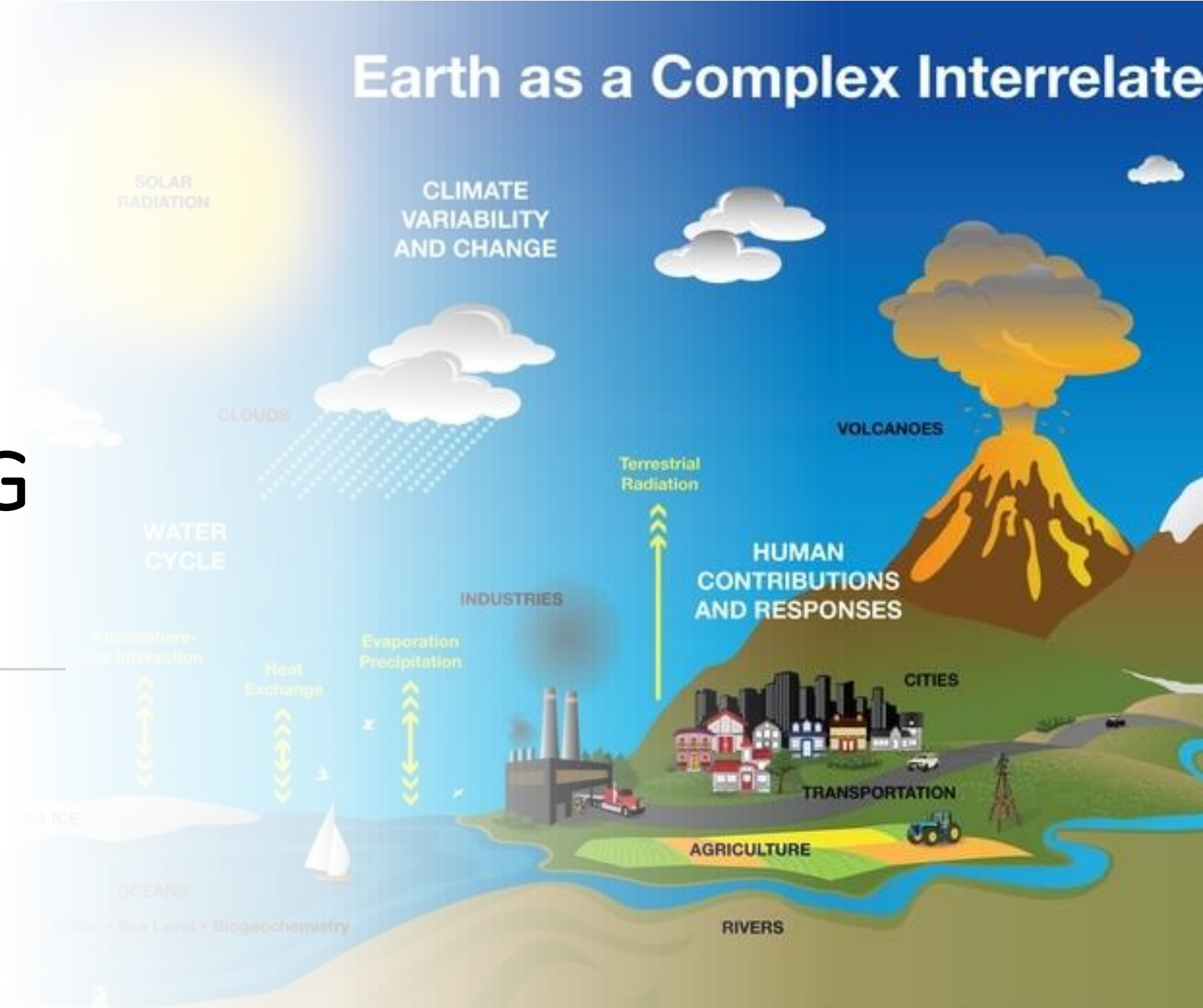
OB.DAAC UWG Meeting

Evelyn Ho

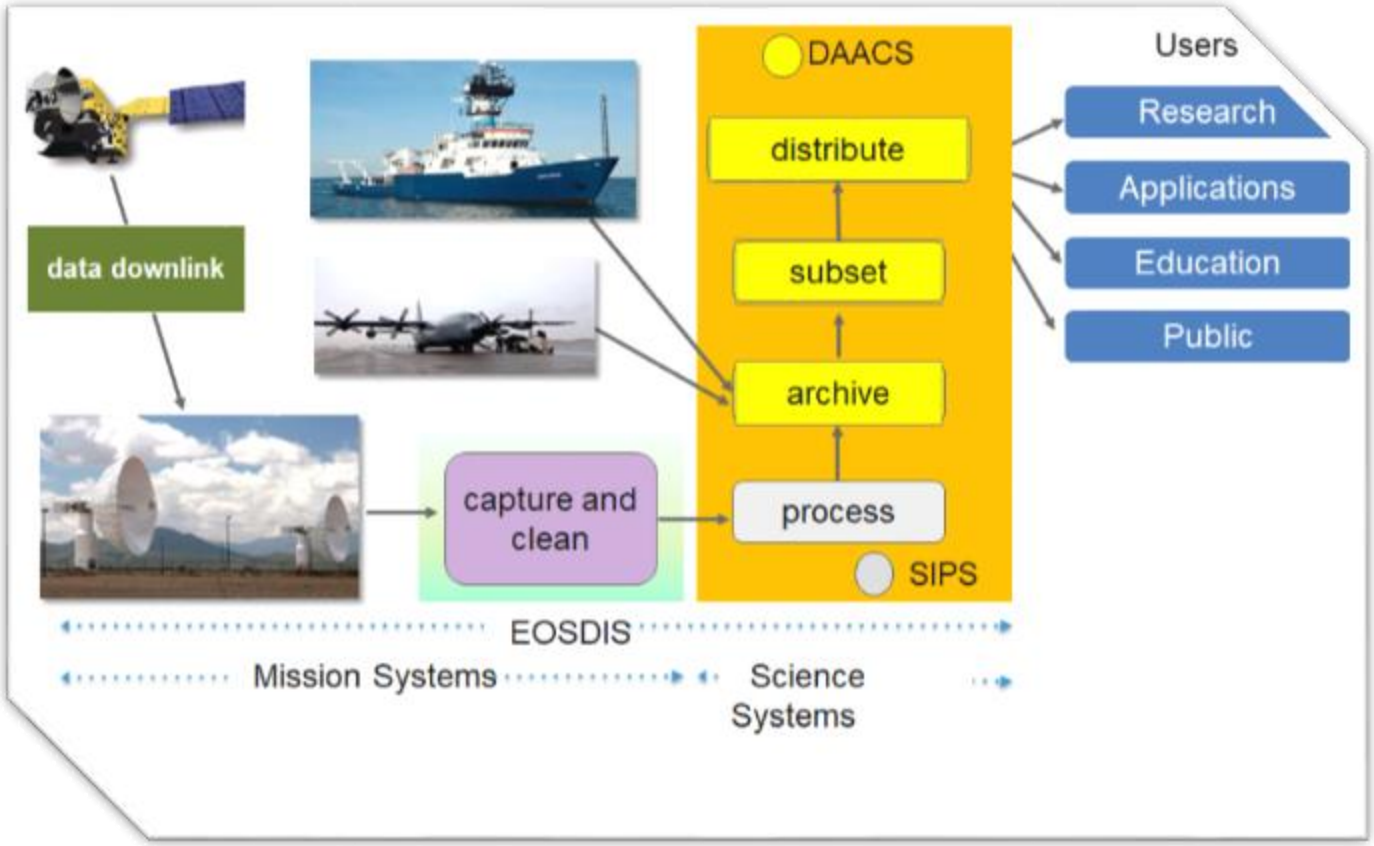
ESDIS Project

September 28, 2022



Earth Science Data and Information System (ESDIS)

- The ESDIS Project manages the science systems of the Earth Observing System Data and Information System (EOSDIS). EOSDIS is a comprehensive distributed Earth science data and information system designed to support NASA's Earth science missions.
- EOSDIS is designed to ingest, archive, distribute, visualize, all types of Earth Science data which include field campaign measurements, airborne data, *in situ* data, model data, ancillary products used for processing and other related datasets.
- The ESDIS Project provides and controls all aspects of the effort including but not limited to requirements, design, acquisition, development, operations, maintenance and decommission.

