



Programmatic updates



FY23 Earth Science Budget Features

What's Changed

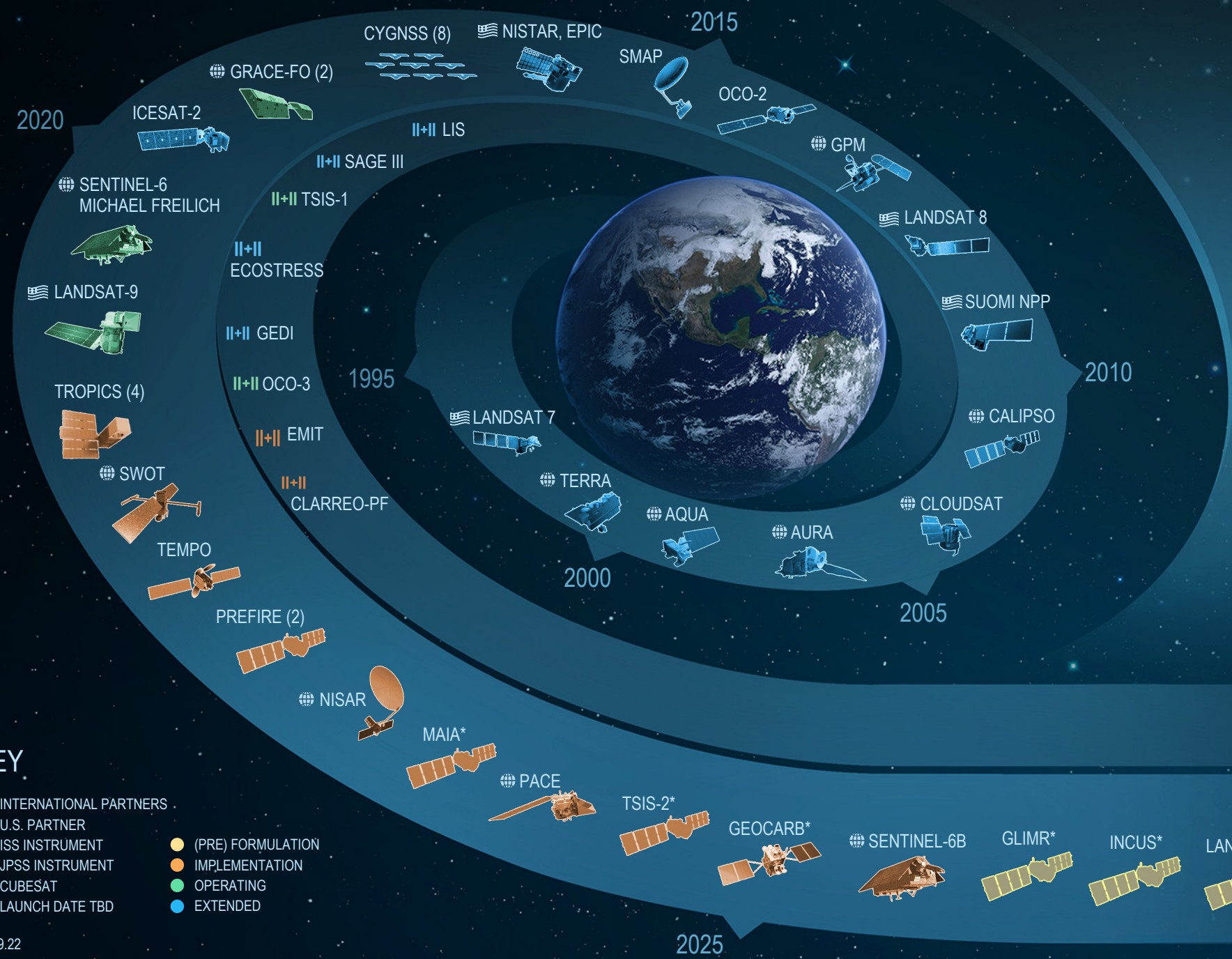
- Accelerates wildfire management support through technology development, modeling, observations, analysis tools, and applications
- Invests in Sustained Climate Observations Future Missions with partners
- Plans for an Earth Information Center with an initial focus on prototyping a greenhouse gas monitoring and information system in coordination with other agencies and partners
- Funds high priority satellite data products in response to the third U.S. Group on Earth Observation interagency assessment of civil agencies' satellite needs
- Supports selected EVM-3/INCUS mission
- Increases GeoCarb and MAIA budgets for access-to-space
- Delays future Venture solicitations by 1 year; new commercial engagement strategy in work

What's the Same

- Implements formulation of Earth System Observatory, including investments in research, data systems and open source science
- Executes first phase of Earth System Explorers
- Continues increases in Commercial SmallSat Data Acquisition
- Supports balanced Research, Technology, and Applied Sciences programs



EARTH FLEET



INVEST/CUBESATS

- CIRIS 2023
- NACHOS 2022
- CTIM 2022
- NACHOS-2 2022
- SNOOPI* 2022
- MURI-FO* 2022
- HYTI* 2023

JPSS INSTRUMENTS

- OMPS-LIMB 2022
- LIBERA 2027
- OMPS-LIMB 2027
- OMPS-LIMB 2032

ISS INSTRUMENTS

MISSIONS

KEY

- INTERNATIONAL PARTNERS
- U.S. PARTNER
- ISS INSTRUMENT
- JPSS INSTRUMENT
- CUBESAT
- LAUNCH DATE TBD
- (PRE) FORMULATION
- IMPLEMENTATION
- OPERATING
- EXTENDED

