Transitioning the NASA GPM Precipitation Processing System to NOAA Operations

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Third Conference on Transition of Research to Operations

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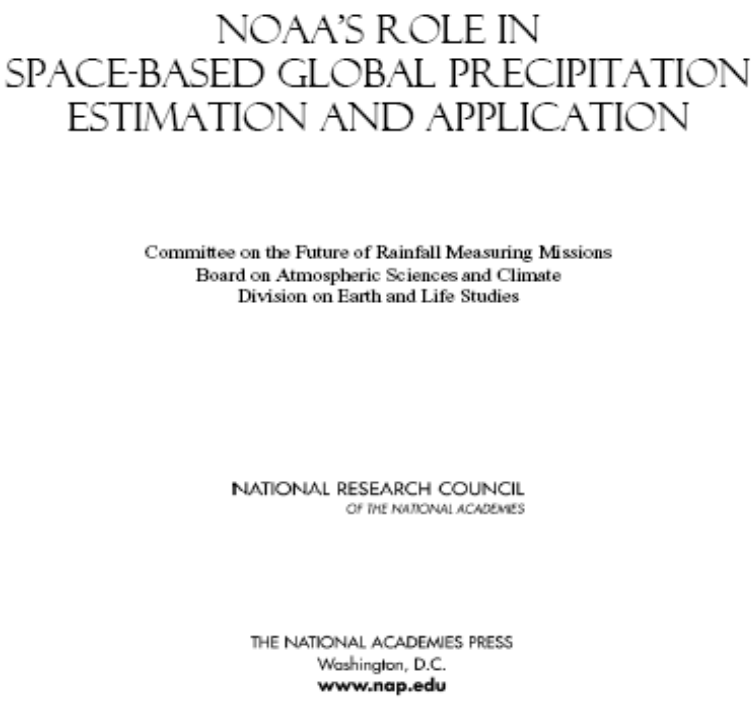
Outline

- Background
- NOAA GPM-Related Requirements
- Current Activities
  - NOAA Steering Group
  - Precipitation Measurement Mission (PMM) Science Team
  - NOAA User Workshops, Recommendations, and Follow-up activities
  - Migration to Enterprise Processing System
- Summary and Future Plans

Background

National Research Council identified lessons learned from TRMM to enhance the use of GPM data in NOAA operations

NRC Report (2007)



NOAA'S ROLE IN
SPACE-BASED GLOBAL PRECIPITATION
ESTIMATION AND APPLICATION

Committee on the Future of Rainfall Measuring Missions
Board on Atmospheric Sciences and Climate
Division on Earth and Life Studies

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A Road Map

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NOAA GPM Related Requirements

NOAA GPM Related Requirements (1/2)

Priority-1: Mission Critical – Observation is needed to meet operational mission objectives

Requirement Title	NOAA Program	Validation Status
Imagery: Microwave	WW-Local Forecasts and Warning _NHC	Yes
	WW-Local Forecasts and Warning _NHC_Storm Area	Yes
	WW-Local Forecasts and Warning_WFO/SPC	Yes
Precipitable Water: Total	CT-Surface Weather	Yes
Precipitation Amount: Snow Water Equivalent	EM-Environmental Modeling Center_Global	Yes
	EM-Environmental Modeling Center_Hemi US	Yes
	WW-Integrated Water Forecasting (Hydrology)_Deep	Yes
	WW-Integrated Water Forecasting (Hydrology)_Shallow	Yes
Precipitation Amount	CL-Climate Observations and Monitoring_Atmos	Not yet
	CT-Surface Weather	Yes
	EC-Environmental Modeling Center_Global	Yes
	EC -Environmental Modeling Center_Hemi US	Yes
	WW-Integrated Water Forecasting (Hydrology)	Yes
	WW-Local Forecasts and Warning_NHC	Yes
	WW-Local Forecasts and Warning_WFO/SPC	Yes

Source: NOAA Consolidated Observation Requirements List (CORL)

NOAA GPM Related Requirements (2/2)

