



# NOAA Update and Strategic Direction

*Dr. Stephen Volz, Assistant Administrator for Satellite and Information Services*

Space Studies Board Meeting

May 3, 2017



# Outline

- NOAA Mission Overview
- The Changing Paradigm
- NESDIS Strategic Plan
  - Continuity
  - Future Architectures
- Challenges

# Supporting NOAA's Mission

*NOAA is a science-based services agency engaged with the entire Earth system science enterprise.*

## NOAA's Top Four Priorities:

1. To provide information and services to make communities more resilient
2. To evolve the National Weather Service
3. To invest in observational infrastructure *50% of NOAA's Budget*
4. To achieve organizational excellence



# NOAA Stakeholders, Services, and Systems

## Stakeholders

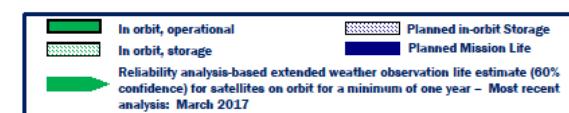
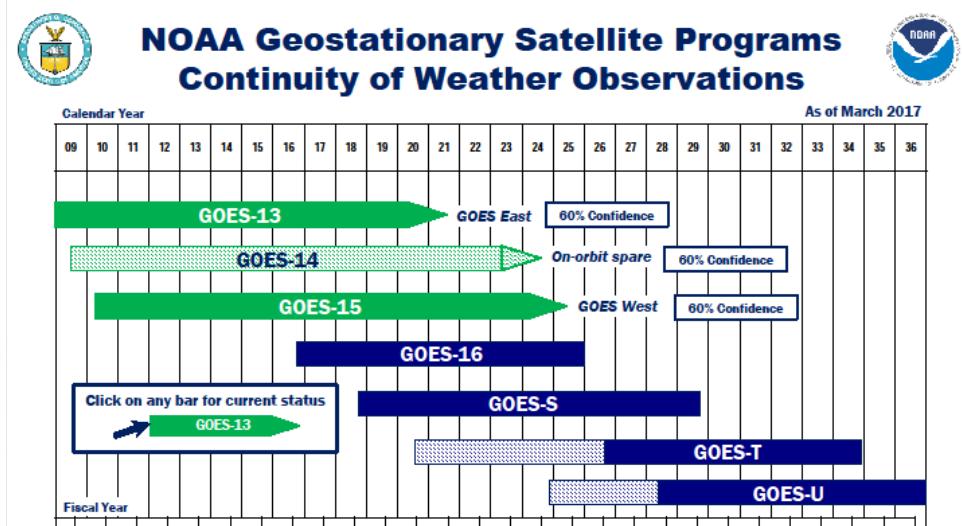
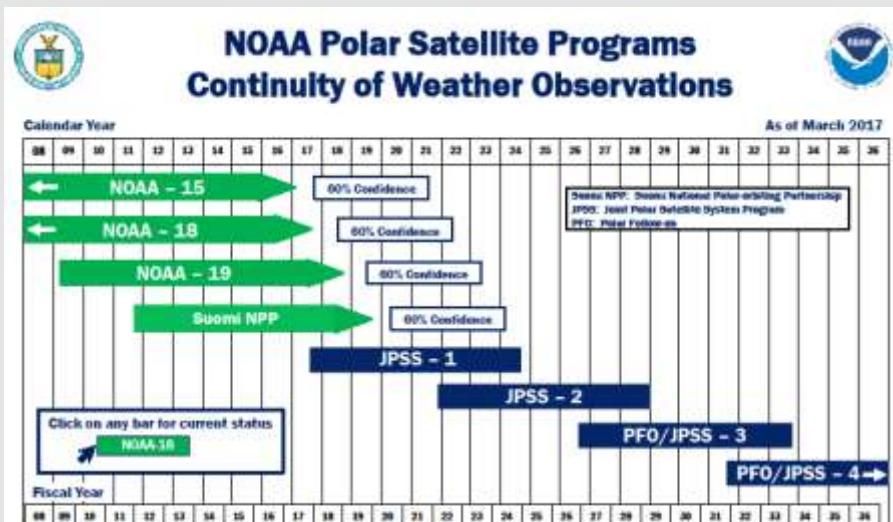
## Services

# Systems

## Satellite Systems

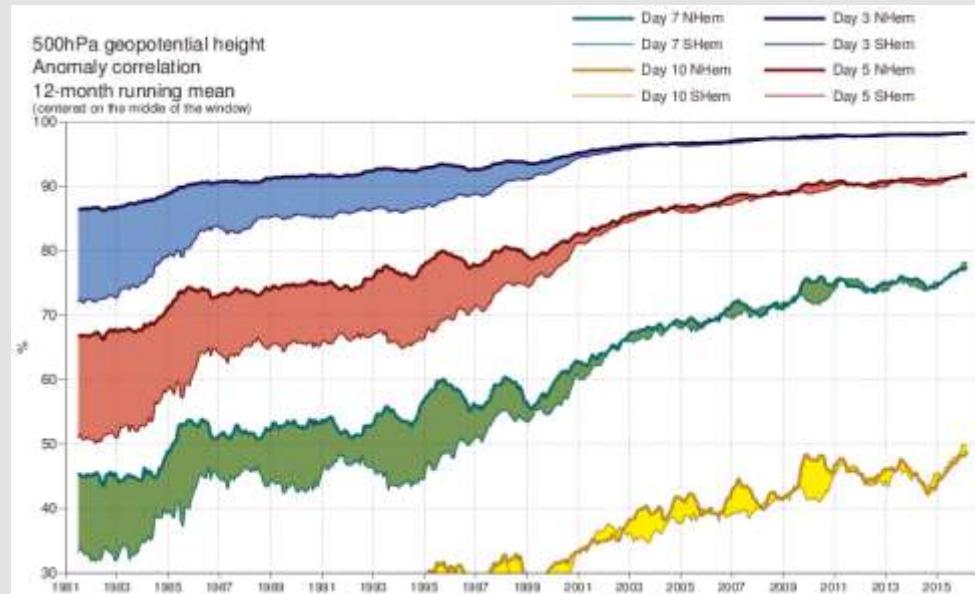
# Tracking the “Two Orbit” Program

- Our historical “Flyout” charts have reflected the polar and geostationary, fixed platform program approach



# This approach has produced great returns over the years

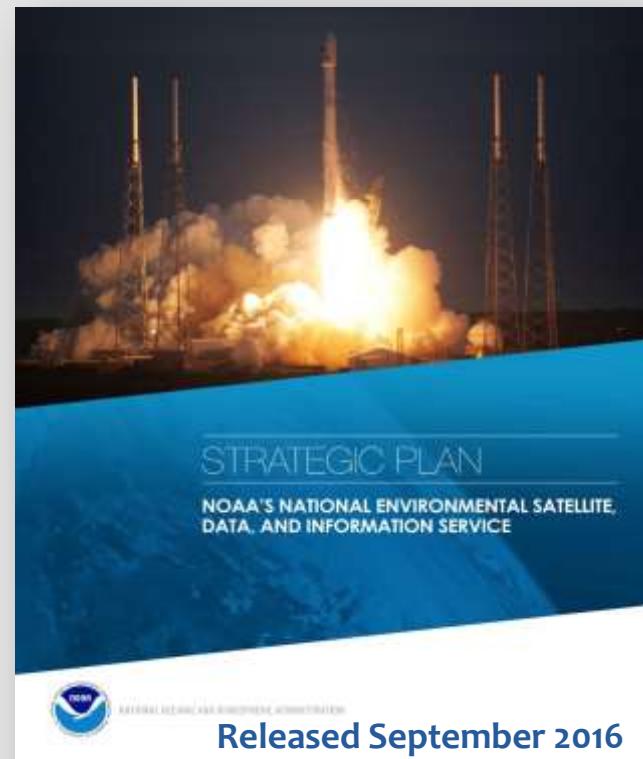
- Significant Improvements in 3-7 day Weather forecasts
- Improved NRT severe storm warnings & alerts
  - 20% increase in hurricane track and intensity forecasts from 2010-2015
- Companion Satellite Services
  - SARSAT: >30,000 lives saved worldwide and >7,000 saved in the USA since the program start
  - Argos Data Collection Services (A-DCS): 14,000 environmental platforms, almost 50% used by NOAA



