

# **NPOESS PREPARATORY PROJECT (NPP) VALIDATION PROGRAM FOR THE ATMOSPHERIC PROFILE DATA PRODUCTS**

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**ITSC-17**  
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# NPP STATUS:

## Latest Accomplishments:

- VIIRS NPP Integration and Test completed successfully
- CrIS F1 *successfully* completed thermal vacuum (TVAC) testing:
  - CrIS is working extremely well and within expectations
  - *TVAC4:All functionality and performance requirements were met*
  - CrIS will provide accurate SDR and EDR products!

## Current Status:

- **On NPP:**
  - ATMS
  - CERES
  - OMPS
  - VIIRS
- **CrIS:**
  - Ship to NPP in June 2010
- **Launch:**
  - NET Late Oct 2011

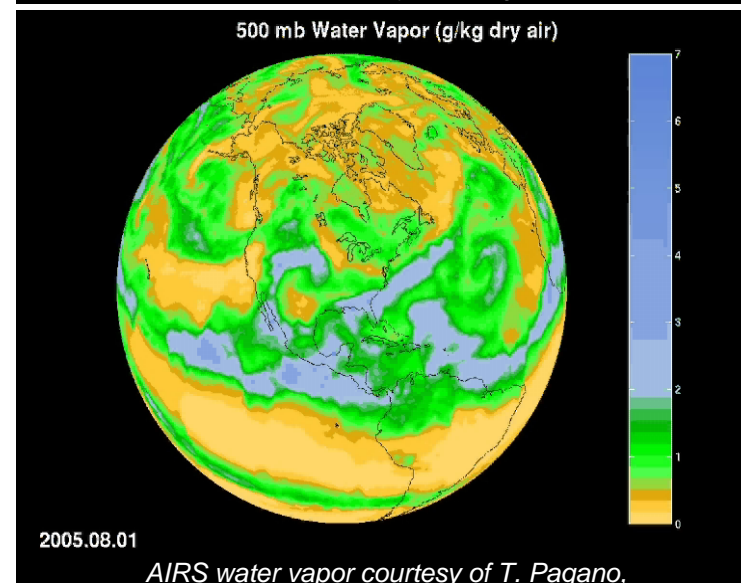
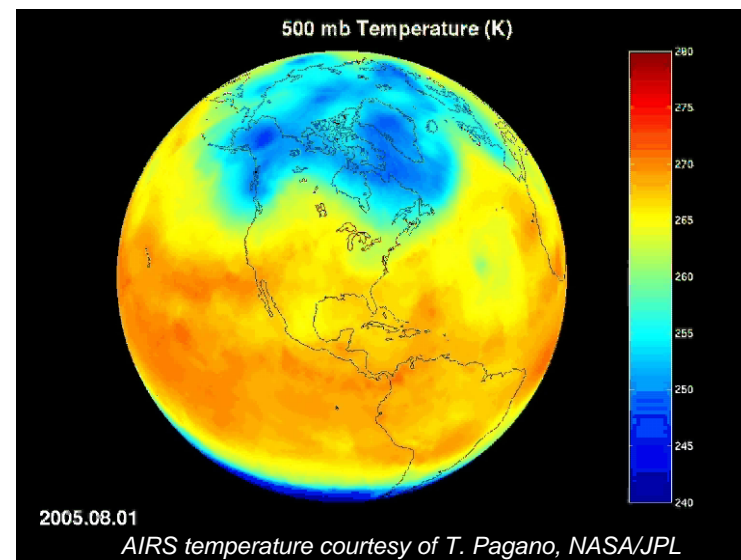
# TRANSITION TO JOINT POLAR SATELLITE SYSTEM (JPSS):



- Memorandum Of Understanding (MOU) between NOAA and NASA for JPSS Program Transition Planning has been signed on April 6<sup>th</sup>.
- JPSS transition will not affect NPP Cal/Val activities.
  - Organization of the Data Products Division is still under discussion, though NESDIS has committed to retaining management control.
  - Transition team indicated necessity of activities to continue without interruption or delay through specific mention in the Acquisition Decision Memorandum signed (March 2010).
- Revised prioritized list of potential algorithm upgrades submitted to Dr. St.Germain.

# SOUNDER EDR: PRODUCTS

- **Atmospheric Vertical Temperature Profile (AVTP)**
  - KPP for lower tropospheric temperature.
  - Used for initialization of high-resolution NWP models, atmospheric stability, etc.
  