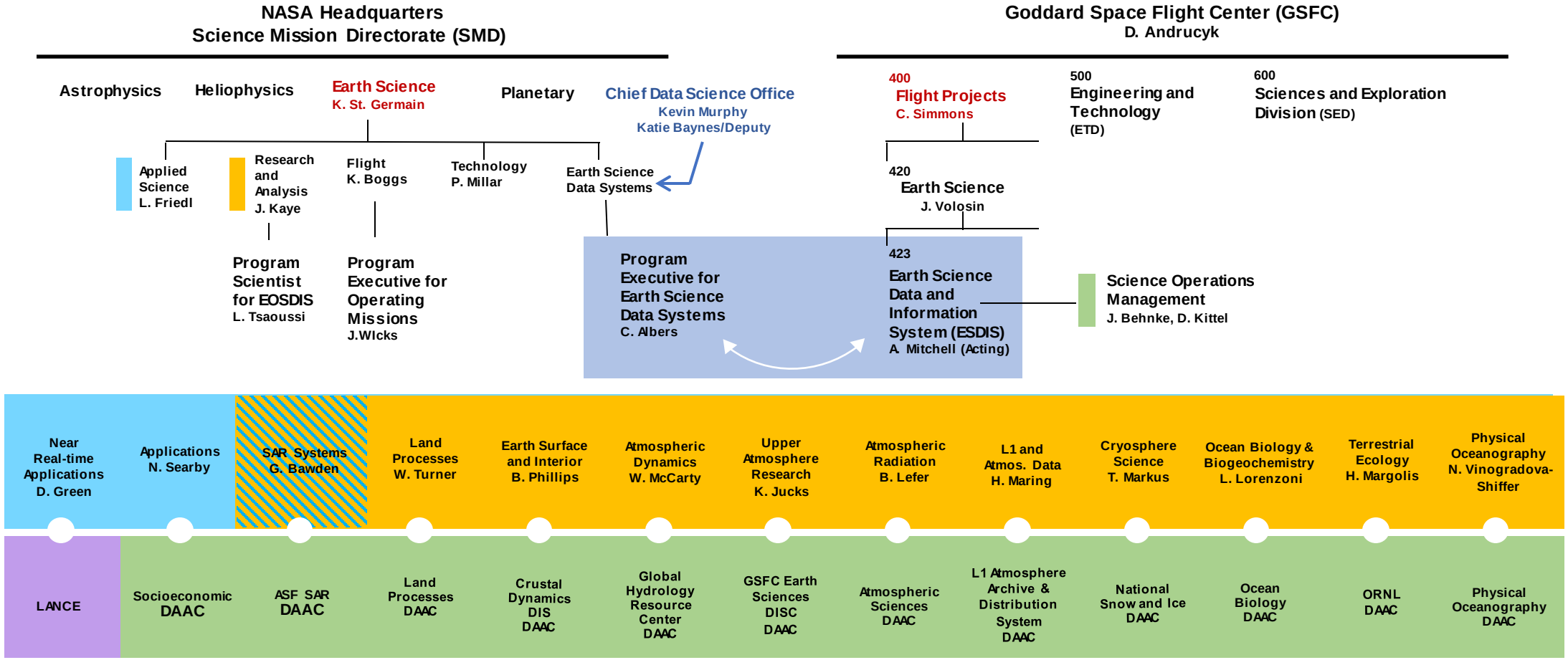


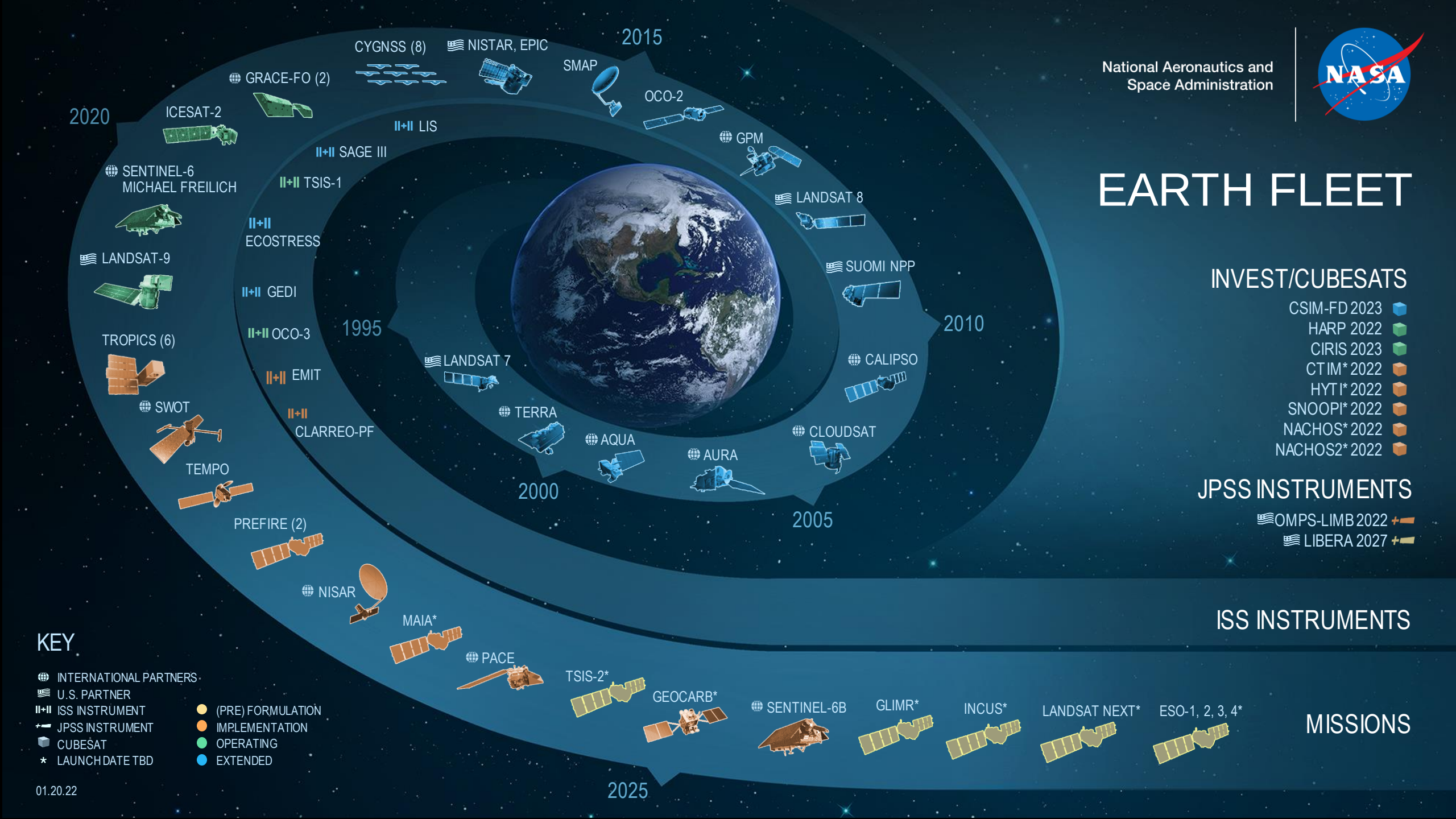
Operating since 1994, it has been evolving to keep pace with technology and users' requirements.

