GLAST

The Gamma-ray Large Area Space Telescope

Mission Status
February 2007

S. Ritz
GLAST Project Scientist

A. Vernacchio
GLAST Deputy Project Manager

Topics

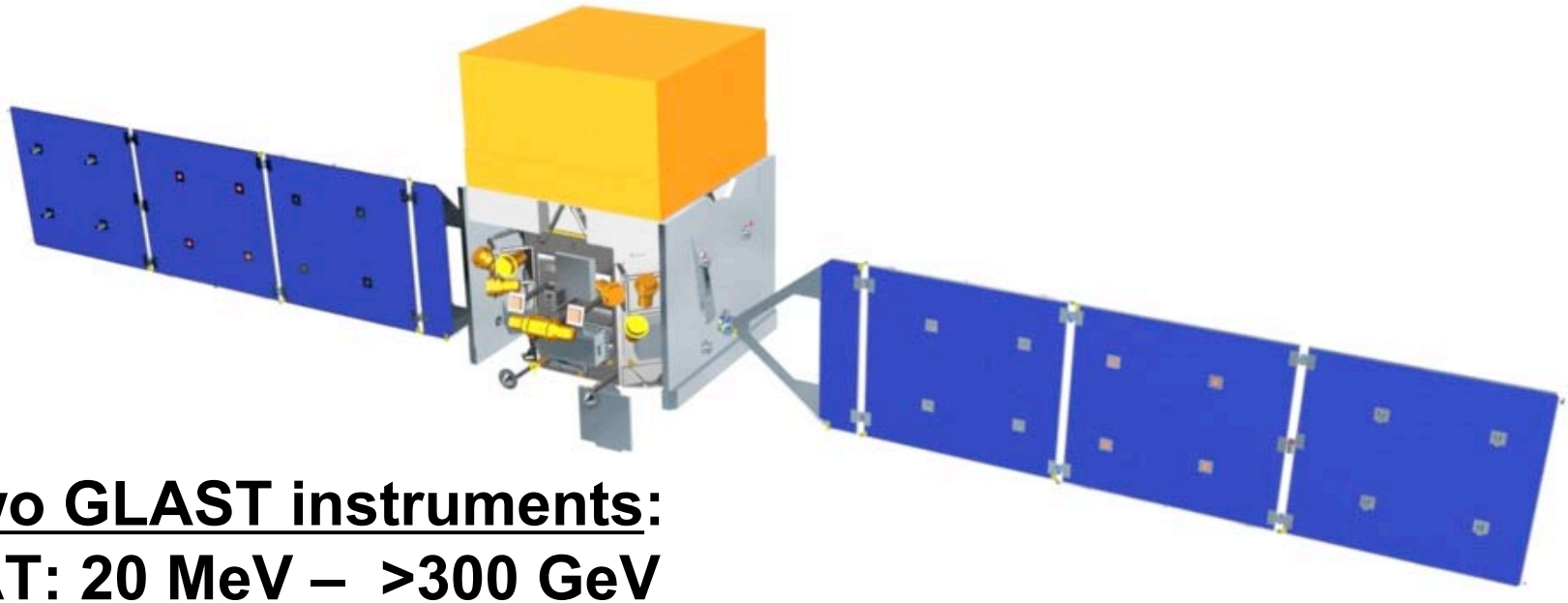
- Context

- LAT
- GBM
- Spacecraft
- Launch vehicle
- Ground system/Flight Operations

- Users Committee
