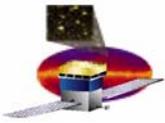


GLAST Large Area Telescope Calorimeter Subsystem

Test Readiness Review

Thursday
September 2, 2004

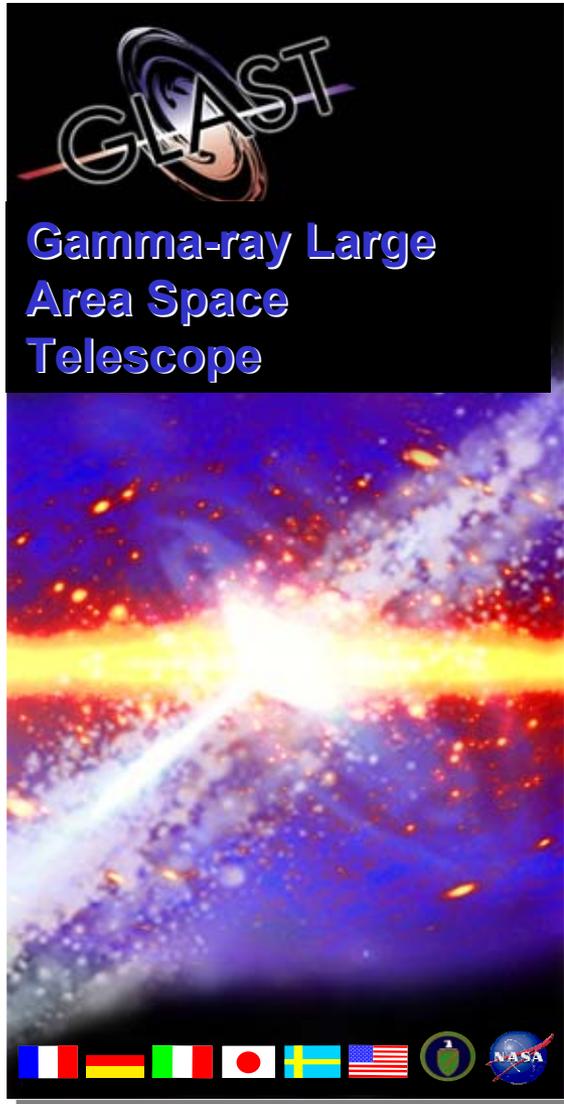
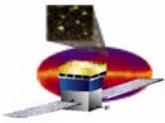




Agenda

- ❑ Objectives – *Bill Raynor*
 - Objectives
 - Present Status
 - Significant Changes since CDR
- ❑ Requirements and Test Flow – *Eric Grove*
 - Requirements and Verification
 - System Test Plan and Flow
 - Test Facilities
 - Test Schedule and Staffing
- ❑ Quality Assurance: Status / Readiness – *Nick Virmani*
 - Problem Report Status
 - System Safety and Risk Assessment
- ❑ Functional / Performance Testing – *Eric Grove*
 - Software Status
 - EGSE Status
 - MGSE Status
- ❑ Weight and C.G. Measurement – *Lisa Gelston*
- ❑ EMI / EMC Testing – *Lisa Gelston*
- ❑ Vibration Testing – *Paul Dizon*
- ❑ Thermal-Vacuum Testing – *Paul Dizon*
- ❑ Issues and Concerns – *Bill Raynor*



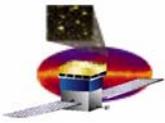


GLAST Large Area Telescope Calorimeter Subsystem

Introduction

Bill Raynor

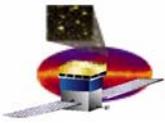




TRR Objectives

- ❑ **Demonstrate that hardware, software, procedures, and support equipment are prepared to support system environmental testing**
- ❑ **Demonstrate that planned and completed testing meets performance and interface requirements**
- ❑ **Identify and understand all risks and limitations**
- ❑ **Completion of system environmental testing will allow appropriate verification closure**
- ❑ **TRR is not intended to:**
 - **Review CAL design**
 - **Improve CAL design**
 - **Review flight readiness**
 - **Buy-off and hardware or software**
- ❑ **RFAs should only be of sufficient concern to stop test**
 - **Prior to the start of any given test, any applicable TRR RFAs must be closed**





Test Entrance / Exit Criteria

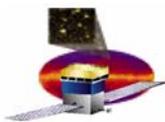
□ Entrance

- All required paperwork released and in place
 - WOA, procedures, ABCs, drawings, inspections, etc.
- Test configuration verified and approved
- Essential personnel in place
- Pre-test CAL functional successfully passed

□ Exit

- As-run procedures completed
- Correct and accurate application of test environments
- Test data acquired and archived
- No damage to the CAL Module
- CAL Module performance within specification limits per the verification matrix for the given environmental test
- Post- test CAL functional successfully passed





