NASA's EOSDIS, Trust and Certification





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Science Systems and Applications, Inc. and NASA GSFC ESDIS Project
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Earth Observing System Data and Information System (EOSDIS)



- Operating since August 1994
- Designated by Federal Government
 - ➤ legally bound by Circular A-130 (Managing Federal Information as a Strategic Resource) and the Federal Records Act
 - > Must follow NIST and NARA regulations
 - NASA Procedural Requirements (NPR 7120.5) govern details of Program/Project Management
- Provides end-to-end capabilities for managing NASA's Earth science data.
 - > Science Operations
 - **❖Science data processing**
 - **❖**Data management
 - **❖Interoperable distributed data archives**
 - ❖On-line data access services
 - **❖**Earth science discipline-oriented user services
 - > Network Data Transport to distributed system elements

Distributed Active Archive Centers (DAACs)

Alaska Satellite Facility DAAC

SAR Products, Sea Ice, Polar Processes, Geophysics

National Snow and Ice Data Center DAAC

Frozen Ground, Glaciers, Ice Sheets, Sea Ice, Snow, Soil Moisture

Land Processes DAAC

Land Cover, Surface Reflectance, Radiance, Temperature, Topography, Vegetation Indices

Goddard Earth Sciences Data and Information

Services Center Global Precipitation, Solar Irradiance, Atmospheric Composition and Dynamics, Global Modeling

Crustal Dynamics Data Information System

Space Geodesy, Solid Earth

Ocean Biology

DAAC
Ocean Biology,
Sea Surface
Temperature

Global Hydrology Resource Center DAAC

Hazardous Weather, Lightning, Tropical Cyclones and Storm-induced Hazards

Oak Ridge National Laboratory DAAC

Biogeochemical Dynamics, Ecological Data, Environmental Processes

LaRC Atmospheric Science Data Center

Radiation Budget, Clouds, Aerosols, Tropospheric Chemistry

Level 1 and Atmosphere Archive and Distribution System (LAADS)

MODIS Level-1 and Atmosphere Data Products

Physical

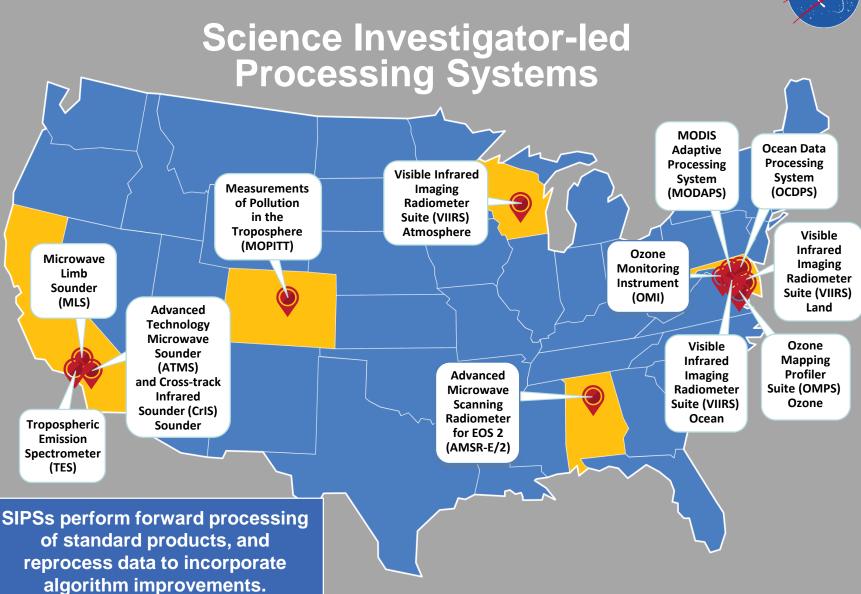
Oceanography DAAC Gravity, Sea Surface Temperature, Ocean Winds, Topography, Circulation & Currents

Data and Applications Center Human Interactions,

Socioeconomic

luman Interactions Land Use, Environmental Sustainability, Geospatial Data





Session Questions and "Quick" answers



- What certification process did you use for your use case?
 - ➤ ICSU/World Data System (most recently)
- Why was this certification process selected?
 - ➤ Recommendation in 2012 by Bernard Minster (Member, Earth Science Subcommittee of NASA Advisory Committee) and request by Martha Maiden (NASA HQ Program Executive for Earth Science Data Systems)
- What were the pros and cons as a result of using the identified certification process?
 - > Pros
 - Provides opportunity for self-examination
 - Relatively easy process given the rigor with which the system and its data centers have been developed and managed
 - > Cons
 - One more review and certification in addition to regular internal and external reviews