- GLAST Symposium
- Launch invitations

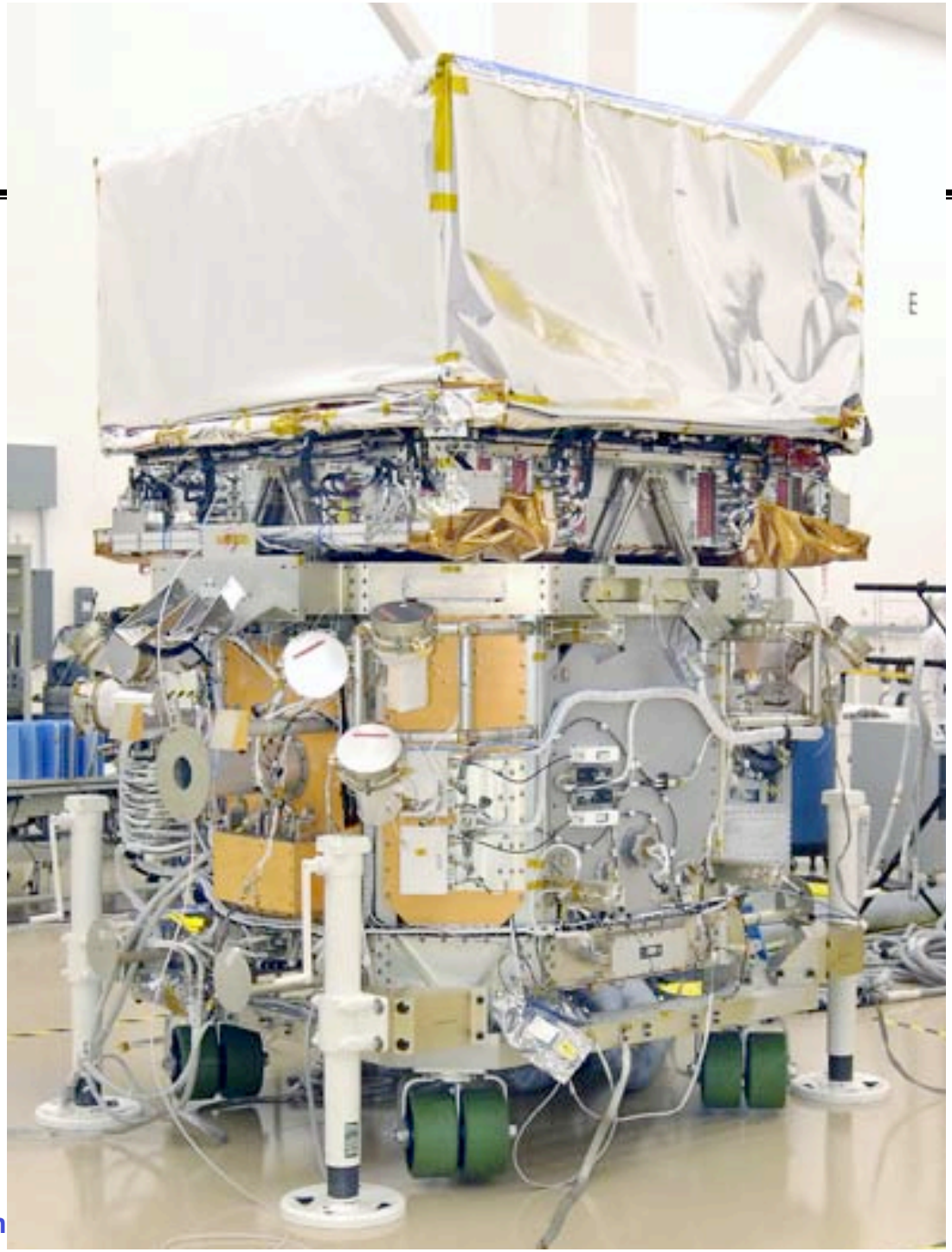
- Introduction to Today's Review

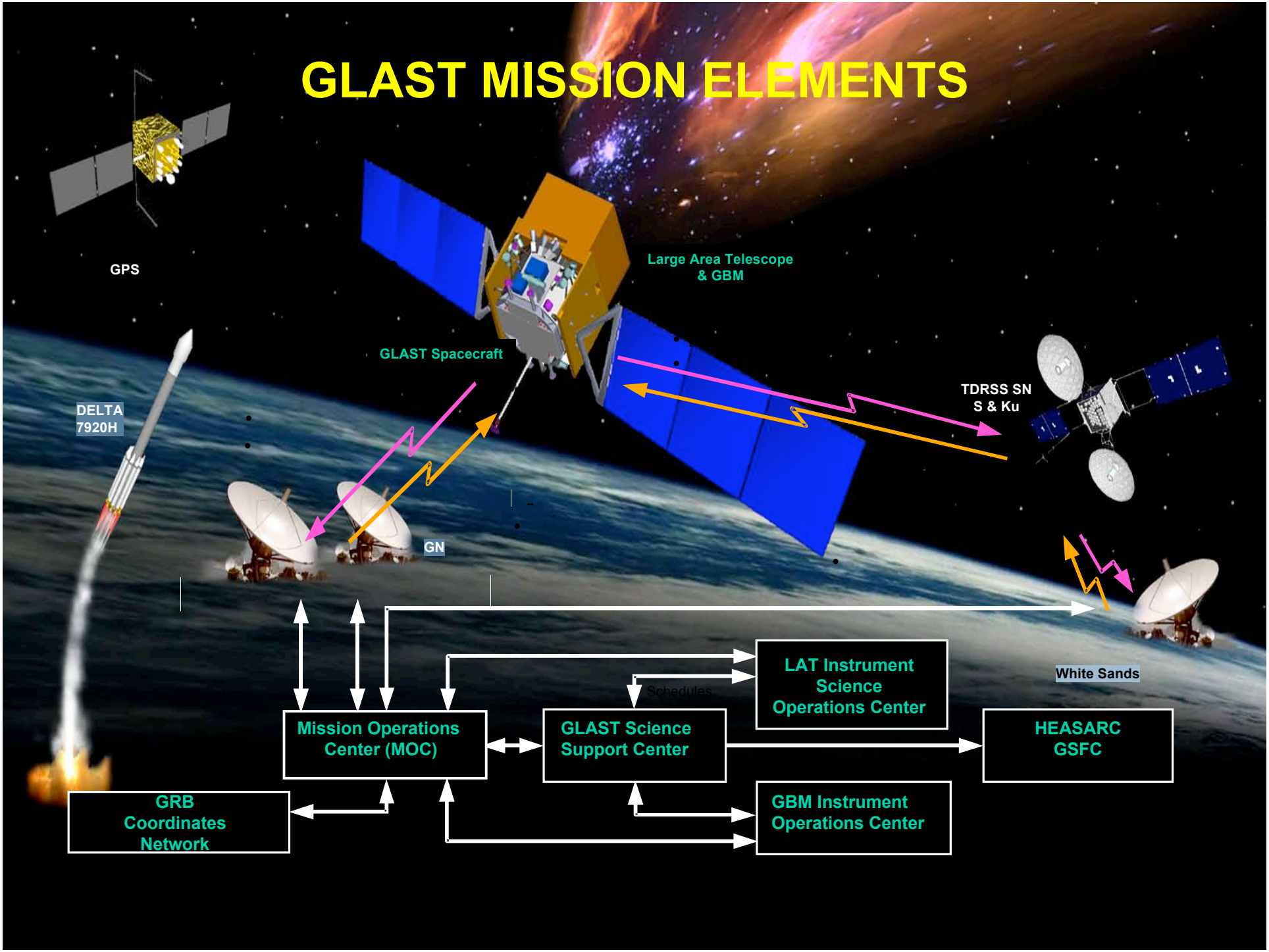
Context: GLAST Observatory



<u>Two GLAST instruments</u>:
LAT: 20 MeV – >300 GeV
GBM: 10 keV – 25 MeV

<u>Spacecraft</u>
General Dynamics Advanced Information Systems (AIS)




GLAST MISSION ELEMENTS
GPS
Large Area Telescope
& GBM
GLAST Spacecraft
DELTA
7920H
TDRSS SN
S & Ku
GN
White Sands
LAT Instrument
Science
Operations Center
Schedules
Mission Operations
Center (MOC)
GLAST Science
Support Center
HEASARC
GSFC
GRB
Coordinates
Network
GBM Instrument
Operations Center

