



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Sounder PEATE Status

NPOESS Preparatory Project (NPP)

California Institute of Technology
Jet Propulsion Laboratory

May 4, 2009

This work was carried out at the Jet Propulsion Laboratory, California Institute of Technology under a contract with the National Aeronautics and Space Administration.

© 2009 California Institute of Technology. Government sponsorship acknowledged.



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Topics

Sounder PEATE 1-Minute Overview

Application Software and Processing System Status

Hardware Status

Plans for the Future





National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Topics

Sounder PEATE 1-Minute Overview

Application Software and Processing System Status

Hardware Status

Plans for the Future



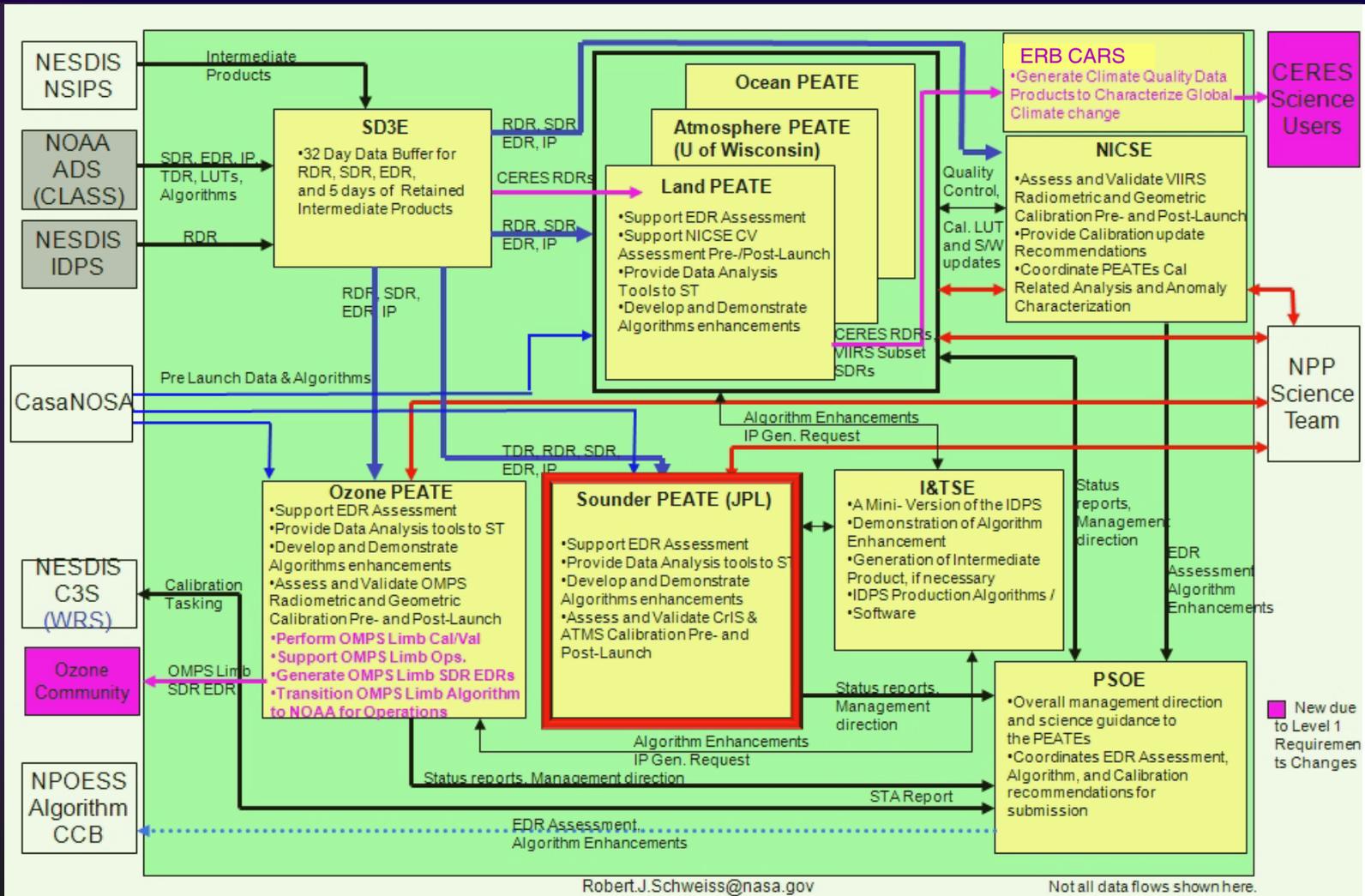
Sounder PEATE 1-Minute Overview

Sounder PEATE Relationships

- **Sounder PEATE is one of 5 PEATES and 1 CARS supporting NASA's role in the NPP Program**
- **The Sounder PEATE is:**
 - Part of the NPP Science Data Segment
 - Reports to Science Data Segment Manager, Robert Schweiss
 - Reports to Program Science Office Element (PSOE), Jim Gleason
 - The NPP Sounder PEATE is a resource of:
 - The NPP SDS
 - The NPP Sounder Science Team

