# Land Processes Distributed Active Archive Center (LP DAAC)

## 25th Anniversary Recognition

## "A Model for Government Partnerships"

## LP DAAC "History and a Look Forward"


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EOSDIS Science Operations
NASA Goddard Space Flight Center

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LP DAAC Project Manager
USGS Earth Resources Observation and Science

# NASA's Grand Challenge
# EROS Press Conference August 28, 1990

# NASA's Grand Challenge 1990

- *Dr. Fisk – "the earth is in trouble, we need to monitor what the human impacts are on the whole earth cycle (ocean, atmosphere, land and ice).
- For the first time in earth's history, man can change how the earth evolves."
- So it is vital to understand planet earth and the long term changes for dealing with and influencing Earth man's induced changes.
- Global means the monitoring needs to be done from space.

USGS

*Dr. Fisk was the Associate Administrator for Space Science and Applications at NASA

NASA

# NASA's Grand Challenge 1990

- *Federal agencies are working together on the President's Office of Science and Technical Policy (OSTP) Committee on Earth Science to develop an integrated, comprehensive and long term program for regional to global scale changes and to understand the effects of Climate Change on the earth and its coupling of systems.
- NASA will provide data (satellite systems) for researchers to understand and predict these changes and enable an ability for policy makers to mandate changes in energy budgets without jeopardizing the global economy.

USGS

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NASA

# NASA's Grand Challenge 1990

- *So, with NASA's history of studying our solar system and beyond; NASA is now turning its knowledge and resources to the Earth
- NASA's response is Mission to Planet Earth
  - A series of satellites; Earth Observing System (EOS)
  - With a goal to understand, and an ability to predict man's changes to the earth
  - And do it over a long period of time (sustainable), to arm policy makers with sound recommendations for the global benefit (children/grandchildren and beyond)

USGS

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NASA

# NASA's Plans from Twenty-five Years Ago (1990)

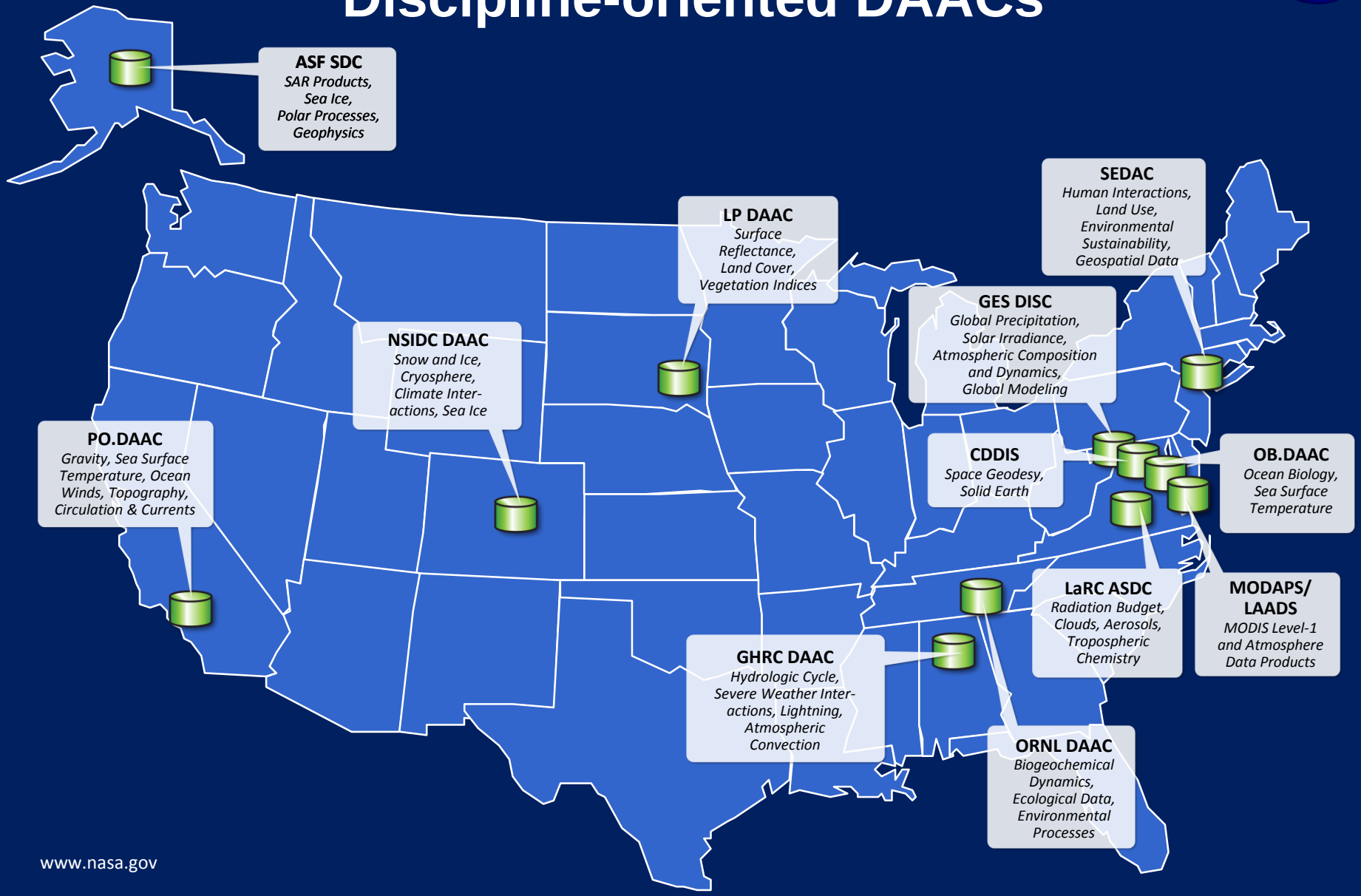
- Many new data sets would be needed and created; several complementary to Landsat missions
- A significant increase in data volume and variety and that centers of experienced science discipline were needed
- Recognized that this type of research would need a new data system to be built:
  - **Earth Observation System Data and Information System (EOSDIS)**
- NASA needed to partner with the USGS to fulfill the objectives of building the large data system
  - Found a home for the *EOS Land Processes data* at the **Earth Resource Observation and Science Center**