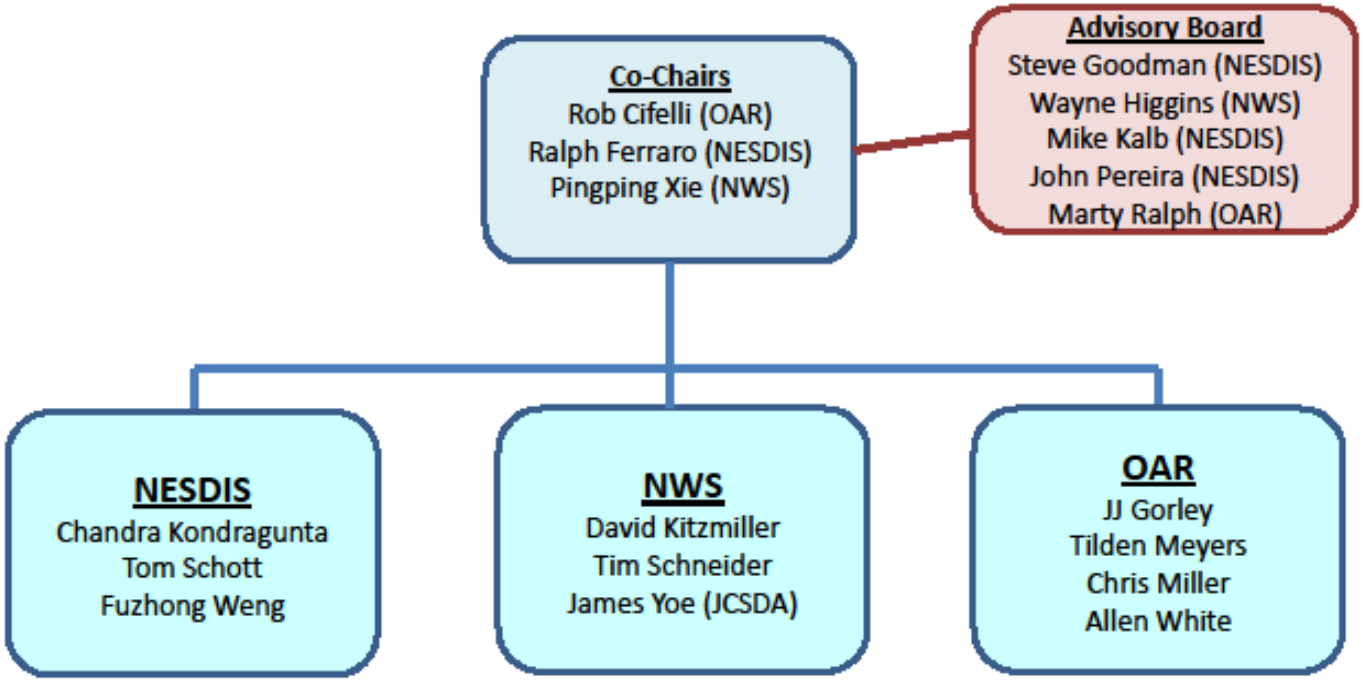
Priority-1: Mission Critical – Observation is needed to meet operational mission objectives

Requirement Title	NOAA Program	Validation Status
Precipitation Rate	CL-Climate Observations and Monitoring_Atmos	Not yet
	CT-Aviation Weather_CONUS	Yes
	CT-Aviation Weather_Global	Yes
	CT-Surface Weather	Yes
	EC-Environmental Modeling Center_Global	Yes
	EC -Environmental Modeling Center_Hemi US	Yes
	WW-Integrated Water Forecasting (Hydrology)	Yes
	WW-Local Forecasts and Warning_NHC	Yes
	WW-Local Forecasts and Warning_WFO/SPC	Yes
	WW-Local Forecasts and Warning _NHC_Storm Area	Yes
Precipitation Type	CT-Aviation Weather	Yes
	CT-Surface Weather	Yes
	WW-Integrated Water Forecasting (Hydrology)	Yes
	WW-Local Forecasts and Warning_WFO/SPC	Yes
	WW-Local Forecasts and Warning _NHC_Storm Area	Yes
Radiance: Microwave	EC -Environmental Modeling Center	Yes

