
# GLAST Large Area Telescope

## Instrument Science Operations Center Status

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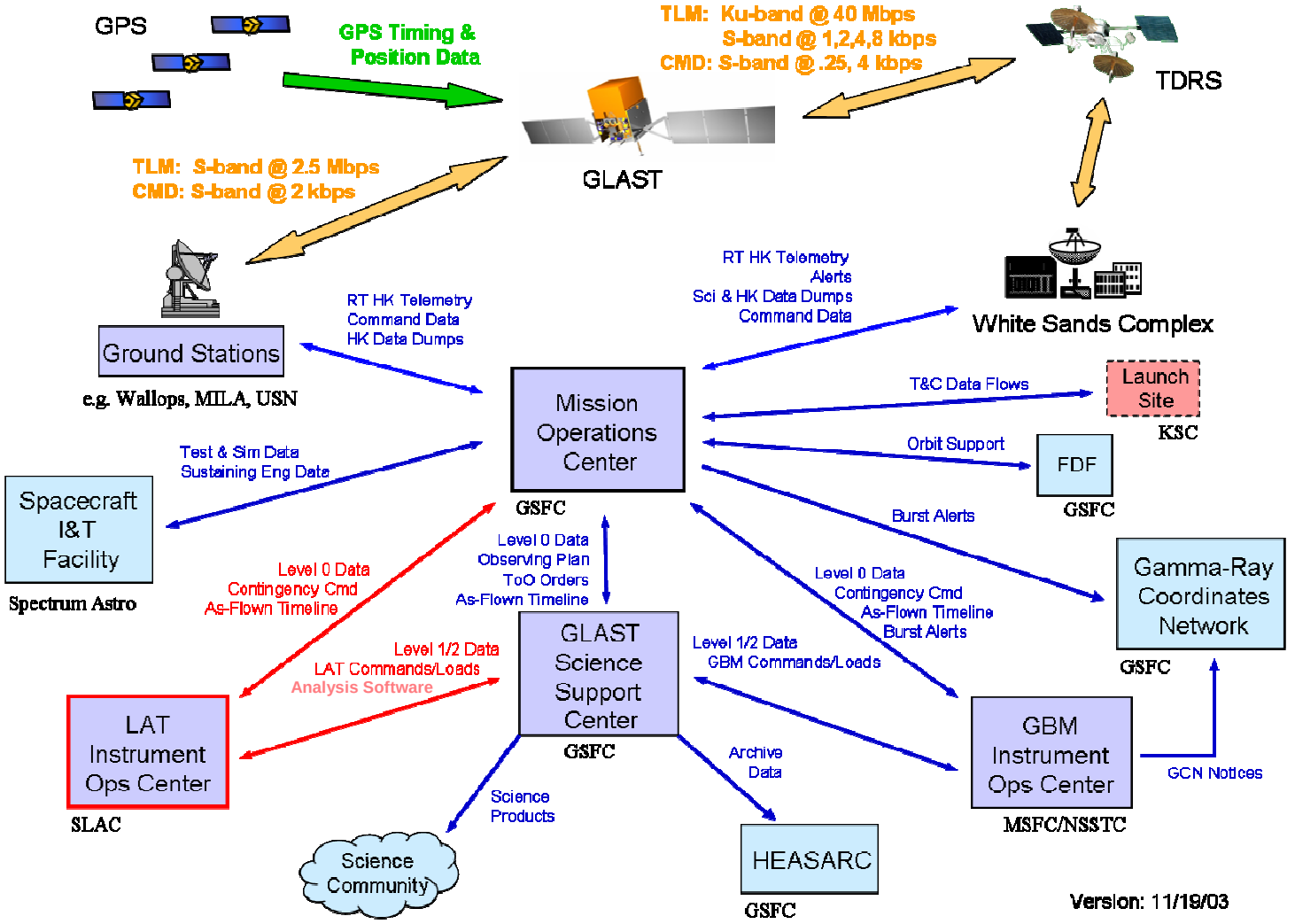
# Outline

- Overview
- ISOC Organization Developments
- Recent Activity
- Operations Facility Planning
- ISOC and the LAT Collaboration
- Summary