USGS

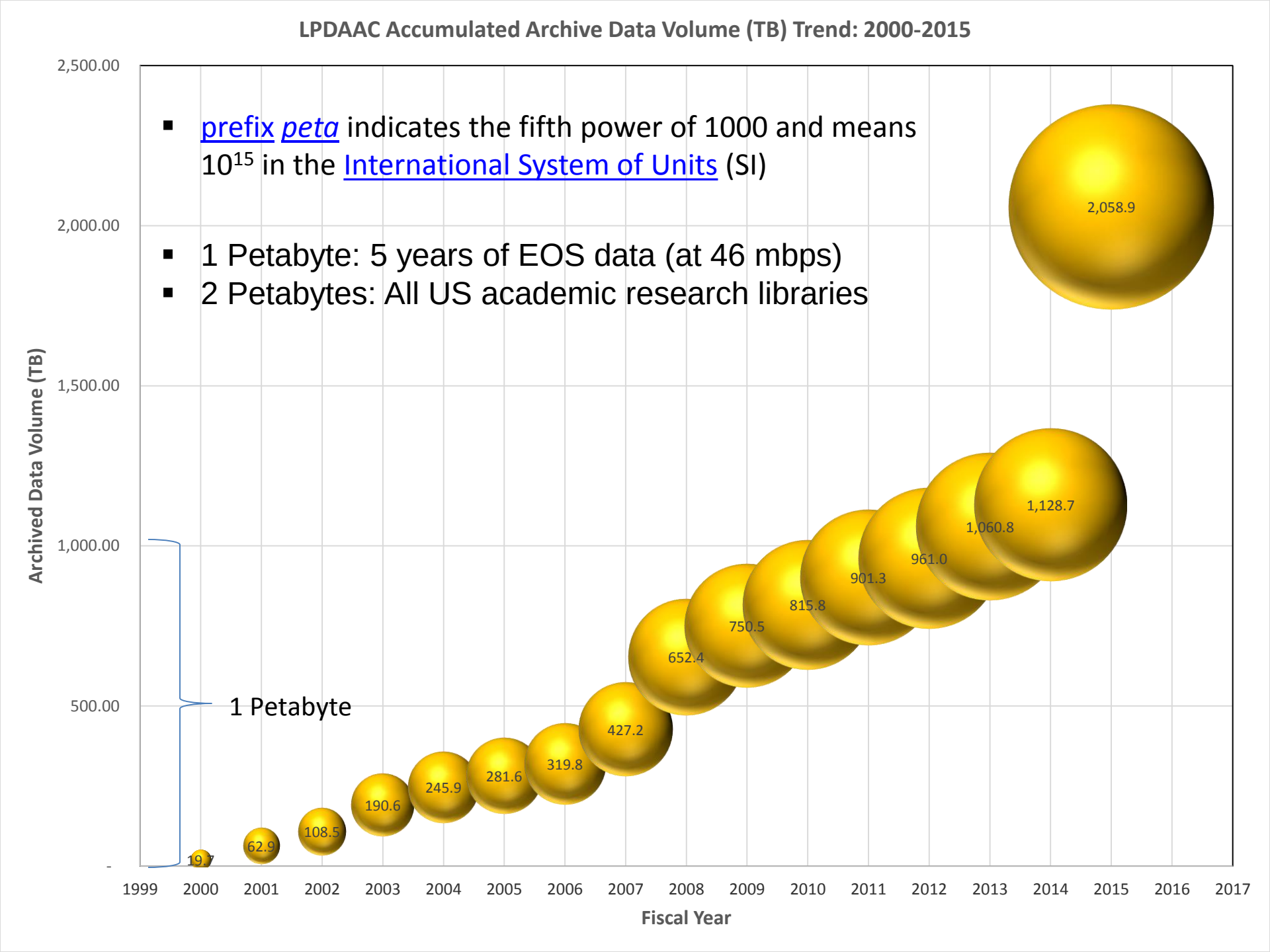
NASA