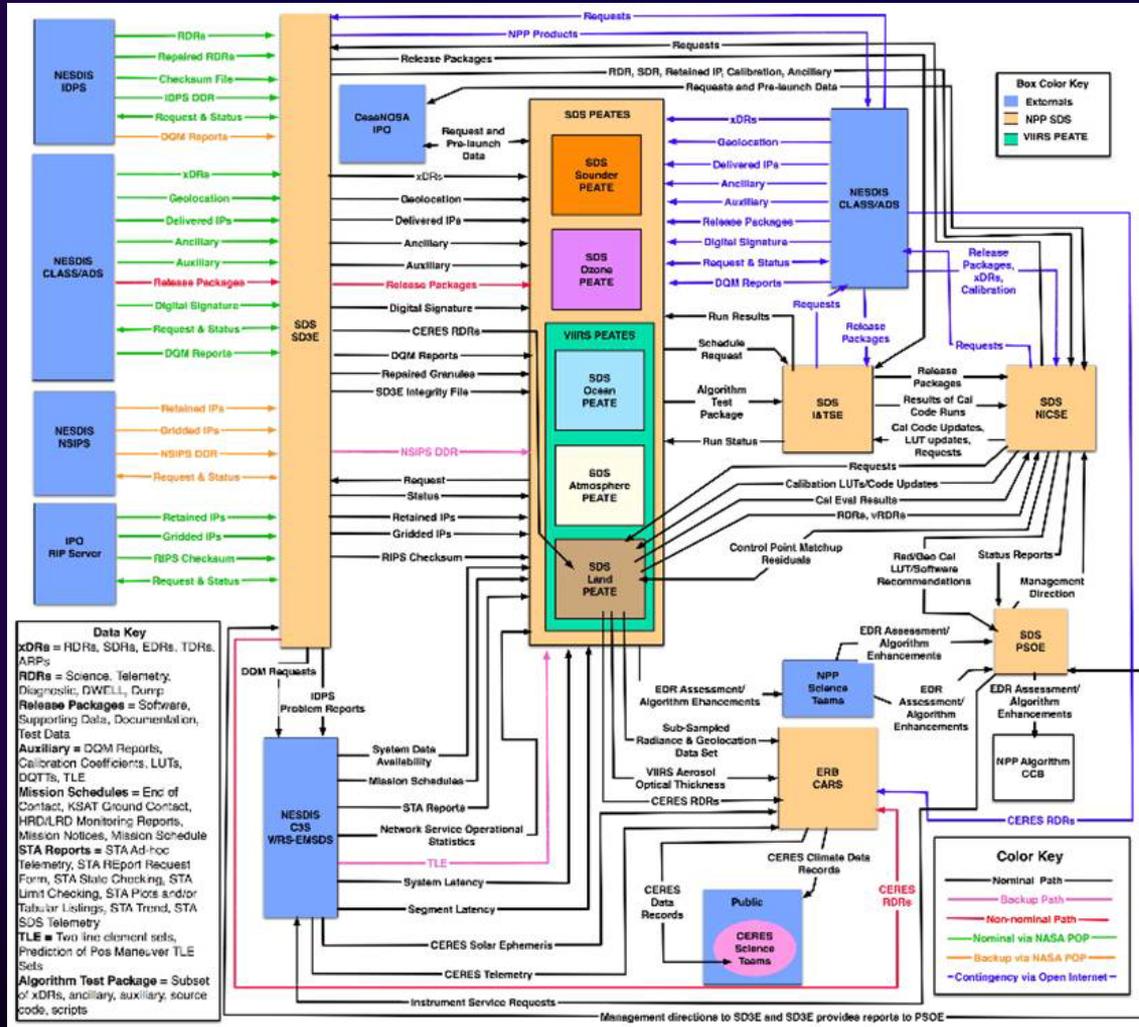


Sounder PEATE 1-Minute Overview SDS Data Interfaces





Sounder PEATE 1-Minute Overview NPP SDS Data Flow Diagram



- Beneath this simple diagram is an intricate patchwork of wires and cables. The Sounder PEATE and other PEATEs shield you from all this!
- The importance of this diagram is not the detail but the fact that the detail has been developed and is being implemented.



Chief Roles of the Sounder PEATE

- **Assist the Science Team in Cal/Val activities**
- **Assist the NPP Sounder Science Team in assessing the Climate Quality of EDR Products:**
 - Vertical Temperature Profile
 - Vertical Moisture Profile
 - Vertical Pressure Profile (including surface)
- **Assist the NPP Sounder Science Team in evaluating the NPP Retrieval Code**
 - Evaluate existing IDPS production and science code bases
 - Test and verify potential algorithmic improvements
 - Recommendations and observations sent to the PSOE



Sounder PEATE 1-Minute Overview **Sounder PEATE Responsibilities**

- **Support Science Team in assessing and validating:**
 - Climate Quality of SDRs and EDRs
 - Calibration of Pre-Launch & Post-Launch xDRs
- **Provide data and analysis products to the Science Team**
 - All data in PEATE and AIRS archives are available
- **Develop tools for data comparisons :**
 - CrIMSS compared to other instruments and correlative data
- **Analyze IDPS Software**
 - Develop and Demonstrate Algorithm Enhancements
 - Provide compute resources to Science Team for local computations



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Topics

Sounder PEATE 1-Minute Overview

Application Software and Processing System Status

Hardware Status

Plans for the Future



Application Software and Processing System Status **Software Development Status**

PEATE software development is well under way

- **System Infrastructure**

- Basic system infrastructure was operational with previous release
- Operator controls for job processing / status checking just added
- System infrastructure to be completed by end of year

- **Applications Software**

- Data ingest and archive fully operational with previous release
- Current release adds initial application functionality
 - Granule Maps (MetOp-A IASI, MHS, AMSU-A)