LAT

- **LAT has been integrated onto the Observatory and is fully functional.**
  - **Flight IEM to LAT signal characterization to be performed following integration of the LAT.**
  - **Demonstrated ability to operate the LAT on the observatory and install new flight software.**
  - **Science data compression installed on the instrument. Limited run time to date due to spacecraft integration activities.**
  - **Continue to eliminate potential causes of SIU and EPU resets.**

GBM

- **Fully integrated and functional!**
- **Final component (cross-strap interface Junction Box) to be installed next week.**

Spacecraft

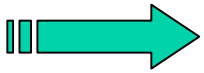
- Observatory integration almost complete.
  - All hardware (except flight battery and Antenna Pointing Assembly) at GD.
- Solar array
  - panels complete, tested, and delivered to GD.
  - Both arrays assembled, dynamics tested, post-test deployment and capacitance tested and ready for TVAC testing.
- RF compatibility tests last month successful.
- Some issues:
  - Integrated Electronics Module (IEM) completion. Impacts to critical path being mitigated through use of the engineering model, but starting to threaten launch date.
  - Antenna pointing array position readback noise understood. Unit de-integrated and returned to the manufacturer for rework.
- FSW and scripts to support the first observatory Comprehensive Performance Tests.
- Environmental testing to commence in March.

Launch Vehicle

- **Delta II transonic issue resolved.**
  - **no loads impacts on GLAST requiring structural modifications**
  - **hold on Delta II launches lifted**

- **Preparations for prep/operations at the Cape in full swing.**

Ground System/Fight Operations

- **Mission Operations Center (MOC) development largely completed.**
- **Most recent mission operations meeting (TIM) 30-31 January in Phoenix.**
- **Tests!!** 

Mission Level Testing

Test	Goals	
ETE #1A and B Basic Observatory T&C (2/26/07 & 3/2/07)	•*Configure Observatory to produce each downlink rate* •*Verify proper receipt of HK telemetry at each downlink rate* •*Command Observatory at all uplink rates* •*Generate S/C C&DH diagnostic telemetry* •*Playback data from SSR and perform SSR management activities* •*Configure Observatory to write HK telemetry to S/C CPU RAM* •*Command dump of HK telemetry from S/C CPU RAM and verify receipt and format of data.*	•*Issue No-op commands to instruments* •*Load and execute simple stored command loads (ATS & RTS)* •*Dump science data from SSR* •*Generate diagnostic data from the S/C and instruments.* •*Verify proper receipt of diagnostic data* •*Provide Level-0 files to the IOC's (post-test)*
ETE #2 Advanced Commanding / Memory Management (5/21/07 – 5/23/07)	•*Initialize the SSR* •*Generate S/C C&DH and GNC diagnostic telemetry* •*Load and execute advanced stored command loads (ATS & RTSs)* •*Perform Memory/FSW table uploads (S/C and instruments)* •*Dump Memory/FSW tables (S/C and instruments)* •*Power on Instruments*	•*Flow Real-Time Instrument HK TLM packets to LISOC* •*Power on components required during L&EO (i.e. Star Trackers, SADAs, and APA)* •*Execute instrument nominal operations procedures*
ETE #3 Advanced Operations (7/10/07 – 7/12/07)	•*Initiate an Autonomous Re-point* •*Perform ToO exercise to verify system interfaces* •*Perform ATS buffer handover/switch* •*Initiate a Burst Alert and flow data to GIOC BAP* •*Perform obit determination exercise* •*Exercise clock management* •*Perform FSW patches (S/C and instruments)*	•*Exercise SSR re-dump operations and frame accounting* •*Exercise instrument diagnostic/calibration procedures* •*Perform Observatory checkout & activation sequences* •*Perform instrument side switching/alternate configurations*
ETE #4 Advanced & Contingency Ops (8/11/07 & 8/12/07)	•*Perform component failover/side switching/alternate configurations (S/C and Instruments)* •*Perform Safe Mode recovery* •*Perform more advanced/complex FSW patches/updates*	
ETE #5 Advanced Operations & Clean-up *(8/20/07 & 8/21/07)*	•*Perform leap second adjustment* •*Test requirements and goals not verified in previous ETE tests* •*Verify system updates (i.e. software updates, proc updates, and T&C database updates)*	
ETE #6 Launch Site Test at Astrotech	•*Check-out of Launch Site specific data paths* •*Perform a selected set of regression tests*	