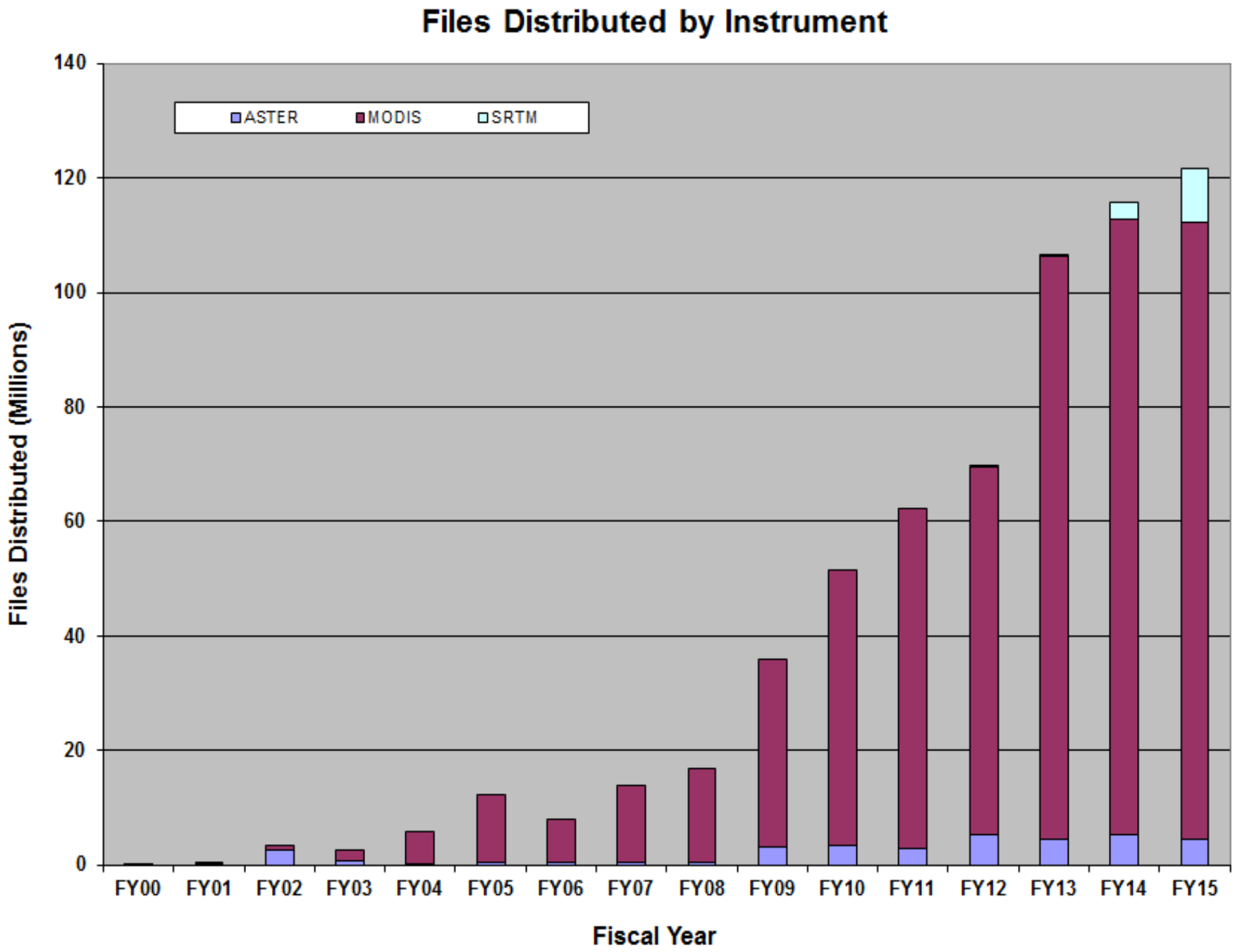
National Aeronautics and Space Administration