 - IASI Calibration Subset (MetOp-A IASI)

- **IDPS Software**

- Understanding the IDPS retrieval software
- Porting to Linux is also under way – EDRs partially operational



Application Software and Processing System Status Software Development Status (cont'd.)

- **Sounder PEATE is actually being built!**



- Build 3 integration testing going on now
- In addition to developing first executables, we are developing key system infrastructure capabilities:
 - Common data file type readers / writers
 - Libraries, frameworks and APIs
- First Match-Up PGE (Analysis Match-up – matching IASI to ECMWF Analysis)
 - Nearly complete
 - Will be added in an incremental build (V3.1) in about a month



- **The Sounder PEATE system is running**
- **Basic system features now available include:**
 - Data ingest
 - Data archive
 - Granule maps
 - Calibration Subset (MetOp-A IASI)
- **We are currently supporting the Science Team by**
 - Ingesting and archiving MetOp-A data
 - Producing Calibration Subset Products



Application Software and Processing System Status **New Data Format for Match-Up Products**

- **A new data product format for all PEATE Match-Up products is being developed:**
 - ***Radiative Transfer Profile – version 3 or “RTP-3”***
 - RTP-1 and RTP-2 data formats were developed by UMBC for representing “sets of atmospheric profiles, optionally paired with calculated and/or observed radiances.”
 - RTP-3 is an extension of RTP-2 that allows for retention of sounder data (CrIS, IASI, AIRS, ...) and metadata in conjunction with correlative products
 - RTP-3 is netCDF compliant and will be CF compliant
 - RTP-3 Reader APIs will be provided for “C”, MATLAB and IDL – planned for Build3.1



Application Software and Processing System Status **The SW CCB – Making it all happen**

- **Software Change Control Board guides development**
 - Reviews and approves all software development activities
 - Helps the PEATE manager prioritize work within budget constraints
- **Sounder PEATE Software CCB consists of:**
 - Sounder PEATE System Engineer
 - Sounder PEATE Task Manager
 - Sounder Science Team Member (when available)*

*The Science Team will be notified by email regarding significant feature or scope changes to existing plan.

