Satellite Applications Testbed

The VISION for

Future Satellites & Their Applications

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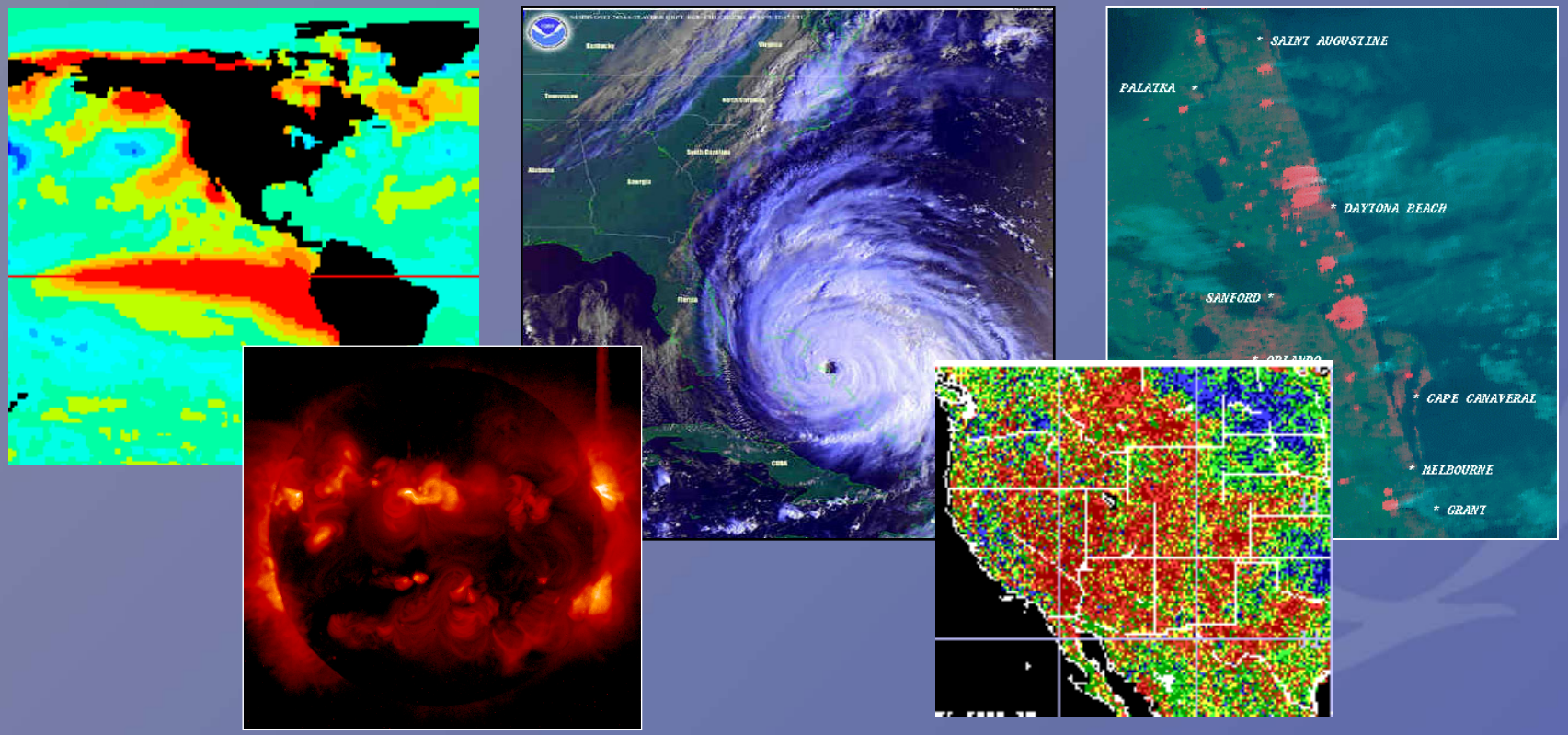
NOAA's Environmental Satellite Information Service

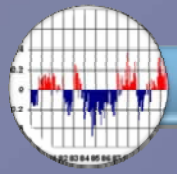
NOAA provides a space-based environmental operational remote sensing capability that makes improved weather, climate, land, and ocean assessments and predictions possible.