# However, we are now transitioning to a new paradigm



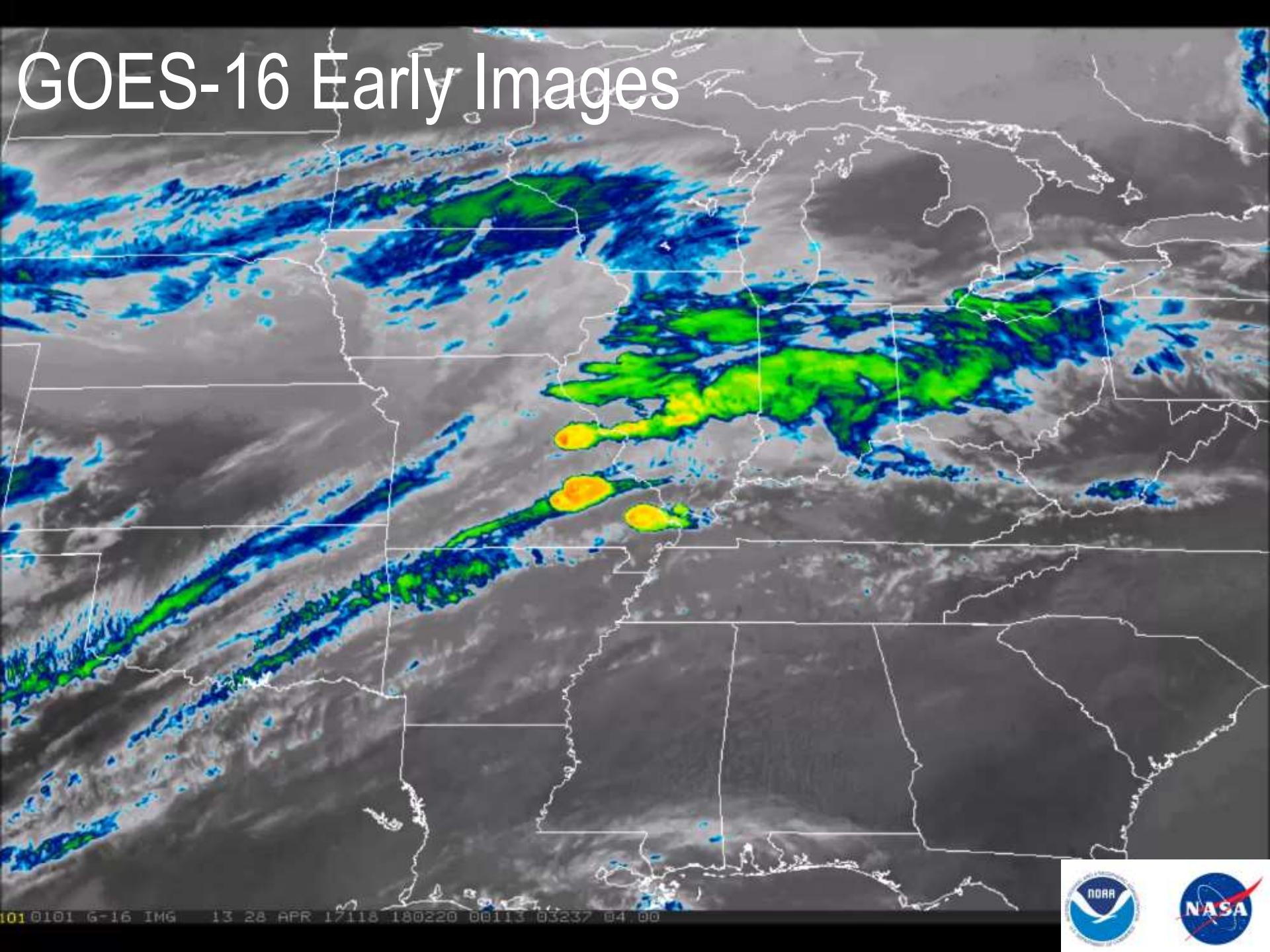
# The NESDIS Strategic Plan



# First Focus: Return on National Investment



# GOES-16 Early Images



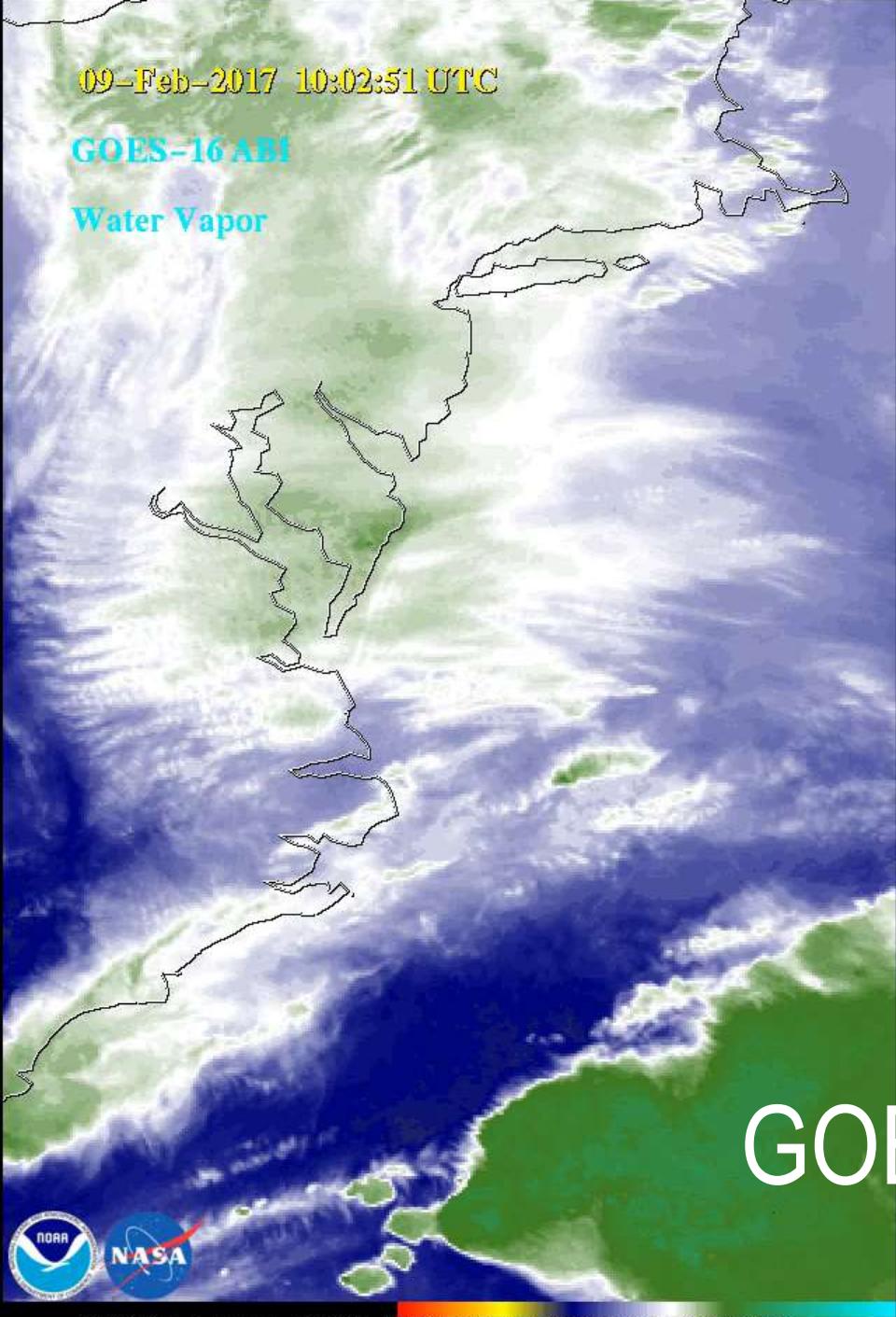
101 0101 G-16 IMG 13 28 APR 17118 180220 00113 03237 04.00