# Discipline-oriented DAACs

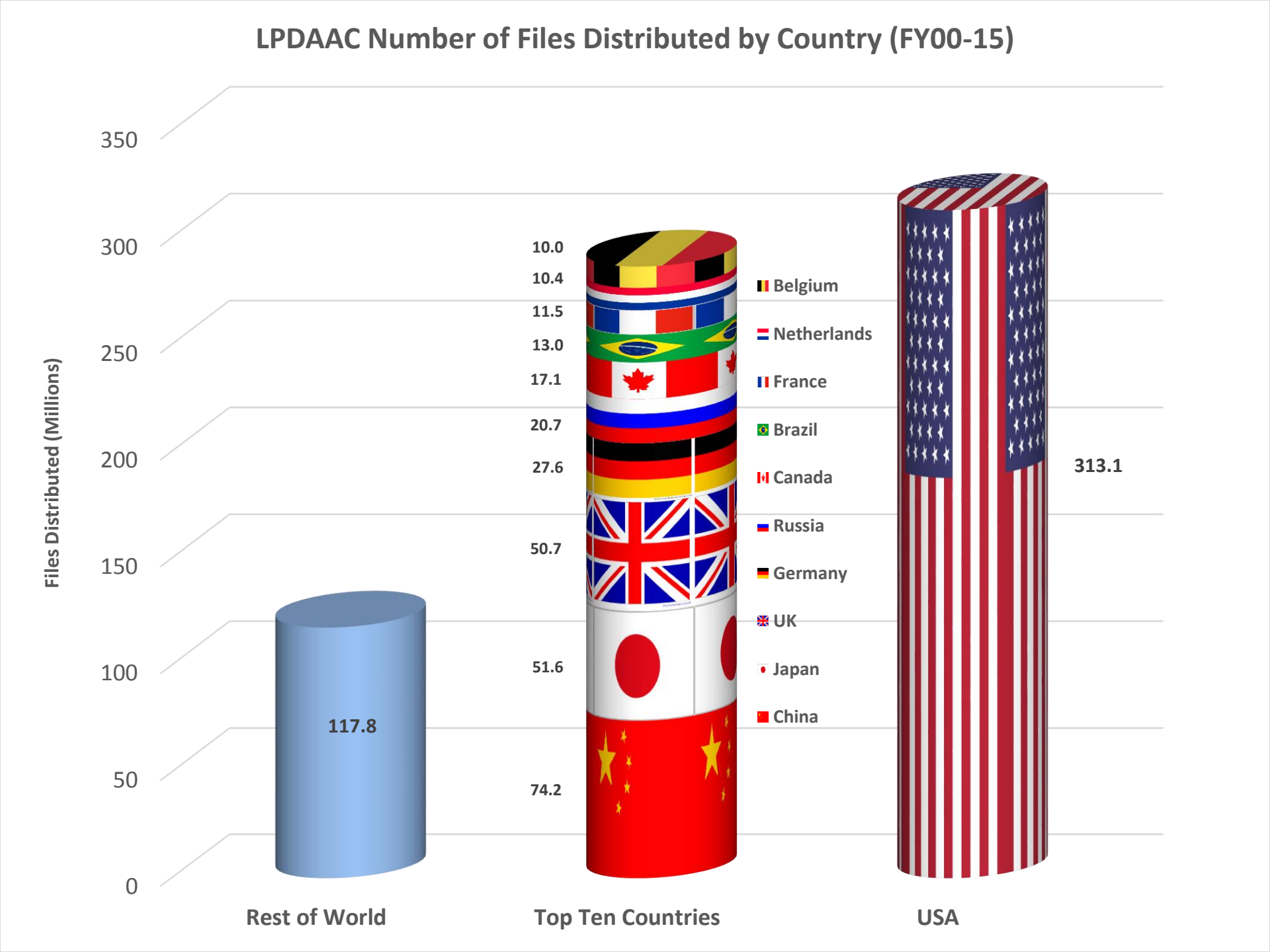



OSTM/Jason 2
(NOAA)
Aquarius
QuikSCAT
TRMM
Terra
ISS-RapidScat,
CATS
EO-1
Landsat 7
(USGS)
SMAP
Aqua
Suomi NPP
(NOAA)
Landsat 8
(USGS)
SORCE,
TCTE (NOAA)
GPM
Aura
GRACE (2)
CALIPSO
CloudSat
OCO-2


LPDAAC Accumulated Archive Data Volume (TB) Trend: 2000-2015
prefix peta indicates the fifth power of 1000 and means 10^15 in the International System of Units (SI)
1 Petabyte: 5 years of EOS data (at 46 mbps)
2 Petabytes: All US academic research libraries
2,058.9
1 Petabyte
19.7
62.9
108.5
190.6
245.9
281.6
319.8
427.2
652.4
750.5
815.8
901.3
961.0
1,060.8
1,128.7
Archived Data Volume (TB)
2,500.00
2,000.00
1,500.00
1,000.00
500.00
-
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
Fiscal Year