When a decision requires Science Team input, the CCB will always include Science Team representation.



Application Software and Processing System Status A New CM Tool!

- **We have adopted a new CM system that will help us**
 - do our work better, and to
 - facilitate Science Team involvement:
- JIRA Bug and Issue Tracker – for logging/tracking SW issues
- AccuRev – for managing our code base
- **JIRA will be open to the Sounder Science Team**
 - Issue Anomaly, New Requirement and Change Requests
 - Monitor status of issues opened by JPL and Science Team
- **Additional features and capabilities will be added via JIRA:**
 - Request for Action (RFA) tool for logging RFAs (not necessarily directly related to code functionality) – *available in May*
 - Data Processing Request (DPR) to request a data processing run within the Sounder PEATE – *future capability*

*In response to
CDR Action Item*



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Topics

Sounder PEATE 1-Minute Overview

Application Software and Processing System Status

Hardware Status

Plans for the Future





Hardware Status Facility Upgrades

- **Development system installed (temporary installation)**
 - Small set of Linux processors sufficient to develop and demonstrate local processing capability *(on-line, Spring 2007)*
 - 30 GB Disk Storage
- **Initial Production System** *(planned to be operational June 2009)*
 - Development Server (1 Sun Blade - 16 processors)
 - Initial Compute Servers (5 Sun Blades – 80 total processors)
 - Data Archive – 200 TB RAID (Sun RAID)
- **PEATE hardware onsite now, awaiting facility upgrades**
 - Initially planned to install the PEATE inside the AIRS TLSCF
 - JPL Facilities Management Board denied our upgrade request
 - Awaiting facilities upgrade completion in another JPL building
 - *Relocating the PEATE should not adversely affect performance*



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Hardware Status

Phased Hardware Acquisitions

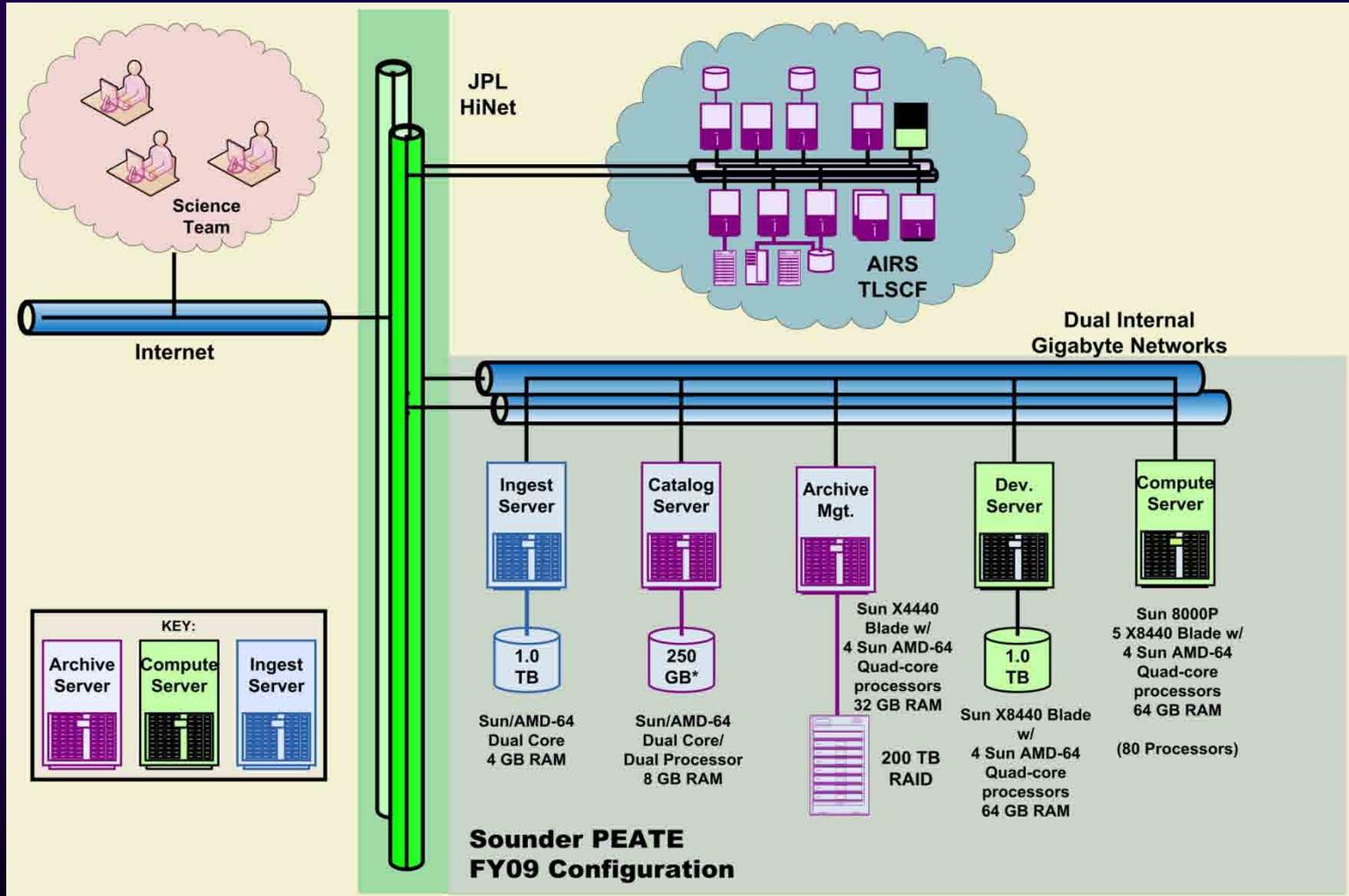
- **We will continue to build the Sounder PEATE hardware over time, balancing:**
 - Immediate needs versus Longer-term needs
 - The economy of acquiring hardware later to obtain more “bang for the buck”
 - Mitigating risks as much as possible
- **Currently planned upgrades over next few years will expand the data archive to at least 500 TB**