# LAT ISOC Functions

- **The LAT ISOC is organized to:**
  - **Safely operate the instrument**
  - **Produce LAT Level 1 and selected Level 2 science data products**
- **Main Functions:**
  - **Command planning and construction**
  - **Instrument health and safety monitoring**
  - **Maintain and modify FSW and the LAT Testbed**
  - **LAT performance verification and optimization**
  - **Process and archive Level 1 and Level 2 data**
  - **Maintain and optimize the software that produces science data products**

# The ISOC Role in GLAST Operations



# ISOC Organization

- Two new Deputy ISOC Managers
  - Richard Dubois
  - Eduardo do Couto e Silva
- Commanding, Health & Safety
  - Two new staff starting this month
- Flight Software
  - Team Lead: Jana Thayer
  - Identification of key continuing staff complete.
- Performance Verification and Optimization
  - Team Lead: Eduardo do Couto e Silva
  - Core PVO team is already in place for I&T SVAC activity, but being expanded with roles for other scientists.
- Science Analysis Systems
  - Team Lead: Richard Dubois
  - Continuation of existing SAS group.

# ISOC Organization

ISOC
Manager: R. Cameron
Deputy: E. do Couto e Silva
Deputy: R. Dubois

Commanding,
Health and Safety

Lead: R. Cameron (TBR)
Deputy: L. Bator

Science Analysis
Systems

Lead: R. Dubois
Deputy: TBD

Flight Software

Lead: J. Thayer
Deputy: S. Maldonado
Deputy: J. Swain

Performance Verif.
And Optimization

Lead: E. do Couto e Silva
Deputy: A. Borgland

# Recent ISOC Development

- Key drivers of ISOC development to date:
  - GLAST Ground System development and test
  - LAT I&T
- GLAST Ground System Development and Test
  - ISOC successfully participated in Ground Readiness Test #2 in May 2005
    - First GLAST GS test involving IOCs.
    - Test of interfaces and basic data transfer protocols between GS elements.
    - Used ISOC CHS software release ISOCr1v0p0.
  - Next GS test involving IOCs: GRT #3, mid December 2005.
    - ISOCr1v0p2 to be completed mod Nov 2005 for GRT#3.
    - First test of transfer and processing of LAT science data by MOC, ISOC and GSSC in a GRT.