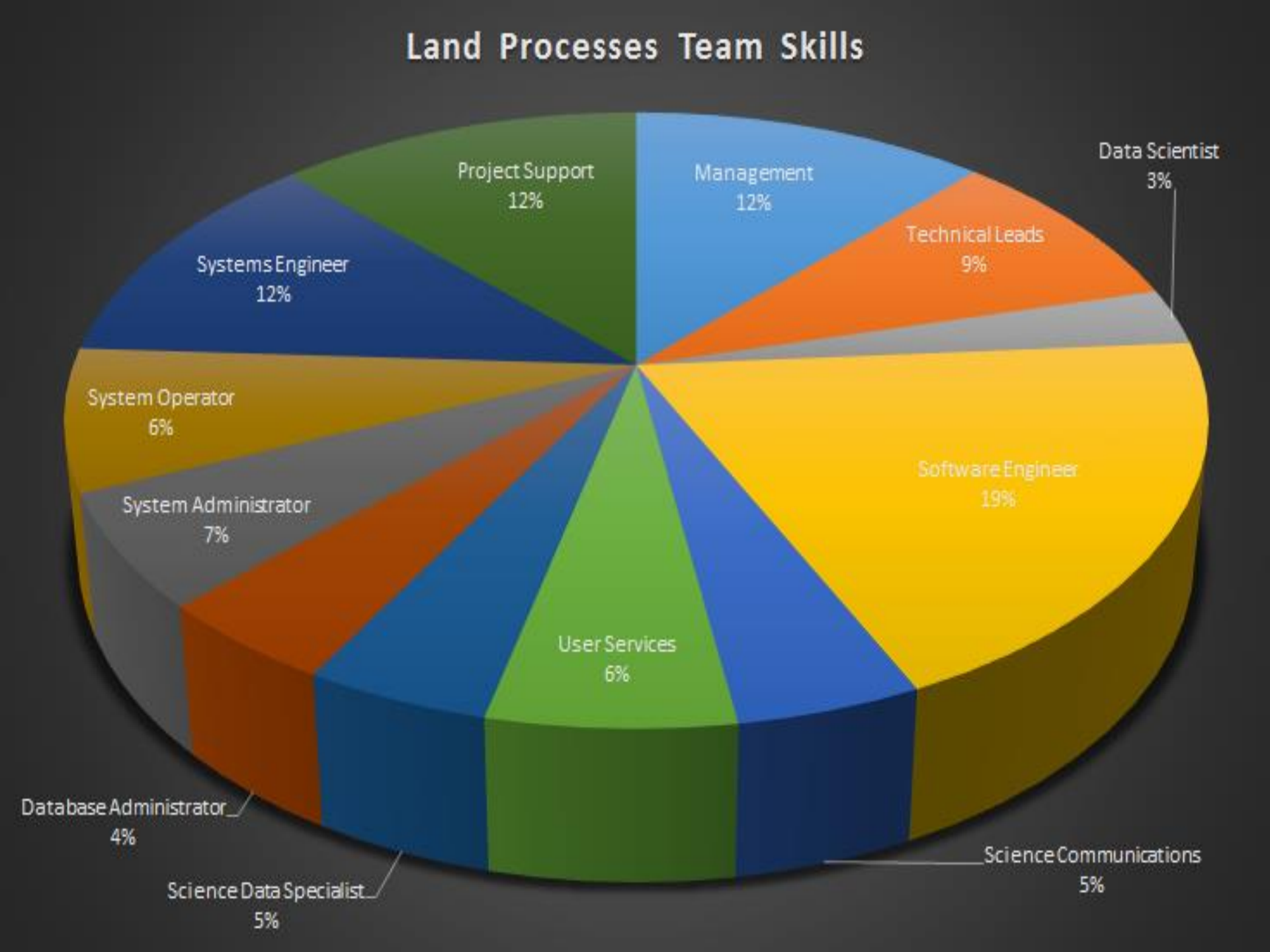

Files Distributed by Instrument
ASTER
MODIS
SRTM
140
120
100
80
60
40
20
0
Files Distributed (Millions)
FY00
FY01
FY02
FY03
FY04
FY05
FY06
FY07
FY08
FY09
FY10
FY11
FY12
FY13
FY14
FY15
Fiscal Year

# LPDAAC Number of Files Distributed to US Goverment Agencies (FY00-15)


LPDAAC Number of Files Distributed by Country (FY00-15)
Files Distributed (Millions)
350
300
250
200
150
100
50
0
117.8
10.0
10.4
11.5
13.0
17.1
20.7
27.6
50.7
51.6
74.2
Belgium
Netherlands
France
Brazil
Canada
Russia
Germany
UK
Japan
China
313.1
Rest of World
Top Ten Countries
USA

# It takes a Team!


**“The team can be proud of it's early initiatives and successes in online search, browse and order systems, development and implementation that served such a critical and highly visible role in early developments of NASA’s Earth Observation System Data and Information System (EOSDIS).” (Lyn Oleson) 1st Land Processes DAAC Manager 1991 - 1998**

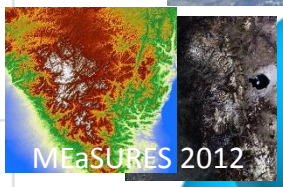

Land Processes Team Skills
Project Support
12%
Management
12%
Data Scientist
3%
Technical Leads
9%
Systems Engineer
12%
System Operator
6%
Software Engineer
19%
System Administrator
7%
User Services
6%
Database Administrator
4%
Science Communications
5%
Science Data Specialist
5%

# LP DAAC Accumulated Archive Data Volume (PB) Trend: FY00-22

*A petabyte is a lot of data:*

- *1 PB is 20 million four-drawer filing cabinets full of text*
- *1 PB is 13.3 years of HD-TV video*
- *1.5 PB is the size of 10 billion photos on Facebook*








# NASA/USGS Summary

- This is a partnership that works very well!
- Our roles and responsibilities are well understood