NOAA's End-to-End Responsibility

User requirements

Instrument requirements

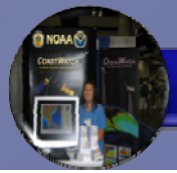


Instrument calibration and validation

Develop and test ground systems and archives

Algorithm and product development

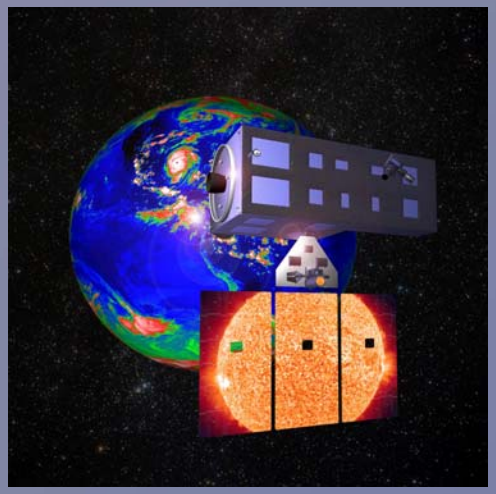
Launch and transition to operations



Education and outreach

Future Satellites and Systems

Increasing Resolution: Temporal, Spatial and Spectral

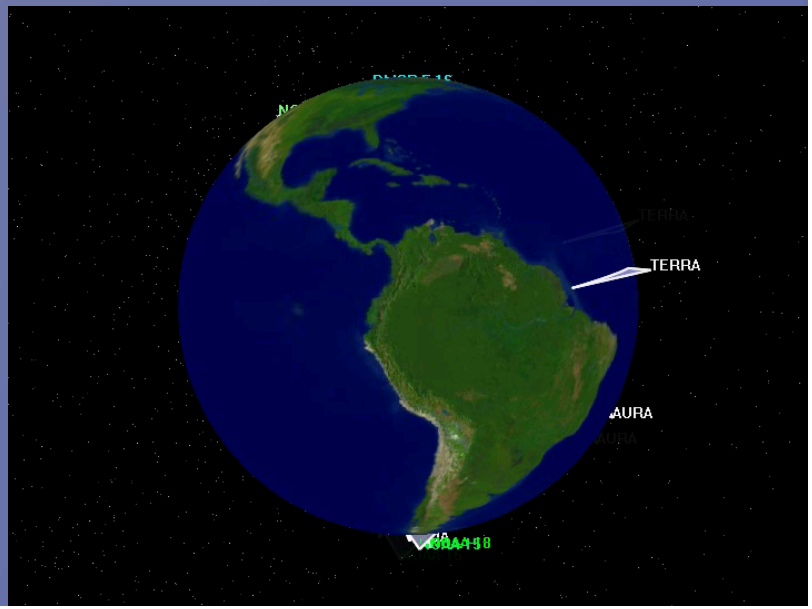


GOES R Series

- 5x greater coverage
- 2x higher resolution
- 3x number of channels
- Multiple sounding tasks
- Full disc images in 5 min

NPOESS

- Standardized sensors
- 15 data receptor sites (Safety Net)
- 30x higher resolution
- 6x faster data relay

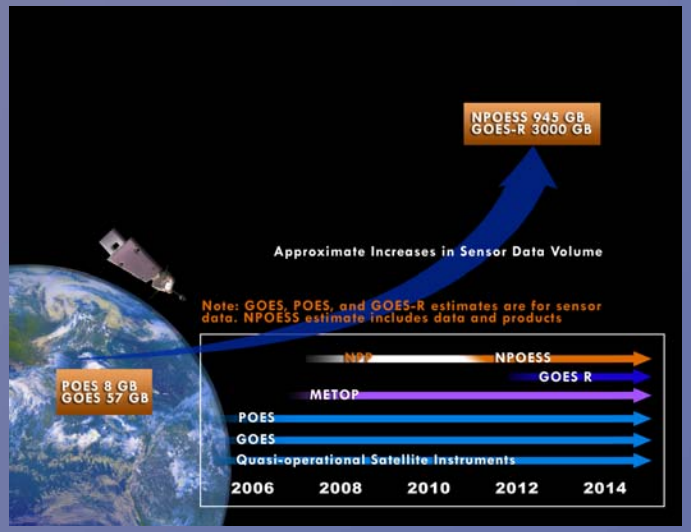


NASA & INTERNATIONAL SATELLITES

- Decadal Survey Missions
- European, Japanese, Chinese, Indian….
- More capability …. that needs integration

Growing to Meet Satellite Data and Information Needs

Satellites	Today	2008-2016	2020+
Polar-Orbiting	3	3	3
Geostationary	3	2	2
Non-NOAA	5	12	14
Sensors	30	45	70
Spatial Resolution	4,000m	1,000 m	400 m
Temporal Resolution	30 min	15 min	5 min
Data Volume	**65 Gb**	**2000 Gb**	**11000Gb**