09-Feb-2017 10:02:51 UTC

GOES-16 ABI

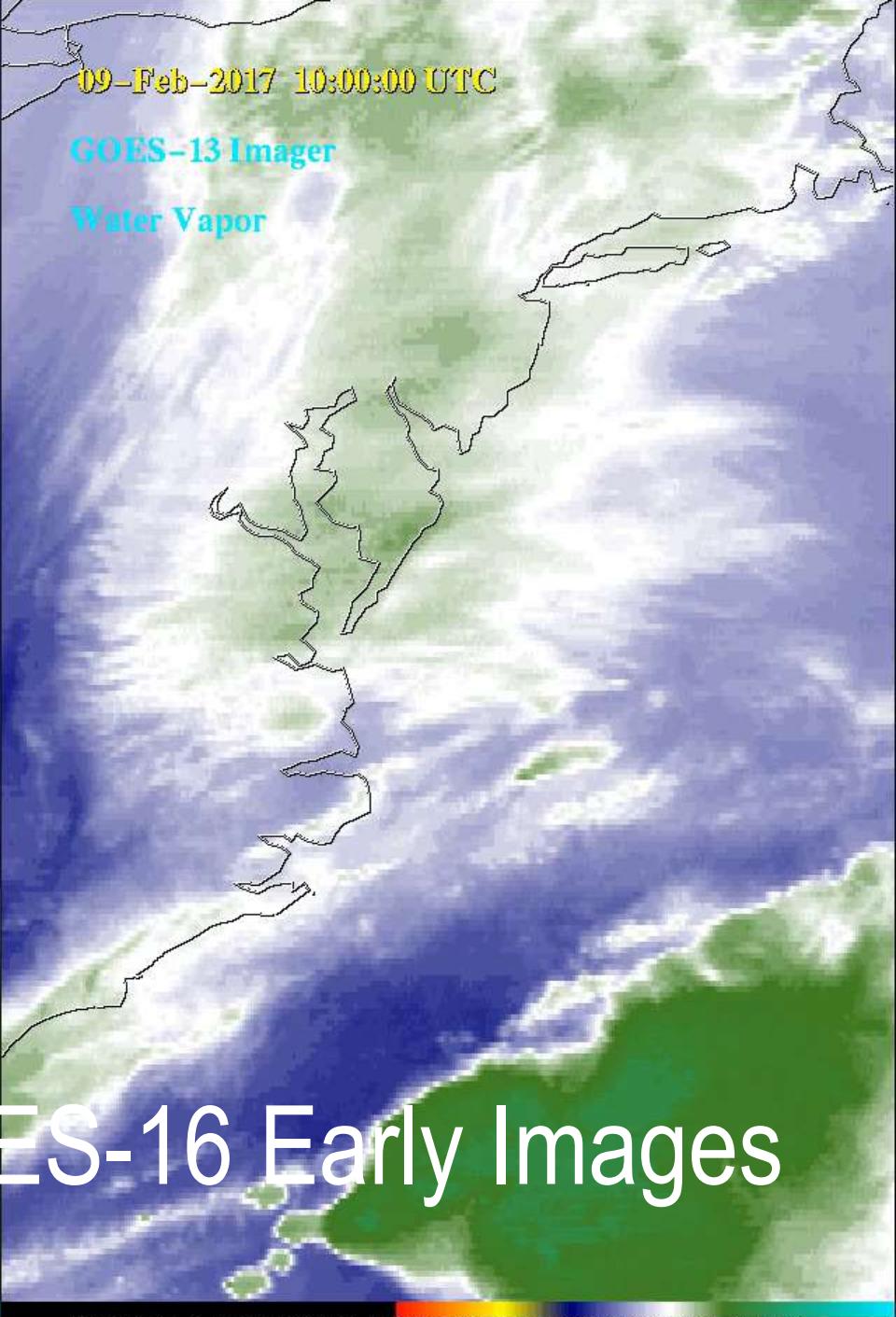
Water Vapor



09-Feb-2017 10:00:00 UTC

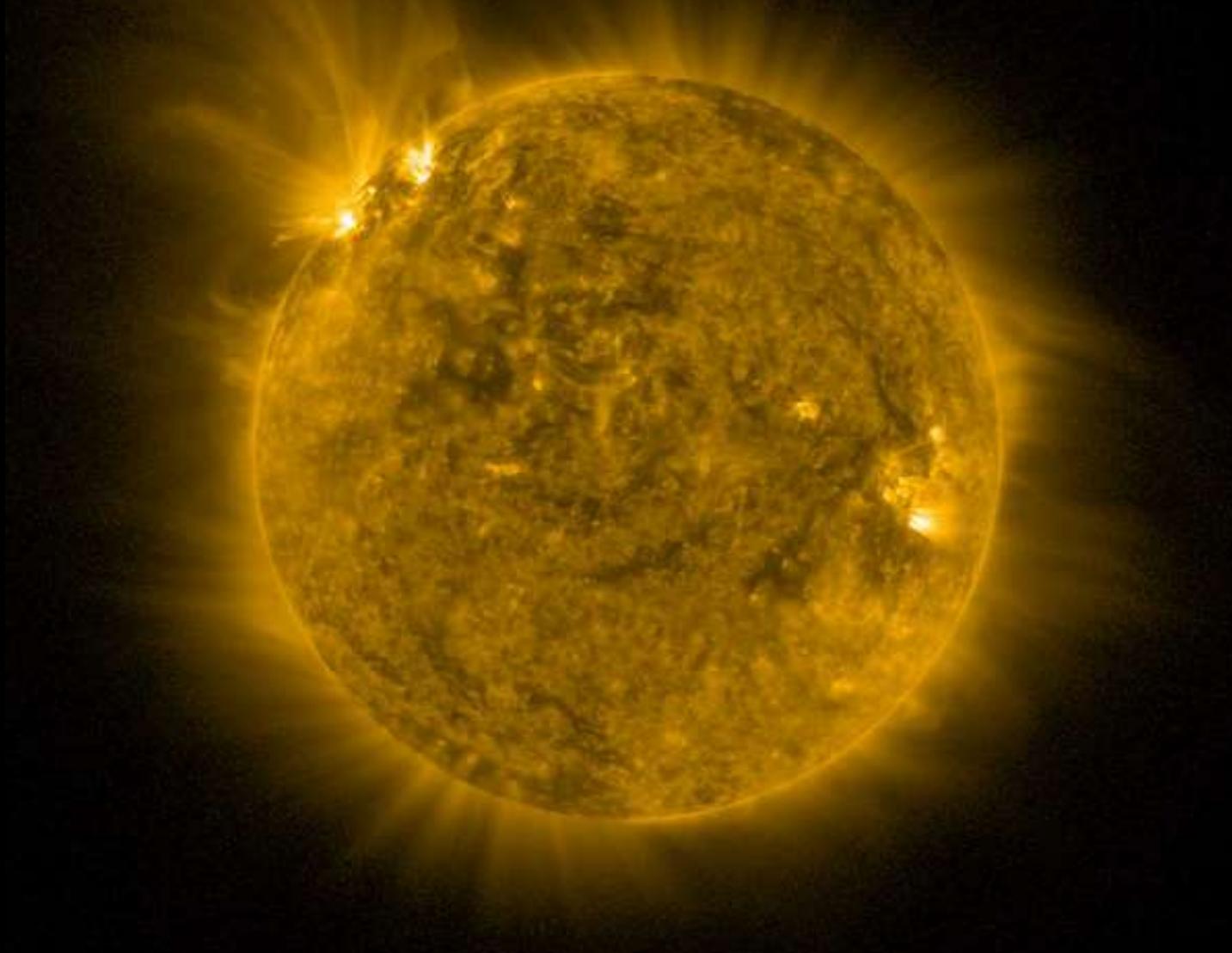
GOES-13 Imager

Water Vapor



GOES-16 Early Images

# GOES-16 Early Images



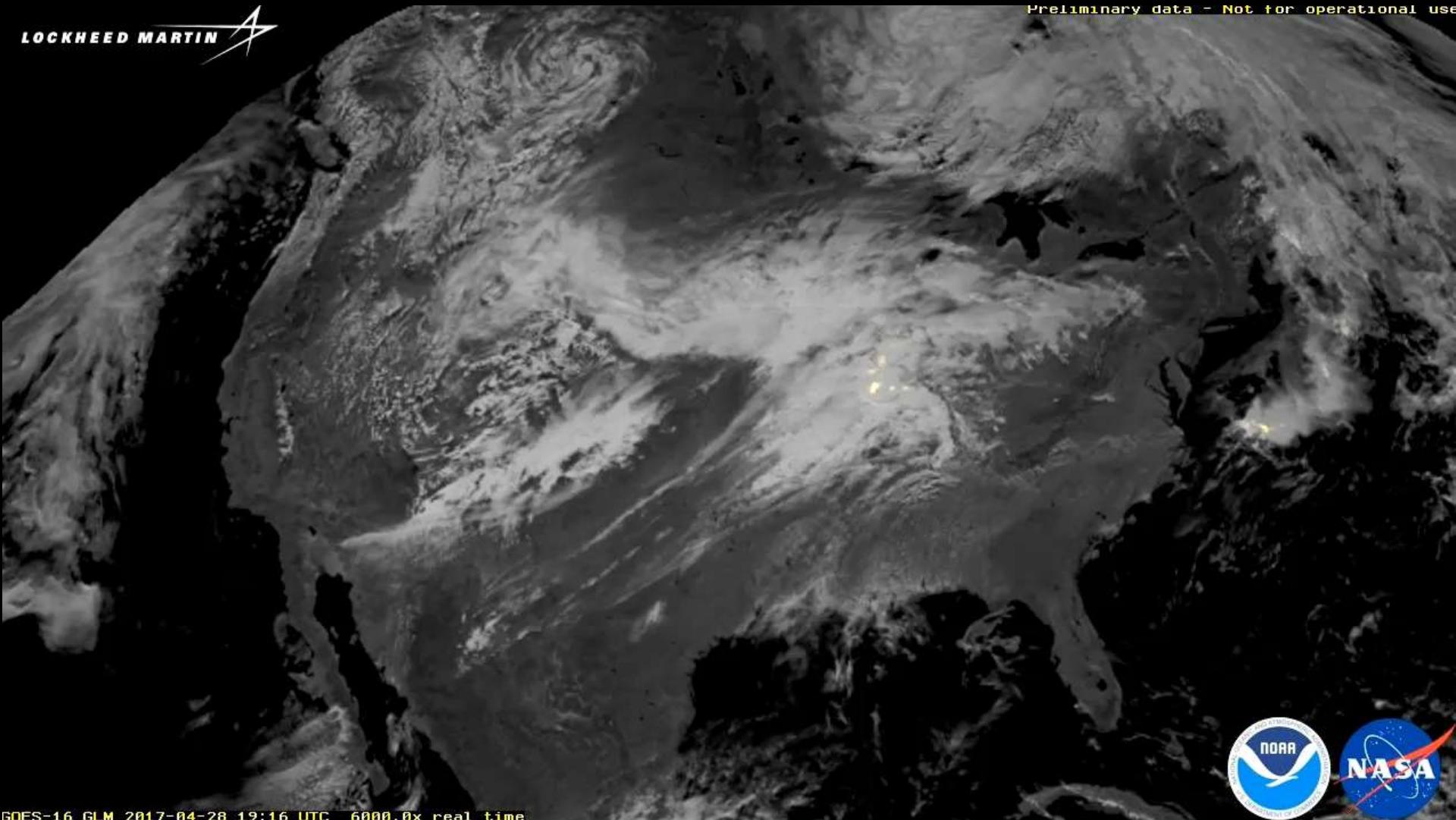
GOES-16/SUVI 171 Å 2017-04-18 18:06:53



# GOES-16 Early Images

LOCKHEED MARTIN

Preliminary data - Not for operational use



GOES-16 GLM 2017-04-28 19:16 UTC 6000.0x real time



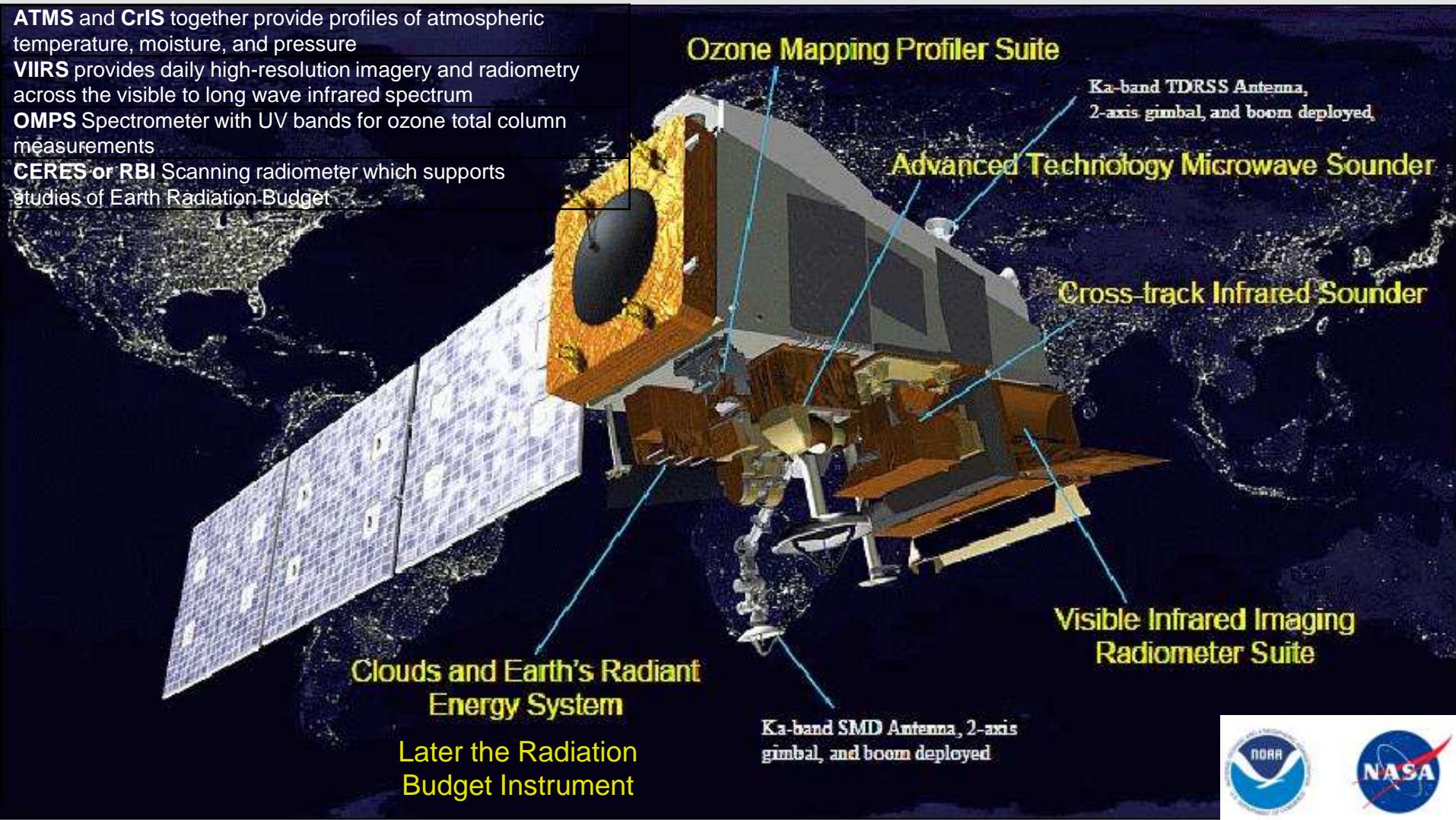
# JPSS-1: Coming in September (Series will extend through ~2038)

**ATMS** and **CrIS** together provide profiles of atmospheric temperature, moisture, and pressure

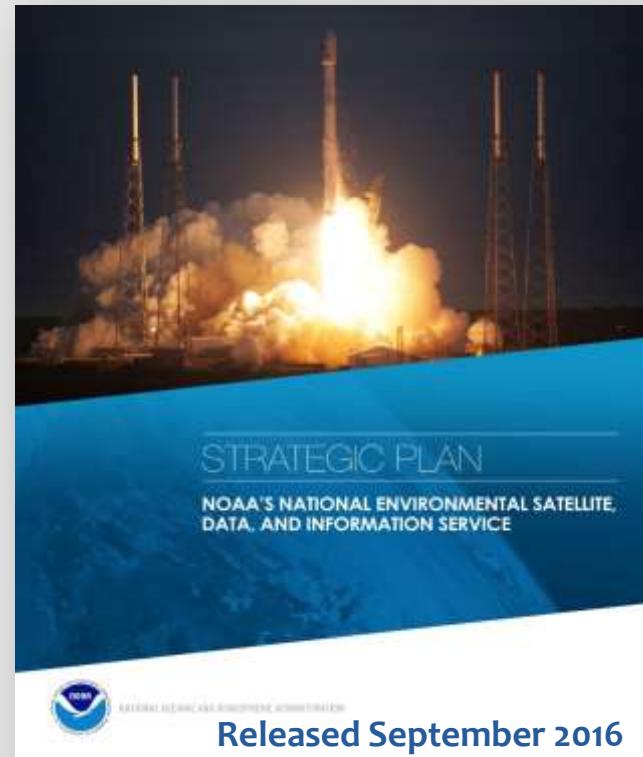
