National Aeronautics and
Space Administration

GLAST Gamma-Ray Large Area Space Telescope

Mission Update

presentation at

GLAST SWG

September 2, 2005

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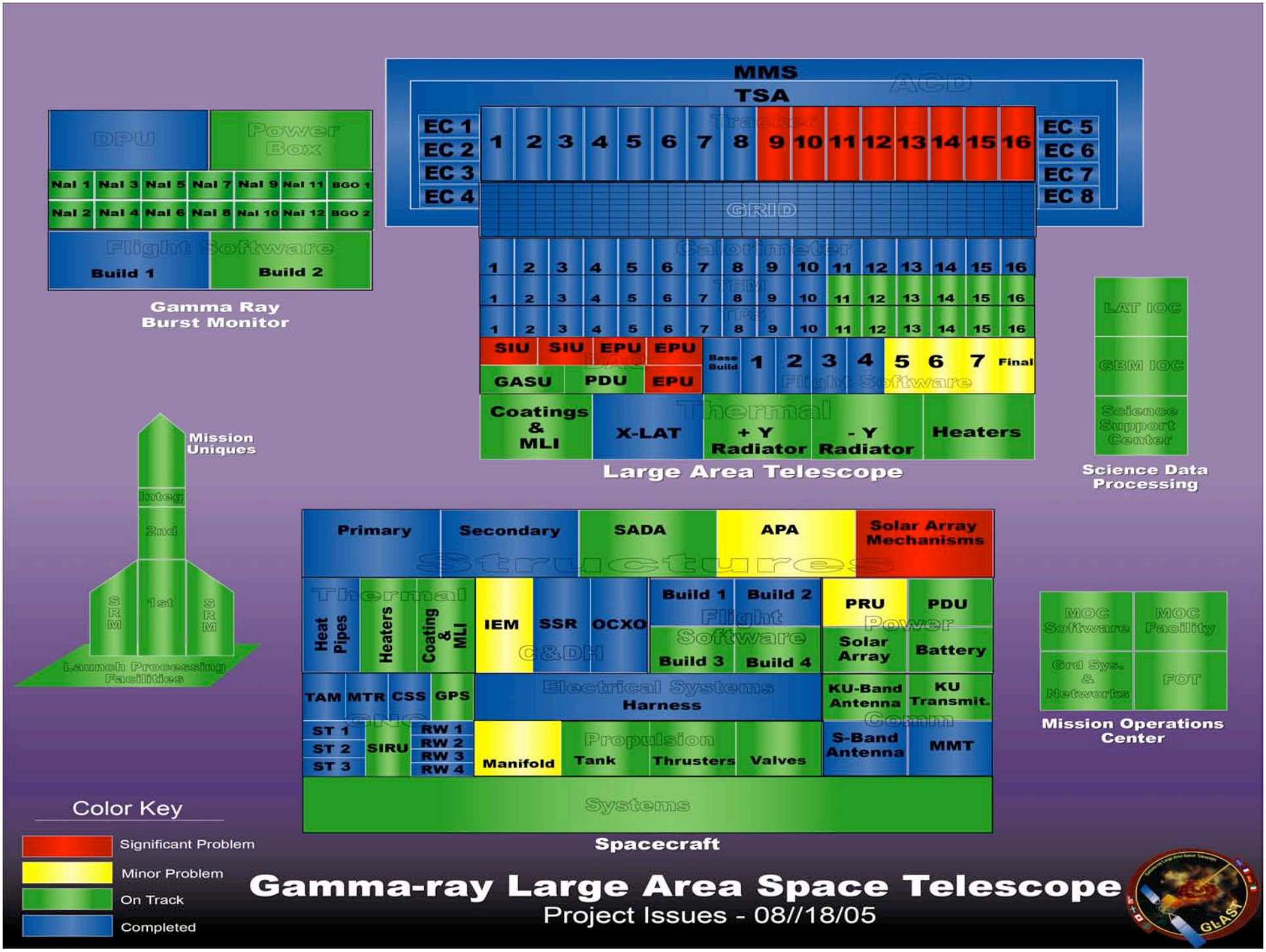
National Aeronautics and Space Administration

The GLAST Team continues to make significant progress.

GLAST Gamma-Ray Large Area Space Telescope

- LAT and GBM in I&T.
- Spacecraft nearing completion of fabrication.
  - Structure tested, harness integrated and tested.
  - 15 of 22 subcontract components delivered and being integrated. SADA, APM, Flight Battery, Solar Array, Prop and Ku systems remain.
  - SASS boxes in test - PDU, PRU and IEM in box level testing.
  - Challenges include release mechanisms, C&DH and propulsion system.
- MOC completed GRT #2 exercising all S-band (MA & SSA) forward and return interfaces through TDRSS. Also, tested MOC data interfaces to science operations centers at SLAC and MSFC.
- Conducted Launch Vehicle TIM. Launch vehicle contract on track to begin in early Sept.
- Next 6 months will be very challenging. Meeting schedule is critical.
  - LAT and GBM integration, system tests and environmental test.
  - Spacecraft I&T.
  - Launch vehicle start-up.
  - Mission Operations Review scheduled for March 2006.