7 Requirements from 6 Programs

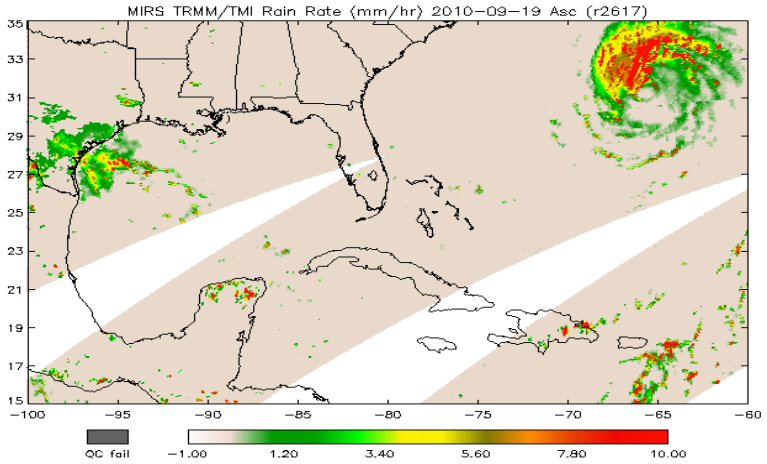
Current Activities

NOAA's Steering Group on Precipitation Measurement from Space



- Interacts with NASA
- Engages in budgeting and planning activities
- Educates users and gains stakeholder support
- Provides oversight within NOAA on GPM related activities and prepares required documentation
  - Transition Plan, L1RD, NASA/NOAA MOU, User Workshops, NOAA Science Team project reviews etc.

NOAA's Contributions to NASA's PMM Science Team and GPM Program



- Six NOAA PIs on NASA's PMM science team, jointly funded by NASA and NOAA (FY 2010-12)
  - Shows expansion of interest in GPM at NOAA (Four PIs in FY 2007-09)
  - Funds provided by NESDIS and OAR
- Continued coordination on Ground Validation (GV) Programs
  - Hydrometeorology Testbed (HMT-SE)
  - MRMS

2nd NOAA User Workshop on the GPM (November 29 - December 1, 2011)

- Over 60 participants from NOAA, NASA, DoD, Academia and Private Sector
- Meeting format - Plenary sessions, Panelists /Working Groups focused on four main themes

WG1 : Enhancing R&D and Innovation of GPM-era data at NOAA

- NOAA Unique Products

WG2 : Accelerating GPM Data use at NOAA

- Existing testbeds? Or new infrastructure (e.g. proving ground)

WG3 : Data Fusion

- How to integrate GPM data into merged products (e.g Q2, MPE, CMORPH etc.)

WG4 : Data Delivery and Formats

- How to improve product processing and delivery to users at minimal data latency

Recommendations from 2nd Workshop (1/2)

- *NOAA needs to prepare immediately to exploit GPM-era data and products:*
  - Data delivery and distribution
  - Research and Development
    - Continuity of operations from current sensors into GPM-era sensors
    - Climate applications and model verification
    - NWP assimilation and model verification
    - Data fusion and uncertainty estimation
    - NOAA unique products from GPM sensors
  - Accelerating the use of GPM data at NOAA through emerging Proving grounds and existing test-beds
    - Look to exploit activities under both GOES-R and JPSS Programs
    - Climate, Hydrometeorology, Hurricane, etc. test-beds

Recommendations from 2nd Workshop (2/2)