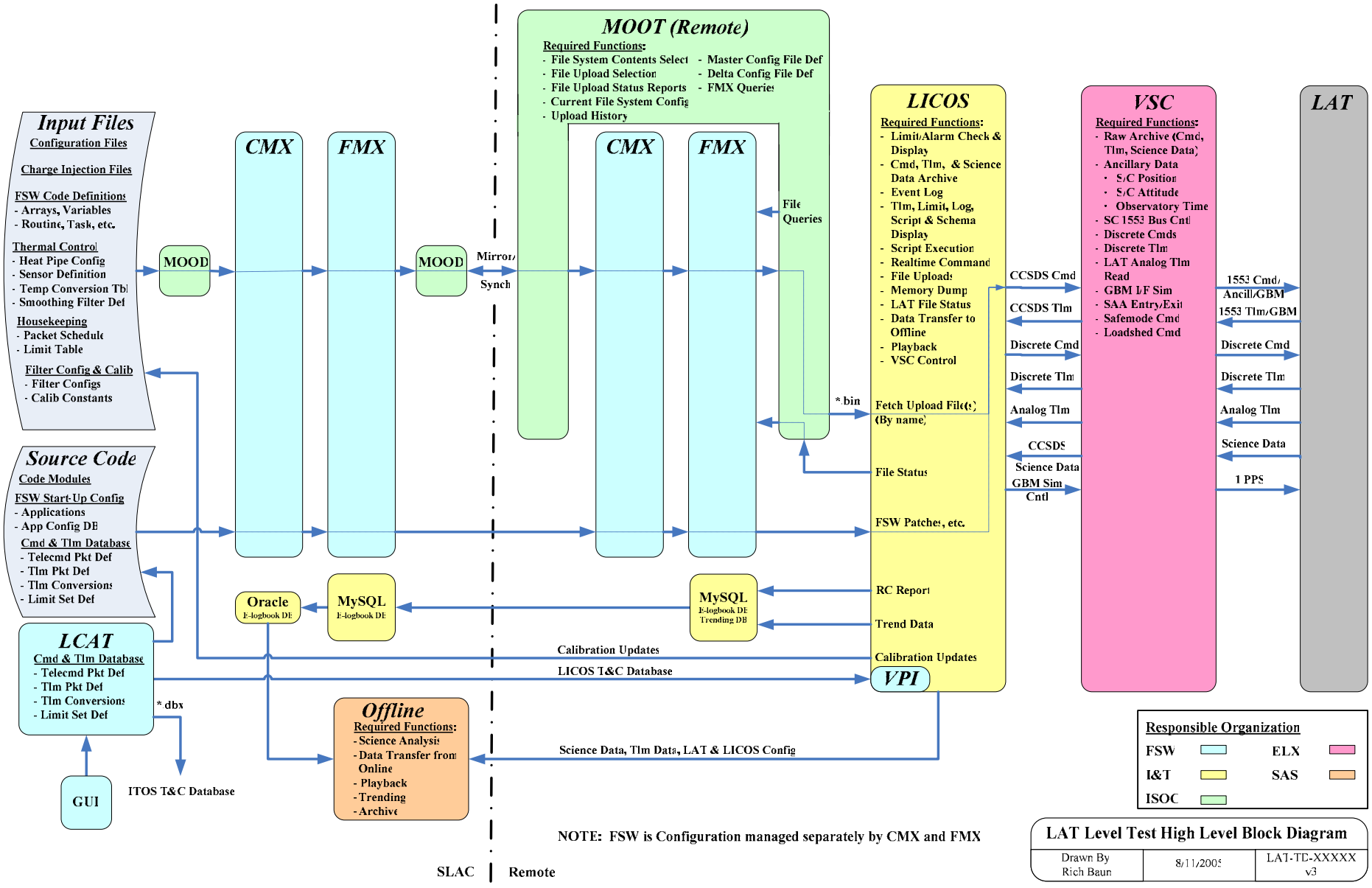
# Ground Operations TIM

- Successful Ops TIM held 14-15 Sept 05 with MOC, GSSC, GD/SASS, and GBM in attendance
- Ground System Architecture
  - MOC access for pre-launch rehearsals and L&EO
- Instrument Operations Procedure Development/Validation
  - NASA hiring Instrument Operations Engineer to work with IOCs
- Data Management
  - Continued development of defining documents
    - Operations Data Products ICD
    - Science Data Products ICD
- Mission Planning
  - Use of shared mission planning tools
- L&EO Planning

# LAT I&T Support

- **ISOC is involved in LAT I&T**
  - **FSW, PVO/SVAC and SAS all strongly participate in I&T**
  - **CHS more recently involved**
  - **Benefit to I&T: data handling and transport; task sharing**
  - **Benefit to ISOC: gain familiarity with LAT data & operation**
- **ISOC provides several new services to I&T**
  - **Shared T&C database tools**
  - **Archiving and trending of LAT housekeeping telemetry**
  - **FASTcopy data transport system for I&T mobile rack**
    - **Transfer LAT I&T data to SLAC from NRL, SASS**
  - **LAT Instrument Configuration Management DBMS**

# LAT Configuration Management in I&T



# Instrument Operations Workshops

- **Intent of Operations Workshops**
  - Preparation for LAT operations during GLAST mission
  - Coordinate development work among ISOC teams
  - Planning for LAT ISOC development activity after instrument shipment and delivery
  - Increase involvement of LAT collaboration in LAT operations
  - Increase visibility of ISOC functions to collaboration
- **First Operations Workshop**
  - November 1 and 2
  - Focused on teams least involved in I&T
    - SAS, PVO, CHS
  - Plans for development of offline software tool and data products

