**ULDB PDR**

**Project Description**

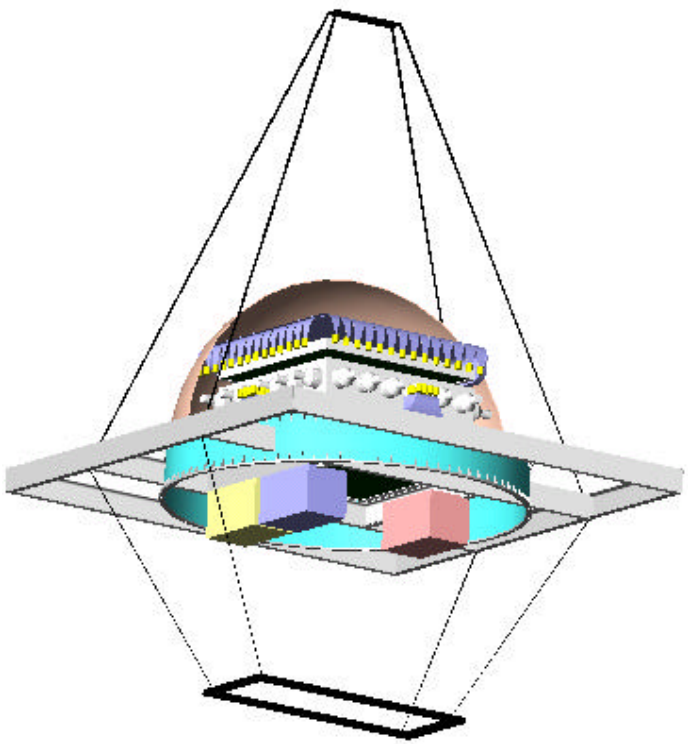
# *The Trans-Iron Galactic Element Recorder (TIGER)*

P.L. Hink[4], W. R. Binns[4], L. Barbier[2], E. Christian[2], J. Cummings[4], G.A. deNolfo[1], M.H. Israel[4], R. Leske[1], R. Mewaldt[1], J. Mitchell[2], S. Schindler[1], R.E. Streitmatter[2], C.J. Waddington[3]

[1]*California Institute of Technology*
[2]*Goddard Space Flight Center*
[3]*University of Minnesota*
[4] *Washington University, St. Louis*

**Paul L. Hink**
**Washington Univ.**
**November 4-5, 1998**

# *Experiment Overview*



- Instrument
  - Detectors
  - Electronics
- Structure
  - Instrument
  - Balloon-craft
- Pressure Vessel
  - Hemispheres
  - Mid-section
  - Gas Make-up

# *Heritage*

- TIGER high-altitude balloon experiment
  - Flown successfully from Ft. Sumner, NM on September 24, 1997, including following ULDB components
    - **Detectors**: S0,S1,C0,C1,S2, similar hodoscope design
    - **Electronics**: PHA boards, CPU family & S/W, HVPS, Housekeeping Sensors
    - **Mechanical**: Primary structure, electronics rack design, detectors
- Accelerator tests
  - BNL April 1998, 10.6GeV/nucleon Au
    - Test of fully-coded hodoscope with proposed PMTs and PMT bases
    - Test of TIGER Cherenkov Detectors (C0 and C1)
    - Test of TIGER PMT PHA Boards

# *Requirements*

- Science Requirements defined in *Instrument Functional Requirements and Description Document* (IFRD)
- Engineering Requirements defined in
  - *Instrument Functional Requirements and Description Document*
  - ULDB Design-To Requirements Document (DTRD)
- New Requirements for TIGER include
  - Balloon-craft Interfaces
  - Enhanced Reliability
    - Increased Redundancy and/or graceful degradation
    - Enhanced testing of components

# *Interfaces*

Flight System

- Electrical
  - Instrument Data
  - Instrument Commands
  - Power
  - B/C Data
  - B/C Commands
  - Time Pulse ?
- Mechanical
  - Field-of-view (FOV)
  - B/C Structure -- Instrument
  - B/C Structure -- Mid-section
- Thermal

Mission Operations

- Integration
  - Instrument Data
  - Instrument Commands
  - Power
  - B/C Data
  - B/C Commands
- RCC
  - Instrument Data
  - Instrument Commands
- WU
  - Instrument Data
  - Instrument Commands