New Satellites

NOAA-N launched
May 20, 2005

GOES-N launched
May 24, 2006

New Facilities

NOAA Center for Weather and Climate Prediction
College Park, MD
2008

NOAA Satellite Operations Facility
Suitland, MD
2006

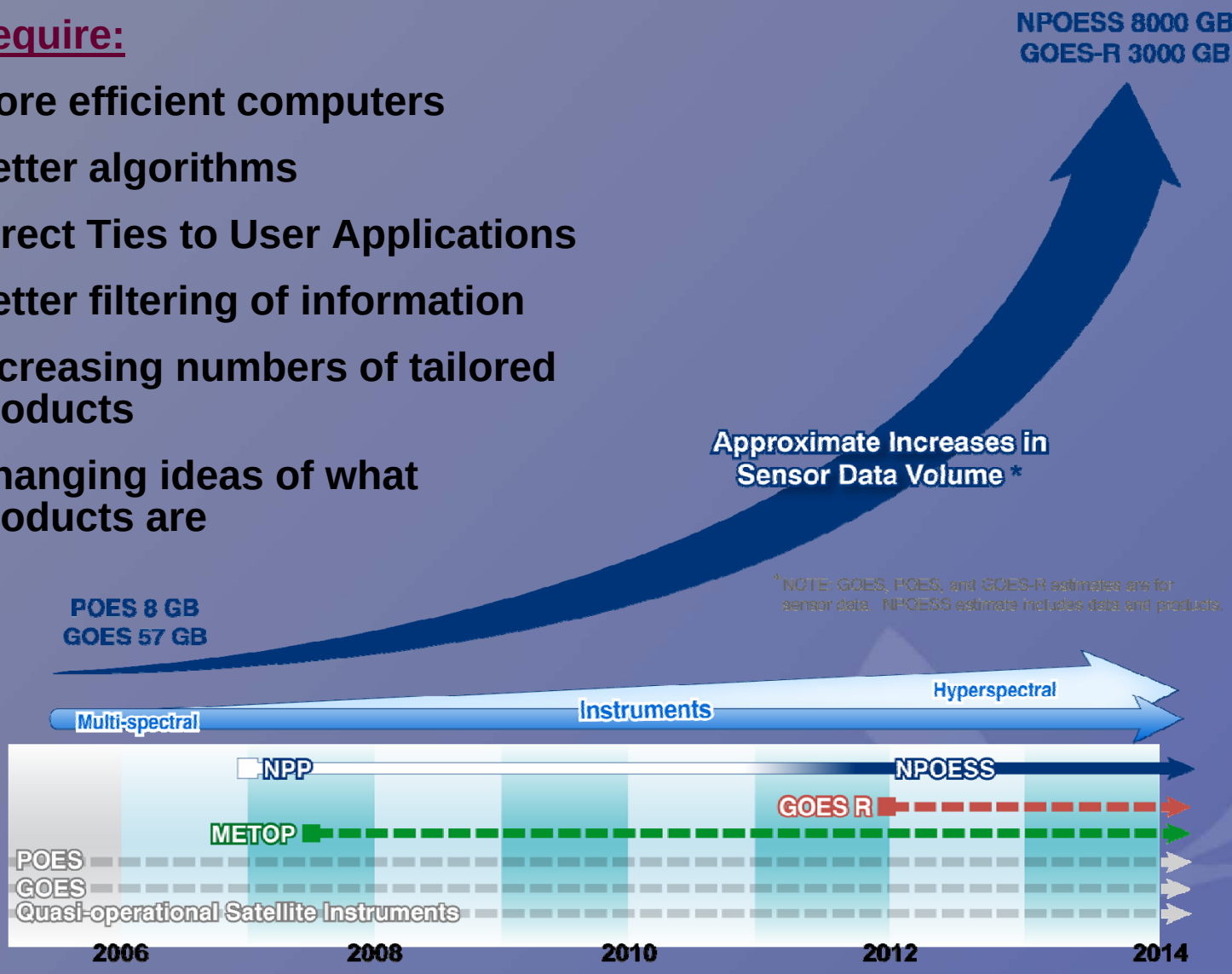
#

DATA VOLUME IMPACTS

Next Generation NOAA-used Satellite Observing Systems

Require:

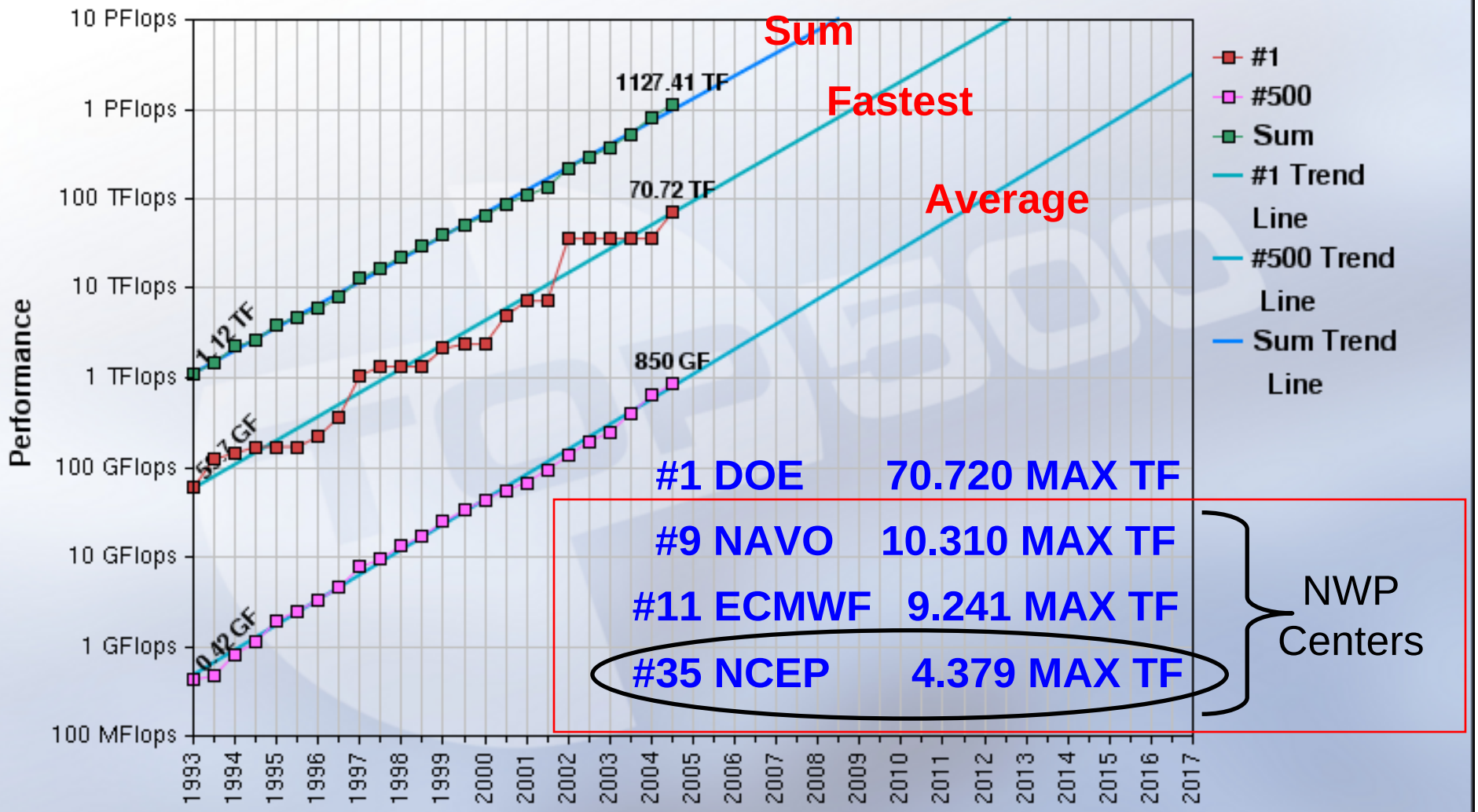
- More efficient computers
- Better algorithms
- Direct Ties to User Applications
- Better filtering of information
- Increasing numbers of tailored products
- Changing ideas of what products are