- **Atmospheric Vertical Moisture Profile (AVMP)**
  - KPP for lower tropospheric moisture.
  - Used for initialization of high-resolution NWP models, atmospheric stability, etc.
  
- **Pressure Profile (derived from AVTP and AVMP)**
  
- **Greenhouse Gas (CO<sub>2</sub>, Ozone) Profiles**
  - Used for Climate Monitoring



# SOUNDER EDR CAL VAL: TEAM MEMBERS

Name	Organization	Funding Agency	Task
Chris Barnett	NOAA/NESDIS/STAR	DPD	Lead CrIS/ATMS EDR Team
Changyong Cao	NOAA/NESDIS/STAR	DPD	Coordination w/ GSICS
Mitch Goldberg	NOAA/NESDIS/STAR	DPD & NOAA-PSDI	NGAS-code, NUCAPS
Anthony Reale	NOAA/NESDIR/STAR	DPD	NPROVS
John Derber	NOAA/NCEP	DPD	NWP ingest
Fuzhong Weng	NOAA/NESDIS/STAR	NOAA-PSDI	MiRS
Gail Bingham	USU/SDL	DPD	Lead CrIS/ATMS SDR Team
Bill Blackwell	MIT	DPD	Microwave products
Allan Larar	NASA/LaRC	DPD	EDR Validation
Xu Liu	NASA/LaRC	DPD	IASI proxy, EDR validation
Hank Revercomb	SSEC	DPD	SDR, PEATE
Dave Tobin	SSEC	DPD	ARM-RAOBS
Larrabee Strow	UMBC	DPD	OSS validation
Joel Suskind	NASA/GSFC	DPD	AIRS proxy
Denise Hagan, Degui Gu	NGAS	NG Prime	EDR Validation/SDR coordination
Steven Beck	Aerospace Corp.	external	RAOB,LIDAR
Steven English	UKMET	external	UKMET analysis
William Bell	ECMWF	external	ECMWF analysis
Steve Freidman	NASA/JPL	NASA	Sounder PEATE
Ben Rustin	NRL	NRL	NOGAPS/NAVDAS analysis

# SOUNDER EDR CAL VAL: PLANNED ACTIVITIES



Activity	Time-frame	Value
Use of proxy datasets	PL,EOC	Exercise EDR and fix issues.
Use of forecast & analysis fields	EOC, LTM	Early assessment of performance
Compare early EDRs to operational products from AIRS & IASI	EOC,ICV,LTM	Early assessment of performance, diagnostic tools to find solutions.
Compare SDRs w/ AIRS and IASI via SNOs and double differences	ICV,LTM	Separate SDR/EDR issues at detailed level.
Operational PCA	EOC,ICV,LTM	Identify and categorize interesting scenes. Instrument health,
RTG-SST and Dome-C AWS	LTM	Long-term stability of ICT
Operational RAOBs	ICV,LTM	Early assessment, long-term stability.
Dedicated RAOBs	ICV,LTM	Definitive assessment.
Intensive Field Campaigns	ICV,LTM	Definitive assessment.
Scientific Campaigns of Opportunity	Whenever	Detailed look at specific issues.

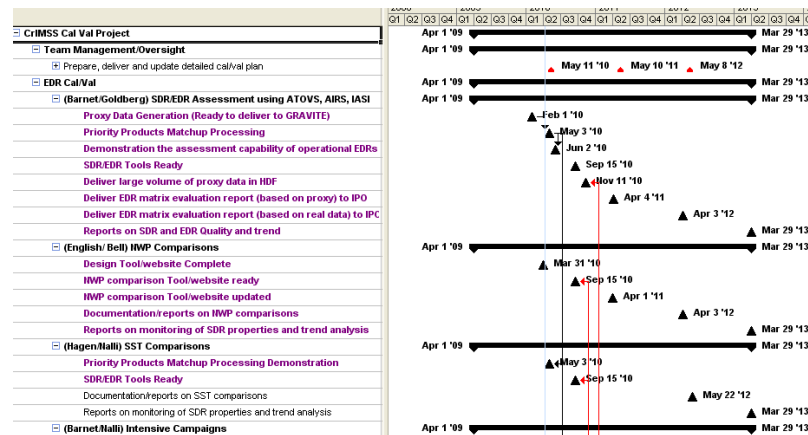
- PL = Pre-launch
- EOC = Early Orbit Checkout (30-90 days)
- ICV = Intensive Cal/Val (stable SDR to L+24 m)
- LTM = Long-term monitoring (to end of mission)