**VIIRS** provides daily high-resolution imagery and radiometry across the visible to long wave infrared spectrum

**OMPS** Spectrometer with UV bands for ozone total column measurements

**CERES** or **RBI** Scanning radiometer which supports studies of Earth Radiation-Budget



# The NESDIS Strategic Plan



# Architecting the Future Observing System

*Develop a space-based observing enterprise that is flexible, responsive to evolving technologies, and economically sustainable.*

--FY15 NOAA Annual Guidance

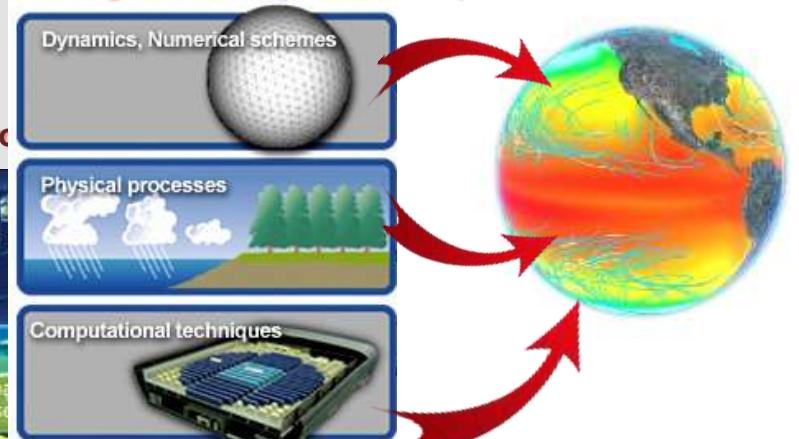
## Global Earth Observing Satellite System

