

# Keynote: Challenges for future PG Activities

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GOES-R Proving Ground and Satellite User Readiness workshop  
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# Outline

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- NOAA planning for future weather operations
- Responding to increasing data volumes
- Preparing for GOES-R
- Transitioning to future operations



# NOAA planning for future weather operations

## Science & Technology Roadmap Capstone Document

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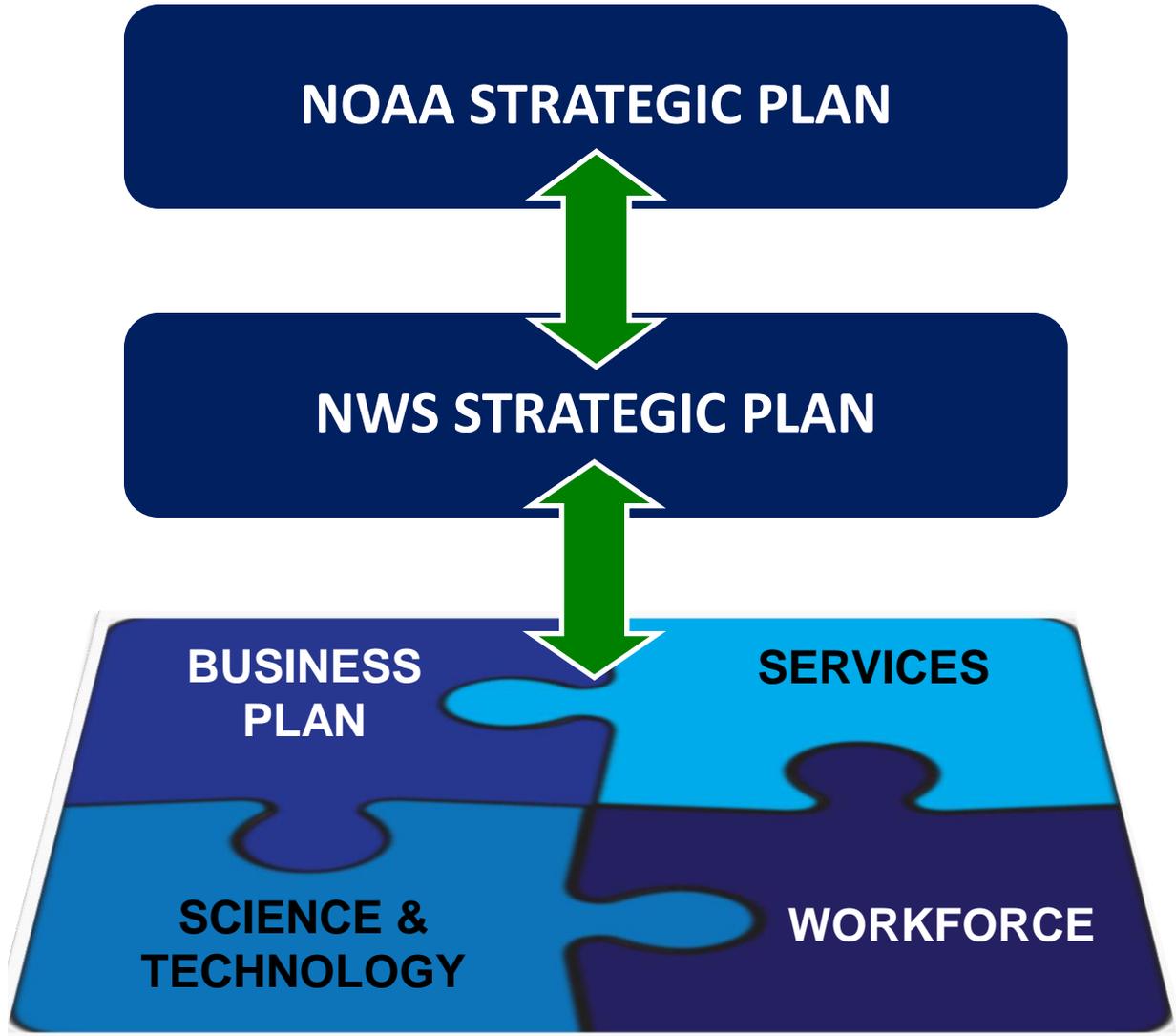


- The NWS is moving from a “product-based” enterprise to a “service-based” enterprise.
- Warn on Forecast requires a revamping of the supporting observation and analysis systems to better observe the boundary layer processes for the numerical modeling system.
- Integrating observations from separate systems into an integrated observing and analysis system is a key challenge.
- Integrated observation networks, advanced computers, and improved environmental modeling to produce environment information must be intelligently targeted to best meet customer needs.
- The NWS must be able to move and interrogate data packages in a manner and speed such that decision support is provided to the community long before an event occurs.