Session Questions and "Quick" answers



- Where were the key outcomes?
 - ➤ ESDIS Project is a Network Member of WDS
 - ➤ 10 of 12 DAACs are Regular Members of WDS
 - Potentially broader visibility (difficult to measure no specific metrics to assess incremental change that resulted by the certification)
 - Participation in ICSU/WDS/CODATA sponsored meetings (SciDataCon; WDS Forum)
- What are the next steps?
 - WDS and Data Seal of Approval (DSA) certification have merged
 - > Recertification every 3 years

A Little History (1 of 5)



- EOSDIS Advisory Panel (early to mid-1990's)
 - adhere to a flexible, distributed, portable, evolutionary design;
 - distribute data products by appropriate high-bandwidth communication or other media;
 - operate prototypes in a changing experimental environment
 - **♦NASA** response:
 - **→ Distributed architecture with DAACs**
 - →Version 0 working prototype
- DAAC User Working Groups (on-going)
 - Science discipline community input to DAAC performance
 - **♦ NASA response:**
 - →Implemented process for adding community-developed tools, services and datasets to the DAACs

A Little History (2 of 5)



NRC Review (1995)

- "Responsibility for product generation and publication and for user services should be transferred to a federation of partners selected through a competitive process open to all"
- http://www.gcrio.org/USGCRP/LaJolla/appF.html
- **♦NASA** response:
 - →Working Prototype Earth Science Information Partners (ESIP) Federation
- EOSDIS Review Group (1997)
 - Recommended "an adaptive approach which will be less centralized, giving more responsibility to the PIs"
 - **♦ NASA response:**
 - → PI-led Science Investigator-led Processing System (SIPSs)
- NRC Review of DAACs (site visits 1997-1998)
 - Committee on Geophysical and Environmental Data, National Research Council – Report ISBN: 0-309-52102-5 (1999)
 - Detailed recertification activity

A Little History (3 of 5)



- New Data and Information Systems and Services (NewDISS) Strategy Team (1998 - 2002)
 - Report:

https://earthdata.nasa.gov/sites/default/files/field/document/ND_Reprt_0.pdf

- Six recommendations
 - Clearly define components
 - Employ Infrastructure providing NASA-private sector liaisons
 - Employ competitive processes to select components
 - Empower science investigators for data system development, processing archiving and distribution
 - Apply lessons learned from WP-ESIP Federation
 - Charter transition team
- **♦ NASA response:**
 - → Core and Community Data Systems (Core: EOSDIS with DAACs; Community: REASoN projects → ACCESS & MEaSUREs)
 - → ESIP Federation
 - → Earth Science Data System Working Groups (ESDSWG, 2004)

A Little History (4 of 5)



- Earth System Science and Applications Advisory Committee (ESSAAC) Subcommittee on Information Systems and Services (ESISS, 2003)
 - **♦NASA** response:
 - →Initiated annual American Consumer Satisfaction Index (ACSI) surveys through CFI, an independent organization
- Evolution of EOSDIS Elements Study Team/ Technical Team (2005)
 - Developed "EOSDIS 2015 Vision"
 - EEE Study Team (2005) Evolution of EOSDIS Elements, Study Team Briefing to NASA.
 - http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20090003203.pdf
 - **♦NASA** response:
 - →First step implementation during 2006-2008 reallocated functions, simplified system, increased automation, improved services, reduced operations costs
 - →Vision tenets continue to be used as a checklist to assess progress of on-going improvements

A Little History (5 of 5)



- Evolution of EOSDIS Elements Study Team/ Technical Team (2005)
 - Developed "EOSDIS 2015 Vision"
 - EEE Study Team (2005) Evolution of EOSDIS Elements, Study Team Briefing to NASA.

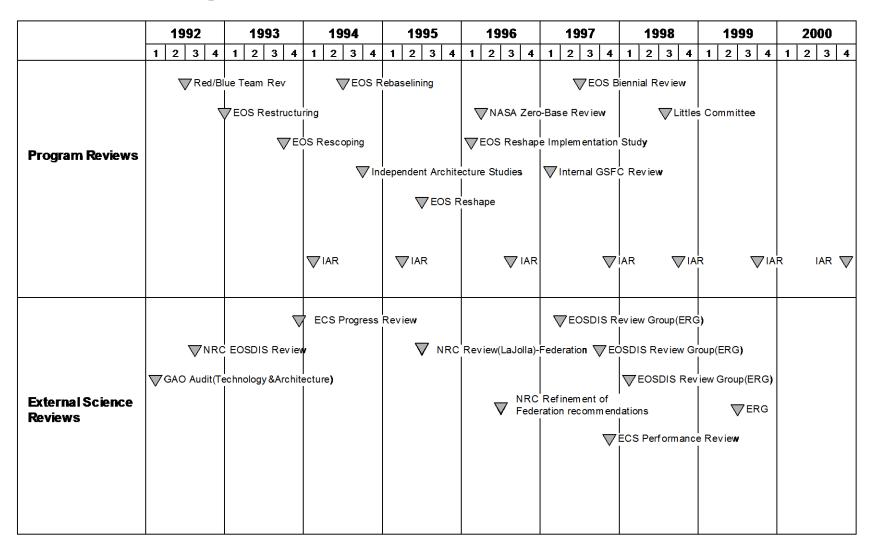
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20090003203.pdf

