



# Status Update ESDIS Science Operations

August 21, 2007 Land Processes DAAC Sioux Falls, SD

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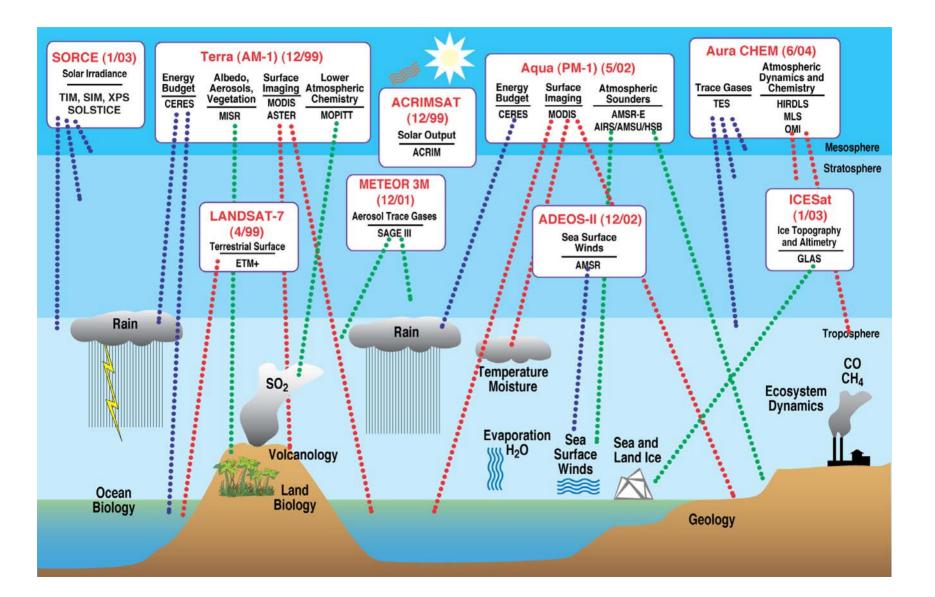


- EOS Data and Information System (EOSDIS) Overview
  - Provides a distributed information framework (data centers, system elements, interfaces and data model) supporting EOS investigators and other science users throughout the world
  - Performs ingest, processing, archive and management for 5 petabytes of data from 16 missions
  - Distributes 2.5 terabytes of science data/day;
  - Over 86 million products distributed to date this fiscal year
  - Interoperates with data archives of other agencies and organizations
- EOSDIS managing extraordinary rates and volumes of scientific data
  - Terra alone produces 194 GB of "raw" data/day; almost as much as the Hubble Space Telescope (HST) in one year