ESDIS Charge to the User Working Group Members

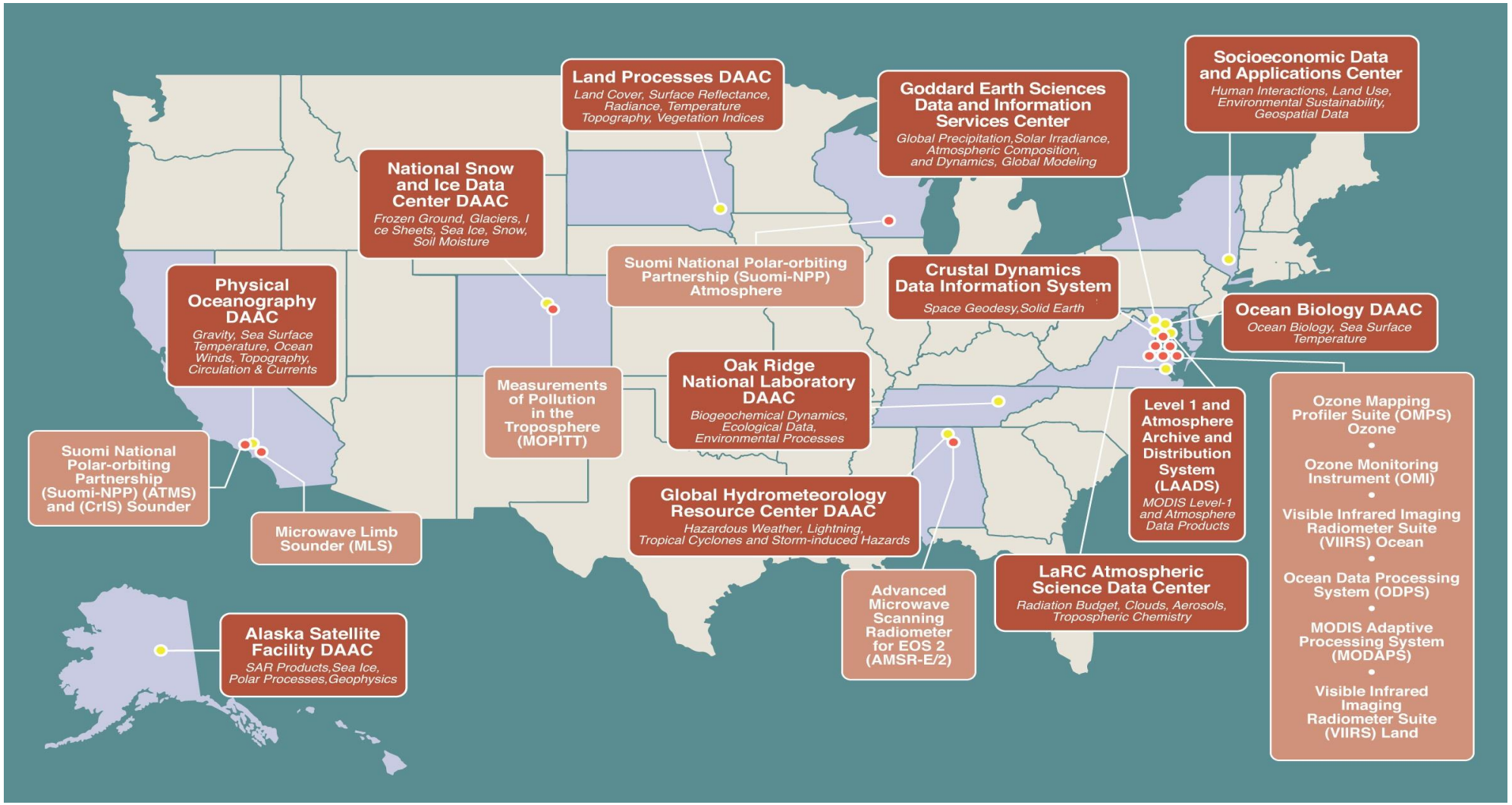
- UWGs have played a pivotal role in the development of the DAACs going back to their earliest days.
- Rather than providing ‘direction’ or ‘advice’, the UWG members are encouraged to share their insight SME, and recommendations pertinent to current practices and activities at the DAACs.
- In times when resources are constrained, how would you prioritize current activities? What is critical and what are ‘nice to haves’ activities?
- Help enable ESDIS, OBDAAC, ESDS, ESD to look ahead and see the possible issues and possibilities of current actions. What are we getting right and where are we falling short?

