GLAST Monthly PSR-December 2003

System Engineering

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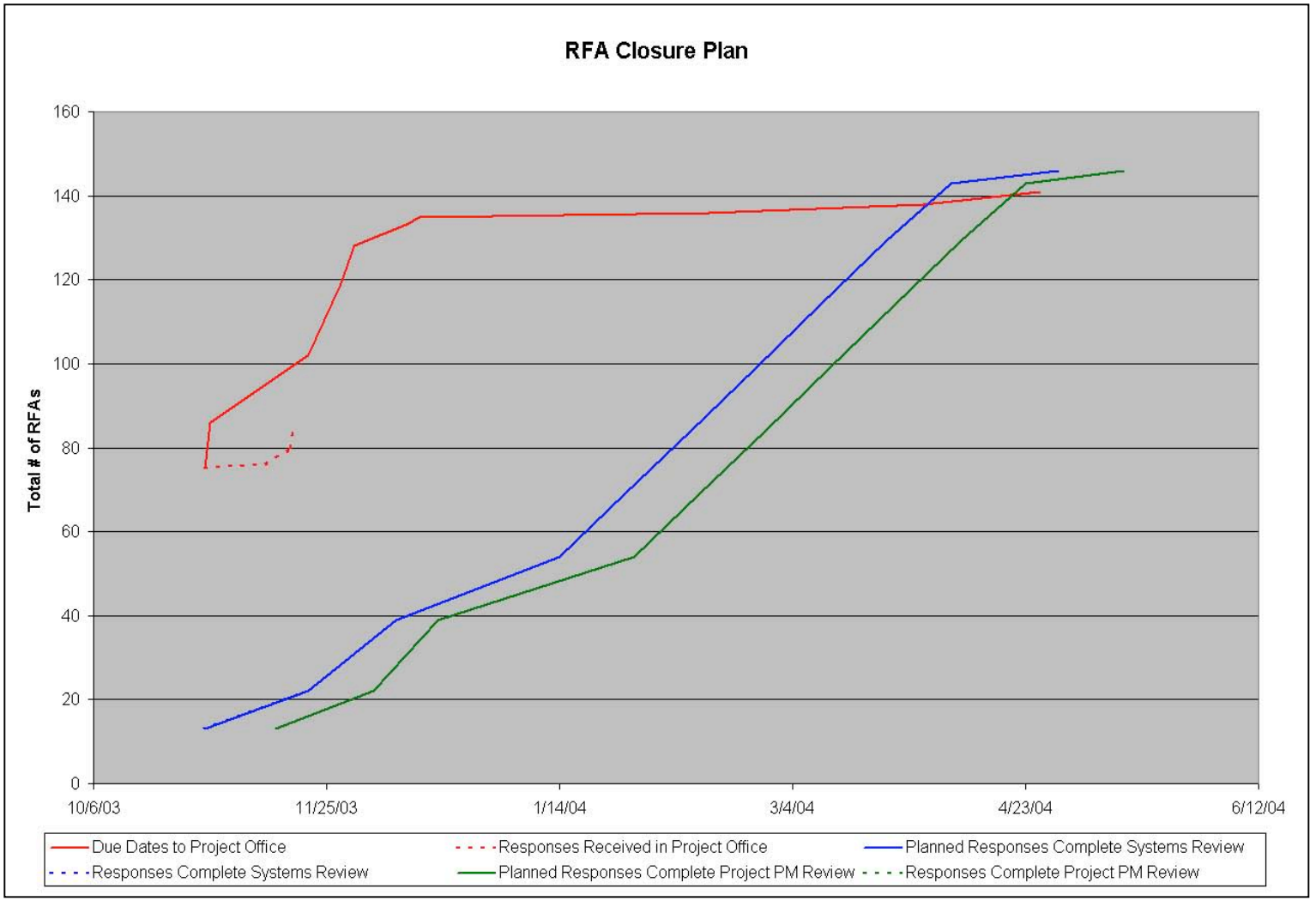
RFA Status

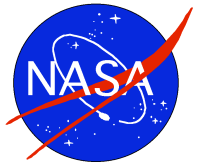
- Reviewed 29 RFA responses with systems & discipline engineers on 11/21, 19 approved, 10 needed additional review or updates based on comments received
- 13 RFA responses sent to PM for review on 10/16, awaiting final approval before sending to Originators, 19 additional responses sent to PM for review on 12/3
- Received 3 additional RFA responses from SLAC this month
- Awaiting updated responses from Spectrum based on previous comments
- Reviewed the open LAT PDR & delta PDR RFAs and assigned actions to close each
- Generated a closure plan for receipt and approval of all RFA responses, already behind Spectrum, SLAC, and Project have missed submittal dates
- RFA tracking tool now on-line on the NGIN website under "Engineering Files". Only Project Office access to these files