# NOAA planning for future weather operations

## S&T Planning Flow Down





# Responding to increasing data volumes IT Infrastructure Limitations

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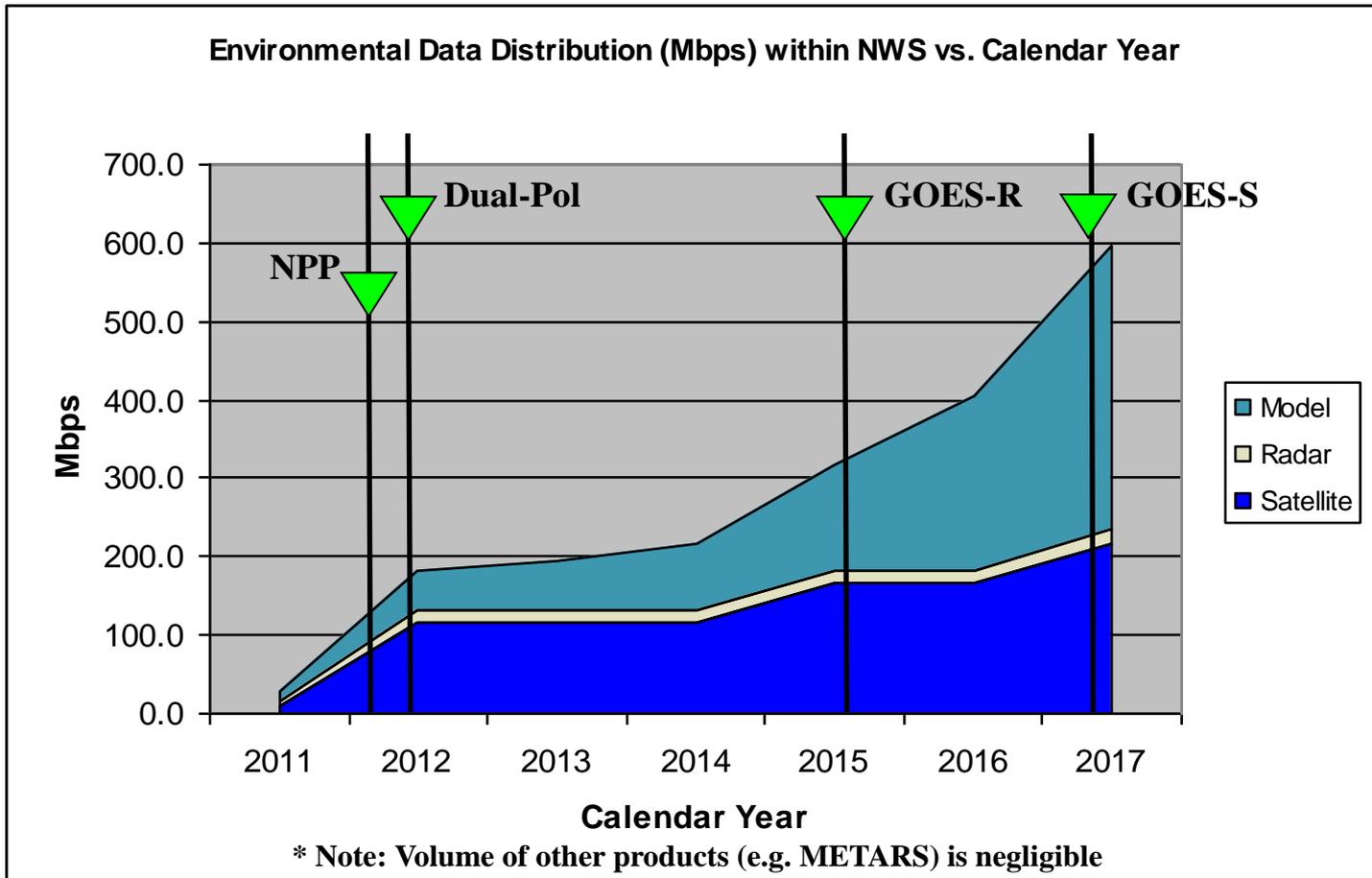
**BANDWIDTH**