ESDIS organization

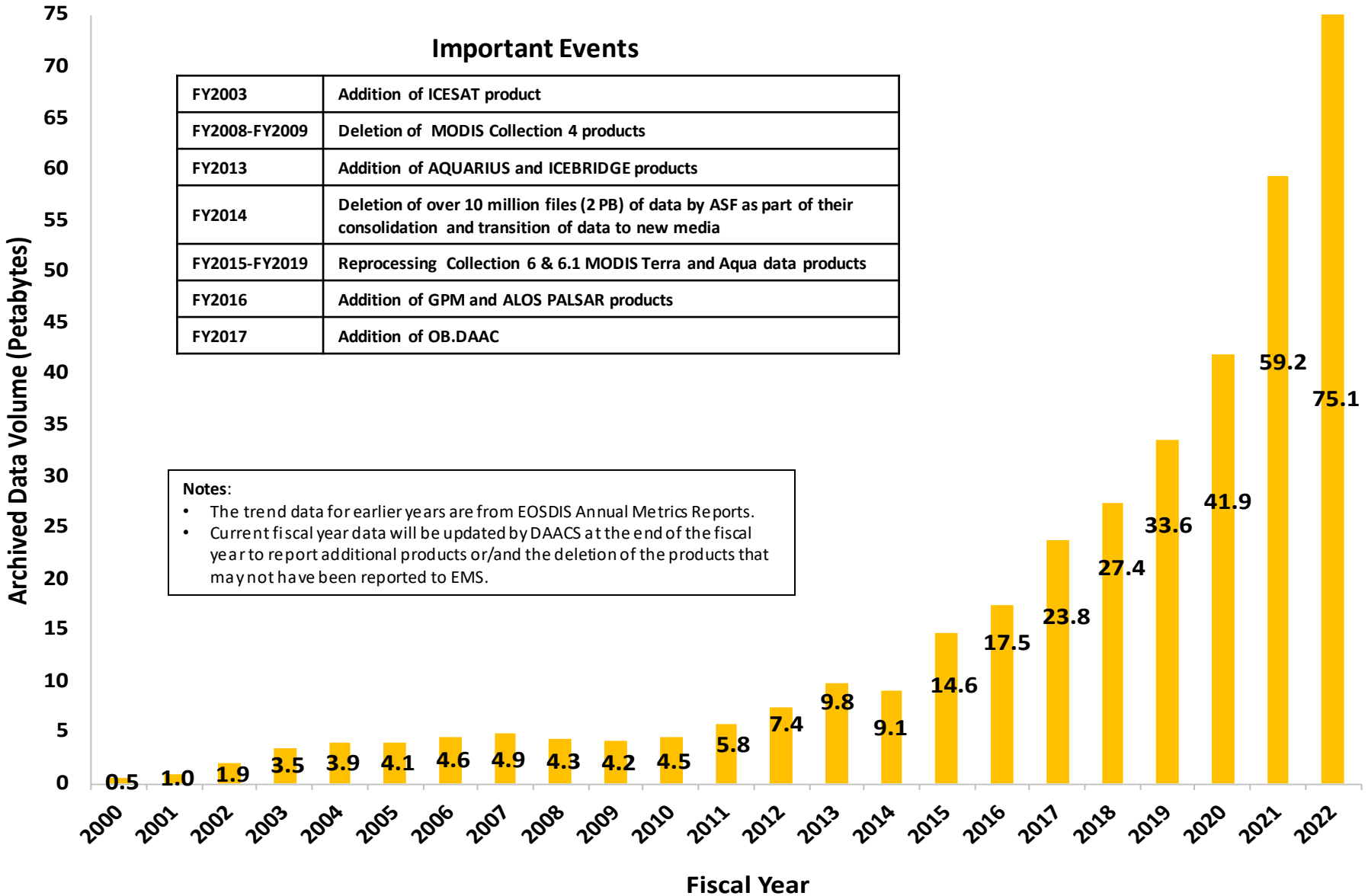



National Aeronautics and Space Administration
NASA
EARTH FLEET
2015
2020
1995
2010
2000
2005
2025
CYGNSS (8)
NISTAR, EPIC
SMAP
OCO-2
GRACE-FO (2)
ICESAT-2
LIS
GPM
SAGE III
SENTINEL-6 MICHAEL FREILICH
TSIS-1
LANDSAT 8
ECOSTRESS
LANDSAT-9
SUOMI NPP
GEDI
TROPICS (6)
OCO-3
LANDSAT 7
CALIPSO
EMIT
SWOT
TERRA
CLOUDSAT
CLARREO-PF
AQUA
AURA
TEMPO
PREFIRE (2)
NISAR
MAIA*
PACE
TSIS-2*
GEOCARB*
SENTINEL-6B
GLIMR*
INCUS*
LANDSAT NEXT*
ESO-1, 2, 3, 4*
INVEST/CUBESATS
CSIM-FD 2023
HARP 2022
CIRIS 2023
CTIM* 2022
HYTI* 2022
SNOOPI* 2022
NACHOS* 2022
NACHOS2* 2022
JPSS INSTRUMENTS
OMPS-LIMB 2022
LIBERA 2027
ISS INSTRUMENTS
MISSIONS
KEY