DPU
Power Box
NaI 1
NaI 3
NaI 5
NaI 7
NaI 9
NaI 11
BGO 1
NaI 2
NaI 4
NaI 6
NaI 8
NaI 10
NaI 12
BGO 2
Flight Software
Build 1
Build 2
Gamma Ray Burst Monitor
MMS
TSA
ACD
Tracker
EC 1
EC 2
EC 3
EC 4
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
EC 5
EC 6
EC 7
EC 8
GRID
Calorimeter
TEM
TPS
DAQ
SIU
SIU
EPU
EPU
GASU
PDU
EPU
Base Build
1 2 3 4 5 6 7 Final
Flight Software
Coatings & MLI
X-LAT
Thermal
+ Y Radiator
- Y Radiator
Heaters
Large Area Telescope
LAT IOC
GBM IOC
Science Support Center
Science Data Processing
Mission Uniques
Integ
2nd
SRM
1st
SRM
Launch Processing Facilities
Primary
Secondary
SADA
APA
Solar Array Mechanisms
Structures
Thermal
Heat Pipes
Heaters
Coating & MLI
IEM
SSR
OCXO
C&DH
Build 1
Build 2
Flight Software
Build 3
Build 4
PRU
PDU
Power
Solar Array
Battery
TAM
MTR
CSS
GPS
GNC
Electrical Systems
Harness
KU-Band Antenna
KU Transmit.
Comm
ST 1
ST 2
ST 3
SIRU
RW 1
RW 2
RW 3
RW 4
Manifold
Propulsion
Tank
Thrusters
Valves
S-Band Antenna
MMT
Systems
Spacecraft
MOC Software
MOC Facility
Grd Sys. & Networks
FOT
Mission Operations Center
Color Key
Significant Problem
Minor Problem
On Track
Completed
Gamma-ray Large Area Space Telescope
Project Issues - 08//18/05
GLAST

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Schedule

GLAST Gamma-Ray Large Area Space Telescope

- **LAT, GBM and Spacecraft I&T in progress.**
  - LAT Delivery to Obs I&T - June 2006
  - GBM Delivery to Obs I&T - May 2006
  - Spacecraft I&T complete - April 2006
- **Mission Operations Review -- March 2006**
- **Observatory Pre-Environmental Review -- August 2006**
- **Obs I&T - May 2006 - June 2007**
- **Launch Site Operations July/August 2007**
- ***Launch - Sept 07, 2007***

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Orbital Debris Update

GLAST Gamma-Ray Large Area Space Telescope

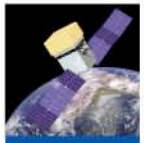
- ***Orbital Debris Assessment***
  - ***Update in work to incorporate informal comments from JSC.***
    - *Accidental explosions of either the battery or propellant tank.*
    - *Demonstrate compliance with the guideline with respect to loss of reentry functions due to collisions with small objects (micro-meteors).*
    - *Contains updated casualty risk figures based on additional ORSAT analysis performed by JSC in support of Mission CDR (last August).*
      - *DCA remains 3063 m^2, casualty risk = 1:16 w/o 15 J threshold.*
      - *DCA is 23.6 m^2* (1:2100) w/ 15 J threshold.

Release Mechanism Update (1 of 2)

GLAST Gamma-Ray Large Area Space Telescope

- ***Project pursuing alternate release mechanisms.***
  - ***Two test failures of the Starsys QWKNUTS. Design changes required and full qualification program in development.***
  - ***Must have high-reliability in this area.***
  - ***SDO project decided to replace the baselined Starsys QWKNUTS with the Hi-Shear sepnuts, based on similar concerns.***
- *GPO conducted internal assessment.*
- *GD/SASS performed a trade study assessing the impacts/risks associated with making a change.*
- *GSFC AETD has conducted a peer review of the trade study and changes. AETD also developed an independent risk assessment of the change and concurred with the use of Hi-Shear sepnuts.*
- *Qwknut qualification to continue and may provide a suitable backup in the event design changes run into severe problems.*

Release Mechanism Update (2 of 2)



- ***GLAST baseline design utilizes a total of 11 release mechanisms.***
  - *4 used on each of two solar array wings; 3 used on the Ku Band antenna.*
- ***General Dynamics/Spectrum Astro Space Systems (GD/SASS) selected the Starsys Qwknut (Boulder, CO) as the baseline release mechanism.***
  - *Pros: Low shock device, resettable mechanism.*
  - *Cons: New mechanism with limited flight heritage (Gen 3 version not yet qualified).*
- ***Replacement of Qwknut with Hi-Shear sep nut is feasible with manageable changes.***
  - *Challenges will include use of pyro device, higher shock levels, GD/SASS lack of experience with these devices.*

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Summary

GLAST Gamma-Ray Large Area Space Telescope

- *GLAST Team continues to make excellent progress.*
- *All elements in integration and test phase.*
- *GLAST continues to be well supported at NASA HQ.*
- *Next 6 months will be an exciting and challenging time for us all.*