

NASA Sounder Science Team Meeting

Transition from PEATE to SIPS

**Near Term Plans and Goals
of the Sounder SIPS**

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How did we get here?

- “Soumi NPP The newest NOAA/NASA mission to Earth...

These were the studies of the first SNPP Sounder Science Team. Their mission:

- To determine whether SDRs and EDRs from the NOAA IDPS* are suitable for continuing ongoing climate studies...
- To determine whether NOAA SDRs and EDRs from the NOAA IDPS can be used in conjunction with the existing Sounder Products (AIRS/IASI) to produce an extended data product line...
- To propose alternative strategies if these products do not meet NASA sounding scientist’s needs!

*IDPS = *Interface Data Processing Segment*,
i.e., the NOAA SNPP data processing system



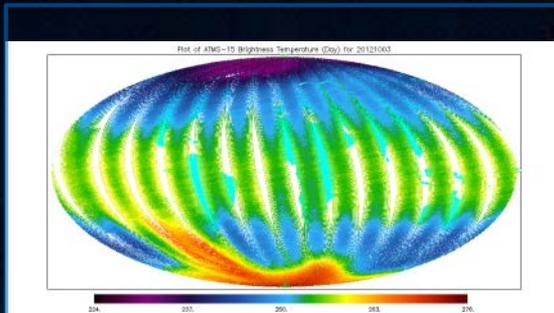
How did we get here?

- **NASA established 5 Science Teams to analyze and evaluate NOAA SNPP Products**
- **Product Evaluation and Analysis Tool Elements (PEATEs) were also funded to support Science Team research activities**
- **The goals of the Science Teams/PEATEs:**
 - *determine suitability of SNPP for in NASA's research programs*
 - *extending the data record started with NASA predecessor instruments and Earth Mission programs*
- **The Sounder PEATE, one of the 5 PEATEs supported:**
 - The Sounder Science Team in assessing climate quality from CrIMSS products (CrIS and ATMS)
 - The SNPP Cal/Val and EDR Teams (informally)

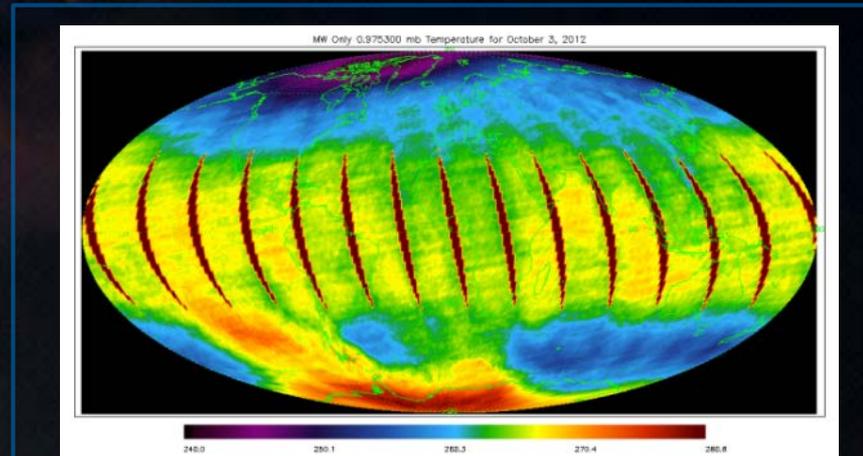
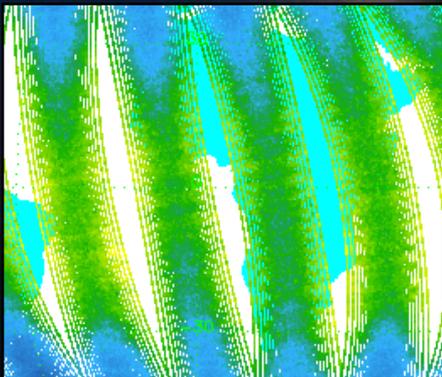


Example Finding: Striping in Microwave

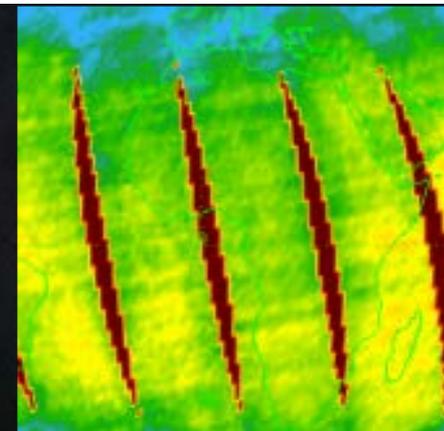
- ATMS-15 has 1/f noise (low frequency sensitivity fluctuation)
- The striping is transferred to EDR temperature



