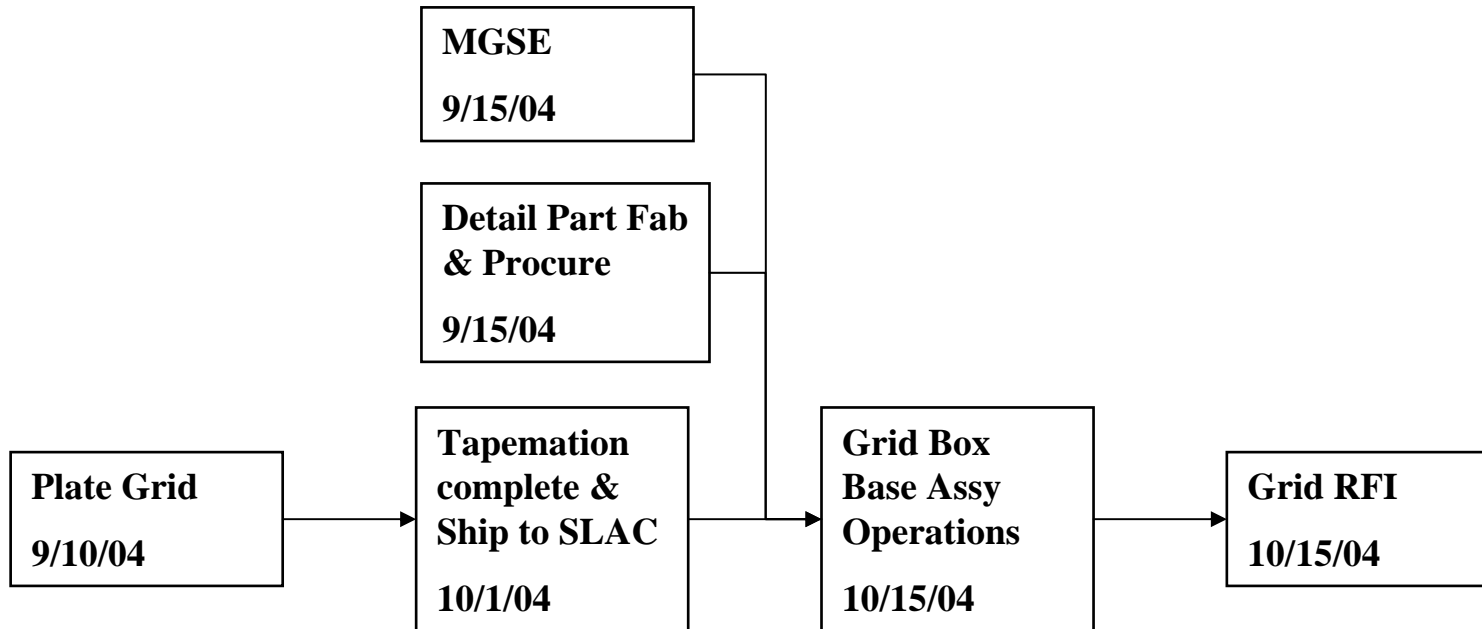
Tapemation Status

- **Grid #1 at Brush Nickel shop (Platron)**
 - **Drawing revised to improve producibility**
- **Radiator Mount Brackets and EMI skirts needed for next assembly machining**
 - **All parts completed machining – out for electroless nickel plating**

Milestones

- **Plating complete 9/10**
- **Grid Box Machining complete 9/22**
- **Final hardware installation 9/28**
- **Clean, inspect pre-ship review 9/29**
- **Ship to SLAC 10/1**

Grid Critical Path



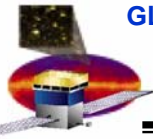
3 Month Milestones Aug - Oct

Milestone Description	Original Date	Current Date	Major Reqmnts to Achieve Milestone	Notes
Receive Grid #1, EMI skirts, details	03/30/04	10/01/04	Grid plating & grid box machining	
Deliver Grid to I&T	07/22/04	10/15/04	All parts + MGSE in house	ECD 9/15
			Procedures in place	in review
			Hold MRR	ECD 9/24/04
Release Grid Box Assy Procedures	04/15/04	09/16/04		<i>in work</i>
Procure Grid Assembly MGSE	05/17/04	09/14/04		<i>on order</i>
Grid Heat Pipe bond process Qual	02/24/04	09/16/04		<i>testing started</i>
Design Heater Control Box	08/19/04	10/19/04	in work	
Order TCS electronics components	01/30/04			<i>activity started</i>
Order TCS flight hardware Heaters, thermostats & thermistors	12/19/03	10/30/04	LM procured TCS components	parts on order
			Grid thermostats	parts in house now
				Qual test pending

The logo for the GLAST LAT Project, featuring a stylized satellite or space station component with a blue and white base and a yellow and red top section, set against a dark background with a starry sky.

Drawing Release Plan

- **54 of 60 (90%) drawings released**
 - **Unreleased parts not needed until I&T operations**
- **Known drawing revisions**
 - **Aug – 5 released**
 - **Sep – 4 planned (X-LAT & Radiator IDD's, Grid as built, Grid box machining)**



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**

The logo for the GLAST LAT Project, featuring a stylized satellite or probe with a circular base and a rectangular top section, set against a background of a globe and a starry sky.

Open Flight Design Issues

- **TCS – location of Grid thermistors, fly away instrumentation 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**
 - **1000 of 30,000 cycles completed**
- **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**
 - **Cost & schedule impacts will be evaluated**
- **Define GBA Static Load test requirements & plans**
 - **Interface loads developed**
 - **Detailed load cases & STE being developed**
 - **Hired a Mechanical Engineer for this task**

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Open Flight Design Issues (cont)

- Radiator integration sequence
 - Initial wet joint trials completed.
 - Evaluation of repeated make & break of joint will be evaluated
 - Disassembly facilitated by use of mold release agent
- Radiator level EMI test was deleted
 - Engineering test of coupon started
 - Coupon is not passing – fixes are under investigation
- 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
- 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	In work	Sep 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 04
Radiator Thermal Vacuum	at LMMS	May
TCS-Radiator Thermal Balance	Scope is changing. Need to define requirements	May 05

PMCS

- **Mech Sys (SLAC only) current period schedule variance -\$110K and**
 - **\$53K associated with Thermal Cycle test which was removed from PCMS**
 - **Remainder for TCS and Grid assembly**
- **Mech Sys (SLAC only) cum schedule variance -\$400K (less \$53k)**
 - **Driven by late receipt of Grid #1**

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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 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**
 - **Cost of work arounds to improve schedule**
 - **Interdependencies with DAQ for fab, assy & test of TCS**