# SOUNDER EDR CAL VAL: SCHEDULE AND MILESTONES



## Near-term Milestones

- 12/09 Complete detailed val schedule
- 01/10 Deliver AIRS/IASI derived proxy data
- 04/10 Demonstrate assessment capability using AIRS and IASI products.
- 4/11 Deliver EDR matrix evaluation report based on proxy data



## Long-term Milestones

	NPP - PFM	NPOESS C1 – FM1
FY09	Complete Validation schedule, exercise assessment techniques	
FY10	Exercise, familiarize, and evaluate EDR code using proxy data	
FY11	Support EOC; ICV and aircraft campaign ( $\geq 1/2012$ ), Deliver Beta EDRs	Recommendations for algorithm modifications
FY12	Deliver Provision EDR	Recommendations for algorithm modifications
FY13	Deliver Validated EDR, Stage 1-3	Simulate FM2 using proxy/NPP products
FY14	Long-term Monitoring	Support SDR validation; Deliver Beta EDR
FY15	Long-term Monitoring	Deliver Provisional and Validated EDR

# SOUNDER EDR CAL VAL: ACTIVITIES UPDATE (1/3)



- Gained community acceptance of plan.
  - Discussed openly in NASA Sounding Team (formerly AIRS Science Team) and SOAT meetings
  - Risk Reduction using AIRS and IASI Demonstration of readiness for CrIMSS validation
- Ported IDPS EDR algorithm and identified number of issues, including the use of non-LTE channels affect daytime soundings, Emissivity hinge points do not allow variation in 950-1050  $\text{cm}^{-1}$  region, and the need for radiance tuning algorithm
- Provided recommendations to IPO and JPSS transition teams on the needed algorithm upgrades.