# Data Requirements Assumptions



## Data Available to AWIPS, NCEP, and the Gateway





# NWS Data Delivery Capabilities



Performance Measure	Description	Bandwidth
Current Capability (Threshold)	Current products ,data volume, and latency	AWIPS: ~20 Mbps NCEP: ~27 Mbps NWSTG: ~71 Mbps
Full Exploitation Capability (Objective)	Full exploitation of planned products, data volume, and latency Improved numerical guidance from NPP observations	AWIPS: ~147 Mbps NCEP: ~ 180 Mbps NWSTG: ~387 Mbps

**\$43M/  
7 Years**

**\$150M/  
7 Years**

**\$77M/  
7 Years**

**Hybrid Solution**



# Preparing for GOES-R

## GOES-R Readiness Project Established



### **Project Benefits**

NPP/JPSS Launch Readiness  
Dual Pol Readiness  
GOES-R and GOES-S Launch Readiness

### **Project Goals**

Implement a robust NWS IT infrastructure that delivers new observations and model data to NWS enterprise while lowering telecommunications and sustainment costs

### **Project Mission**

Ensure NWS IT infrastructure readiness to support both internal and external NOAA requirements with an emphasis on the GOES-R launch.



# Preparing for GOES-R Proving Ground Focus



2009-2013

Focus on Products

- Day 1
- GOES-R Risk Reduction

2011-2019

Prepare & Implement Fusion

- Evolve fusion concepts
- Implement NWS Roadmaps
- Test concepts operationally
- Transition to service focus

2020&Beyond

Focus on Services

- Improve fusion support
- Fully Implement service focus

Developers ↔ Forecasters



# Preparing for GOES-R Proving Ground Activities



GOES-R Proving Ground Activities		
Year	Location	Focus
2009	Storm Prediction Center (SPC) and NOAA's Hazardous Weather Testbed (HWT) Demonstration.....	Convection
2010	SPC and NOAA's HWT Demonstration..... National Hurricane Center Demonstration.....	Convection Tropical Weather
2011	SPC and NOAA's HWT Demonstration..... National Hurricane Center Demonstration..... Alaska Region..... Alaska Aviation Weather Unit..... Aviation Weather Center..... Hydrometeorological Prediction Center and NESDIS' Satellite Analysis Branch..... Ocean Prediction Center and NESDIS' Satellite Analysis Branch..... Air Quality (EPA, State and Local Air Quality Offices)... Pacific Region.....	Convection Tropical Weather Show/Clouds/Ash Aviation Aviation  Precipitation and QPF  Offshore Thunderstorms Air Quality Precipitation and QPF
2012	NOAA Testbeds, NCEP Centers, and WFOs.....	Continue demonstrating Warning Related Products
2013 – 2015	NOAA Testbeds, NCEP Centers, WFOs, and NWS Proving Ground at the Training Center.....	Transition from demonstrating Warning Related Products to demonstrating the remaining GOES-R Products, Day 2 Products, and Decision Aids



# Preparing for GOES-R PG Accomplishments

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- Volcanic Ash
  - Satellite-derived volcanic ash products developed for GOES-R were generated in near real-time to support the London Volcanic Ash Advisory Center (VAAC) operational Eyjafjallajökull volcanic ash cloud forecasts
  - GOES-R volcanic ash products (applied to SEVIRI) showed the evolution of the ash cloud resulting in significant airspace restrictions over Europe.
  - Ash cloud products were used to help initialize and validate the volcanic ash forecast models and to issue SIGMET messages to divert aircraft
- Global Lightning Mapper
  - “...The total lightning was picking up on storms before the AWIPS lightning [NLDN] program picked up on them. One could see the utility of this in the future, bringing with it a potential for lightning statements and potentially lightning based warnings.”
  - Pseudo GLM useful when blended with other products derived from radar, satellite, and the National Lightning Detection Network
- RGB Air Mass
  - Is a useful complement to the dust product
  - Better separates the dry and moist air regions in some cases