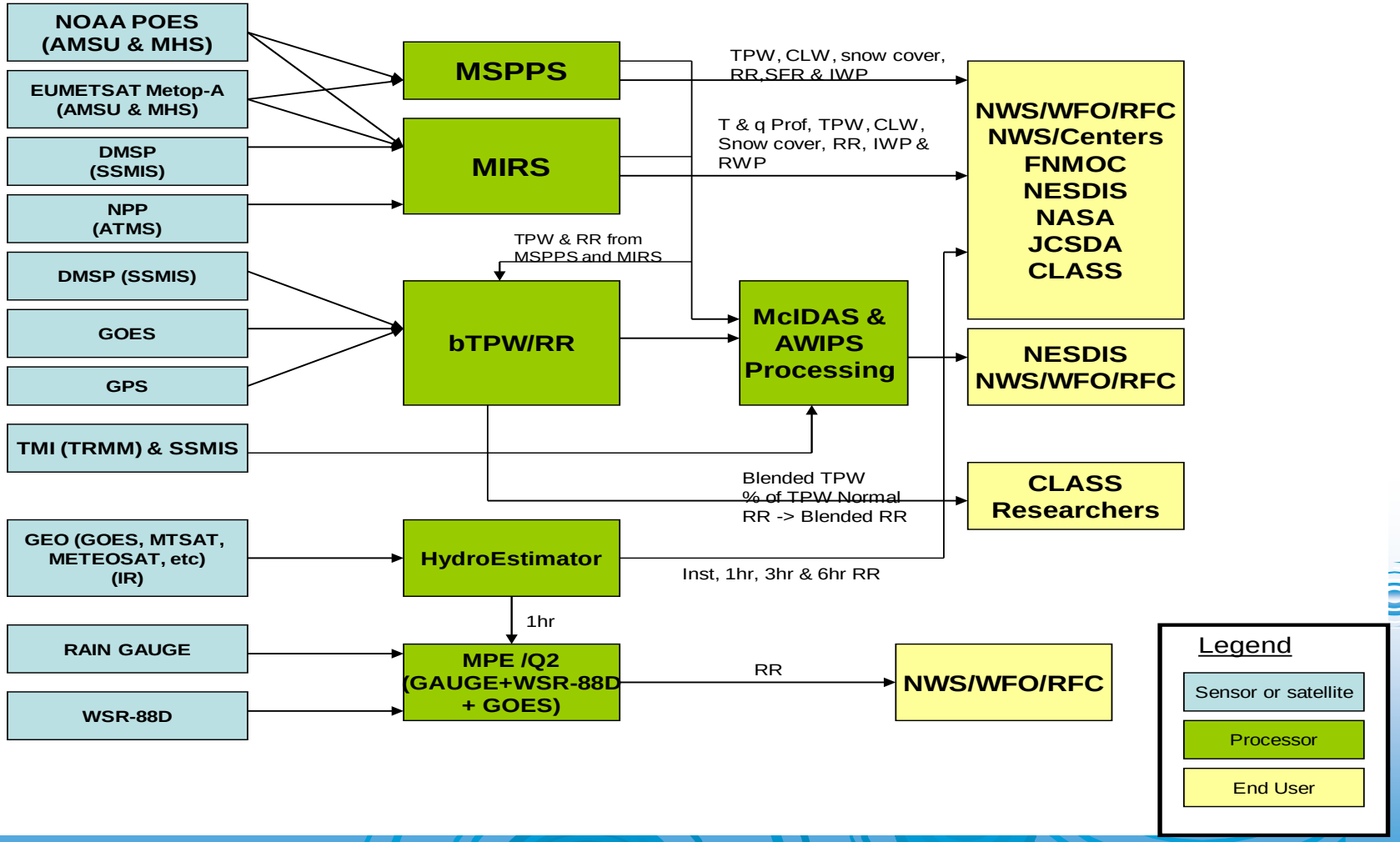
- *Obtain specific NOAA requirements for GPM-era data:*
  - Level 1 Requirements Document
  - Transition Plan for a NOAA-specific, operational version of NASA's GPM Precipitation Processing System (PPS)