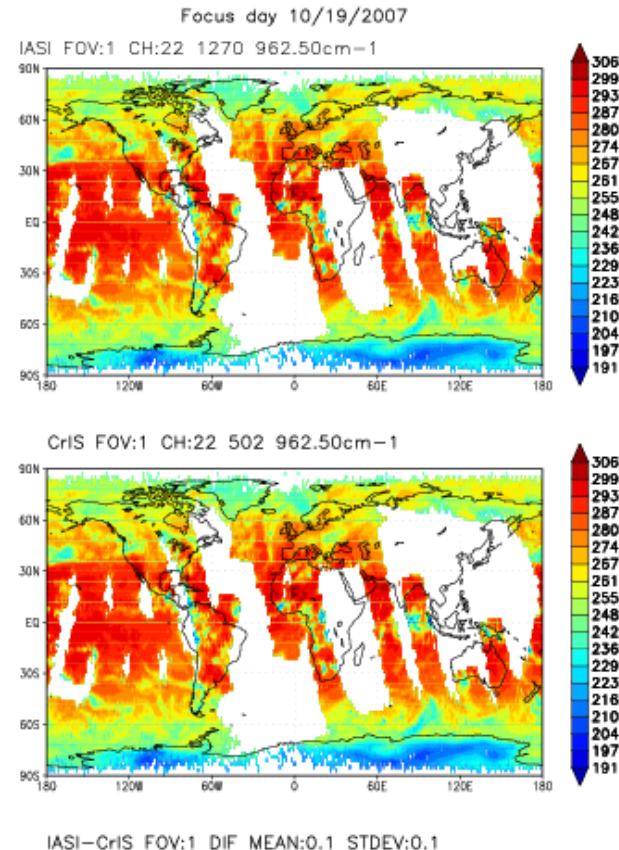


# SOUNDER EDR CAL VAL: ACTIVITIES UPDATE(2/3)



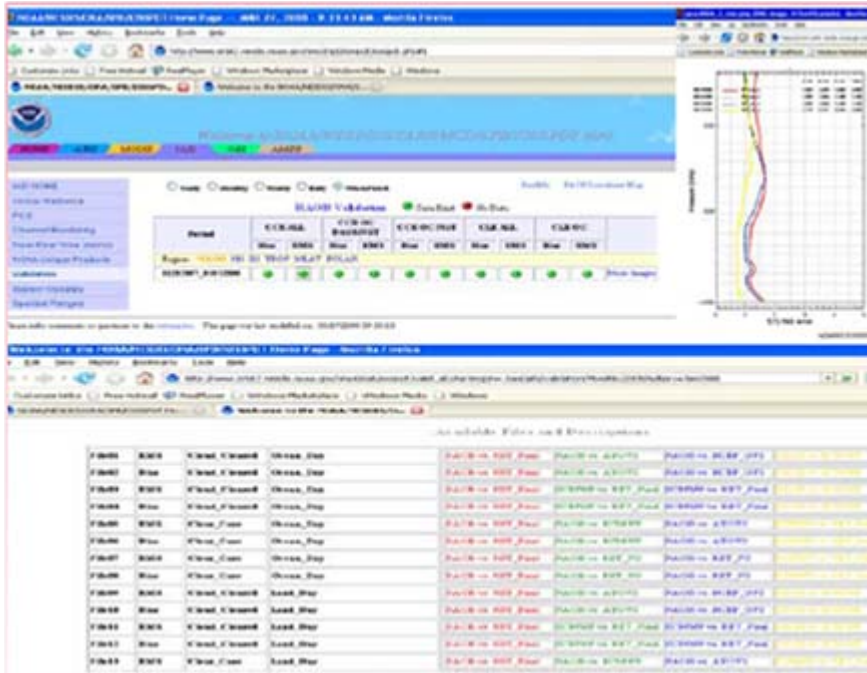
## ○ Proxy Data Package

- A team effort
- Matched Datasets for the 'Focus Day' (20071019)
  - CrIS/ATMS
  - IASI/AMSU-A/MHS
  - IASI NOAA Ops EDR
  - NCEP-GFS, ECMWF
  - RAOB Matches
- SDR/EDR Readers/Writers
- Documentation



Proxy datasets support algorithm testing

# SOUNDER EDR CAL VAL: ACTIVITIES UPDATE (3/3):



- Successfully running CrIS/ATMS proxy data (from IASI/AMSU) through ported NGAS algorithm.
- Results are being compared with the IASI NOAA Ops EDRs.
- Website and FTP site are under construction.
- Team scheduled SOAT for 15-17 June at the IPO. More results on proxy datasets will be presented at the SOAT.

Proxy datasets support launch readiness

# IPO ACTIVITIES UPDATE (1/3)

- Team Management:
  - Revised Quarterly Reporting Format ties directly to the implementation plans created to organize tasks across teams and eases DPD tracking.
  - Format allows teams to clearly identify issues needing IPO involvement for resolution, and identify accomplishments relevant to Program Management.
  
- Cal Val Datasets/Tools:
  - Cal/Val datasets and tools have been identified
  - Archivist Server prototype
    - “Containerize” appropriate cal/val data for archive in CLASS - In development with NCDC
    - Will be tested with the validation teams.

## IPO ACTIVITIES UPDATE (2/3)

- Government Resource for Algorithm Verification, Independent Testing, and Evaluation (GRAVITE):
  - Developed to provide dedicated support for the Cal/Val teams
  - GRAVITE Transport Protocol (GTP) is successfully being used to distribute data to validation team members and NGAS.
  
- Algorithm Development Library (ADL)
  - Use of ADL (along with associated standards) by the science team dramatically reduces the science-to-operational conversion time
  - Availability of ADL to science team allows implementation of operational code on science platforms, reducing cycle time and costs for updating algorithms to check cal/val updates or new science
  - Use of ADL eases science verification activity post-operationalization (e.g., during checkout of algorithm updates)

## IPO ACTIVITIES UPDATE (3/3)

- User Interaction:
  - IGARSS10 Data Users' Workshop will be held 25 Jul (Sunday before IGARSS10) in Hawaii.
    - Objective of workshop is to prepare community for NPP data products use by informing where and when to get sample data, actual data post-launch, and product information.
    - Presentations from CLASS, McIDAS, and NPROVS teams scheduled
- Algorithm Theoretical Basis Documents (ATBD) for CrIS SDR public release approved.

## SUMMARY:

- The **NPP Cal/Val Plan** for validation of CrIMSS Sounding EDRs was released to the public in September 2009.
- **Pre-launch Cal/Val efforts are currently underway** including generation and distribution of the proxy data and algorithm testing.
- **Infrastructure & Tools** for Performing Cal/Val Activities are identified and developed, many Cal/Val tools are already in use supporting NPP sensor hardware performance analyses.
- **The NPP Cal/Val effort** will assure the high quality EDR sounder products provided to the users.

**THANK YOU!!**

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15

International TOVS Study Conference, 17<sup>th</sup>, ITSC-17, Monterey, CA, 14-20 April 2010.  
Madison, WI, University of Wisconsin-Madison, Space Science and Engineering Center,  
Cooperative Institute for Meteorological Satellite Studies, 2011.