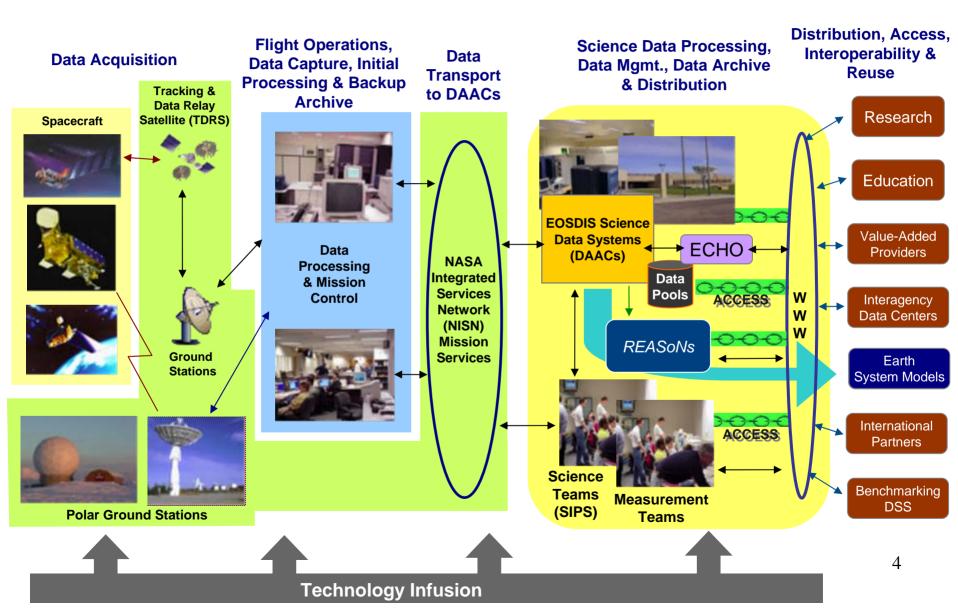


### EOSDIS Manages Data From 22 Instruments on 9 Spacecraft



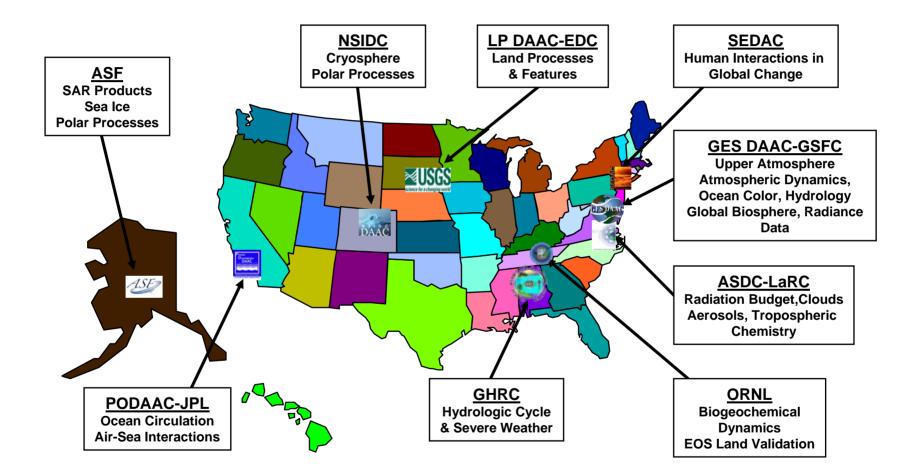


Earth Science Data System Architecture





# **EOSDIS** Data Centers







- In late 2005, HQ chartered an "Evolution of EOSDIS Elements" Study to examine full scope of EOSDIS, including data centers
- Address multi-faceted goals/issues:
  - Reduce recurring costs of operations and sustaining engineering
  - Identify opportunities for optimization, synergistic combinations
  - Streamline operations, eliminate/combine older heritage systems
  - Manage archive volume growth
  - Improve science need response and data access
  - Update age of systems and components for improved performance
  - Move towards more distributed environment
- A vision for the 2015 timeframe was developed to guide conduct of study
- EOSDIS Evolution "Step 1" Plan approved by NASA Headquarters in late 2005 and now in execution phase<sup>6</sup>





- MODAPS manages and distributes MODIS atmosphere data
  - Production on-demand implemented (ex: L1A...)
- Goddard DAAC implemented a new archive and distribution system (S4PA)
  - Production on-demand implemented (ex: AIRS...)
  - A Train Depot
- LaRC DAAC is implementing a new archive and distribution system
  - More automation of CERES processing, introduced commodity systems
- EOSDIS Core System (ECS) is completely reworked at NSIDC and LPDAAC
  - Two major revisions 7.20 and 7.21 (due in May 2008)
  - Increased automation, focus on commodity systems, smaller footprint
- LPDAAC is implementing many enhancements to the system, 7
  particularly for ASTER





- Just starting 4th year of 5 year inter-agency agreement
  - Performance period Sept 2004-Sept 2009
- Plan is to support LPDAAC through the life of the NASA missions it supports plus 4 years
- Every year ESDIS and LPDAAC prepare a work plan that covers the current year and next year
  - Looking for continued improvements in operations
  - Budget planning for 5 years for NASA's
    - FY08-14 submission prepared for Apr 2007
    - Evolution cost savings have decreased the costs at LPDAAC beginning in FY08; budget reflects the new operating environment