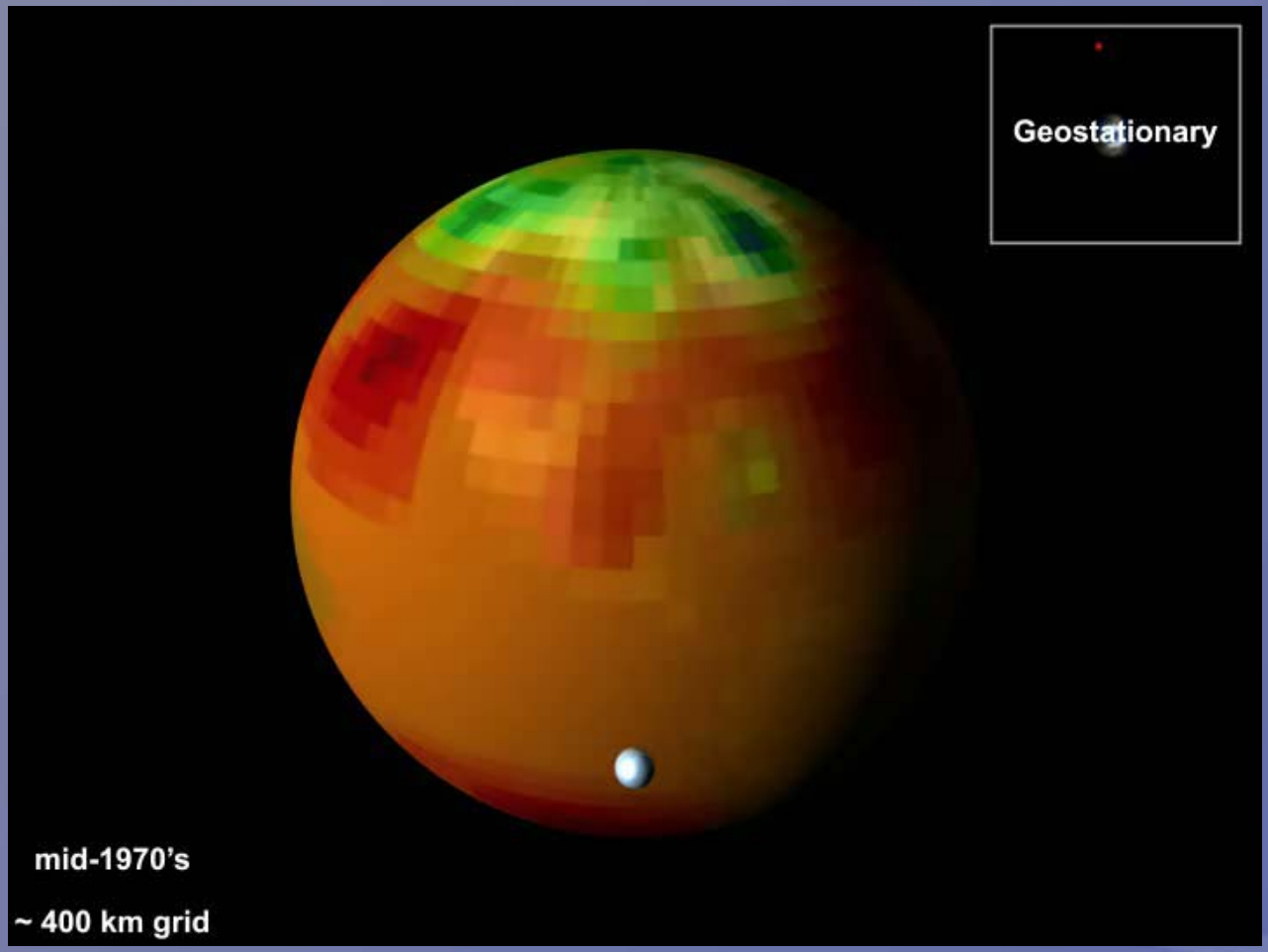
TOP500 SUPERCOMPUTER SITES

Projected Performance Development

500 Fastest Supercomputers in the World -- 2004



Data Impacts on Modeling



Material from Louie Uccellini & NOAA's EVP

Decision Support Via Geospatial & Environmental Analysis

Environmental Data

Maps

Imagery

Census Data

Community Data

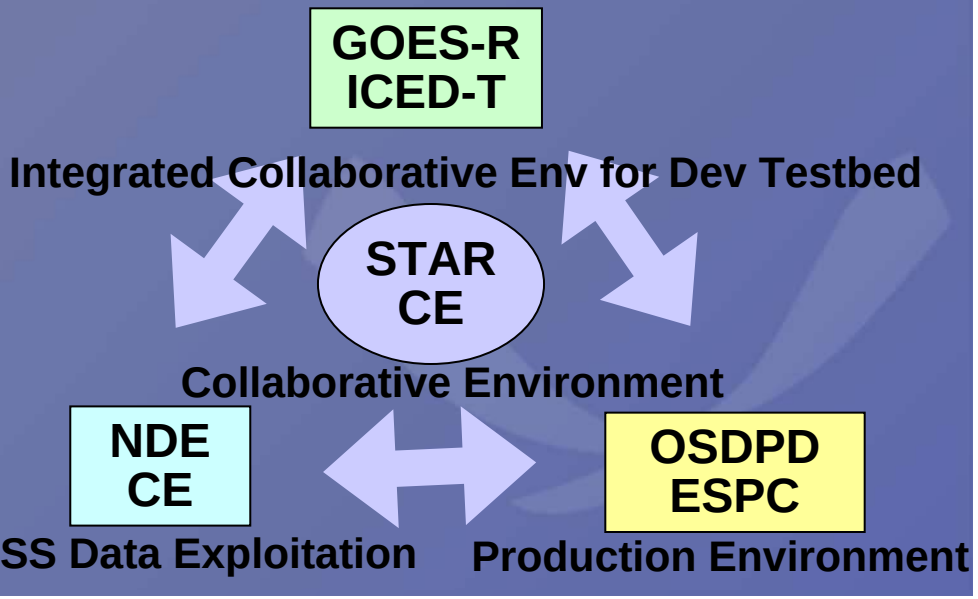
Property Information

Tools for the Future

CHANGING ENVIRONMENT

Collaborative Environment (CE)

