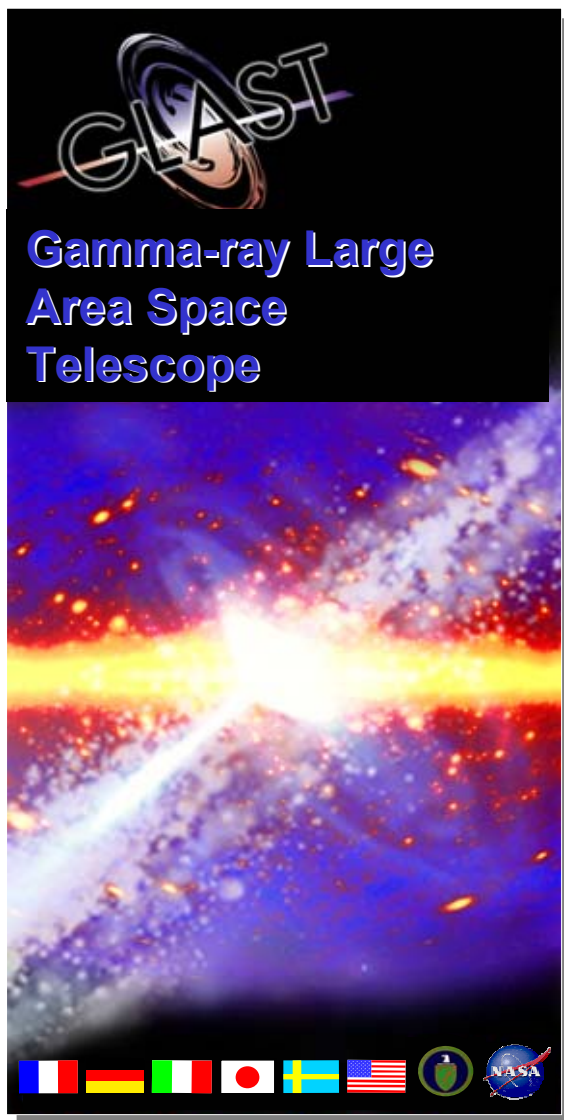


## Engineering Meeting

## Risk Management Status

**Bob Marcellini**  
**Marcelli@slac.stanford.edu**  
**650-926-2473**



The logo for the GLAST LAT Project, featuring a stylized satellite or space station with a colorful orbital path around a central point.

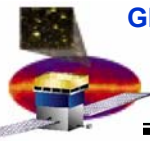
# Risk Management Status

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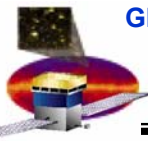
- Inputs received from all subsystems except CAL
- Reviewed with RRB and identified improvements to the database which are being incorporated
- Objective is to tune inputs to get clearer action and closure plan
- Selected 11 Risks to review today as examples
- Next Steps –
  - D. Horn & B. Marcellini will arrange with each Subsystem Manger a time to discuss and update each input (complete by 3/5)
  - Develop a roadmap to stay on top of actions
  - These risks will provide consistent format for discussions at Peer Review, CDR, Qtrly Reviews etc.

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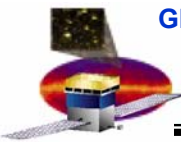
<b>Originator:</b>	Johnson, Robert
<b>Risk Manager:</b>	Johnson, Robert
<b>Risk Date:</b>	19-JAN-2003
<b>Risk Description:</b>	Low Tracker MCM yield. Each MCM holds 26 ICs. The MCMs are tested before encapsulation, to allow for rework. However, rework is costly, and too much rework could make it impossible to hold the schedule and budget. We need it to be the exception, rather than the rule, but so far, in the EM run, rework involving IC replacement was needed on the majority of MCMs.
<b>Risk Mitigation:</b>	Screening and handling procedures need to be improved.
<b>Risk Impact Assessment:</b>	Possible delay in tower assembly and increased labor cost at Teledyne.
<b>Risk Mitigation Implementation Plan:</b>	1. (Johnson, Sugizaki) Improve IC screening. The GTRC chips were not screened for the EM, some features of the GTFE were not screened, and the screening was at only 2 MHz due to technical problems. These systems will be improved and tested. An inker is being added to the probe station to remove human error in die sorting. We also may need to reject close to the wafer edge. (Date) 2. (Johnson, Ziegler) Improve IC handling. Detailed procedures are being written. (Date) 3. (Borden) Improve testing of the MCM PWB prior to assembly and again prior to die attach. (Date) 4. (Johnson, Sugizaki) Improve the MCM test software to speed up localization, of a bed IC. (Date) 5. Improve IC design (done), especially to remove the G-chip oscillation problem.
<b>Risk Probability:</b>	3
<b>Risk Type:</b>	Cost, Schedule
<b>Technical Impact Assessment:</b>	Very Low
<b>Cost Impact Assessment:</b>	Moderate
<b>Schedule Impact Assessment:</b>	Moderate
<b>Risk Period:</b>	Mid-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	TKR