ATMS SDR



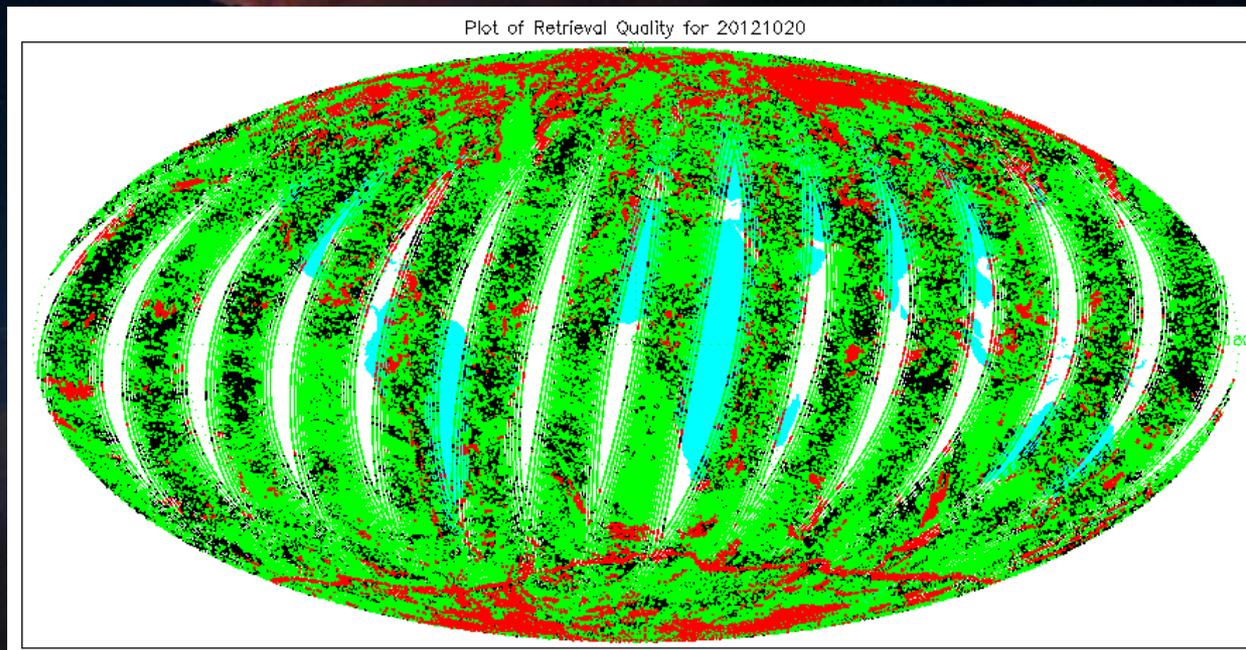
ATMS EDR IP





Example Finding: Poor Yield in Early EDR Products

- **EDRs were routinely evaluated**
 - Early EDRs exhibited very little high quality products (symbolized in **BLACK**)
 - Most FOVs are marked “LowMW” (**GREEN**) and “Poor” (**RED**)



- Product quality improved with subsequent releases - Mx7



Sounder PEATE Produced Products

- **Calibration Subsets (CrIS and IASI)* FOVs in four categories:**

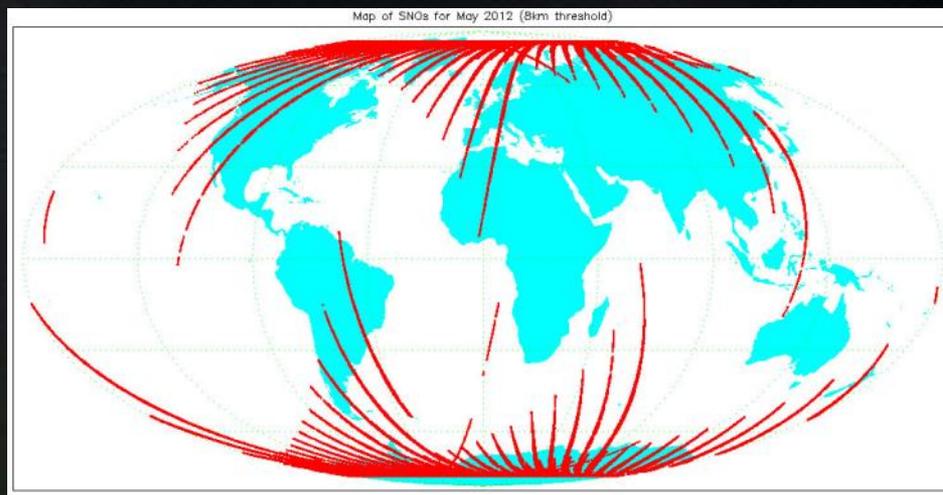
- Clear
- Random
- Deep-convective Cloud
- Fixed-site