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2020&Beyond

Focus on Services

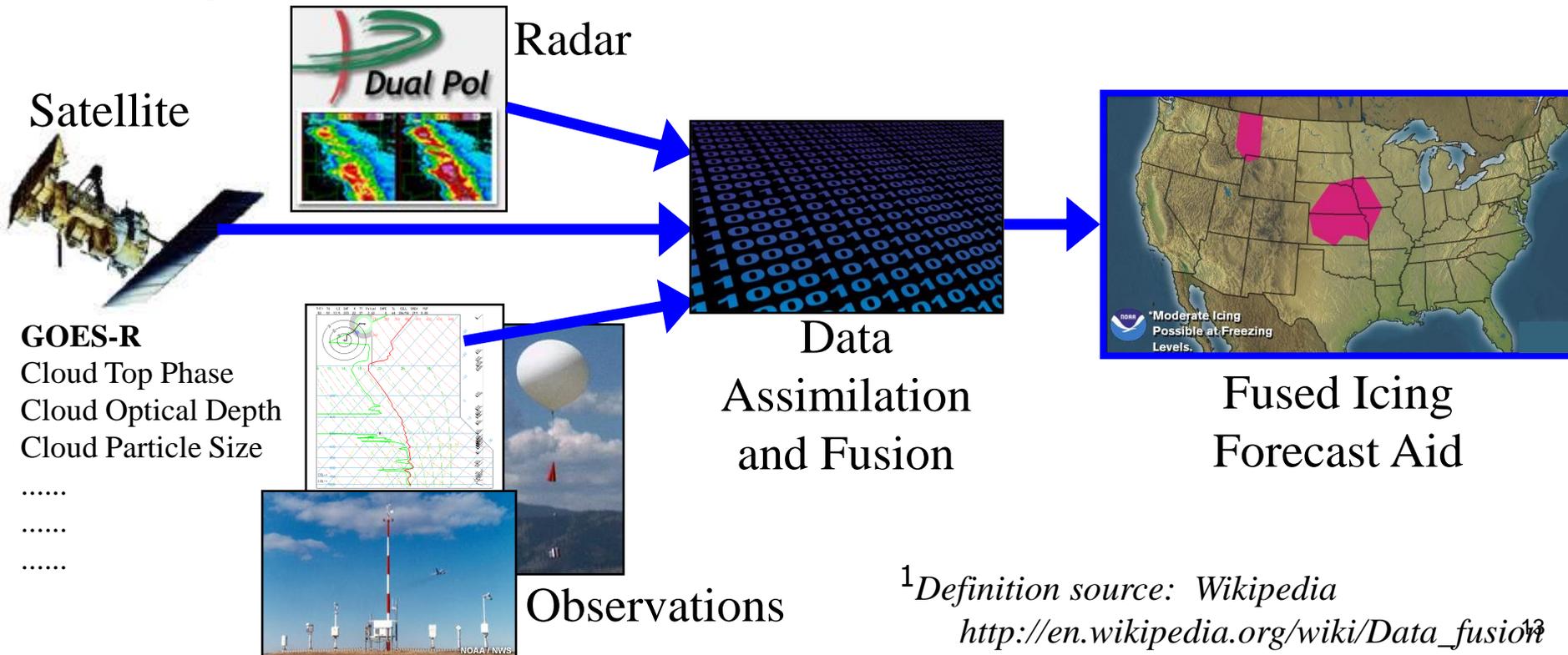
- Improve fusion support
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# Transitioning to future operations

## Data Fire Hose to Data Fusion

- Data fusion definition<sup>1</sup> and example

The use of techniques that combine data from multiple sources and gather that information in order to achieve inferences, which will be more efficient and potentially more accurate than if they were achieved by means of a single source.