<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Thompson, Dave
<b>Risk Manager:</b>	Thompson, Dave
<b>Risk Date:</b>	17-JAN-2003
<b>Risk Description:</b>	Design flaw in flight ASIC
<b>Risk Mitigation:</b>	Five foundry runs, comprehensive test program, and peer reviews. Contingency plan: Replace with newly designed ASICs
<b>Risk Impact Assessment:</b>	The analog and digital ASICs are in line with all the ACD data flow. If they fail to meet requirements, so does the ACD.
<b>Risk Mitigation Implementation Plan:</b>	(1) Receipt from foundry 4/30/03 (2) Quick look 5/5/03 (3) AT complete 5/23/03 (4) Develop Recovery Plan 3/5/03
<b>Risk Probability:</b>	3
<b>Risk Type:</b>	Technical, Cost, Schedule
<b>Technical Impact Assessment:</b>	Moderate
<b>Cost_Impact_Assessment:</b>	Moderate
<b>Schedule Impact Assessment:</b>	High
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	ACD



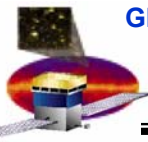
<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Haller, Gunther
<b>Risk Manager:</b>	Haller, Gunther
<b>Risk Date:</b>	23-JAN-2003
<b>Risk Description:</b>	Tower Power Supplies Cost & Schedule of supplies depend on bids received in response to RFP to be sent out end of Jan-03. Bidding cycle 4-weeks.
<b>Risk Mitigation:</b>	(1) Needs Bids and select supplier by April 1, 2003. (2) Increase funding to accelerate schedule
<b>Risk Impact Assessment:</b>	(1) Increase in cost requires CCB action. (2) Delay in schedule will delay availability to I&T
<b>Risk Mitigation Implementation Plan:</b>	(1) Bids expected 3/11/03 (2) Assess schedule problem (3) Determine cost impact to maintain schedule (4) Pursue CCB Approval
<b>Risk Probability:</b>	3
<b>Risk Type:</b>	Cost, Schedule
<b>Technical Impact Assessment:</b>	Moderate
<b>Cost_Impact_Assessment:</b>	Moderate
<b>Schedule Impact Assessment:</b>	Moderate
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	ELECTRONICS



<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Campell, Marc
<b>Risk Manager:</b>	Campell, Marc
<b>Risk Date:</b>	28-JAN-2003
<b>Risk Description:</b>	CAL to Grid friction joint does not perform as designed. The critical joint properties (coefficient of friction and bolt clamping force) can not be directly verified before or after environmental test.
<b>Risk Mitigation:</b>	EM testing of joint and FE model verification. Maintain large design margins for joint load capability.
<b>Risk Impact Assessment:</b>	LAT test program may not be able to detect if slippage has occurred. Launch is only time LAT sees combined dynamic, thrust and acoustic environment.
<b>Risk Mitigation Implementation Plan:</b>	(1) EM Test completed (Date) (2) FE Model Verification (Date) (3) Independent analysis complete (Date)
<b>Risk Probability:</b>	2
<b>Risk Type:</b>	Technical
<b>Technical Impact Assessment:</b>	Very High
<b>Cost_Impact_Assessment:</b>	Low
<b>Schedule Impact Assessment:</b>	Very Low
<b>Risk_Period:</b>	Long-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	ACD, TKR, CAL, MECHANICAL

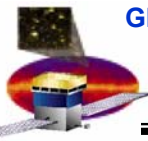
[Update Record](#) [Return to Listing](#)