# LAT Operations Facility

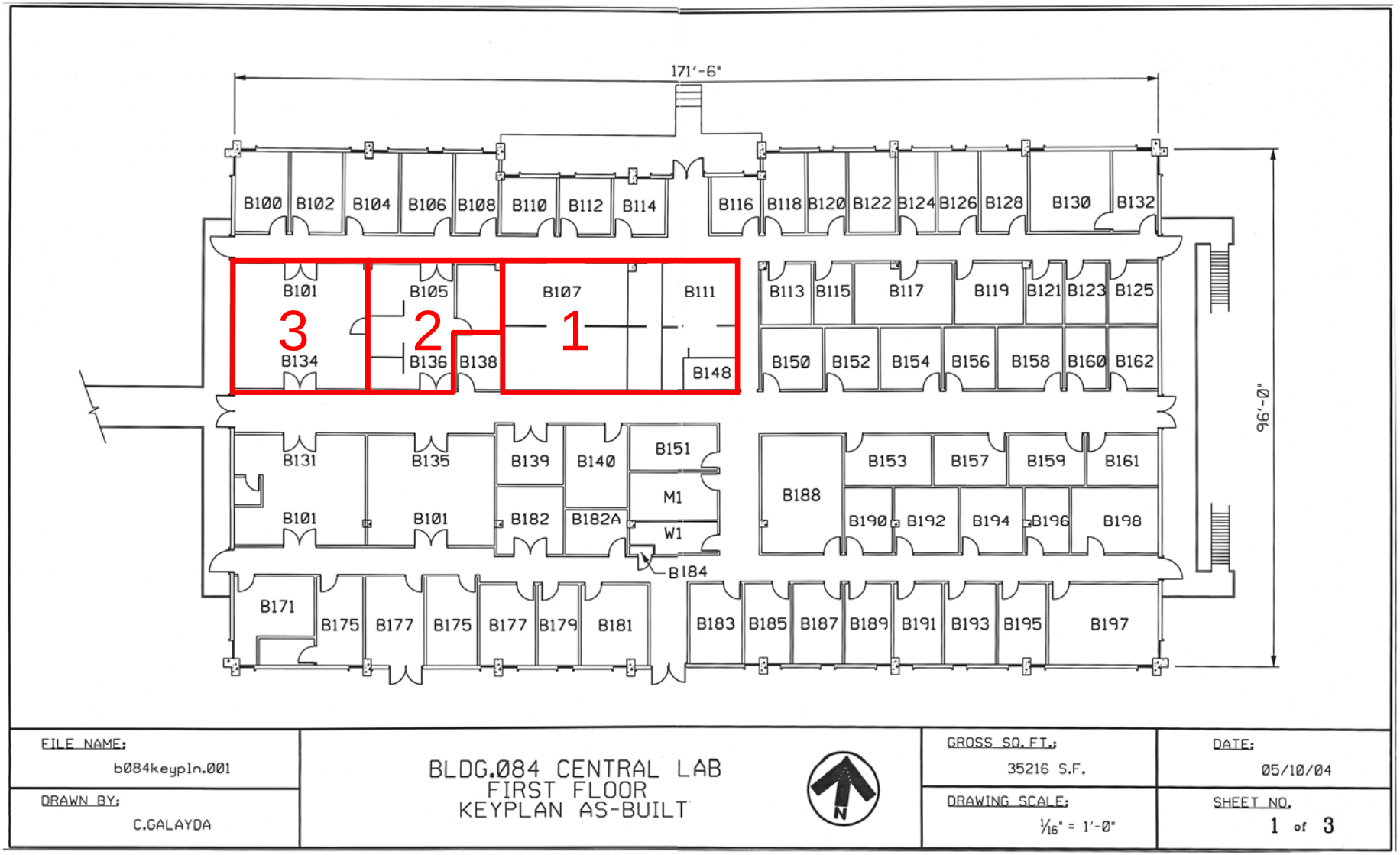
- **Detailed Planning of the LAT Operations Facility has begun**
  - **SLAC Infrastructure Proposal has been submitted for construction of Operations Facility at SLAC.**
  - **To be located in the Central Lab Annex.**
  - **Elements**
    - **Operations Control Room. To be built and configured in 2006, to support pre-launch operations testing.**
    - **Dataflow Lab. Existing Dataflow lab area will be extended in 2007. Minimizes disturbance of LAT testbed, but provides space for spare detectors and other additional equipment to be used in conjunction with testbed.**
  - **Working with SLAC Facilities staff to start detailed engineering design soon.**

# LAT Operations Facility (cont.)

- ISOC operations staff offices will be consolidated in Central Lab Annex.
  - Operations Facility construction and office changes will be phased with move of KIPAC staff into new Fred Kavli building.
- ISOC presence on Stanford campus
  - Varian 2 building in construction on campus: mostly for research office space, but with small operations presence