*Sounder Science Team can also access AIRS Calibration Subsets

- **Simultaneous Nadir Observations (SNO), SNPP-CrIS/ATMS with:**

- Aqua (AIRS/AMSU)
- MetOp A/B (IASI/AMSU/MHS)
- NOAA-18, NOAA-19 (AMSU)

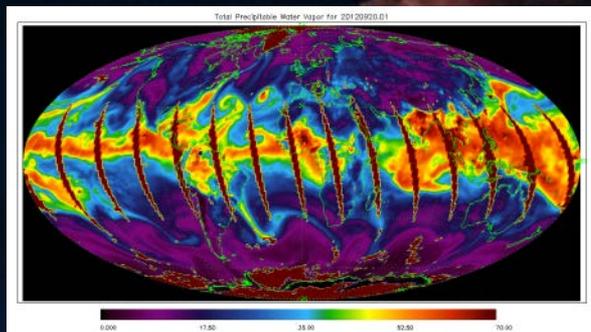
(radiances matched to radiances)





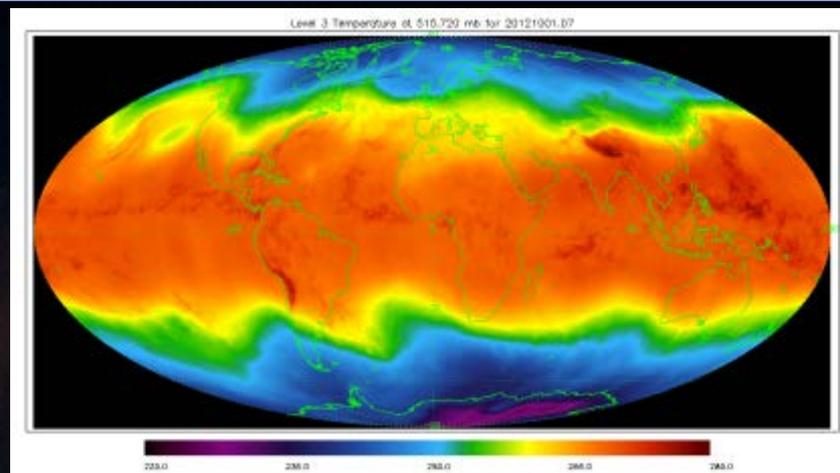
Sounder PEATE Products (cont'd.)

- **Level 3 Products (SNPP, MetOP, AIRS*)**
 - Daily, Multi-day, Monthly

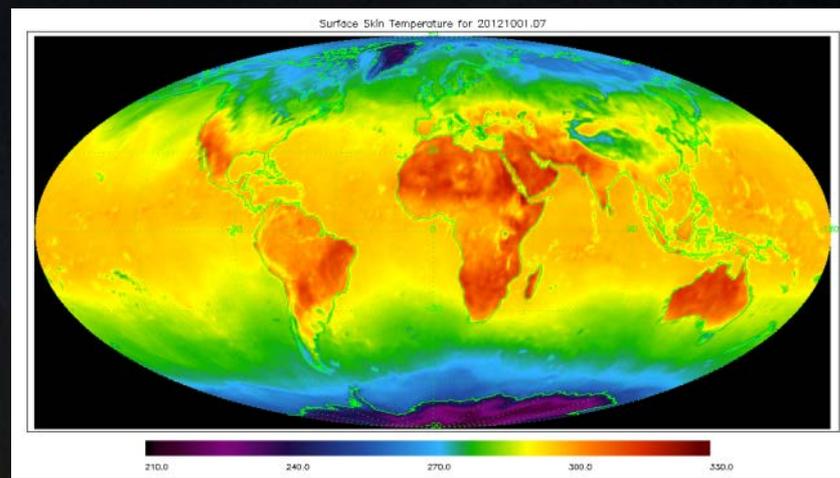


- Useful for characterizing global patterns of temperature, water vapor and key atmospheric constituents
- Support cross-comparisons between SNPP, MetOP and AQUA Level 3 products