# *Sub-systems*

**Detectors**

- S0 - S3
  - Radiator/WLSB
  - 1” PMT Assy
  - Housing
- Hodoscope
  - Fibers
  - 1” PMT Assy
  - Housing
- C0 (CIT)
  - Radiator (CIT)
  - Light Box (GSFC)
  - 5” PMT Assy (GSFC)
- C1 (GSFC)
  - Radiator (GSFC)
  - Light Box (GSFC)
  - 5” PMT Assy (GSFC)
- Light Calibration

**Electronics**

- Core Module
  - CPU
  - LVPS
  - 1553
  - PHA I/O
  - B/C I/O
  - Relay Bd
  - Housekeeping
  - S/W
- Front-End
  - PHA Bd
  - Bus Controller
  - LVPS
- HVPS
- HTR Control

**Mechanical**

- Structure
  - B/C Interface
  - Mid-Section
  - Instrument Support
  - Electronics Housings
  - Gas make-up interface
- Pressure Vessel (CIT)
  - Shells
  - Bladder
  - Ring
- Gas Make-up (CIT)
- Thermal
  - Heaters
  - Fans
  - Radiator (?)
  - Insulation
  - B/C Interfaces

# *Development Schedule*

- Insert Roll-up of Schedule

# *TIGER2000 Resource Requirements - Overview*

| Resource | Average Requirement | Peak Requirement |
|---|---|---|
| Mass | 540 kg | N/A |
| Power | 222 Watts | 522 Watts (night) |
| Telemetry | 4.4kbps | 5.7 kbps |
| Commanding | < 1 per day | 20 during LOS checkout |



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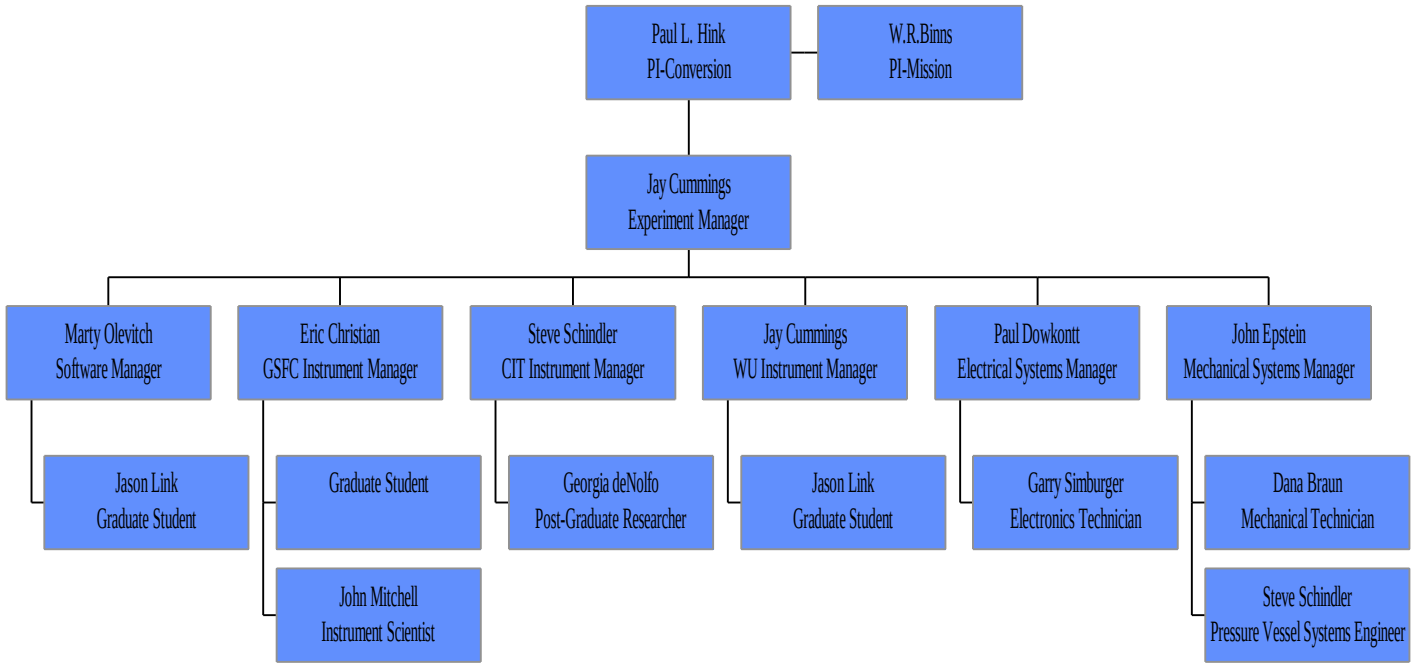
# Organization



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