# GLAST LAT Operations Facility

1. Operations Control Room
2. Dataflow Lab Expansion
3. Existing Dataflow Lab



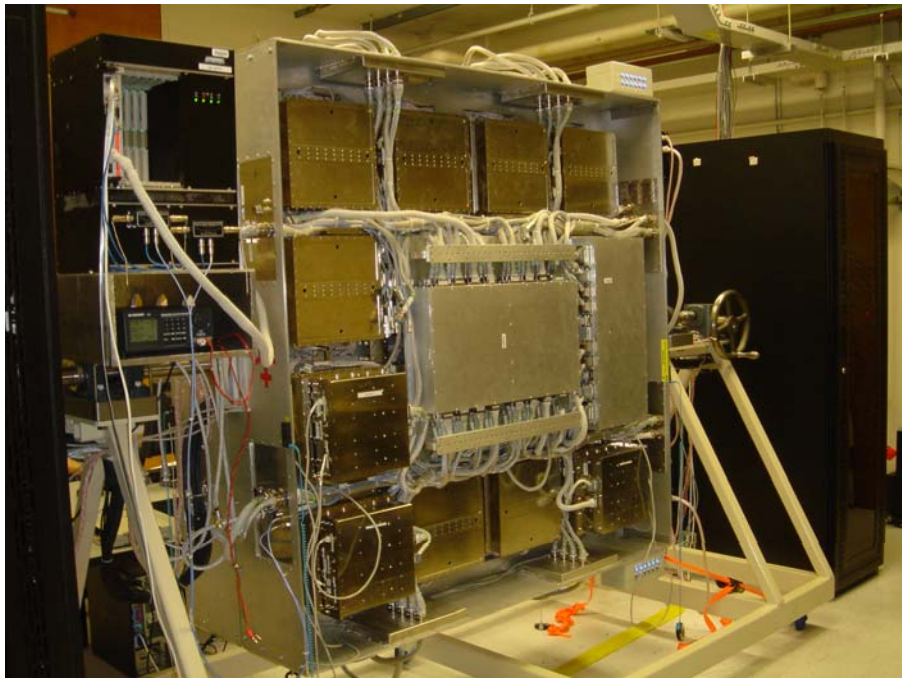
# LAT Data Flow Lab

**Operations supported by the LAT Data Flow Lab**

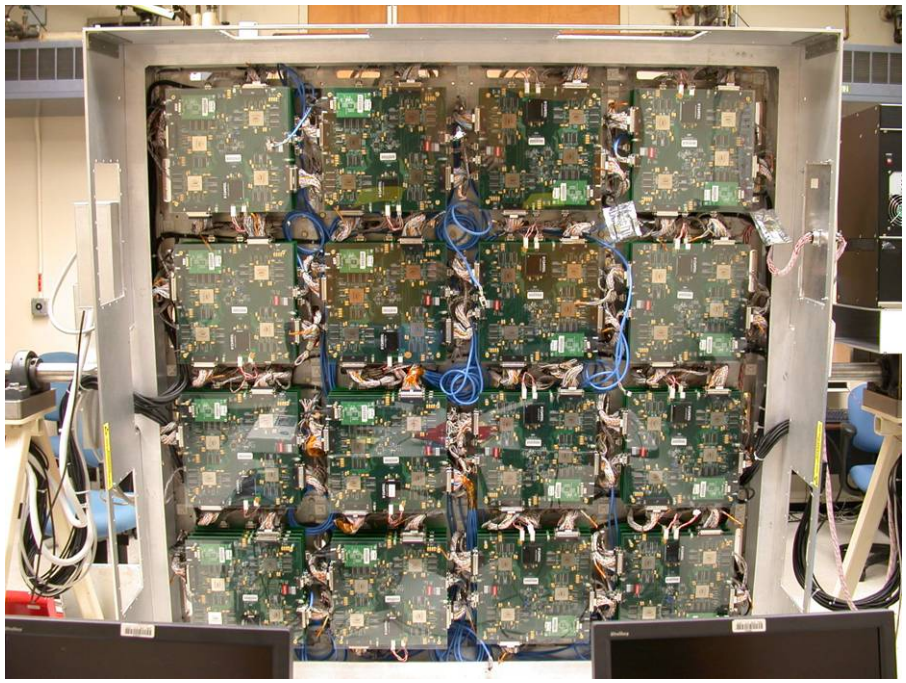
- **Command load verification before uplink**
- **Instrument configuration validation**
- **Flight software development and test platform**