GLAST Users Committee Members

➡ new members

- Josh Grindlay (Chair)
- ➡ Matthew Baring
- Roger Brissenden
- Wim Hermsen
- ➡ Buell Januzzi
- Don Kniffen
- ➡ Henric Krawczynski
- Reshmi Mukherjee
- ➡ Luigi Piro
- ➡ Jim Ulvestad
- Ann Wehrle

Plus

- David Band
- Neil Gehrels
- Rick Harnden
- Julie McEnery
- Chip Meegan
- Peter Michelson
- Steve Ritz
- Rita Sambruna
- Chris Shrader
- Kathy Turner
- Lynn Cominsky

•Most recent F2F meeting at Goddard in November, featuring a beta-test of the science tools.

http://glast.gsfc.nasa.gov/ssc/resources/guc/

Agenda for GLAST User's Group (GUG)

Stanford/Physics & Astrophys. Bldg., Conf. Room 102/103 (see map)

Feb. 4, 2007

Sunday, Feb. 4:

1:05 Welcome and Introductions (Josh, Steve)

1:10 **Welcome to New Members** (Rick, Steve, Josh)

1:15 Review Nov '06 meeting Minutes (Josh)

1:17 The view from HQ and other News (incl. GLAST Fellows program) (Rick)

1:25 Mission update and issues (Steve and Julie)

1:50 LAT status and schedule, upcoming milestones (Peter)

2:00 GBM status and schedule, upcoming milestones (Chip)

2:10 GSSC status and issues (Chris)

2:15 GLAST Symp. Planning and SWG activities (Steve)

2:30 Cycle 1 GI program & demo of RPS proposal submission tools (Chris, David)

3:00 Break

3:30 GLAST-NRAO Draft MOU (Steve, Jim U.)

3:45 Review open Action Items (see GUC webpage for current AI's due) (all as named)

4:45 VOEventNet issue (Dave T.)

5:00 New business (all)

5:15 Next meeting (all)

5:20 **THANK YOU to GUG Members rotating off the Committee** (Rick, Josh, Steve)

5:30 Adjourn

Launch Invitation Coordination

- **Please contact Peter (LAT-related), Chip (GBM-related), or Steve (mission-related) with names of individuals who are not team members who should be invited to the launch.**

Today's Review: Purpose

- **Instruments were delivered by the teams for Observatory Integration, following the Preship Reviews (PSRs)**
  - **acceptance for shipment to GD for integration on the GLAST observatory**
  - **PSRs covered all aspects of the instrument performance (thermal, mechanical, electrical, environmental, operational, and compliance with science requirements)**
- **PSRs were primarily engineering reviews, with not much time available to discuss the science requirements compliance in depth**
  - **asked SWG review the science performance relative to the SRD of the as-built instruments (Tables 1 & 2)**
  - **feedback on the performance analysis, in preparation for launch**
  - **plus status of verification of observatory requirements (Table 3)**
- **Thanks to the teams for all the preparation work, and to our three external reviewers: Ed Fenimore, Wim Hermsen, Don Kniffen**

Agenda

- 8:00 - 8:30 coffee
- 8:30 - 9:00 intros, review scope, mission status, etc.
- 9:00-10:30 SRD Table 1 LAT
- 10:30-10:45 break
- 10:45-12:00 SRD Table 1 LAT continued
- 12-13:30 lunch
- 13:30-15:30 SRD Table 2 GBM
- 15:30-15:45 break
- 15:45-16:45 SRD Table 3 Observatory/Mission
- 16:45-17:30 discussion
- 17:30-18:00 Actions
- 18:00 Adjourn