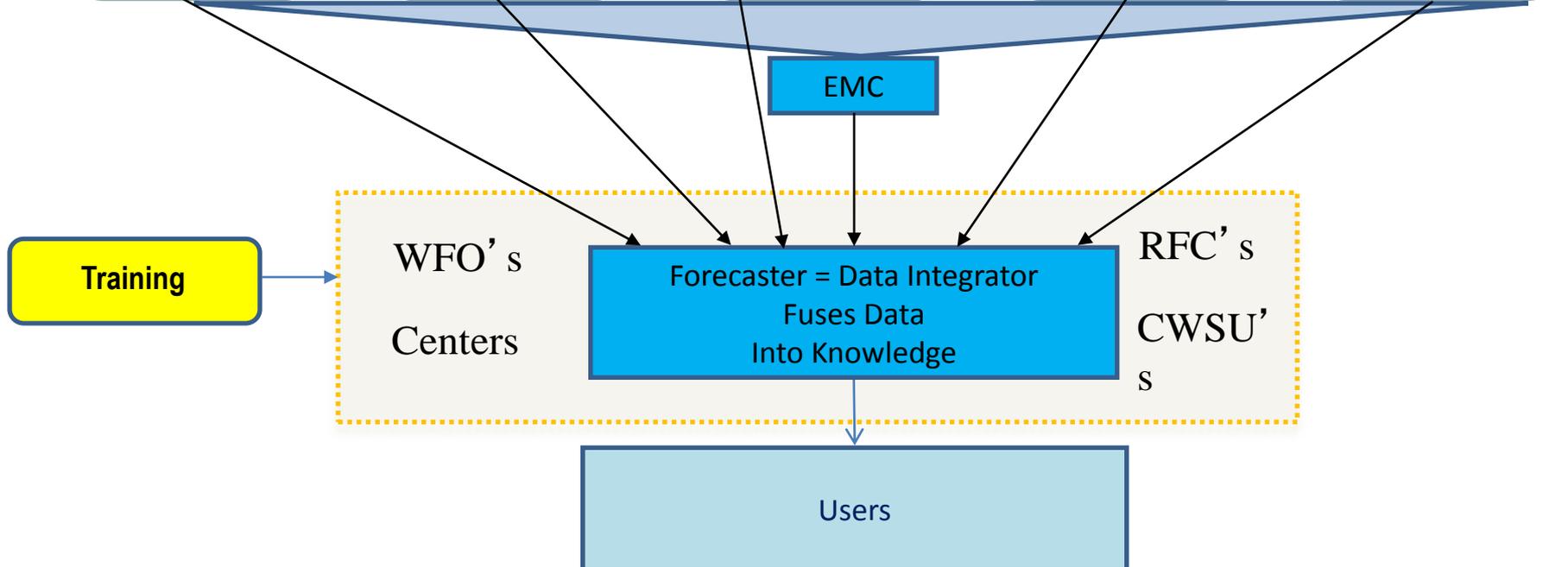
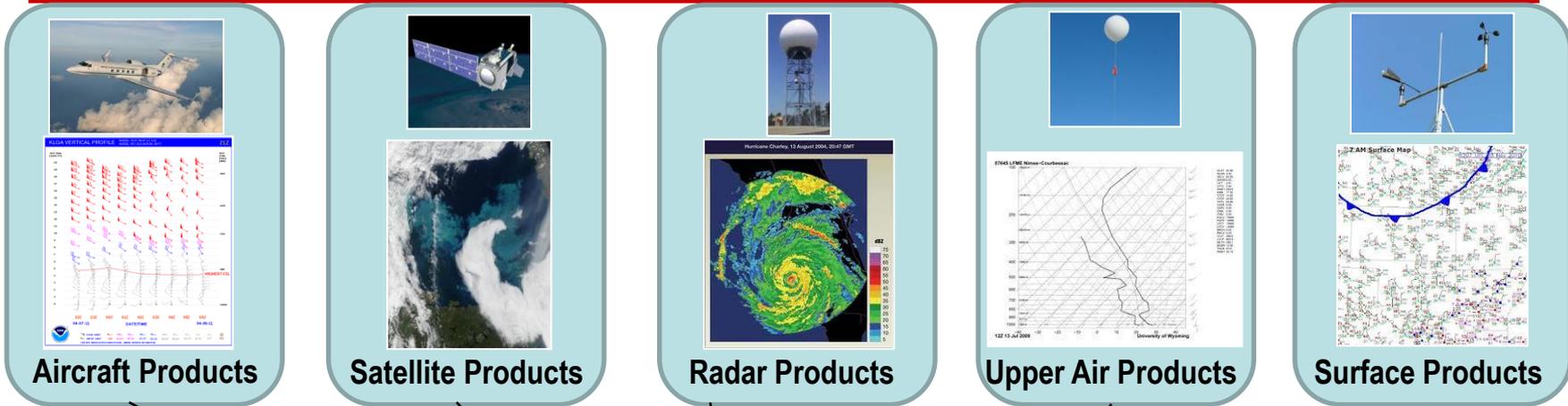


<sup>1</sup>Definition source: Wikipedia  
[http://en.wikipedia.org/wiki/Data\\_fusion](http://en.wikipedia.org/wiki/Data_fusion)