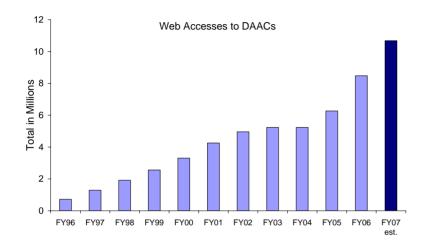


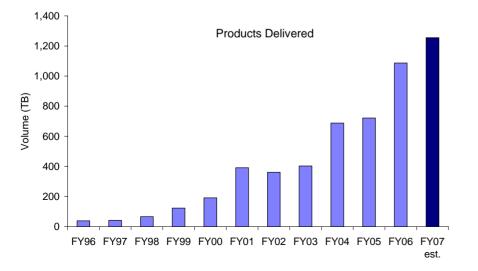


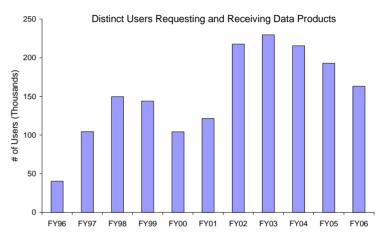
- Support UWG meetings
  - Joint UWG meetings; consider a joint activity with LPDAAC UWG, ORNL UWG and MODIS
- Coordinate, plan and prepare for conferences
  - Data product information materials
  - Booth preparation, staffing
  - Data for ESDIS-sponsored animations, demonstrations
- Support analysis of utilization metrics and user characterization
  - Implement Web services analysis tools (i.e., NetTracker)
  - ACSI Survey Key Areas for Focusing Improvement
  - Complementing Analysis of Search Methods and Documentation
- Sponsor a forum for collaboration among data centers
  - exchange data center technology,
  - keeping abreast of applicable industry technologies



## User Access Metrics







Analysis of EOSDIS Metrics for guiding program strategies

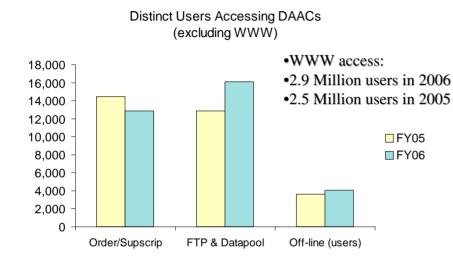
Reports tailored to NASA HQ for evaluation of EOSDIS performance and effectiveness

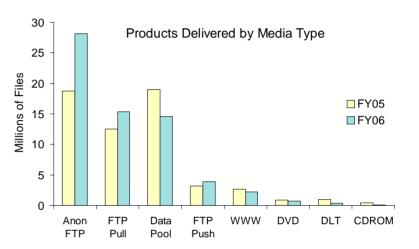
Reports to NASA data center mangers, ESDIS Project, and NASA HQ for determining how best to apply resources to support the science community



# Analysis of Access Methods







### Most users find their data through the web.

Anticipate increase in sophisticated users of new search and discovery methods

Respond to users through analysis of WWW search patterns using NetInsight

Look for Web content and services to enable new and repeat user communities

### *More products are delivered via anonymous FTP.*

Anticipate higher utilization of distribution networks

Respond with services and 'how to' explanations that enable users to extract and transfer smaller datasets from archive formats