		Systems Review Status		Project Review Status		Code 300 Status	
Review	**Total # of RFAs**	**In Review**	**Complete**	**In Review**	**Complete**	**# Closed**	**Notes**
Mission SRR	22		22		22	22	All Closed
LAT PDR	57	9	48	5	43	43	All Closed
GBM PDR & FSW PDR	27	4	23		23	23	4 Open, 1 Withdrawn
LAT delta PDR	20	3	17		17	17	3 Open
SC PDR	43	10	10	10			All Open
SC FSW PDR	14	5	1	1			All Open
LAT CDR	37	20	2	2			All Open
MPDR	14	3	6	6			All Open
GS SRR	17	4	8	8			All Open
Totals	251	58	137	32	105	105	

RFA Closure Plan



GLAST Project CCR Status



- ***No CCBs held in November***
  - *2 deferred CCRs (0184 & 0185, SIIS/SDIS) were updated per the CCB action and approved.*
  - *1 additional action to resubmit the Digital Photos CCR as R1*
- ***Currently there are 18 CCRs in the System***
  - *Discussing EMI Requirements today (CCR 0205), SAI needs SSR EMI requirements by 12/12 or cost/schedule impact; if signed out of board, we should also review CCR 0206, the EMI CDRL delivery dates*
  - *Plan to schedule next CCB for week of 12/15; agenda to include Rebaseline GSRD & Ops Con, SSMAP, Slews per Orbit, TVAC Dwell Time, LAT Quasi-Static Limit Load Factors, LAT-SC Radiator Interface Pad Size, SEMP updates for Lessons Learned and Metric Units and CDRL 1 updates*
  - *Still need SAI response for Increasing SC Power Capability to LAT*
    - *Spectrum position is they can modify solar array later, so why force them to make a decision now*
  - *Working with SAI on comments to the ITAR document*

Independent Safe Mode Processor Status

- ***Independent Safe Mode Processor (ISMP) Status***
  - *Stop work order issued for Independent Safe Mode CSCI (software load part of mission computer)*
  - *ISMP Special Study # initiated - concern is lack of RAD750 flight heritage*
  - *Separate and distinct processor from RAD750 for safe mode applications*
  - *Three requirements iterations in last 3 weeks between project and Spectrum*
  - *"Final" Special Study requirements set available to be delivered*
- ***Spectrum Astro Special Study short term schedule***
  - *12/5 Requirements due from GPO (REQUIREMENTS FROZEN)*
  - *12/12 Feedback discussion/Trades Discussion (DESIGN FROZEN)*
  - *12/29 Discuss Midterm results*
  - *Project desires face-to-face in mid December*
- ***Requirements with significant cost impact***
  - *Communications / Data Storage – Storage and downlink of data critical for diagnostics and recovery operations*
  - *Simultaneous processor operations and re-programmability*
  - *1553 data bus interface (for SIRU) – need for SIRU tied to communications management operations plan*

Accomplishments

- ***Project proceeding with 5 Mil Solar Array Kapton***
  - *NTE ROM from Study #9 overdue*
- ***Burst Alert Latency estimates being refined***
  - *Current estimate is ~7-9 seconds*
  - *Will discuss with S. Ritz and N.Gerhls to determine if acceptable*
- ***GLAST Orbital Debris Assessment Report on hold***
  - *Awaiting meeting with Deputy AA Code S to determine if removal of propulsion system is viable from a Code S perspective*
    - *If viable (removal of prop system viable), next step to meet jointly with Code Q*
    - *If not, thanks for all the hard work*
  - *ODA Report will be modified accordingly and sent to HQ*