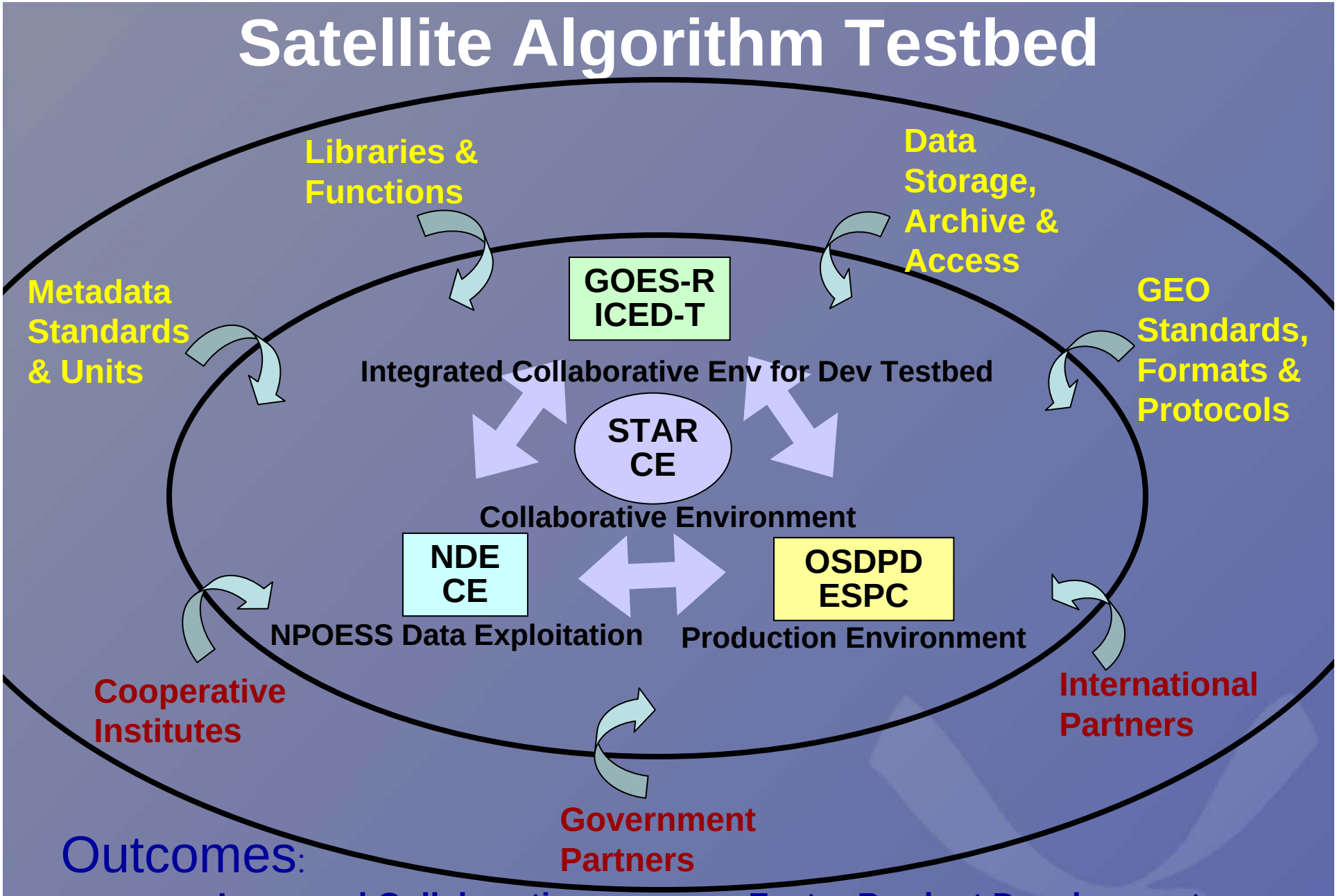
- Host Algorithm In A Near Operational Environment
  - Same Compilers, Operating Systems
  - One Set Of Standardized Documentation
  - Test Input & Output Data Sets
  - Use Operational Components
    - Example: Community Radiative Transfer Model
  - Defined Benchmarks
- Provide Access To CE For All Approved Transitions