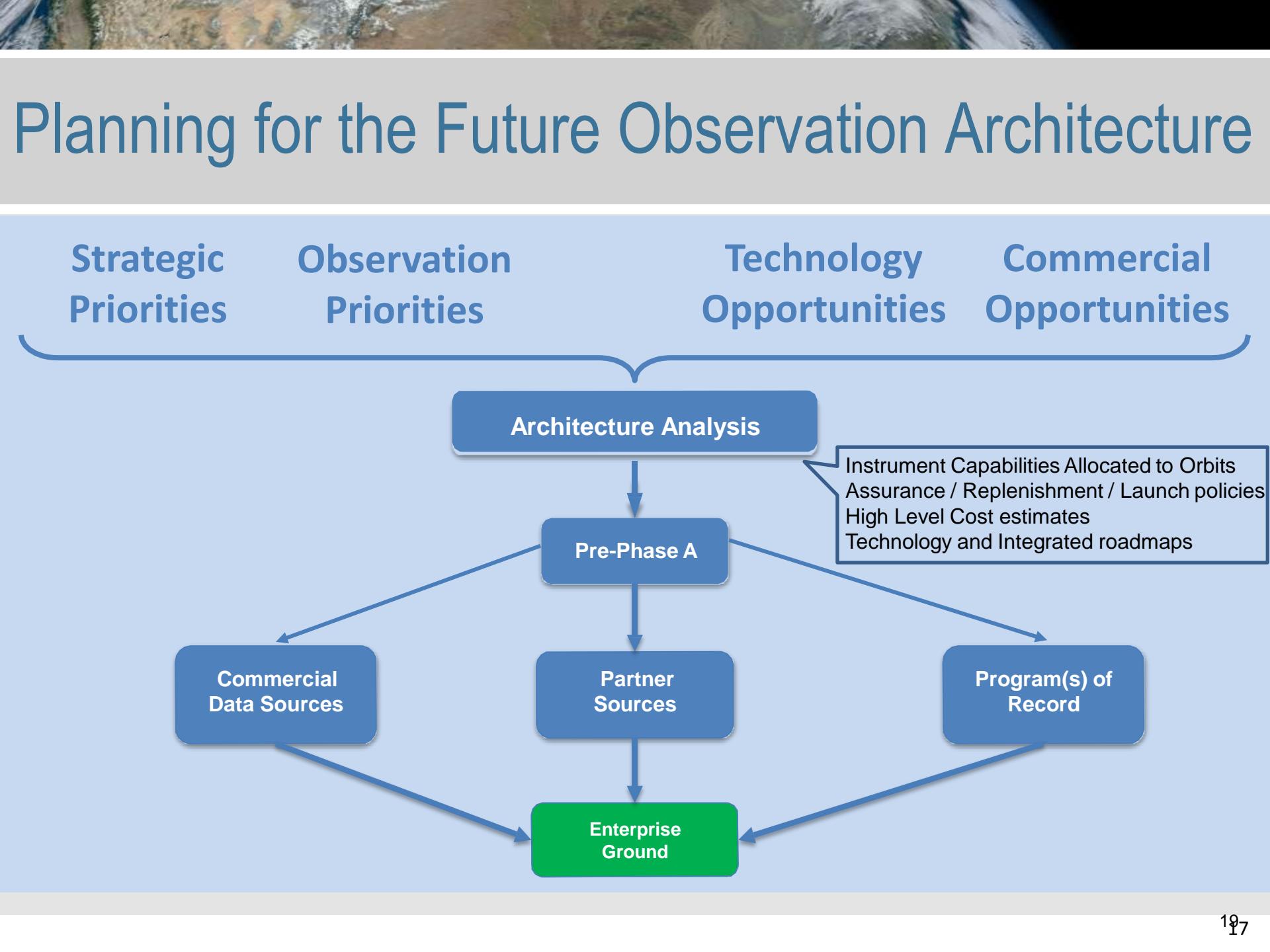


## Next Generation Integrated & Adaptive Grid



## Integrated & Assimilated Operational Data Flow





# Addressing Needs Across NOAA

## WEATHER READY NATION

1. Aviation Weather and Volcanic Ash
2. Fire Weather
3. Hydrology and Water Resources
4. Marine Weather and Coastal Events
5. Hurricane/Tropical Storms
6. Routine Weather
7. Severe Weather
8. Space Weather
9. Tsunami
10. Winter Weather
11. Environmental Modeling Prediction
12. Science, Services and Stewardship

National Weather Service

## HEALTHY OCEANS

1. Ecosystem Monitoring, Assessment and Forecast
2. Fisheries Monitoring, Assessment and Forecast
3. Habitat Monitoring and Assessment
4. Protected Species Monitoring
5. Science, Services and Stewardship

National Marine Fisheries Service

## RESILIENT COASTS

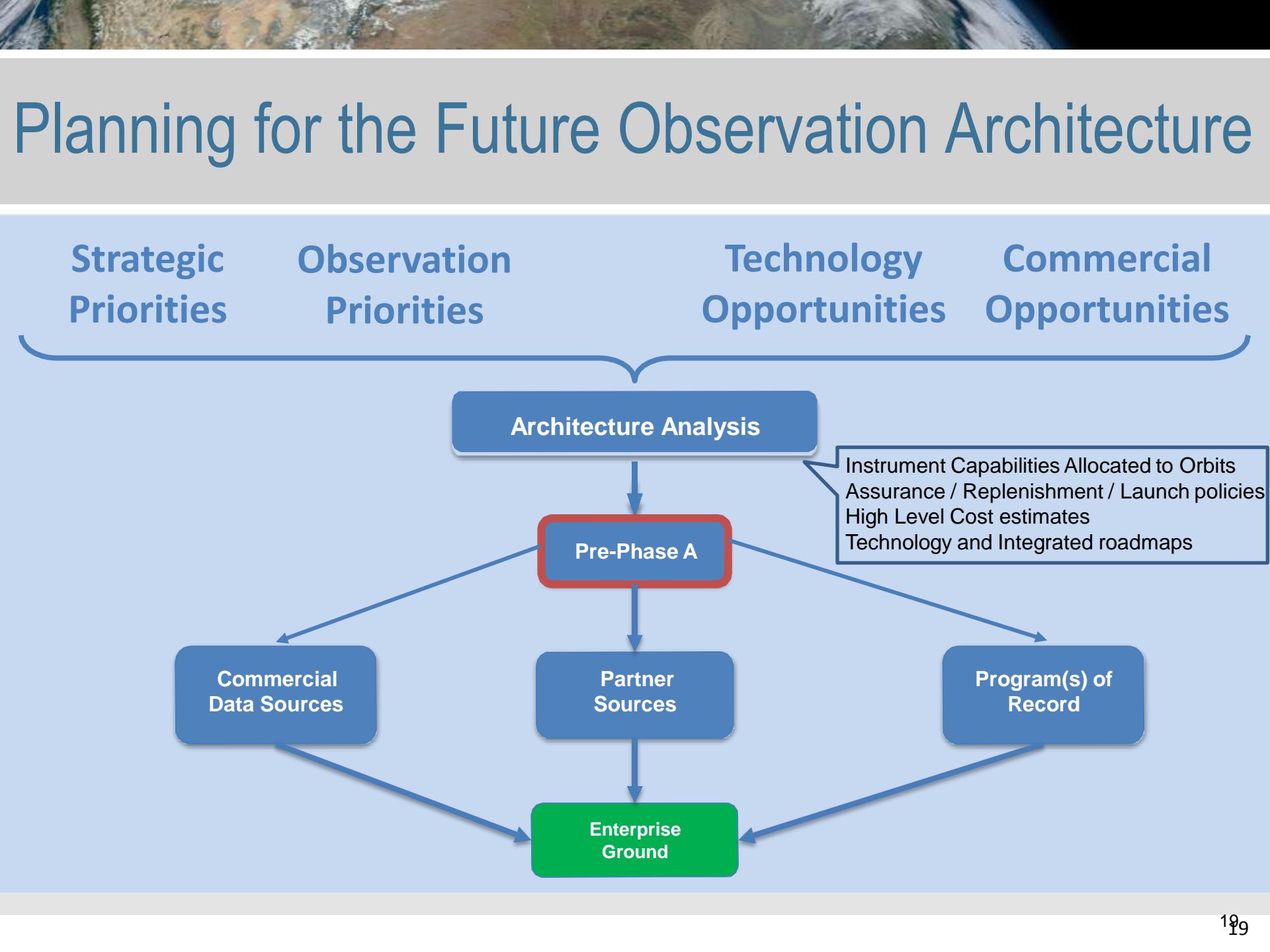
1. Coastal Water Quality
2. Marine Transportation
3. Planning and Management
4. Resilience to Coastal Hazards and Climate Change
5. Science, Services and Stewardship

National Ocean Service

## CLIMATE

1. Assessments of Climate Changes and Its Impacts
2. Climate Mitigation and Adaptation Strategies
3. Climate Science and Improved Understanding
4. Climate Prediction and Projections

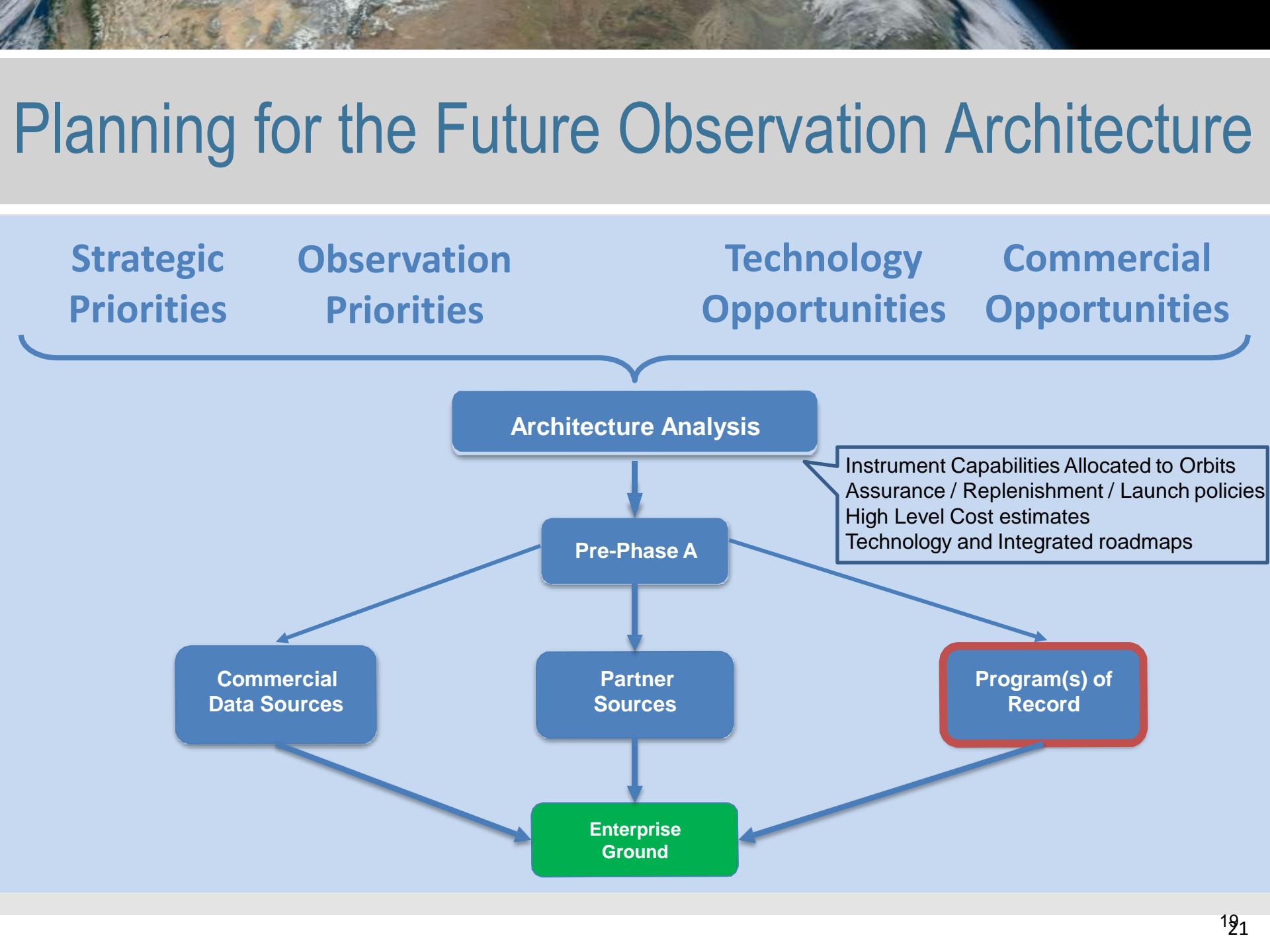
Office of Oceanic and Atmospheric Research