Observatory STOP Analysis Status

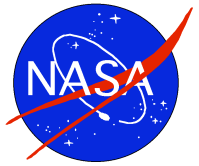
- ***Cycle 1: Unit Thermal Gradient Analysis (UTGA) w/ delta-PDR Models***
  - *SAI completed unit thermal gradient analysis using delta-PDR models with updated thermal properties (CTEs) and LAT boresight definitions*
    - *Thermal/mechanical distortions < 6 arc-sec per 1 deg C in all axes (X,Y,Z)*
- ***Cycle 2: UTGA w/ interim LAT CDR models and Four Static Thermal Case Analysis***
  - *SAI to perform unit thermal gradient analysis using updated models*
    - *11/15 - SAI integrated LAT & SC models and perform model checkout*
    - *12/08 – SAI to perform unit thermal gradient analysis (compare to Cycle 1 results)*
  - *SAI to perform static case runs using integrated observatory models*
    - *11/25 – SAI completed initial run with four static thermal cases; provide results to GPO*
    - *12/05 – GPO-Thermal and Swales refine mapping and provide four static load cases to SAI*
    - *01/07 – SAI to complete four static case runs*
    - *01/21 – Spectrum to provide static thermal case analysis results*
- ***Cycle 3: Observatory-Level STOP Analysis using final LAT CDR models***
  - *Transient case analysis using worst-case on-orbit thermal cases identified and Cycle 1&2 results*
    - *12/05 – SLAC to deliver LAT CDR FEM (10.07) to GPO*
  - *GPO considering having Swales (P.Baird) perform Cycle 3 analysis*
- ***Cycle 4: Reperform Cycle 3 using T/V-correlated LAT models***
- ***Cycle 5: Reperform Cycle 3 using T/V-correlated observatory models***

Mass Budget

	Mass (kg)				
	Allocation	Estimate	Margin	%	Delta
Dry SC	1169	912	257	28	6
SC including propellant	1530	1273	258	20	6
LAT	3000	2756	244	9	6
GBM	97	84	13	15	0
Observatory mass	4627	4113	515	**13**	12

- *Note: Positive Delta represents a decrease in margin from last month*
- *Estimate includes 39 kg LAT Mass increase expected from X-LAT Plate Peer Review*
- *Delta II Heavy throw weight to 575 km with cg at 1.37 m = 4627 kg*
- *70% of LAT mass estimate is measured*
- *LAT has entered the CDR level of maturity, and is showing 9% margin.*
- *AIAA recommendations for the mass of flight systems recommend holding 7.2% margin at the PDR stage of the LAT program (198kg), and the LAT is holding 1.9% reserve on top of that (55kg).*
- *LAT is carrying 29% margin on the unmeasured LAT mass of 827kg*

Power Budget



Orbit Average Power (Watts)

	Allocation	*Estimate*	*Margin*	*%*	*Delta*
Spacecraft	*985*	*734*	*251*	*34*	*4*
LAT	*650*	*573*	*77*	*13*	*-15*
GBM	*65*	*55*	*10*	*18*	*0*
Observatory total	*1700*	*1362*	*338*	***25***	*-11*

Note: Negative Delta represents an increase in margin from last month

12-04-2003

Communication Link Margins

Link	Type	Data Rate (kbps)	Coverage	Link Margin (dB)
Ku Band Science	Data, TLM	40,000	> = 5 min per obit	4.9
GN	CMD	2	90% Spherical Coverage	39.0
GN	TLM	2,500	90% Spherical Coverage	10.5
TDRSS MA	CMD	0.250	90% Spherical Coverage	1.4 (-.8)
TDRSS SA	CMD	4	90% Spherical Coverage	4.8 (+.1)
TDRSS MA	TLM	1	90% Spherical Coverage	1.1 (-.8)
TDRSS SA	TLM	1	90% Spherical Coverage	10.7

- Ku Band Link Margin introduce for first time
- TDRSS estimates adjusted to incorporate conservatism in GSFC CLASS TDRSS analysis

12-04-2003

Top Issues/Concerns

- ***LAT data rate increase CCR needs quick go-ahead for Spectrum to purchase additional 32 M 64 M of memory for SSR***
  - *Allows 21/27 hours of science data storage at LAT 1.2 Mbps avg rate*
  - *Approval would help wrt SSR CDR in January*
- ***Held discussions on current monitoring***
  - *Spectrum agreed that some additional capability would help*
    - *Need to agree on specifics soon*
- ***Power on at launch configuration***
  - *What spacecraft components does the Project consider need to be on at launch?*
    - *C&DH in order to monitor spacecraft during ascent and separation*
    - *Transmitter(s) to provide telemetry in real-time*
    - *SSR to record (?)*
    - *GNC components necessary for sun capture (?)*
  - *Precise configuration definition needed as it may impact component (as well as system) specs and testing*