# Transitioning to future operations

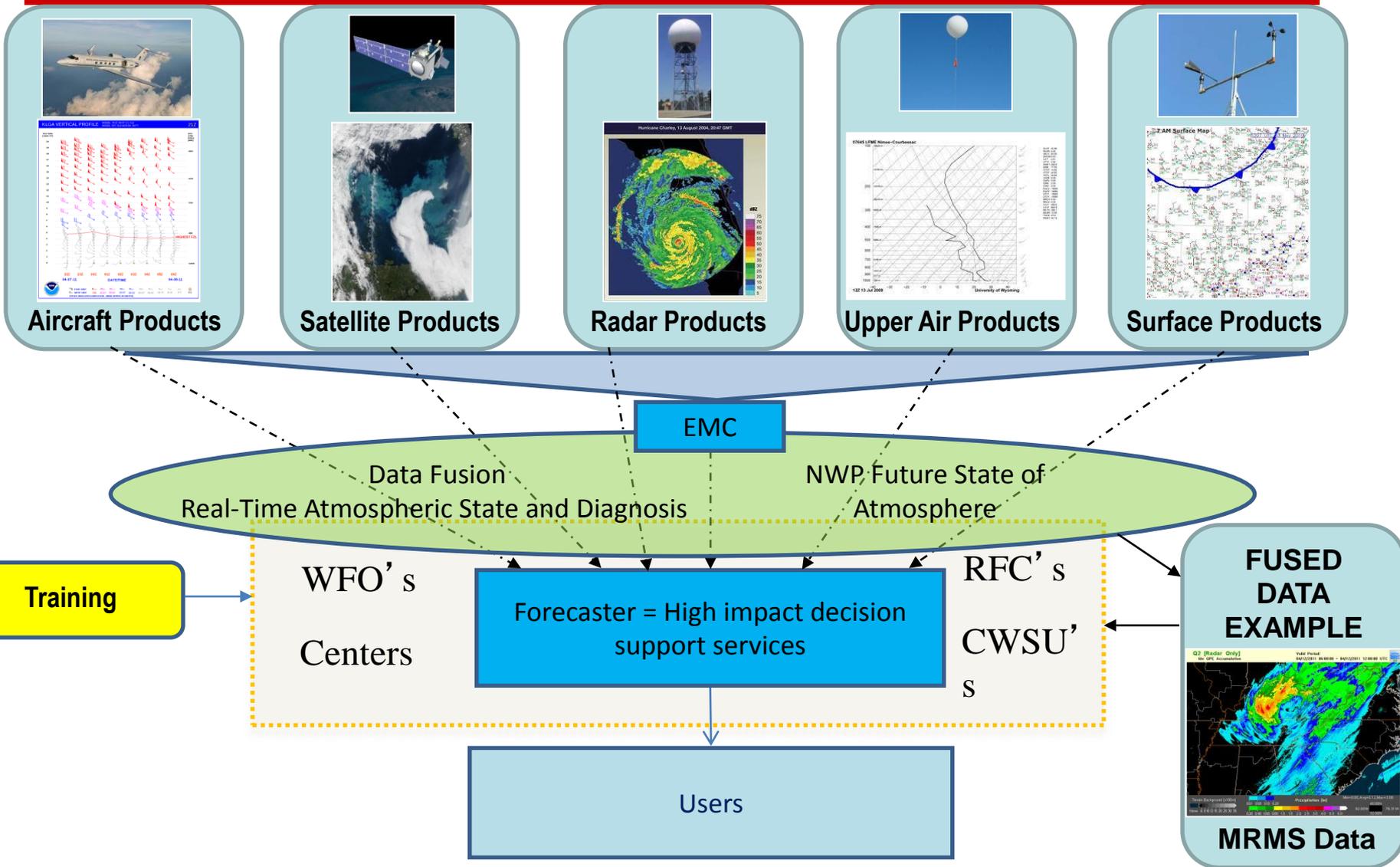
## Today's Data Processing





# Transitioning to future operations

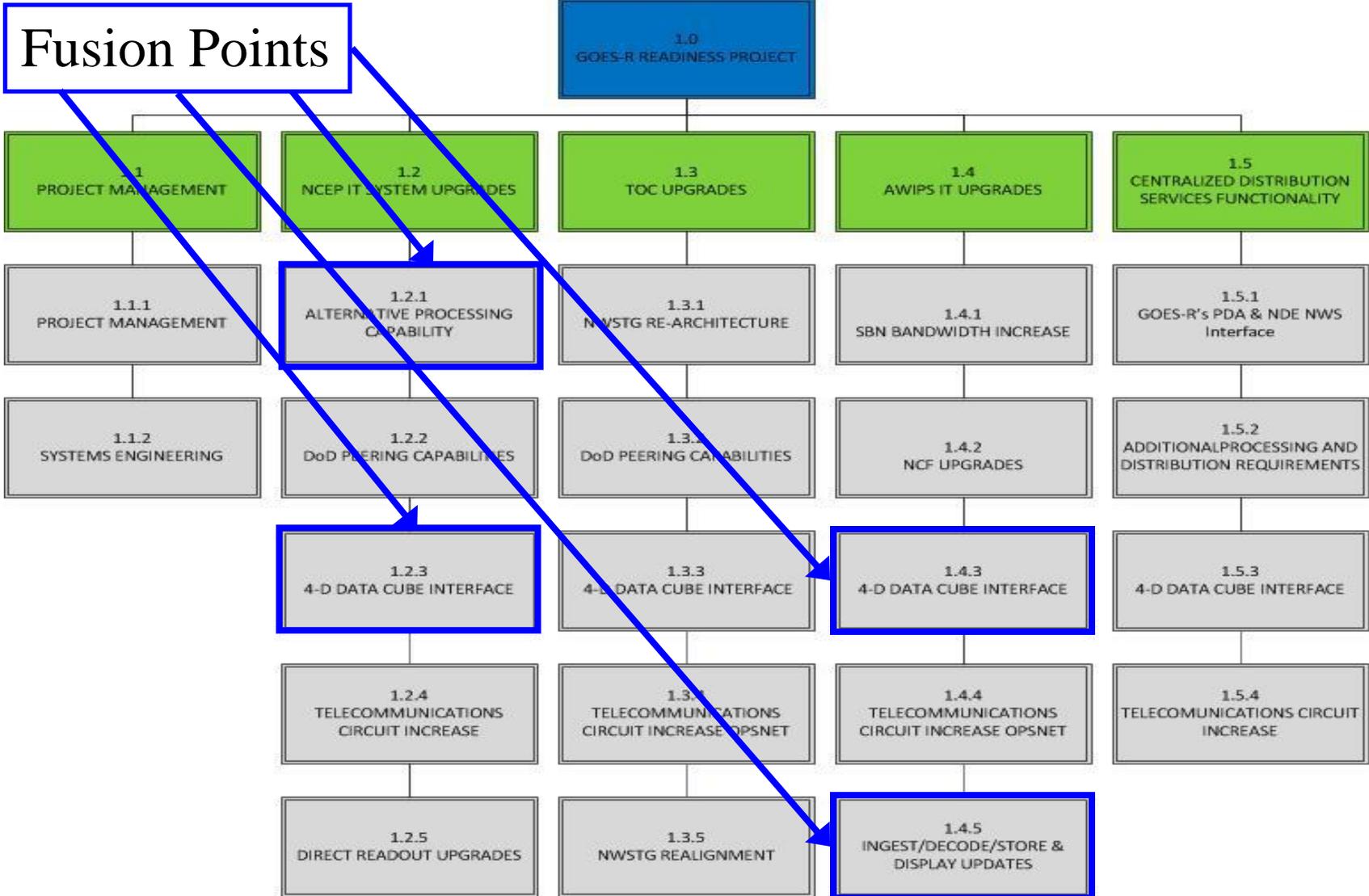
## Future Data Processing





# Preparing for GOES-R

## GOES-R Readiness Project WBS





# Path Forward



- Develop NESDIS/NWS Data Fusion-Product Reduction Tiger Team