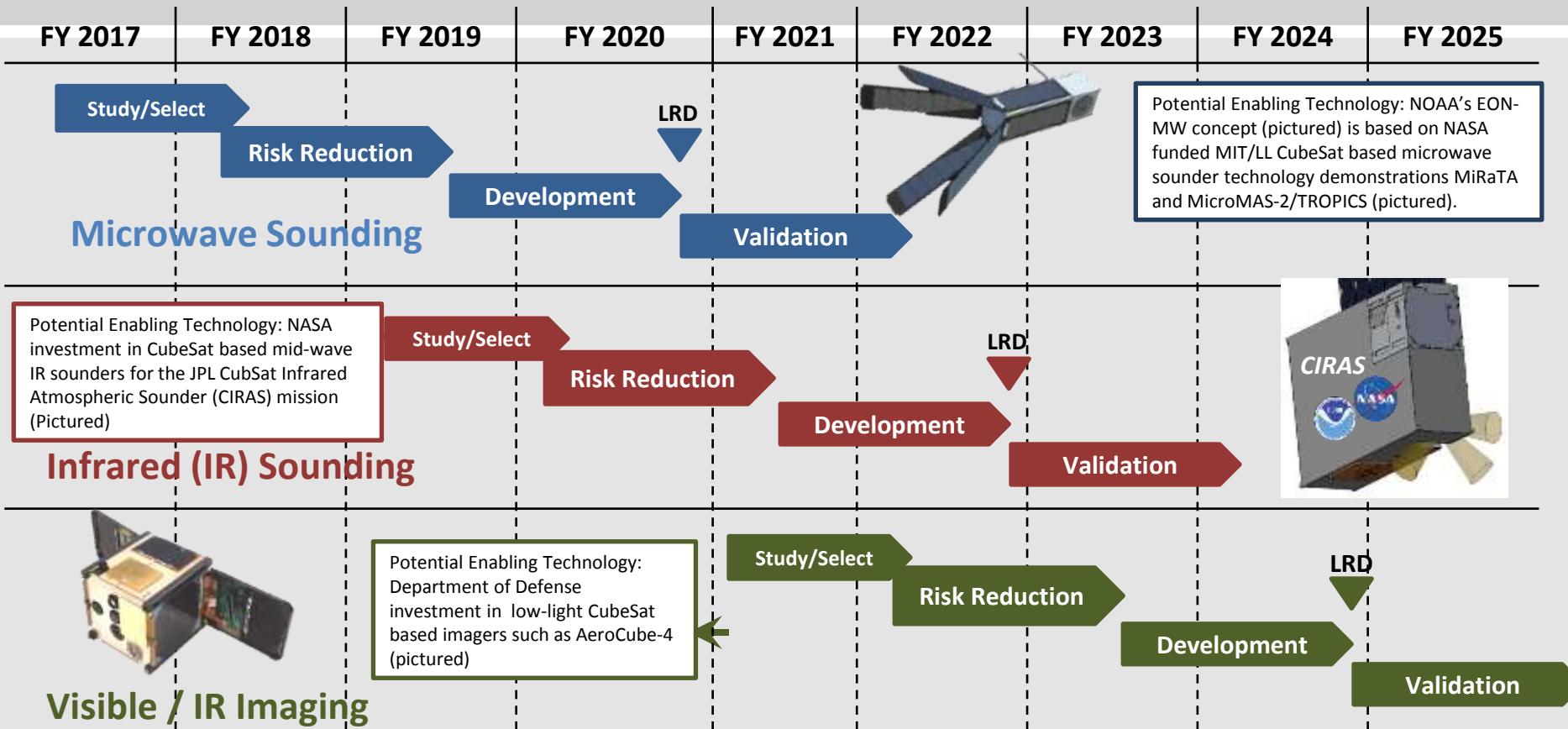
# Pre-formulation: Bridging the gap between tech development and operational system acquisition

- Reduces costs thru design concept studies and tech demos
- Detailed activities will be based on Architecture Study results

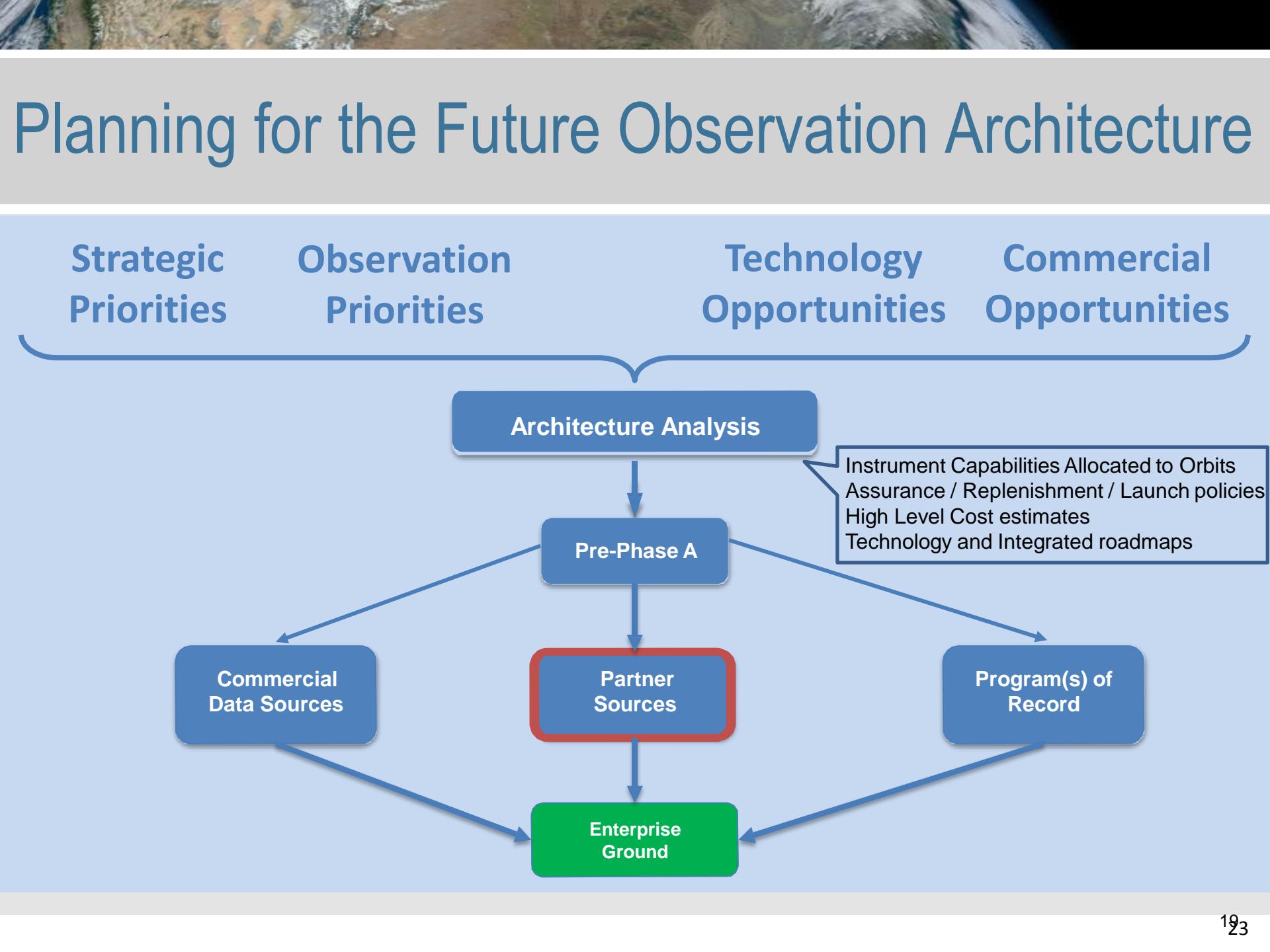
Architecture Element	Pre-Formulation Activity	Acquisition Activity	Potential Examples
Commercial Service	<ul style="list-style-type: none"><li>▪ Sample Data Buy for System Engineering and Quality Evaluation</li></ul>	<ul style="list-style-type: none"><li>▪ Operational Mission Data Buy</li></ul>	<ul style="list-style-type: none"><li>▪ Radio Occultation Data</li><li>▪ Communication Services</li></ul>
New Technology insertion (e.g. Lab-developed)	<ul style="list-style-type: none"><li>▪ Technology transition, producibility &amp; manufacturability</li><li>▪ Concept competition</li></ul>	<ul style="list-style-type: none"><li>▪ System Procurement</li></ul>	<ul style="list-style-type: none"><li>▪ EON to mature Small Microwave Sounder to TRL 7 for operational system following NASA-funded MIRADA</li></ul>
Heritage Instrument	<ul style="list-style-type: none"><li>▪ Obsolescence Mitigation</li></ul>	<ul style="list-style-type: none"><li>▪ System Procurement</li></ul>	<ul style="list-style-type: none"><li>▪ EO Focal Planes</li></ul>
Use-driven Data Product	<ul style="list-style-type: none"><li>▪ Algorithm transition/development</li></ul>	<ul style="list-style-type: none"><li>▪ Operational Data Exploitation Algorithm, End-to-End Validation</li></ul>	<ul style="list-style-type: none"><li>▪ Urgent data products (e.g. volcanic eruptions, oil spills)</li></ul>