INTERNATIONAL PARTNERS
U.S. PARTNER
ISS INSTRUMENT
JPSS INSTRUMENT
CUBESAT
LAUNCH DATE TBD
(PRE) FORMULATION
IMPLEMENTATION
OPERATING
EXTENDED
01.20.22

EOSDIS Distributed Active Archive Center (DAACs) and Science Investigator-led Processing Systems (SIPS)



Total EOSDIS Accumulated Data Archive Volume (Petabytes) Trend: FY2000-FY2022 (at the end of August 2022)



EOSDIS Metrics

In FY21, EOSDIS distributed more than **2 BILLION** data products to over **1.7 MILLION** distinct data users around the world

There were more than **75 PETABYTES** of Earth science data in the EOSDIS archive

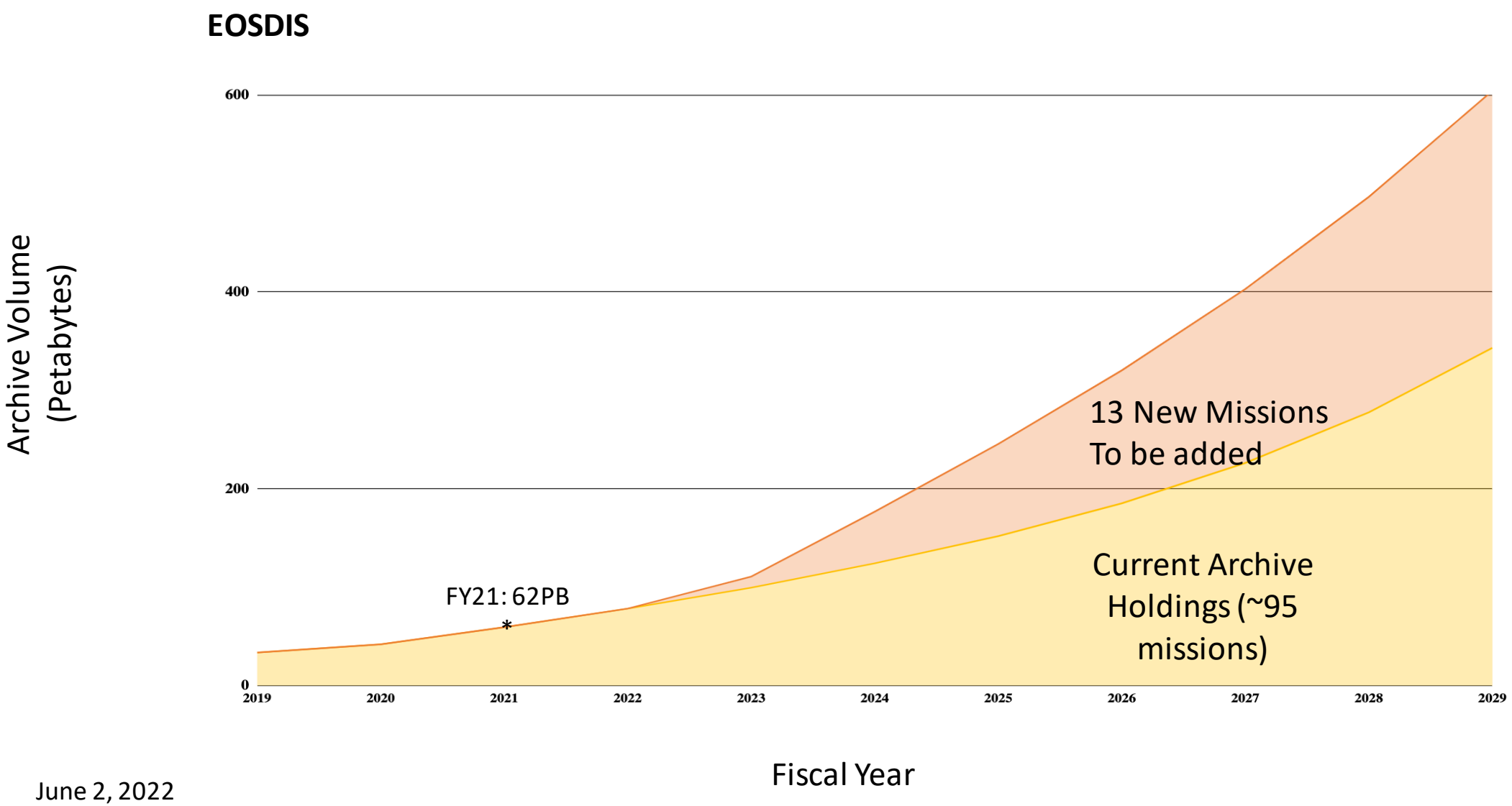
24 PB of data **(~73 million files)** in Earthdata Cloud