Source: Sung-Yung Lee, Sounder PEATE



MW-only Temperature (515 mb) - 7-day mean (CrIMSS EDR)



Surface Skin Temperature - 7-day mean (CrIMSS EDR)



Foundation and Formulation of New NASA Science Teams and SIPS for SNPP

- **Early mission NASA SNPP Science Teams reported findings regarding suitability for performing climate studies:**
 - Current IDPS products did not meet NASA's needs
 - SNPP instrument data is generally high quality could be very useful in developing multi-mission data sets
 - NASA should develop its own products (Levels 1, 2 and 3)
- **Based on Science Team recommendations, NASA HQ agreed it was essential to develop data products from SNPP using NASA Science Team algorithms**
 - Issued ROSES A.29, calling for NASA Science Teams and SIPS with the following goals*:
 - *Development of science quality standard data products using Suomi NPP measurements that will enable continuity of key standard Earth system data records from NASA's EOS Terra, Aqua, and/or Aura satellites*
 - *Development and demonstration of innovative and practical applications of NPP measurements*
 - *Development of other new science data products from Suomi NPP measurements that will meet high-priority Earth science needs (a secondary priority)*



Emphasis of Science Teams

- **Science Team emphasis is to be placed on developing Levels 2 and 3 data products and placing them into the production stream**

- **Development of “merged data products*” is of secondary importance**

“Development of merged Suomi NPP-EOS extended time series data products, while clearly NASA’s longer-term goal, will not be emphasized in this solicitation.”

*A.29, p. 6.

- **Science Teams to develop ATBDs, algorithms and beta code**
 - ATBDs to be reviewed by NASA before authorization to code
 - ATBDs, algorithms and code to be handed over to the SIPS for development of operational production code
 - The proposed implementation schedule is very ambitious



A word about Level 1

- **Level 1 algorithms and code are to be developed by members of previous SNPP NASA Science Teams. (earlier ROSES awards)**
- A.29 proposers are to assume that NASA would provide Level 0 data and that previous Science Teams will deliver ATBDs and code to SIPS for implementation of L1 code
- CrIS Level 1 Team:
 - University of Wisconsin – Madison
 - University of Maryland, Baltimore County
- ATMS Level 1 Team:
 - Jet Propulsion Laboratory
 - Bjorn Lambrigtsen (Lead)
 - Sounder PEATE/SIPS implementation



- **Five Science Teams/SIPS pairs were selected from A.29 solicitation:**

<u>Team/Focus</u>	<u>Instrument Specialization</u>
Land	VIIRS
Ocean	VIIRS
Atmosphere	VIIRS
Sounder	ATMS and CrIS
Ozone	OMPS

- **JPL was selected to be the Sounder SIPS and is teaming with the GES DISC**
 - JPL will be the chief developer, integrator and tester
 - GES DISC will perform operational data processing
- **Sounder SNPP Products will be archived at a TBD DAAC**



- **The Sounder Science Team was also selected from A.29:**
 - **Chris Barnet** – Team Lead
Development and validation of a community hyper-spectral infrared microwave Earth retrieval algorithm: CHIMERA
 - **Hartmut Aumann**
Analysis of the AIRS and CrIS radiometric calibration under cloudy conditions and error propagation into environmental variables
 - **Jean-Luc Moncet and Vivienne Payne**
Refined Atmosphere Data Products from CrIS and ATMS
 - **Joel Susskind**
Analysis of CrIS/ATMS using an AIRS Version 6-like retrieval algorithm
 - **Karen Cady-Pereira and Helen Worden**
Developing retrieval algorithms for NH₃ and CO from NPP CrIS measurements
 - **Bjorn Lambrigtsen**
Microwave sounder Earth System Data Records
 - **Eva Borbas**
Continuation of EOS Clear Sky Infrared Total Precipitable Water Vapor Product Using a Combination of VIIRS and CrIMSS Measurements