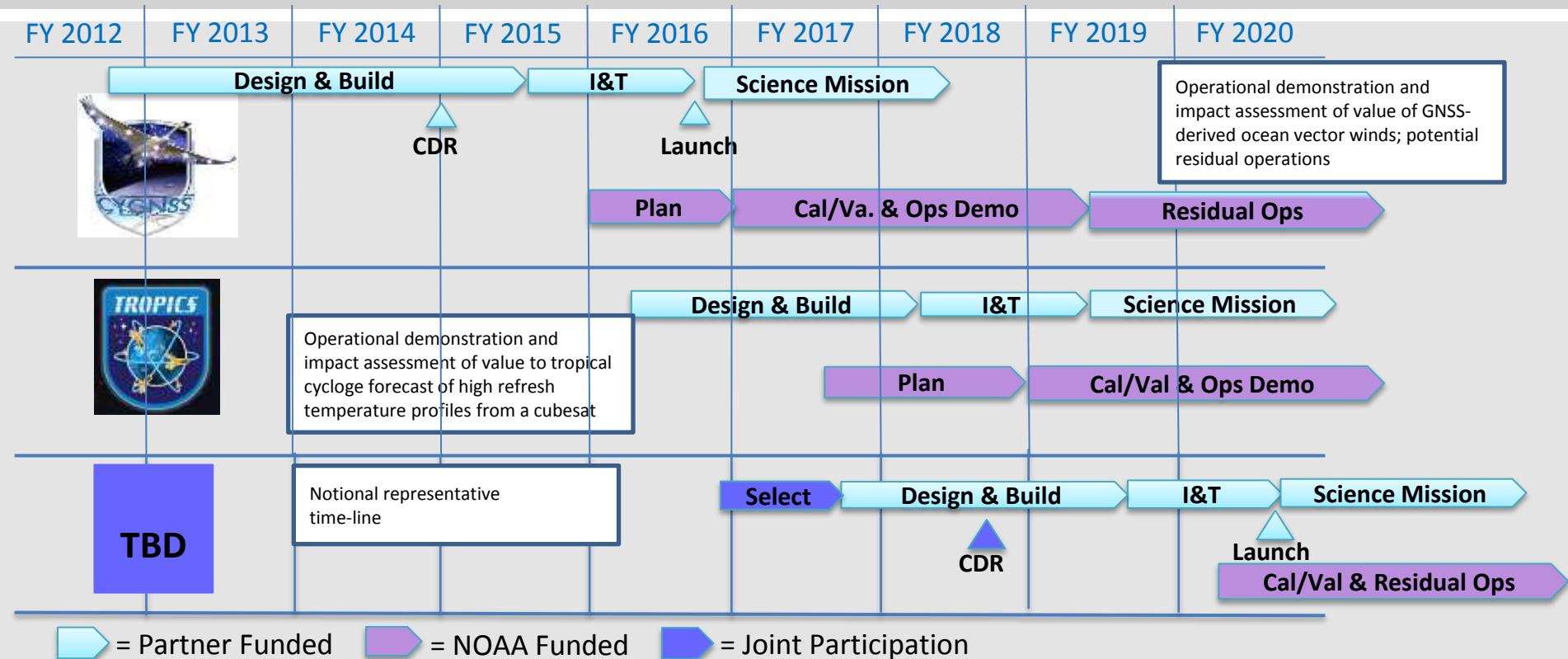
# Technology Insertion Candidate Examples



- Low cost, quickly deployable systems allow for potential cost reduction, increased resiliency and continuity of observation while augmenting existing operational systems
- Validation (success/failure) of multiple easily deployable assets allows shorter turn times to address gaps
- Short turn times allow for tech insertion and revectoring of resources upon system validation

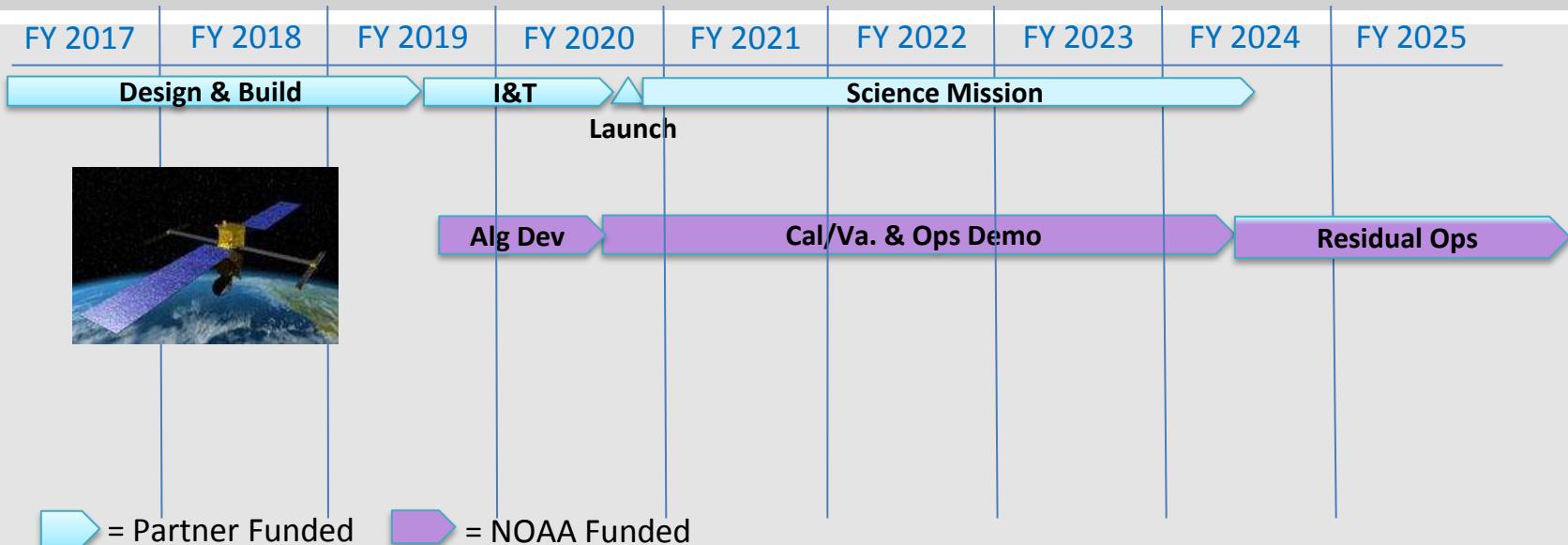


# Example of operational demonstration plan (NOAA/NASA collaborative Ops)



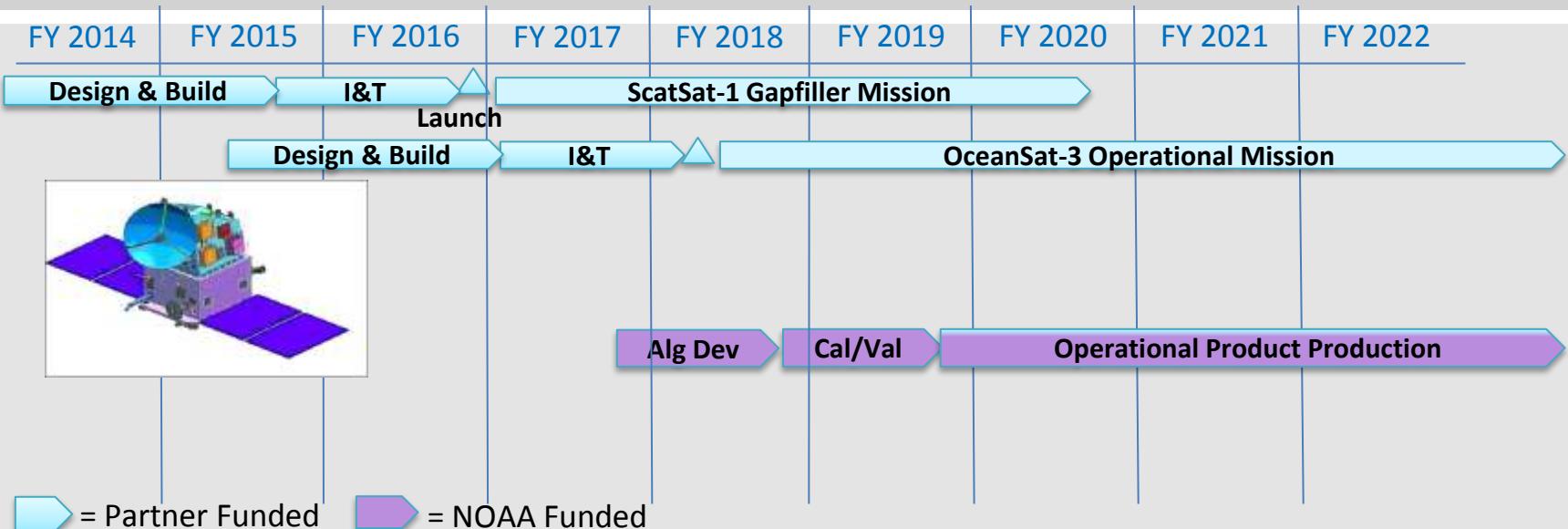
- Earlier collaboration with NASA in its selection of Earth Venture and other competitive selections
  - Explore co-investments, co-authored calls, joint selection
  - Potential for additional NOAA funding to support enhanced operational features (e.g., near real time access)
- Participation in cal/val and execution of operational demos to assess potential operational impact
- Inform operational system requirements and priorities