- NASA and USGS share a common mission/vision which can be characterized as "contributing to the understanding of a changing Earth."
  - With that, our Earth Observing programs are global in scope, so reaching out to the broadest global user community is fundamental to our success.
  - **Therefore, NASA and USGS provide land imaging data to anyone, anywhere, anytime, at no cost to the user.**

- Another way to state the obvious is:
  - “The USGS and NASA are putting satellite imaging data at the public’s finger-tips, allowing USGS and NASA to share their rich resources with more people than ever before. ”

USGS

NASA


Questions???

# ESDIS/LP DAAC Highlights

- Over the last 15 years
  - 11 PB of data has been distributed
  - To over 830,000 users, 130,000 discrete users in any year
  - More than 90% of the distribution was of MODIS sensor products
- 57% of the data distributed went to U. S. researchers or application users
- 13% of the data distributed went to U. S. government users
- 16% of the data distributed went to U. S. academia users
- Total archive size is currently 2 PB +
- On average LP DAAC annually distributes 2+X the size of the archive
- 56% of the users are from foreign countries
- Over the last 10 years, LP DAAC data distribution has increased by 6 fold
  - During this same period – distribution increased 4 X for U. S. users
  - During this same period - # of foreign users increased 20 X
  - During this same period – # of U. S. users increase 7 X

- There is a very bright future for the LP DAAC on into the future!
- Enjoy the day and please ask questions to our talented and outgoing staff!

USGS

NASA