National Aeronautics and Space Administration

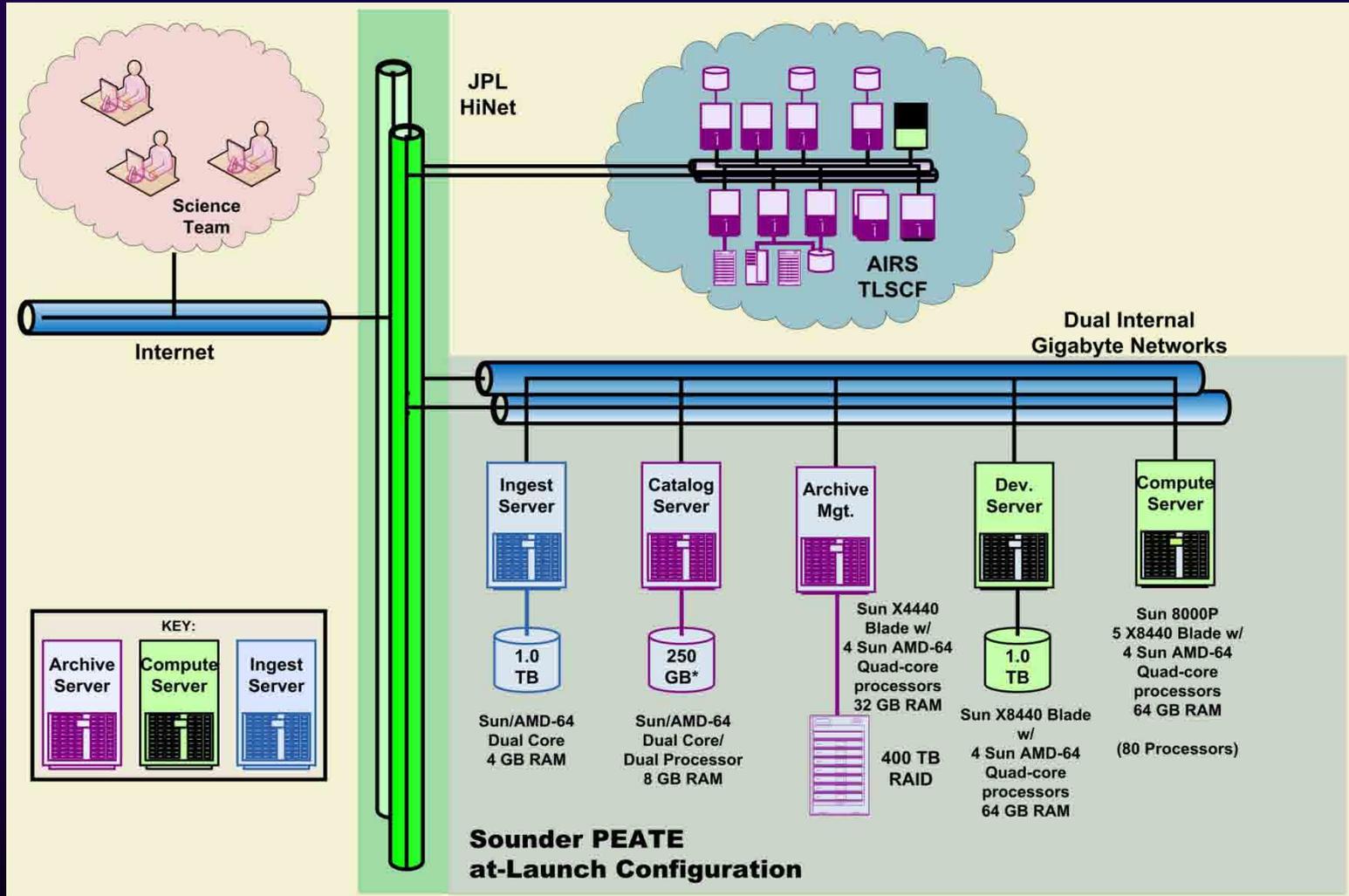
Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Hardware Status June 2009 Upgrade Configuration