# Example of leveraging a NASA investment: NASA Surface Water & Ocean Topography (SWOT)

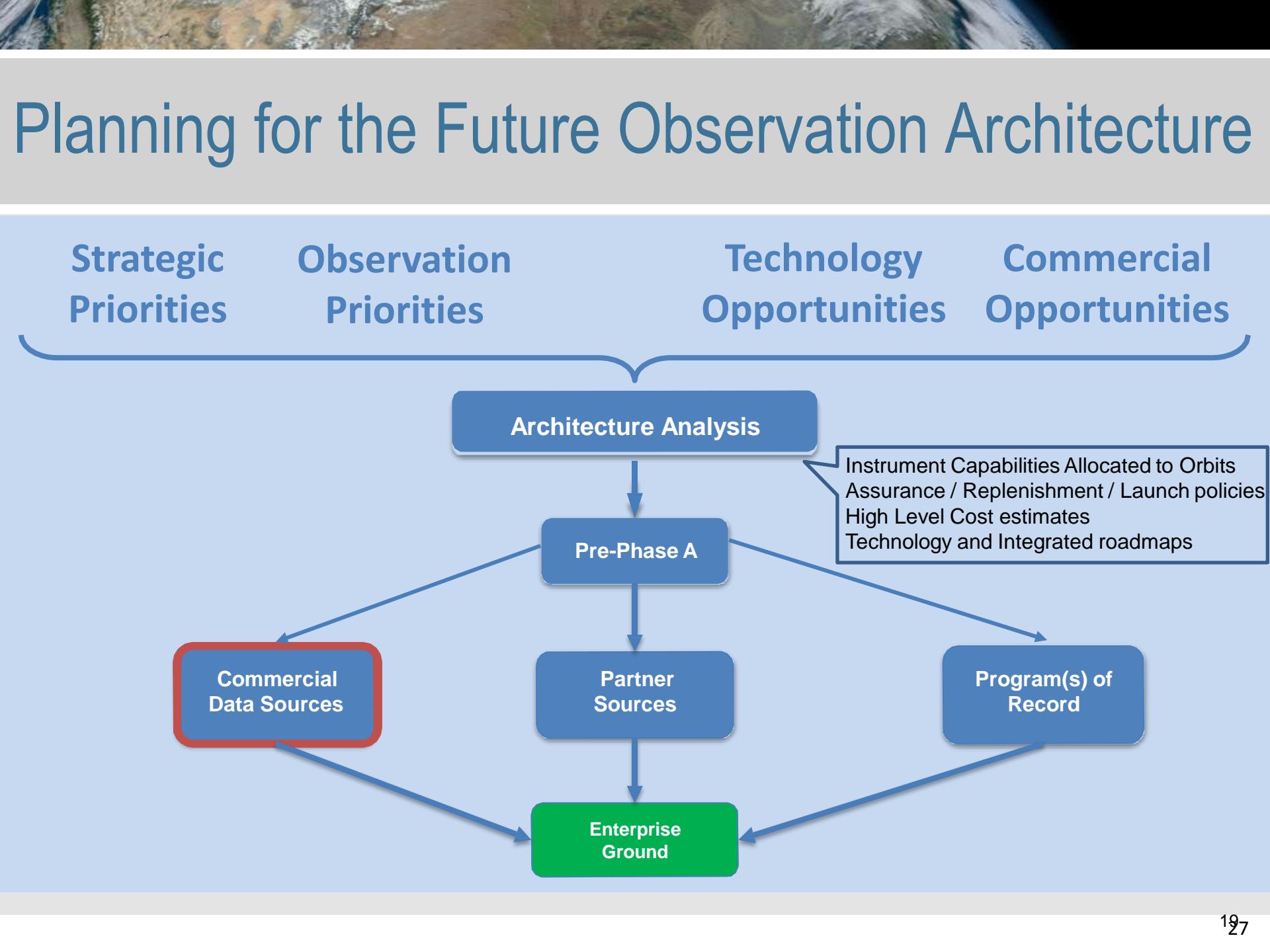


- NASA/CNES mission to measure ocean topography and waves, hydrology
  - Altimeter, Ka-band Radar Interferometer, Microwave radiometer
- NOAA could:
  - Develop and operationally deploy algorithms (leveraging NASA science team investment)
  - Participate in the Calibration/Validation
  - Provide operational or mature “experimental” products to NWS, NOS to achieve currently unsatisfied observation requirements

# Opportunity to leverage international partnership: India's Ocean Surface Scatterometer Mission

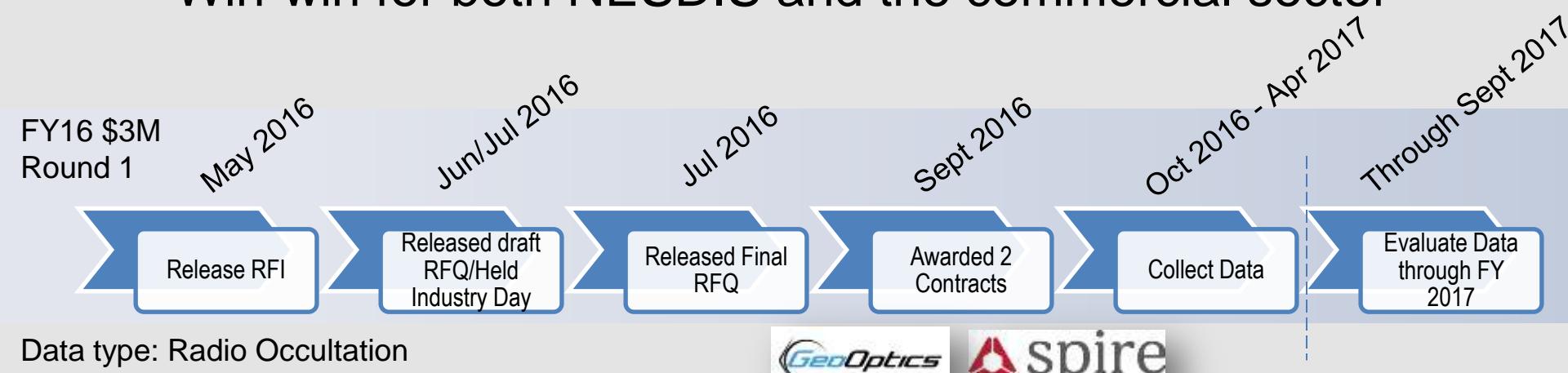


- Indian Space Research Organization (ISRO) missions to measure ocean surface vector winds
  - ScatSat-1 gapfiller: OceanSat Scatterometer
  - OsceanSat-3: OceanSat Scatterometer
- NOAA could:
  - Develop and operationally deploy algorithms (leveraging previous scatterometer algorithm work)
  - Build data pipe and secure ingest of data
  - Provide operational products to NWS and NOS through 2023



# Commercial Weather Data Pilot

Win-win for both NESDIS and the commercial sector



FY17 \$5M Request  
Potential Round 2



Data type: To Be Determined

*Additional Outreach to the Commercial Community is likely*



# Recent guidance to NESDIS

- Administration: FY 2018 Budget Blueprint
  - Maintains the development of NOAA's current generation of polar orbiting and geostationary weather satellites
  - Achieves annual savings from NOAA's Polar Follow On satellite program
  - Provides additional opportunities to improve robustness by expanding the utilization of commercially provided data to improve weather models
- Congress: Weather Research and Forecasting Innovation Act of 2017
  - Quantitative assessments of the relative value and benefits of observing capabilities and systems
  - NAS study of future satellite data needs
  - Authorizes commercial data purchases and hosted payloads
  - NOAA strategy for use of commercial sector capabilities
  - Pilot program to demonstrate commercial capabilities, and for the purchase and operational use of commercial capabilities once demonstrated
  - Continued adherence to international data sharing agreements



# Our Challenges Remain

- Continue to deliver the complex and expensive systems on time and on budget
  - *Challenge: Maintaining the performance and reliability of the observing system, led by GOES and JPSS systems, under the revised budget guidelines*
- Evolve the NESDIS and NOAA satellite utilization model to incorporate seamlessly data from multiple sources, including interagency, international, and commercial
  - *Challenge: Devise and implement operational approach to ingest data from all sources while meeting time latency, quality, validation, and IT security requirements*
- Define a new operating paradigm where the system is characterized as much by the product output and service provision as by the satellite input
  - *Challenge: Places significantly greater emphasis on the end-to-end system performance, including satellites but also data processing, ground system hardware and data management, and service providers such as NWS*

# IRT Report Released

Report available at <https://www.nesdis.noaa.gov/press>

Secure | <https://www.nesdis.noaa.gov/press>

The 2016-17 Independent Review Team report provides expert analysis of how well NESDIS has addressed recent challenges and opportunities and its strategic path forward. This marks the third such review we've commissioned since 2012. We welcome you to read the [executive summary \(PDF\)](#) and the [full report \(PDF\)](#).

Members of the news media may contact NESDIS by reaching out to our office of public affairs:

**John Leslie**  
Email: [John.Leslie@noaa.gov](mailto:John.Leslie@noaa.gov)  
Phone: 301-713-0214

**Latest**

[A Note to the Weather Community about Using GOES-16 Data](#)

[NOAA Scientist Receives Prestigious Space Science Award \(PDF\)](#)

[Flashy First Images Arrive from NOAA's GOES-16 Lightning Mapper](#)

[NOAA's GOES-16 Satellite Sends First Images to Earth \(PDF\)](#)

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#NOAA's #GOES16 captured this incredible imagery of the strong storms over the southern Plains & Miss. Valley this past weekend.



01 May

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# Thank you!