Sounder SNPP Data Products

- **The Sounder SIPS will work hand-in-hand with the Science Team to develop the following products*:**
 - Level 1B Calibrated Radiances
 - ATMS
 - CrIS
 - Level 2 Products
 - Retrieved Products (Temperature, Water Vapor, ... other species)
 - Cloud-cleared Radiances
 - Level 3 – gridded retrieval products, grouped into ascending and descending, 1x1-degree cells
- **Additional Products**
 - Simultaneous Nadir Observations (SNO)
 - Calibration Subsets (CalSub)
 - Other TBD products
- **All products will be formatted to netCDF-4/HDF 5 specification**

*pending Science Team concurrence

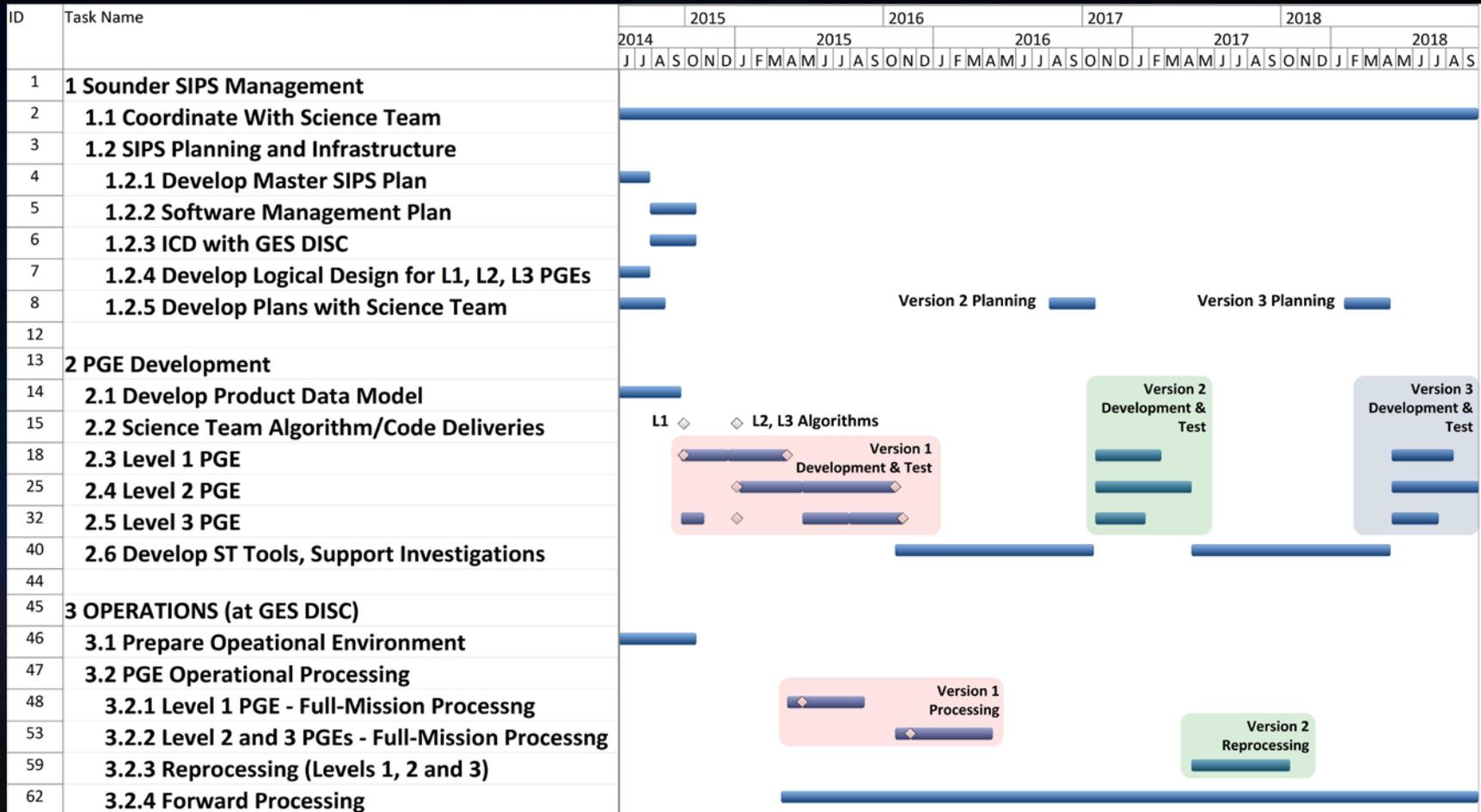


Development Plans and Schedules

- **Sounder SIPS will work with the Science Team to develop and release PGES and subsequent products**
 - Work to a mutually agreeable schedule
- **Products will be produced in accordance to the NASA data policy**
 - Rapid release of all products
 - No sequestration of products for science team-only
- **Science Team members and SIPS have yet to meet and develop a schedule**