BENEFIT:

Faster, cheaper, smarter research into operations

Satellite Algorithm Testbed

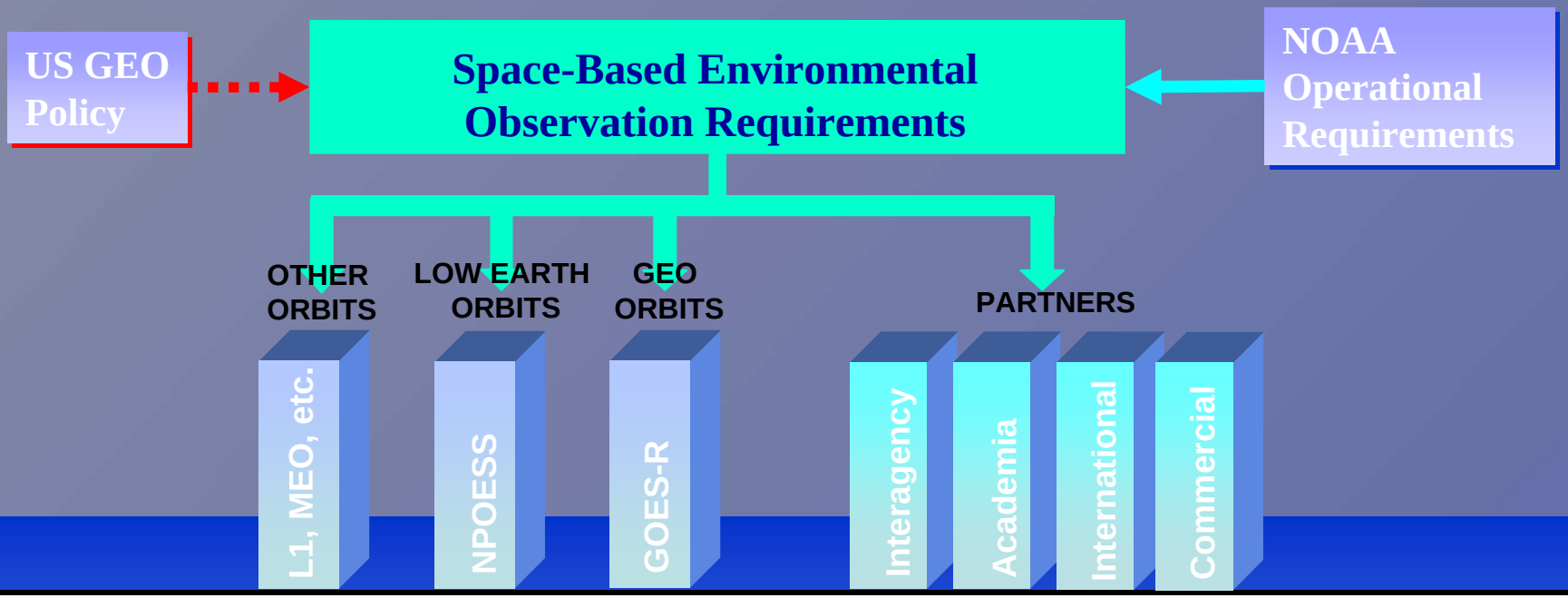


Outcomes:

Improved Collaboration
Faster Research to Operations,
Integrated Data Environment,

Faster Product Development
Improved Product Quality,
Service Oriented Architecture

Cross-Cutting Ground Services



Cross-Cutting Ground Services:

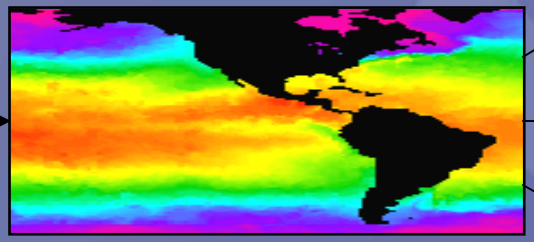
- Satellite Operations & Ground Systems (C3)
- Calibration, Algorithm Development, Validation & Sustainment
- Product Processing & Distribution
- Data Archive & Access
- Information Technology Architecture, Standards, & Security

Service Oriented Architecture (SOA)