  - Explore these concepts of data management and exploitation
- Complete NWS Roadmap efforts and begin to develop implementation plans
  - Flesh out data fusion idea
- Identify short term actions
  - Leverage prototype and Proving Ground activities



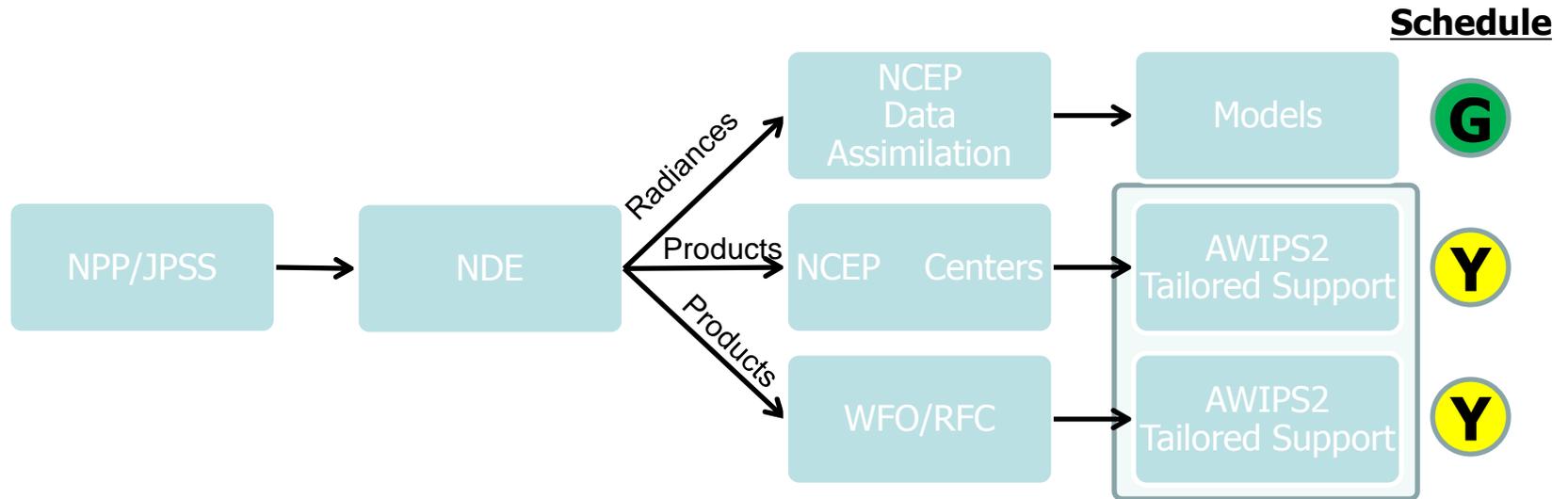
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# Backup