Follow-up to 2nd Workshop

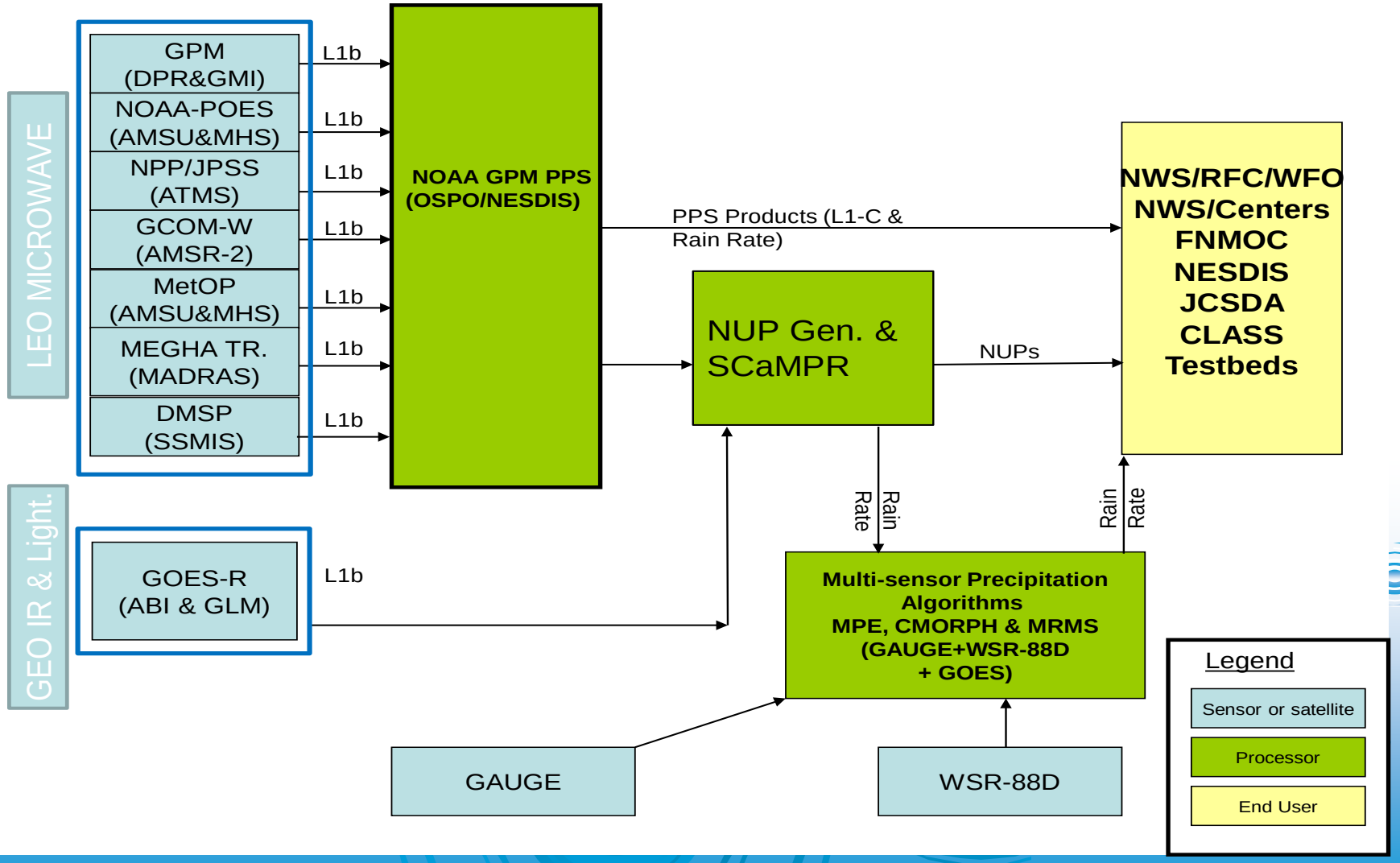
- A tiger team was formed to develop a GPM Level-1 Requirements Document (L1RD) and a Concept of Operations
  - Captures specific NOAA needs for GPM-era data
  - Supports advanced planning and budgeting activities

- ***Tiger Team Members:***
  - Bob Kuligowski
  - Brian Nelson
  - Chandra Kondragunta
  - Dan Mundell
  - David Hermreck
  - David Kitzmiller
  - James Yoe
  - James Heil
  - John Beven
  - Kevin Schrab
  - Limin Zhao
  - Michael Brennan
  - Miek Bodner
  - Mike Johnson
  - Pingping Xie
  - Ralph Ferraro
  - Richard Fulton
  - Rob Cefelli
  - Sheldon Kusselson
  - Sid Boukabara
  - Tom Schott
  - Yu Zhang

Current Precipitation Processing in NOAA



Proposed Enterprise Precipitation Processing in NOAA



Summary and Future Plans

- GPM data address NOAA observation requirements
  - Provide data continuity beyond current passive microwave sensors (AMSU, SSMIS, etc.)
  - Will help improve and build the foundation for merged precipitation products for weather, climate and aviation

- Goals for upcoming year:
  - Continue working with NASA on PMM Science Team and GPM Ground Validation programs
  - Organize 3rd NOAA User Workshop on the Global Precipitation Measurement (GPM) Mission: Focus on Proving Ground
  - Complete L1RD and Transition Plan for PPS