<b>Originator</b>	Thompson, Dave
<b>Risk Manager:</b>	Horn, Dick
<b>Risk Date:</b>	17-JAN-2003
<b>Risk Description:</b>	Requirements that the ACD must meet could change, forcing a redesign, loss of performance, or potentially loss of the ACD from inability to meet such requirements. External ACD requirements not under final signature release may change; resulting in cost & schedule impact.
<b>Risk Mitigation:</b>	(1) ACD engineers and managers will keep LAT management informed immediately when new requirements seem to appear. In coordination with the LAT Systems Engineering group, we will maintain a table of open items involving requirements on the ACD. (2) LAT systems engineering will help resolve these issues in a timely fashion.
<b>Risk Impact Assessment:</b>	This has already been a problem. Some examples: The orbital debris model has changed. A change in the orbit and related environmental requirements has been proposed. We have completed CDR without a final IDD. The latest version from the Mechanical group requested a change in location of our primary mounting holes. This could require complete redesign and reanalysis of the ACD primary structure. The recent draft of the LAT Environmental specification contains a number of new requirements that the ACD has not designed to, such as a qualification temperature of -50 C for the Tile Shell Assembly. In light of this experience, and especially the fact that we need to start building flight hardware soon, we consider the risk of further changes in requirements to be very high. The impact of trying to meet new requirements - redesign, reanalysis, and rebuilding after starting flight hardware fabrication - is very serious in all areas: cost, schedule, technical.
<b>Risk Mitigation Implementation Plan:</b>	(1) Table of open items created and statused on a weekly basis (or more frequently as required) (2) IDD final draft under ACD review, comments by (Date). (3) IDD release target (Date) (4) Environmental Specification under review by GSEFC, target release by 13 March. (5) Process in place to require impact assessment and LAT IPO approval before implementing any requirement changes.
<b>Risk Probability:</b>	5
<b>Risk Type:</b>	Programatic, Technical, Cost, Schedule
<b>Technical Impact Assessment:</b>	Very High
<b>Cost_Impact_Assessment:</b>	
<b>Schedule Impact Assessment:</b>	Very High
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	ACD

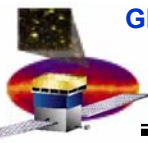


<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Campell, Marc
<b>Risk Manager:</b>	Campell, Marc
<b>Risk Date:</b>	28-JAN-2003
<b>Risk Description:</b>	Maturing spacecraft design may result in late changes in Instrument/SC interfaces; resulting in LAT design changes past I-CDR and associated cost; schedule impact
<b>Risk Mitigation:</b>	Identify priority of detailed I/T design tasks with Spectrum via ongoing working groups
<b>Risk Impact Assessment:</b>	Potential change could occur as Spectrum Astro proceeds to their PDR
<b>Risk Mitigation Implementation Plan:</b>	(1) Identify key I/F's driving detailed design by Peer Review 26 March. (2) Complete final Interface drawings by 28 March to support final S/C-LAT ICD release. (3) Finalize CG and document of internal agreements 28 March. (4) Develop and agree upon closure plan with Spectrum for all issue identified in (1), by 26 March
<b>Risk Probability:</b>	2
<b>Risk Type:</b>	Programatic
<b>Technical Impact Assessment:</b>	Low
<b>Cost_Impact_Assessment:</b>	Moderate
<b>Schedule Impact Assessment:</b>	Moderate
<b>Risk_Period:</b>	Mid-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	CAL, MECHANICAL

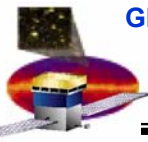




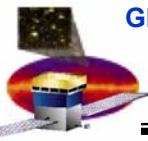
<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Bloom, Elliott
<b>Risk Manager:</b>	Bloom, Elliott
<b>Risk Date:</b>	17-JAN-2003
<b>Risk Description:</b>	Finalization of all LAT test plan requirements may not be complete by CDR; resulting in potential compressed schedule and increased cost for I&T
<b>Risk Mitigation:</b>	(1) Identify and track open test plan issues (2) Identify required decision dates to support I&T development
<b>Risk Impact Assessment:</b>	
<b>Risk Mitigation Implementation Plan:</b>	(1) Decision point for radiator on or off during acoustic test established 15-AUG-03 (Allows complete mechanical analysis evaluation) (2) End to end functional & performance evaluation audit to be completed by System Eng in support of CDR 4/18/03 (3) Airplane test, thermal cycle & Van der Graaf tests contingent on above audit, test planning WG (Leisgang, Ritz, Bloom) to form recommendations to Althouse by 4/18/03
<b>Risk Probability:</b>	4
<b>Risk Type:</b>	Programatic, Cost, Schedule
<b>Technical Impact Assessment:</b>	
<b>Cost_Impact_Assessment:</b>	High
<b>Schedule Impact Assessment:</b>	Moderate
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	CAL, MECHANICAL, THERMAL, I&T, PROGRAMATTICS