Pre-Launch (nominally 6MOS before launch)





Hardware Status Configurations FY08 – FY12

	FY08	FY09	FY10	FY11	FY12*
Compute Server		5 Sun 8000P X8440 Blade Systems (80 processors)	5 Sun 8000P X8440 Blade Systems (80 processors)	Evaluate need for additional processors	Evaluate need for additional processors
Data Archive	31 TB	200 TB RAID	400 TB RAID	500 TB RAID	600 TB RAID
Development Server	Sun V4100 2 Dual Core/Processors	1 Sun 8000P X8440 Blade Systems (80 processors)	Same	Same	Same

Each X8440 Blade System consists of:
 4 Sun AMD-64 Quad-core processors (16 Processors)
 64 GB RAM

*System Refresh planned in FY13



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

Topics

Sounder PEATE 1-Minute Overview

Application Software and Processing System Status

Hardware Status

Plans for the Future

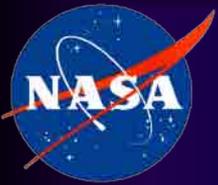




National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California





- **We have developed a detailed baseline schedule that covers activities through June 2010**
- **Major categories of deliverables include:**
 - RTP-3 Readers/Writers for PGE development
 - RTP-3 Reader APIs supporting C, MATLAB, IDL
 - Science PGEs including Match-Ups, Cal Subsets, others
 - Completion of Infrastructure
- **Analysis and development activities pertaining to IDPS production code are also under way, but not heavily scheduled**