**Also a testbed for onboard science data processing**

**Flight Spare Detectors will be co-located with testbed after Beam Tests**

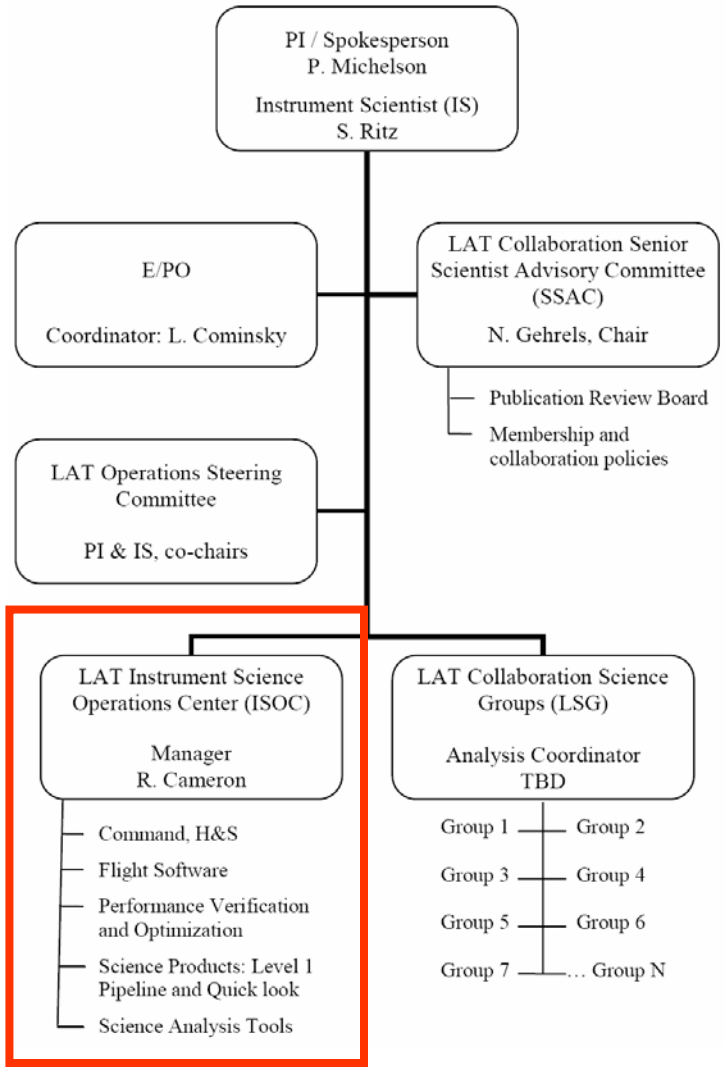


**DAQ Testbed**



**Simulator**

# The ISOC in the LAT Collaboration




- **ISOC has close connections to LAT Science Groups**
  - **e.g. Working with Calibration and Analysis Methods Group to incorporate improvements to event reconstruction into ISOC processing and products**
- **ISOC has broad involvement in the LAT collaboration**
  - **e.g. instrument performance analysis and tool development are coordinated by the ISOC across the collaboration**

# Working with the LAT Collaboration

- **Completion of the LAT is fast approaching**
  - **Now is the time to expand ISOC to full implementation and involve the Collaboration!**
- **Roles for the Collaboration with the ISOC, e.g.**
  - **Support the full science potential of the LAT, with data downlinks and full-sky coverage every 3 hours**
    - **Quicklook Science**
    - **LAT data V&V**
- **Concept: "*The sun never sets on the LAT Collaboration*"**
  - **Implement rotating duty scientist roster to continuously monitor LAT data**
  - **Use Europe/Japan/USA longitude distribution**
- **Future Operations Workshops**
  - **Involve all Collaboration countries, groups**
  - **Ensure ISOC supports Collaboration needs**

# Summary

- ISOC team structure is in place, with key leads identified
- Transition from I&T is underway, with shared ISOC/I&T activity
- Need to involve the full Collaboration in the ISOC, to achieve maximum science from the LAT