- **♦NASA** response:
 - →Implementation during 2006-2008 reallocated functions, simplified system, increased automation, improved services, reduced operations costs
 - →Vision tenets continued to be used as a checklist to assess progress of on-going improvements
- NASA Technology and Capabilities Assessment Team (TCAT, 2014)
 - Evolution and Efficiency Team Recommendations
 - →Consider advancing current efforts to achieve efficiencies across DAACs, including cloud computing, open source software, and dataset interoperability
- **EOSDIS Review Team (2015)**

Pre-2000 Review History (1 of 4)



Program Reviews and Science Reviews with Redirection



Pre-2000 Review History (2 of 4)



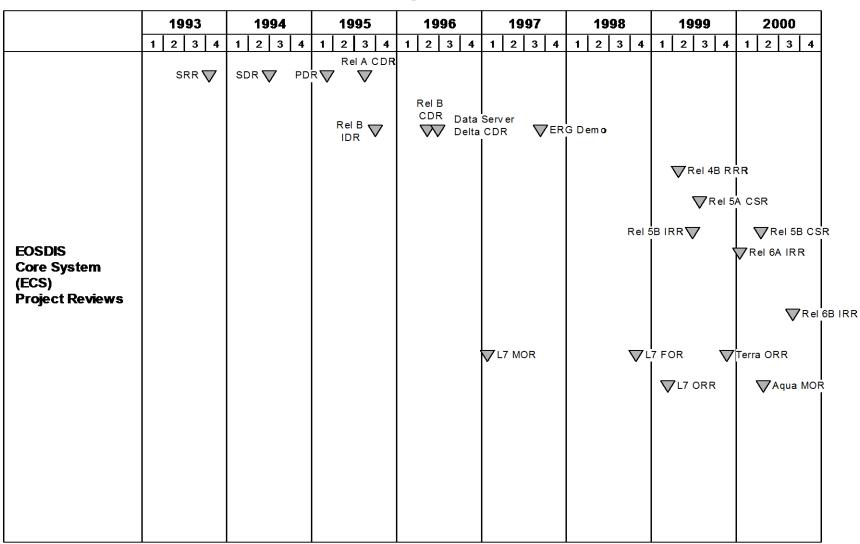
Other External Reviews

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Pre-2000 Review History (3 of 4)



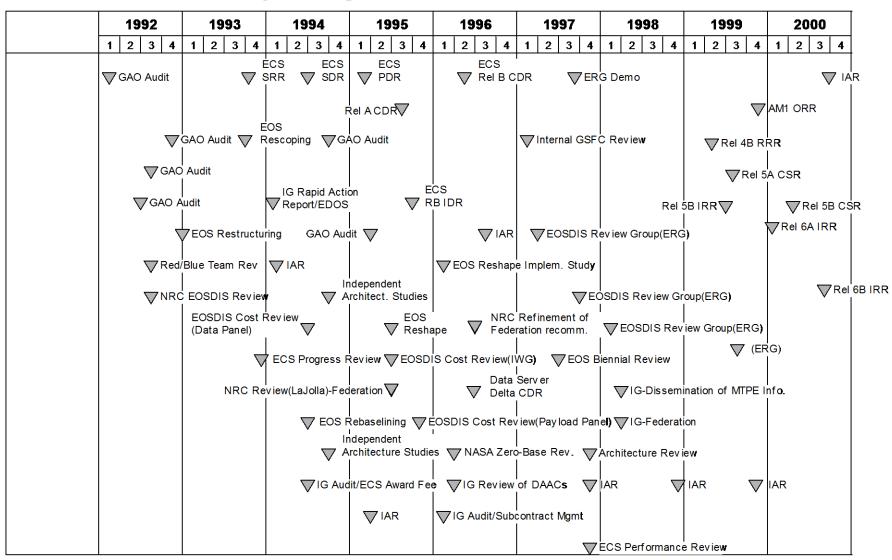
ESDIS Project Reviews



Pre-2000 Review History (4 of 4)



ESDIS Project/Program/Science/Other External Reviews



Independent Survey of Customer Satisfaction



- As a result of the 2003 Panel Review, ESDIS was requested to conduct an Independent Survey of DAAC performance and customer satisfaction.
 - Survey contract was awarded to the CFI Group that runs the American Customer Satisfaction Index.
- For 13 years, EOSDIS consistently exceeded the Federal Government average
- Ratings in the mid to upper 70s are considered "very good/world class" by the rating organization, the CFI Group
- 2016 Survey results based on 7,133 responses https://earthdata.nasa.gov/about-eosdis/performance/american-customer-satisfaction-index-reports
- Comments in surveys help define DAAC system improvements

EOSDIS ACSI History