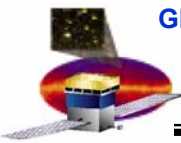
<a href="#">Update Record</a>	<a href="#">Return to Listing</a>
<b>Originator</b>	Johnson, Robert
<b>Risk Manager:</b>	Johnson, Robert
<b>Risk Date:</b>	22-JAN-2003
<b>Risk Description:</b>	MCM-SSD CTE mismatch. The Tracker MCMs and the SSDs are connected by wire bonds, which are to be encapsulated. This interface is not yet tested. Since it goes the full width of a tray, there is a risk of damage from movement during thermal cycling.
<b>Risk Mitigation:</b>	The flight MCMs are to be fabricated in Polyimide instead of FR4, to lower the CTE (Aramid was considered but has other undesirable features). The encapsulation will be Nusil silicone, as in the ladders, which allows some movement with low stress. The interface needs to be tested on the EM.
<b>Risk Impact Assessment:</b>	Critical Path Impact
<b>Risk Mitigation Implementation Plan:</b>	Build a complete functional engineering-model tray (Date)(two MCMs) in addition to the ones in the mini-tower, and put it through full qualification-level thermal-vacuum testing. (Date)
<b>Risk Probability:</b>	3
<b>Risk Type:</b>	Technical
<b>Technical Impact Assessment:</b>	Moderate
<b>Cost_Impact_Assessment:</b>	High
<b>Schedule Impact Assessment:</b>	High
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	TKR



<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Johnson, Robert
<b>Risk Manager:</b>	Johnson, Robert
<b>Risk Date:</b>	24-JAN-2003
<b>Risk Description:</b>	Tray-panel fabrication start-up. Fabrication of tray panels at Plyform needs to start in early March (i.e. pre-CDR) unless the rate can be made to exceed current predictions. We have not yet seen a plan from Italy/Plyform on how to accomplish this, nor have we seen any documentation.
<b>Risk Mitigation:</b>	SLAC assistance to Pisa in getting documentation and materials in place.
<b>Risk Impact Assessment:</b>	Critical path impact
<b>Risk Mitigation Implementation Plan:</b>	Acquire Carbon-Carbon material early from SLAC (done). Procure cores from SLAC (in progress, urgent). Tom Borden travel to Plyform in early February to assist with planning and documentation.
<b>Risk Probability:</b>	4
<b>Risk Type:</b>	Schedule
<b>Technical Impact Assessment:</b>	Moderate
<b>Cost_Impact_Assessment:</b>	High
<b>Schedule Impact Assessment:</b>	High
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	TKR



<a href="#">Update Record</a>	<a href="#">Return to Listing</a>
<b>Originator</b>	Campell, Marc
<b>Risk Manager:</b>	Campell, Marc
<b>Risk Date:</b>	28-JAN-2003
<b>Risk Description:</b>	X-LAT plate to Electronics box thermal joint does not perform as designed.
<b>Risk Mitigation:</b>	(1) Prototype (2)EM testing will verify joint performance
<b>Risk Impact Assessment:</b>	Higher than predicted E-box temperatures would shorten lifetime of certain electronic components
<b>Risk Mitigation Implementation Plan:</b>	(1) Prototype completed (date) (2) EM test complete (date) (3) Detailed electronic box thermal analysis available (date)
<b>Risk Probability:</b>	3
<b>Risk Type:</b>	Technical
<b>Technical Impact Assessment:</b>	High
<b>Cost_Impact_Assessment:</b>	Moderate
<b>Schedule Impact Assessment:</b>	High
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	Design, fab and test prototypes of thermal joint.
<b>Current Status:</b>	
<b>Affected Systems:</b>	CAL, ELECTRONICS, MECHANICAL, THERMAL



<a href="#">Update Record</a> <a href="#">Return to Listing</a>	
<b>Originator</b>	Johnson, Robert
<b>Risk Manager:</b>	Johnson, Robert
<b>Risk Date:</b>	28-JAN-2003
<b>Risk Description:</b>	<p>Procurement of MCM components. MCM production at Teledyne needs to start soon to have MCMs ready to accept ASICs in late May. The design includes parts that are not yet approved but have 8-week lead times (the connectors), parts for which we have been working for a long time for approval without complete closure (polyfuses), and parts for which we do not have agreement on fabrication specifications (the PWB and flex). Furthermore, our success rate at SLAC for procuring these items for the EM was poor. We need Teledyne on contract to help us handle these procurements. The LAT parts specialist to date has never made any contacts with Teledyne.</p>
<b>Risk Mitigation:</b>	Contract with Teledyne to procure most of the parts and do all of the parts receiving.
<b>Risk Impact Assessment:</b>	Critical path impact.
<b>Risk Mitigation Implementation Plan:</b>	<p>Have a meeting at Teledyne, including Nick Virmani, as soon as possible to iron out the contract and specifications to be used for MCM PWB and flex procurements and specifications to be used for MCM assembly. Action also needs to be taken on the Omnetics nano-connectors to get them approved for flight.</p>
<b>Risk Probability:</b>	5
<b>Risk Type:</b>	Schedule
<b>Technical Impact Assessment:</b>	Moderate
<b>Cost_Impact_Assessment:</b>	High
<b>Schedule Impact Assessment:</b>	High
<b>Risk_Period:</b>	Near-Term
<b>Summary of Risk Resolution:</b>	
<b>Current Status:</b>	
<b>Affected Systems:</b>	