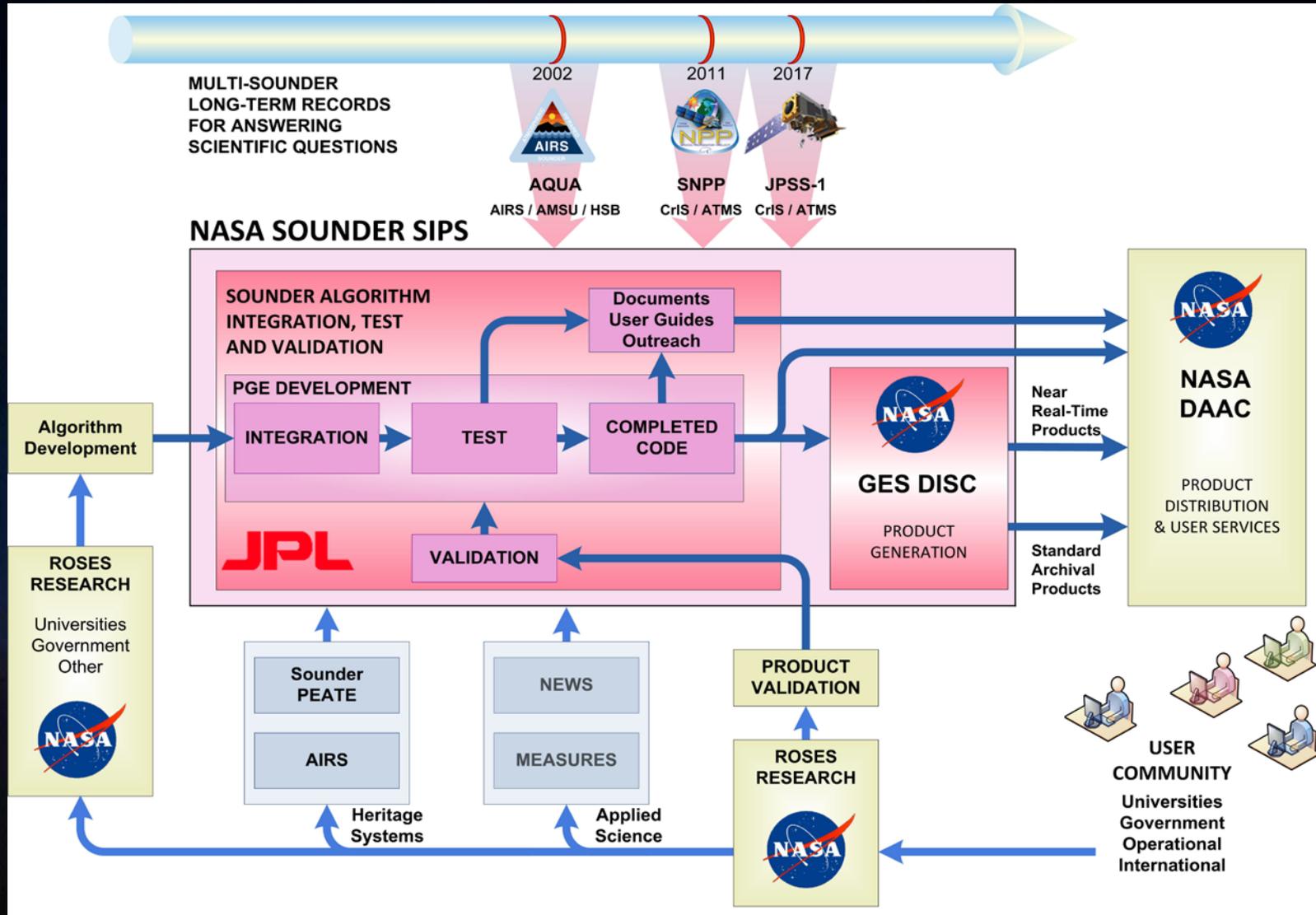


Development Plans and Schedule





A Working Relationship





National Aeronautics and
Space Administration

Jet Propulsion Laboratory
California Institute of Technology
Pasadena, California

BACKUP SLIDES



Example Finding: Comparing IPDS and Mini-IDPS Products

Differences are exhibited between IPDS and mini-IDPS products