# NPP/JPSS User Readiness

## Model and Forecaster Systems Preparedness

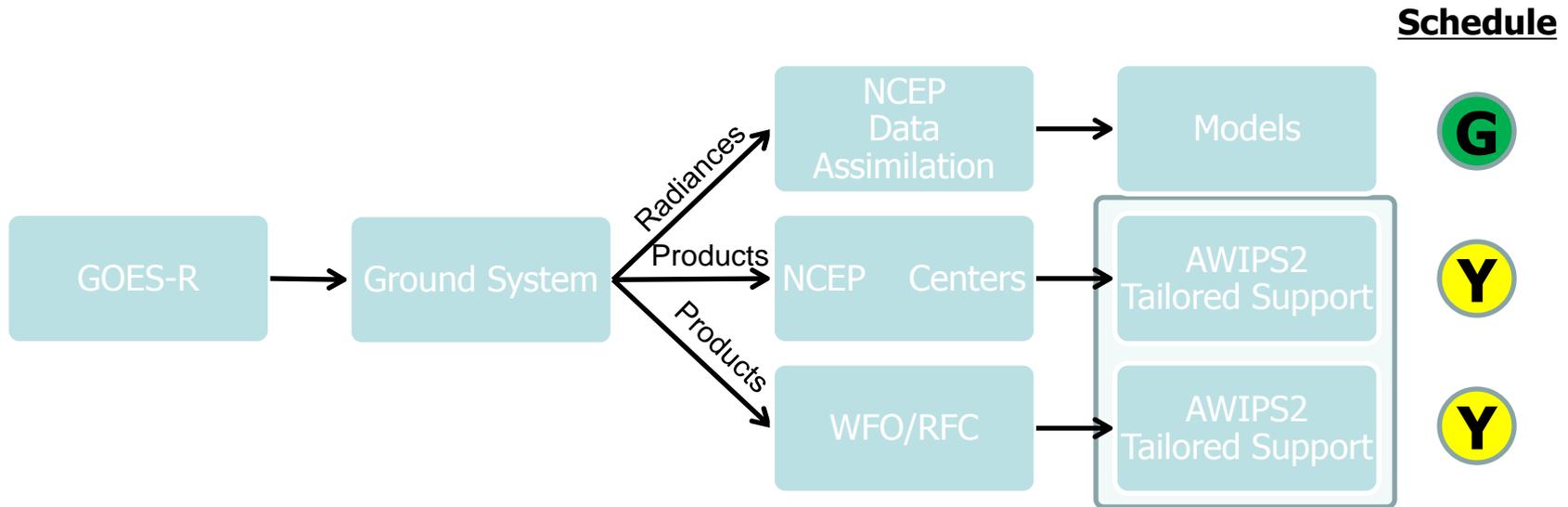


**Green:** Ready at Launch  
**Yellow:** Ready by end of Cal/Val  
**Red:** Ready after Cal/Val



# GOES-R User Readiness

## Model and Forecast System Preparedness



**Green:** Ready at Launch  
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# NWS NPP Priorities

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NPP readiness is defined incrementally because of resource constraints

- Priority 1 – radiance data to models
- Priority 2 – imagery to critical operations (satellite centric warning dependence ~ OCONUS)
- Priority 3 – operations vetted prioritized list of all NPP products

Answer of what we' ll do lies between Priority 2 and 3