Calorimeter Assembly Flow and Build Status

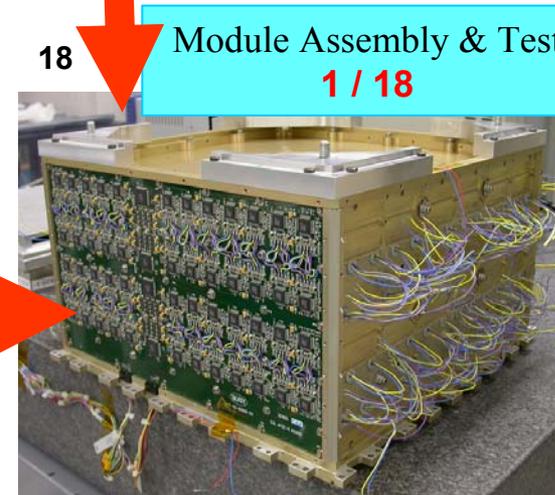
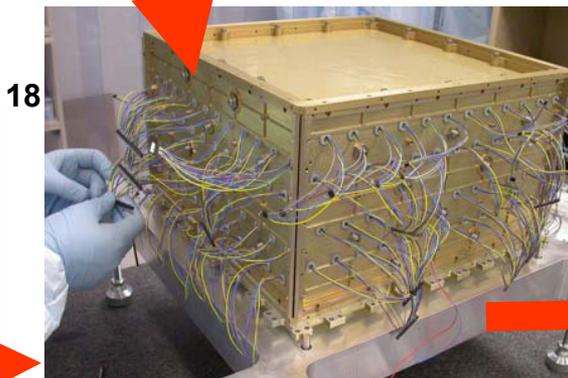
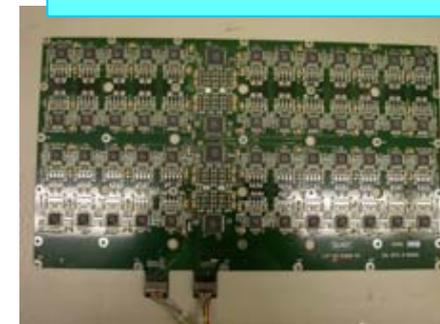
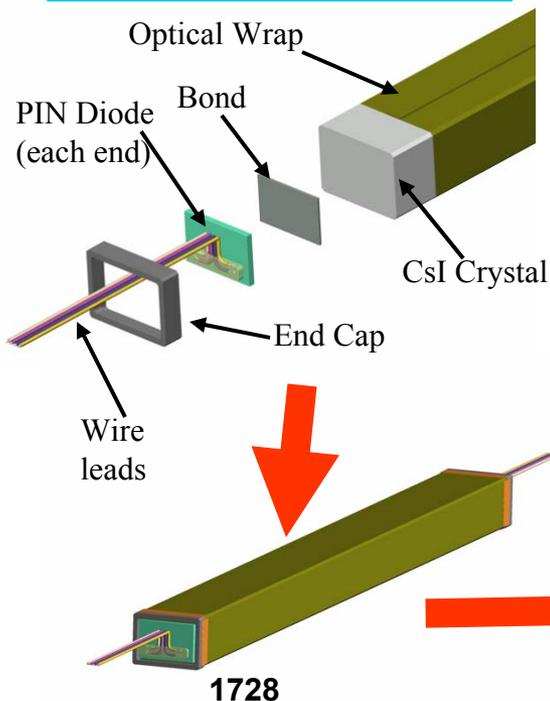
Dual PIN Diodes
4800 / 4800

CsI Crystals
1803 / 1902

Crystal Detector Element (CDE) Assembly
1620 / 1902

Mechanical Structure
14 / 18

Front-End Electronics
40 / 110



PreElectronics Module (PEM)
8 / 18

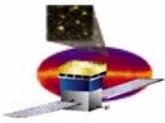
Module Assembly & Test
1 / 18

complete

planned (including spares)

Research Lab
Washington DC

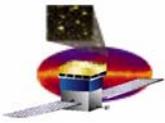




Present Status Summary

- ❑ **8 Pre-electronics Modules (PEM)**
 - **Assembly complete**
 - **Functional testing complete**
- ❑ **AFEE Boards (Qty 40 Sovereign, Qty 8 Sierra)**
 - **16 Sovereign boards have completed 3 temp & 168 Hr burn-in**
 - **6 boards conformal coated, 4 for FMA CAL**
 - **1 pulled due to failed coupon test**
 - **8 boards to begin conformal coating**
 - **2 dropped out during testing (ESD)**
 - **22 Sovereign boards ready for 3 temp & 168 Hr burn-in**
 - **2 Sovereign boards have dropped out during initial functional testing**
 - **8 Sierra boards designated for SLAC**
 - **Remaining boards returned for re-manufacture**
 - **Awaiting more flight 22nF caps, replacements of Novacap capacitors**
 - **Awaiting re-manufactured AFEE boards for correction of solder mask problem**
- ❑ **1 Calorimeter Module**
 - **Assembly ongoing**





Significant Changes Since CDR

At CDR, CAL was beginning the qualification test program of an Engineering Model (EM). The design changes from EM to Flight Module are...

- ❑ **PIN photodiodes: slightly smaller, different optical window material**
 - **Flight design has been fully qualified**
- ❑ **ASICs: GCFE and GCRC have additional revision for flight from that used on EM CAL**
 - **Flight screening complete; qualification program completes on 10/15**
- ❑ **AFEE board**
 - **Improved PIN diode connections; additional filtering**
 - **Removed Novacap; new QML cap replacement**
 - **Voltage ref diode current limiting resistor modified**
- ❑ **FM composite structures use an improved (autoclaved) curing process**
 - **Each structure verified for strength in vibration test program**
- ❑ **FM CAL: GRID interface modified to incorporate shear pins**
 - **4 shear pins added, mounting tabs adjusted**
- ❑ **EMI/EMC improvements**
 - **Exterior metal surface treatment changed to electroless nickel plating**
 - **EMI gaskets and O-rings seal cracks**
 - **Extra power filtering added to AFEE cards**

