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
SIPSs perform forward processing of standard products, and reprocess data to incorporate algorithm improvements.
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
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)

  - “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](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)
  - Detailed recertification activity
A Little History (3 of 5)


- 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)

  - 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.
  - 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
Evolution of EOSDIS Elements Study Team/ Technical Team (2005)

- Developed “EOSDIS 2015 Vision”
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    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 (2 of 4)

### Other External Reviews

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- **Other External Reviews**
  - ▼ GAO Audit
  - ▼ IG Rapid Action Report/EDOS
  - ▼ IG Review of DAACs
  - ▼ Architecture Review
  - ▼ EOSDIS Cost Review(Data Panel)
  - ▼ Lucent Tech Review
  - ▼ EOSDIS Cost Review(IWG)
  - ▼ IG-Dissemination of MTPE Info.
  - ▼ GAO Audit
  - ▼ EOSDIS Cost Review(Payload Panel)
  - ▼ IG-Federation
  - ▼ IG Audit/Subcontract Mgmt
  - ▼ IG Audit/ECS Award Fee
  - ▼ IG ECS Perf. Assessment
Pre-2000 Review History (3 of 4)

**ESDIS Project Reviews**

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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

- Comments in surveys help define DAAC system improvements
EOSDIS ACSI Scores consistently exceed the Federal Government Overall Score