GEO-Integrated Data Environment

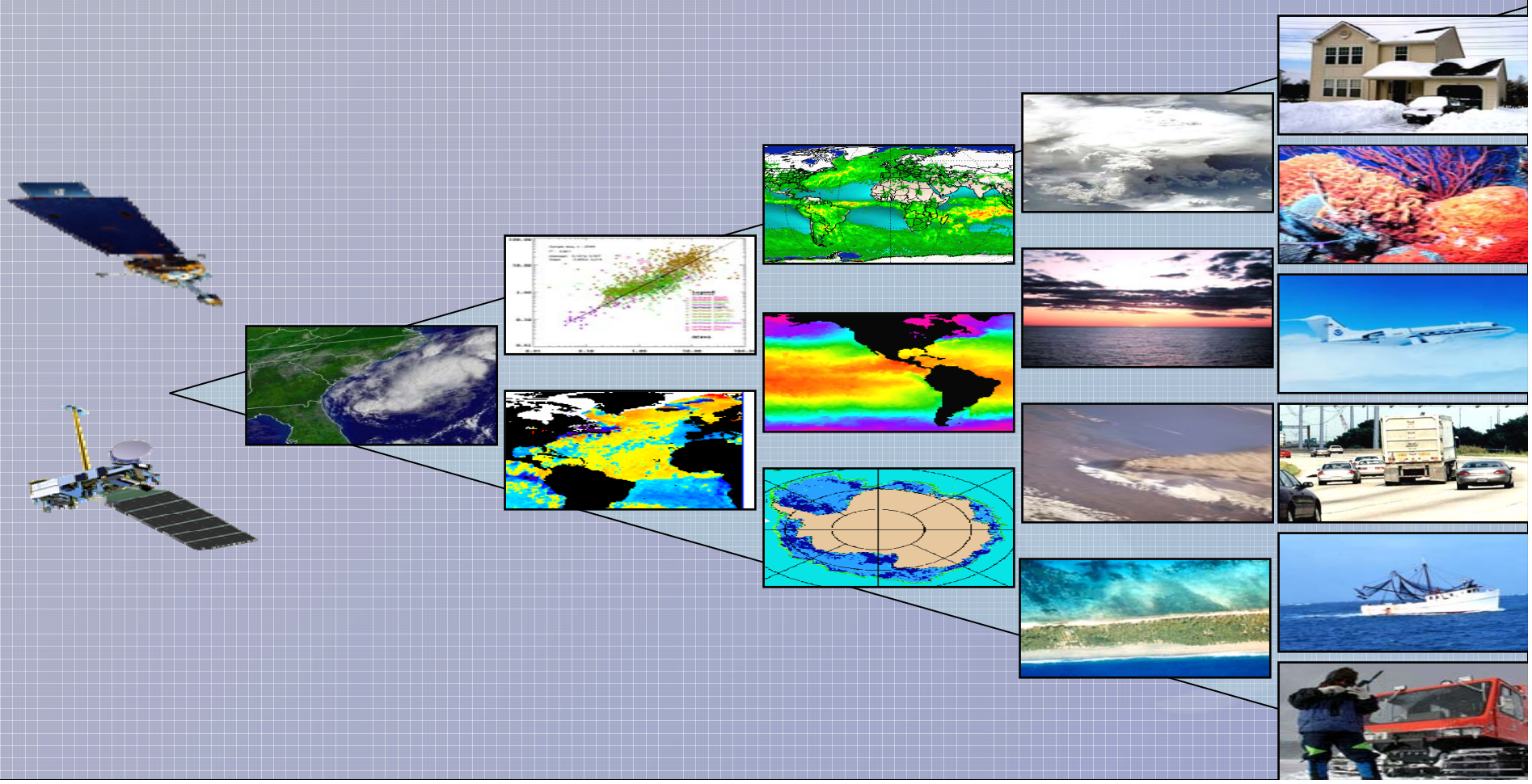
The Future is Bright And Exciting!!!!

- Fast and efficient RESEARCH TO OPERATIONS
- New capabilities: satellites, sensors & products
- Collaborative Environments, Service Oriented Architectures & Testbeds
- Geospatial and Integrated Analysis
- Greater Collaboration with Partners & Users
- New User Applications
- Greater impacts and benefits



Satellite Algorithm Testbed

NOAA is where science earns value!!



Challenges in Monitoring Global Climate Change from Space (CDRs)

- Need to construct time series by stitching together observations of many satellites
- Extremely small signals
  - Atmospheric temperature trends as small as 0.1 C/decade
  - Ozone changes as little as 1%/decade
  - Variations in the sun's output as tiny as -0.02%/decade
    - Different analyses of observations vary from:

      -0.023 to +0.25 W/m^2
- **Good calibration and intercalibration are crucial**