➤Look for incentives to encourage user registration via email address

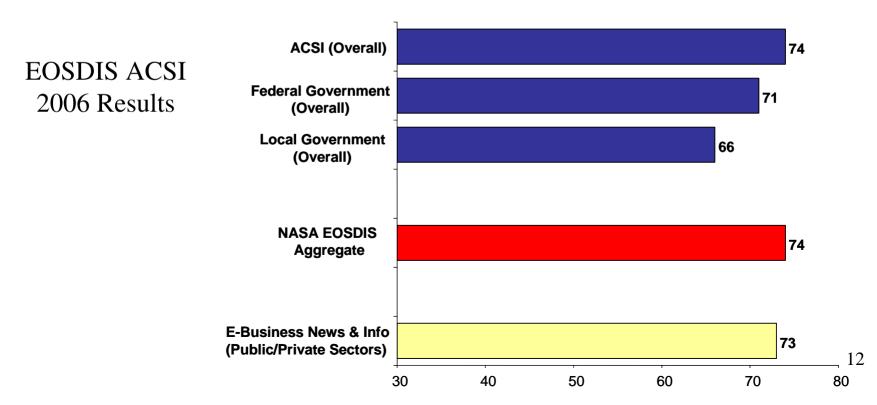
# NASA EOSDIS Results (CFI Group)



EOSDIS surveys are performed by CFI Group through a contract with the Federal Consulting Group (Dept of Treasury)

NASA provides CFI Group a list of 25,000 email addresses (21,000 in 2005) for people who have requested and received data center products in 2006

CFI sends out email invitations and the Survey web site is made available for 3 weeks in the summer. Users completed 2953 surveys in 2006 (1,395 in 2005)





- For LPDAAC in 2006:
  - 6,166 invitations sent
  - 909 responses received
  - Response rate 15%
  - Satisfaction index for 2006: 72
  - Satisfaction index for 2005: 77 (419 responses received)







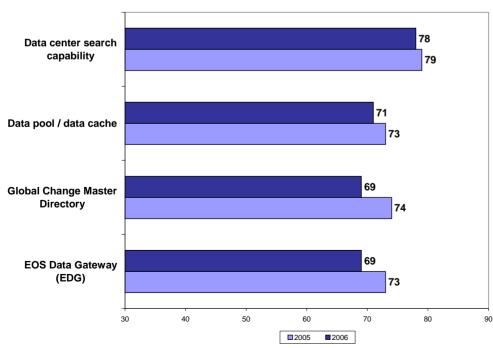
#### The survey shows desire for immediate retrieval is growing.

#### The survey shows that product search continues to be the top opportunity for improving satisfaction.

Responses suggest users prefer data-center specific search tools

However, the majority of users depend on the EOS Data Gateway – the common cross-data center search tool

Q12. How did you search for the data products or services you were seeking? (n=2,857)



	Q22. How	Q23. Which
2006 Survey	was your	method of
	data	delivery do
	delivered?	you <u>prefer</u> ?
FTP retrieved after order	58%	42%
FTP immediate retrieva	14%	27%
FTP via subscription	2%	3%
Download from web	19%	22%
CD	3%	2%
DVD	4%	5%
DLT tape	0%	0%

#### For 2005:

65% said FTP was their preferred method of delivery; 22% said download from web.

### A significant number of users indicated they would prefer TIFF or GeoTIFF.

	Q27. In what	
_	format were	Q28. What
2006 Survey	your data	format would
	products	/ do you
	provided to	prefer?
	you?	
HDF-EOS	37%	21%
HDF	30%	21%
NetCDF	3%	8%
Binary	6%	7%
ASCII	6%	9%
TIFF or GeoTIFF 🥂 🧹	10%	23%
JPEG, GIF, PNG	3%	4%
OGC Web services	1%	2%
Other	3%	5%





- ACSI 2007 survey questions will start with the 2006 set developed by DAAC User Services Working Group.
  - ASCI model questions will remain the same
  - Opportunity for minor modifications to demographic questions
- ESDIS will provide CFI Group a list of email addresses for people who have used DAAC products
  - CFI Group will send out email invitations to participate
  - The Survey will be made available late summer 2007
- ESDIS continue to sponsor development of Metrics System
  - Provides opportunity to define new metrics on utilization of data documentation, data search, and data formatting services
- Data Center web page re-organization
  - Use EMS NetInsight Web tracking for suggesting more efficient access patterns
  - Release new Web pages in time to get maximum benefit from survey





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