11.7 Million files added to the cloud since June

with over **3.56 BILLION** files in the EOSDIS archive

Our Land, Atmosphere Near real-time Capability for Earth Observing System (LANCE) had **OVER 820** unique datasets, distributed more than **125 MILLION FILES** and produced 2.57 Petabytes of data **WITHIN 3 HOURS OF A SATELLITE OBSERVATION**

Earth Science Data Archive Growth Projection



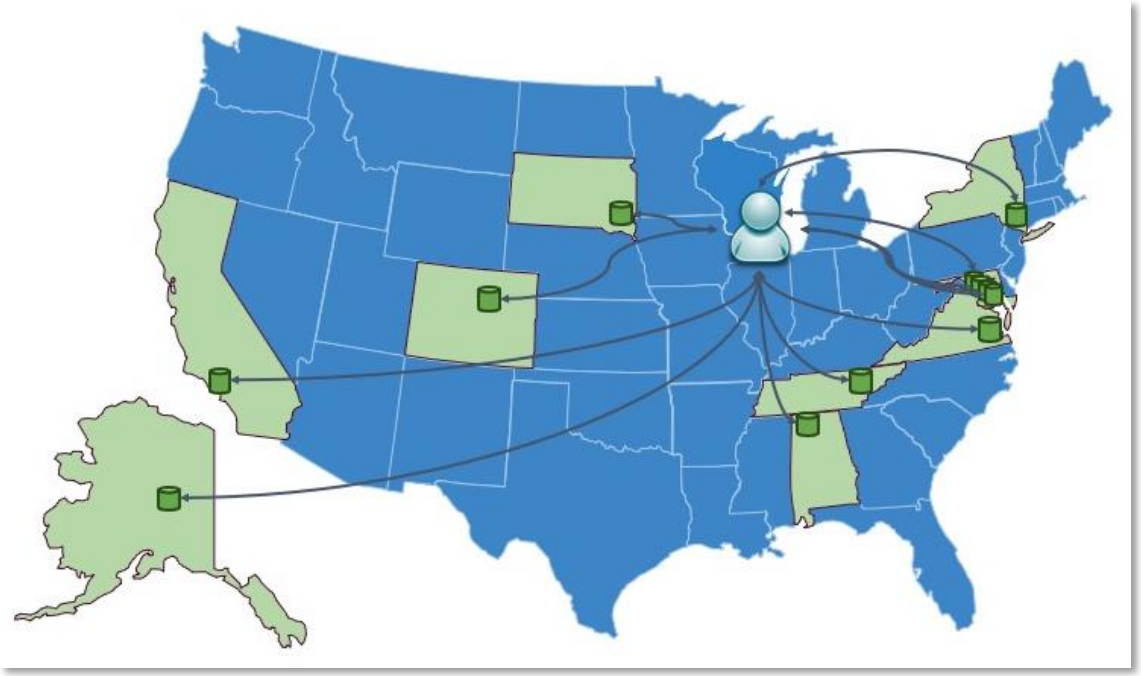
New Missions Information

Future Missions (LRD after Jan 2022)	Future Instrument	DAAC
CLARREO-PF on ISS	CLARREO-PF on ISS	ASDC DAAC
EMIT (ISS)	EMIT (ISS)	LPDAAC
GeoCARB (EVM-2)	GeoCARB (EVM-2)	GES DISC
JPSS-2	Sounder & OMPS	GES DISC
	VIIRS Ocean	OB DAAC
	VIIRS Land	LP DAAC
	VIIRS Cryo	NSIDC DAAC
	VIIRS Atmosphere	LAADS DAAC
Libera/JPSS-3	Libera/JPSS-3	ASDC
JPSS-3	Sounder & OMPS	GES DISC
	VIIRS Ocean	OB DAAC
	VIIRS Land	LP DAAC
	VIIRS Cryo	NSIDC DAAC
	VIIRS Atmosphere	LAADS DAAC
MAIA (EVI-3)	MAIA (EVI-3)	ASDC DAAC
NISAR	NISAR	ASF DAAC
PACE	PACE	OB. DAAC
PREFIRE (2 cubesats)	PREFIRE (2 cubesats)	ASDC DAAC
SWOT	SWOT	PO.DAAC
TEMPO (EVI-1)	TEMPO (EVI-1)	ASDC DAAC
TROPICS (EVI-3)	TROPICS (EVI-3)	GES DISC
TSIS-2	TSIS-2	GES DISC