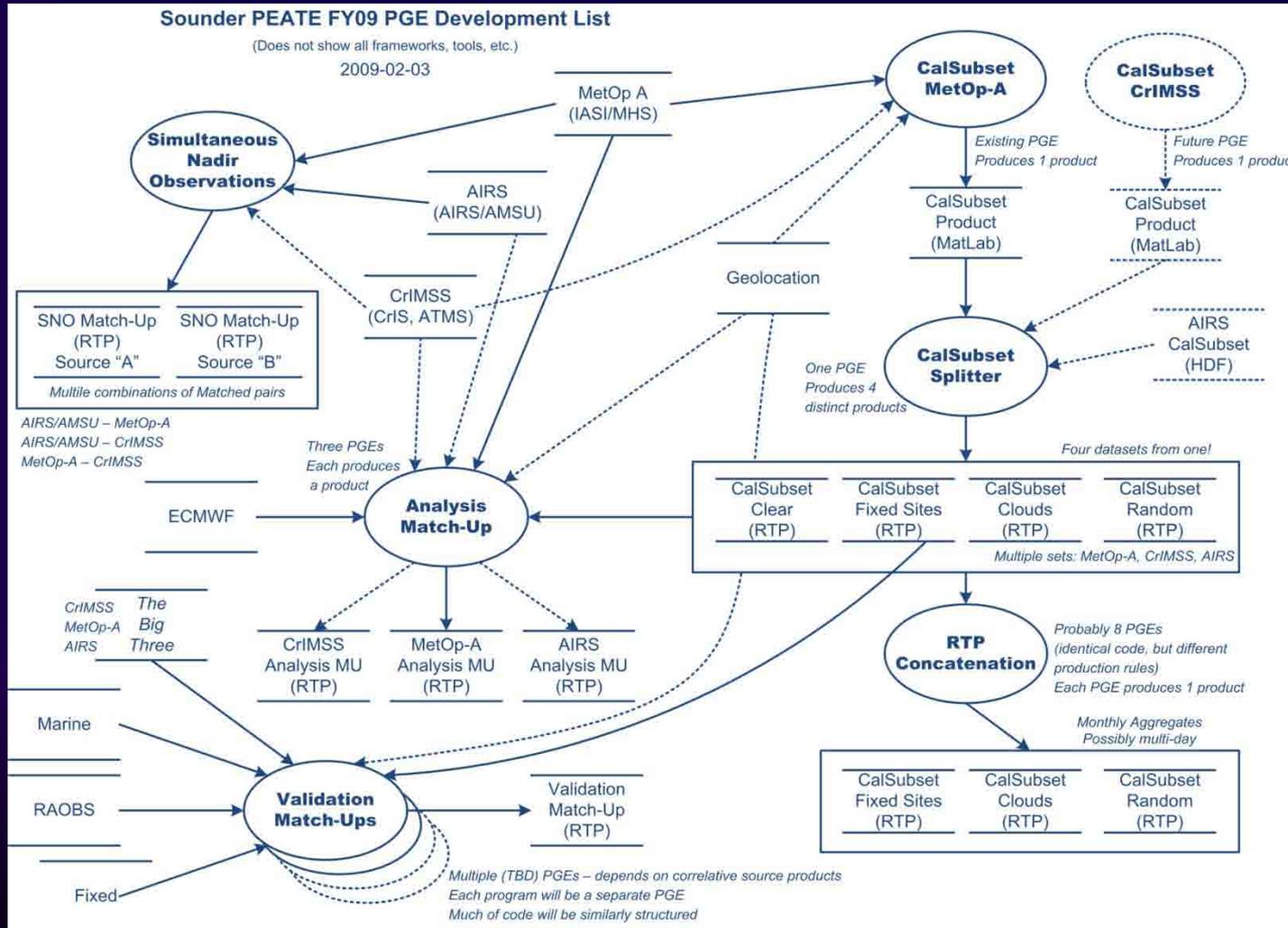


Near-term Software Development Plans

- **Sounder PEATE Science Software**
 - Analysis and Validation Match-Ups
 - Simultaneous Nadir Observations (SNO)
 - CrIMSS - IASI \
 - CrIMSS - AIRS MW and MW/IR combinations
 - IASI - AIRS /
 - Filtered Calibration Subsets and monthly aggregates
- **IDPS Production and Science Code Algorithms**
 - Understanding the IDPS retrieval software
 - Porting to Linux



Planned Capabilities – early FY10





Life After Launch - Beyond the Baseline

- **Software Development continues after launch**
 - Gridded Products (Daily, Multi-Day, Monthly)
 - Updated CrIMSS Calibration Subset
 - Specialized IPs, not included in standard EDR IP set
 - Other unique products/tools requested by Science Team
- **IDPS Code Base**
 - Investigate upgrades to existing code
 - Upgrades (that improve EDR climate quality) submitted to the PSOE
 - Investigate alternate retrieval algorithms, if needed
- **Current long range plans indicate that all PEATES, including the Sounder PEATE, remain in action through at least two-years after launch**



National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