June 2, 2022

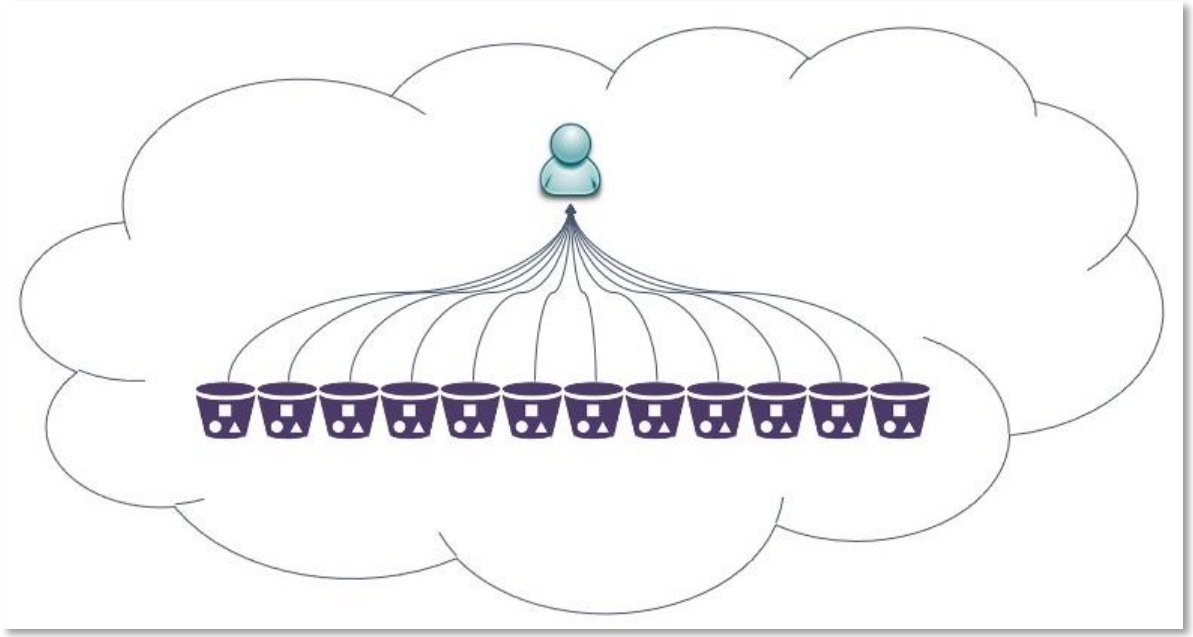
- The new missions' Interface Control Documents provide initial volume estimates and growth rate
- Start the volume estimates 6 months after launch (for IOC)
- Only on-orbit missions provided here; airborne and field campaign volumes are provided in the current archive holdings estimate

EOSDIS Transition:
DAACs moving data into EDC



Today users seeking NASA's data may have to visit several DAACs to fulfill their needs. Moving between data centers and interfaces can be less efficient and time consuming.

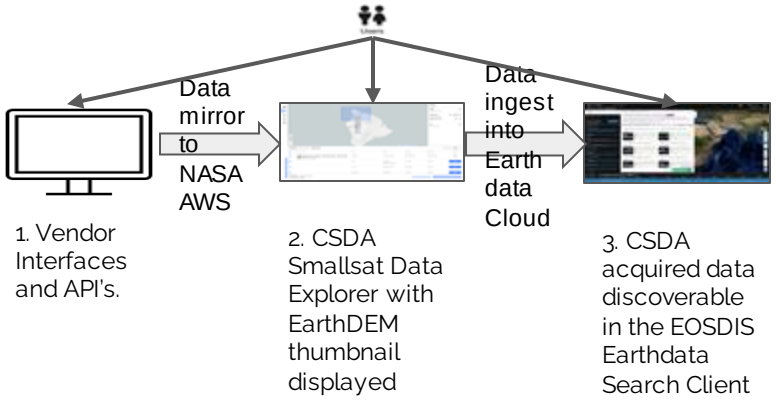
As more EOSDIS data is moved into NASA's Earthdata Cloud, users will **be increasingly** able to (seamlessly) use data across traditional discipline silos – making the near future look a lot like a 'Data Lake'.

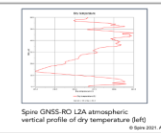
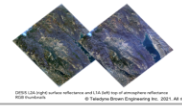


Commercial Satellite Data Acquisition Program

Program Objectives

- Establish a continuous and repeatable process to onramp new commercial data vendors.
- Enable sustained use of purchased data for broader use and dissemination by NASA scientific community.
- Ensure long-term data preservation, access and distribution of purchased data and long-term access for scientific reproducibility.
- Coordinate with other US Government agencies and international partners on the evaluation and scientific use of commercial data.



Vendor	Constellations/ Products	Availability Dates	Orbit Characteristics	Spatial Resolution	Spectral Characteristics	Sample
Planet	PlanetScope, RapidEye	12/31/2005 - Present	Sun Synchronous	3 - 6.5 meters	RGB, NIR (440-860 nm), Panchromatic	
	SkySat	3/10/2015 – 12/12/2019		< 1 meter	RGB, NIR (450-900 nm), Panchromatic	
Spire Global, Inc	GNSS Radio Occultation, GNSS Grazing Angle Reflectometry, Satellite Precise Orbit Determination (POD) and Satellite Attitude, Total Electron Content, Ionospheric Profiles, Scintillation, Magnetometer, Raw IF	9/24/2018 - 4/18/2019 (partial) 11/1/2019 - Present (all)	GNSS-R and GNSS-RO receivers satellites: 37° and Sun Synchronous			
Maxar Technologies	Worldview 1-4, GeoEye-1, QuickBird, IKONOS	10/24/1999 - Present	Sun Synchronous	0.31 - 4.0 meters	Multispectral and Panchromatic (400 - 2245 nm)	
Teledyne Brown Engineering, Inc.	DESIS L1B, L1C, and L2A	11/21/2018 - Present	Non Sun Synchronous 52° N to 55° S (ISS)	30 meters	235 channels, 2.5nm from 402 to 1000 nm	
Polar Geospatial Center EarthDEM product	individual strips and mosaic Digital Elevation Model	2009 - Present		2 meters		

A NASA OPEN-SOURCE SCIENCE INITIATIVE: TOPS: TRANSFORM TO OPEN SCIENCE

POC: Dr. Chelle Gentemann, TOPS Program Officer, CSDO

https://github.com/nasa/Transform-to-Open-Science

TOPS Upcoming Activities

- TOPS – Transform to Open Science

- Open Science creates more advanced and inclusive research faster, builds a more just and equitable world, and ensures that minds from all walks of life can participate in science. TOPS is NASA's ambitious plan to accelerate open science practices.

- It's a 5 year journey that will:

1. Accelerate major scientific discoveries
2. Broaden participation by historically excluded communities
3. Increase understanding and adoption of open science principles and techniques

- Open Core: Transform-to-Open-Science/readme.md at main · nasa/Transform-to-Open-Science · GitHub

2023 is NASA's Year of Open Science

TOPS is energizing and uplifting open science across the scientific community through:

Visibility

Publishing articles, appearing on podcasts, developing targeted communication that expands footprint

Integrating Open Science into themes at large-scale events and conferences

Capacity Sharing

Producing online, free, Open Science curriculum on Open edX

Hosting workshops, events, cohorts, science team meetings, hackathons

Constructing multiple pathways to Open Science Badge

Incentives

Developing Open Science Badge/Certification

Sponsoring high profile prizes and challenges

Establishing high profile awards in support of open science research

Moving toward Openness

Recognizing open science practices

Holding open meetings

Sharing hidden knowledge

Inclusive collaboration

For more information visit:
earthdata.nasa.gov

or email:
evelyn.l.ho@nasa.gov

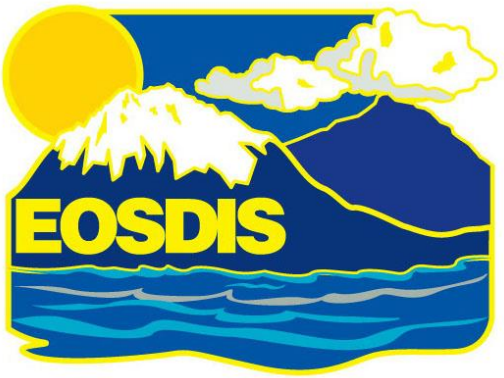
Backup

Understanding our Acronyms

- ESDS – Earth Science Data Systems is the name of the NASA Headquarters Program Office that funds the ESDIS Project.
- ESDIS – is the acronym name for the Project at GSFC that currently manages earth science data systems for EOS and other assigned missions.
- EOSDIS – is the acronym name for the System that was developed to manage NASA's Earth Observing System missions. It has evolved over the years.
- Earthdata – is the name of the website that describes the ESDIS Project, the EOSDIS system, and HQ's Earth Data Systems program.

ESDIS Project

Earth Science Data and Information Systems Project



- Formed in the late 1980s-early 1990s to develop and build an earth observation system consisting of a fleet of spacecraft and pre-existing earth science data
  - System was known as the Earth Observation System (EOS)
  - Part of the Mission to Planet Earth program
- System was assigned to Goddard Space Flight Center – the ESDIS Project – Code 423
  - Build, launch, operate EOS spacecraft
  - Build and operate data systems that acquire, process and distribute data
  - Tropical Rainfall Measurement Mission, the first EOS mission, launched in 1997. Followed by Terra, in 1999.
  - The EOS Data and Information System (EOSDIS) was developed and made operational for use by all EOS missions and has continued operations under the ESDIS Project

ESD/ESDIS Understanding User Needs and Assessing Performance – even more so these days!

- **DAAC User Working Groups** – Provide assessments and recommendations based on unique DAAC mission requirements.
- **DAAC Customer Satisfaction**
  - Annual Online survey of all DAAC users to evaluate satisfaction and measure performance
  - Performed by CFI Group, the American Customer Satisfaction Index (ACSI) is the #1 national indicator of customer satisfaction for more than 225 companies and 130 Federal programs
- **EOSDIS Metrics System** – collects complex metrics on ingest, archive and distribution for evaluation of system performance.
  - Enables ESDIS to characterize use of the EOSDIS, and report to NASA Headquarters and OMB.
- **User Services/UN Working Group** – DAAC User Services personnel work together to best service science communities
  - User feedback – via Kayako
  - Personal interaction with users