EARTH SYSTEM OBSERVATORY

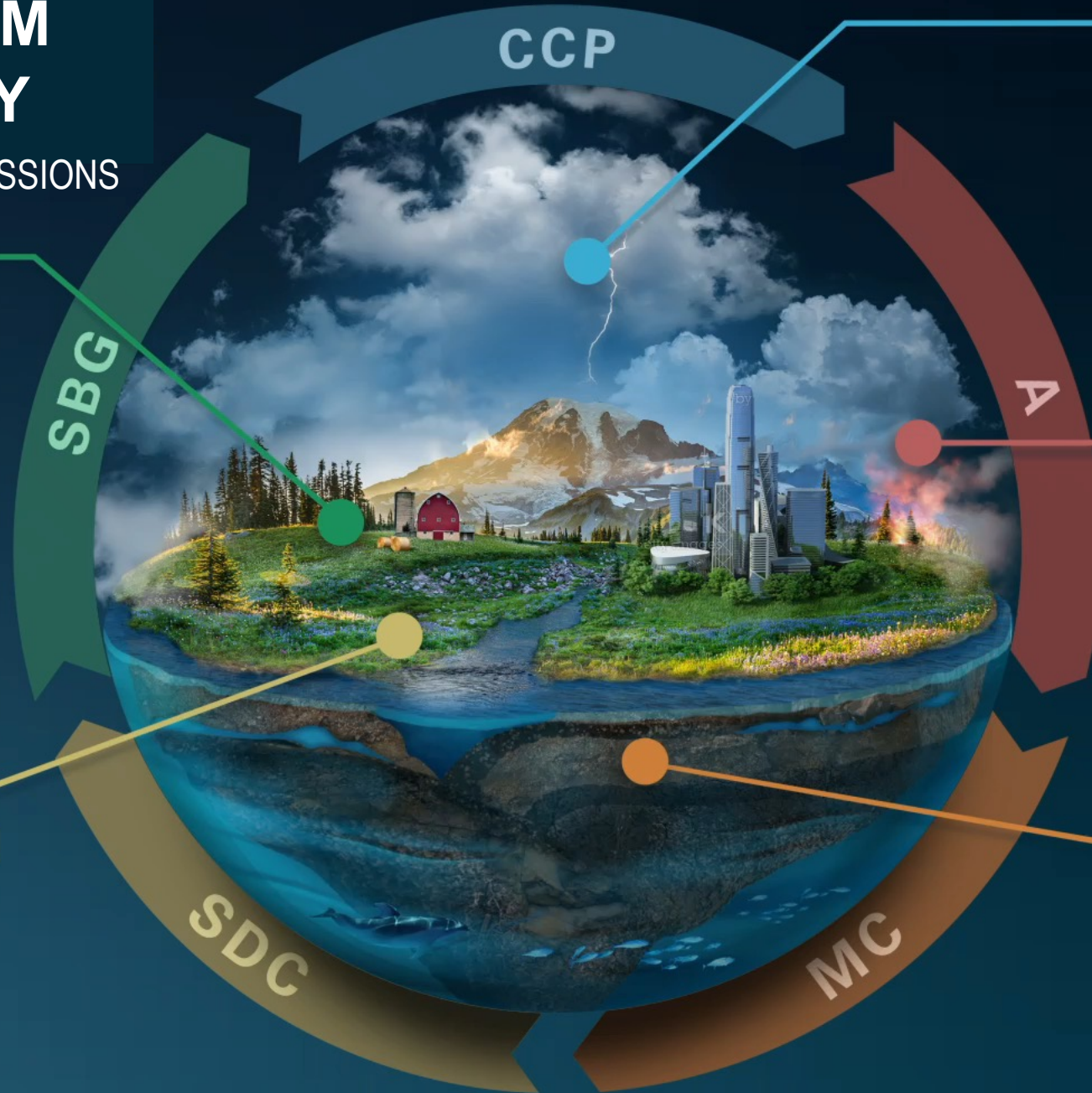
INTERCONNECTED CORE MISSIONS

SURFACE BIOLOGY AND GEOLOGY

Earth Surface & Ecosystems

SURFACE DEFORMATION AND CHANGE

Earth Surface Dynamics



CLOUDS, CONVECTION AND PRECIPITATION

Water and Energy in the Atmosphere

AEROSOLS

Particles in the Atmosphere

MASS CHANGE

Large-scale Mass Redistribution

EARTH SYSTEM OBSERVATORY

INNOVATION & COMPETITION
EARTH EXPLORER MISSIONS

Snow Depth and
Water Content

3D Ecosystem
Structure

Ocean Surface
Winds and Currents



Greenhouse Gases

Ozone and
Trace Gases

Atmospheric Winds

Ice Elevation

Earth Science Flight Opportunities

Open solicitation/In review	Completed solicitation
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Mission	Mission Type	Release	Selection	Major Milestone
EVS-1 (EV-1) (AirMoss, ATTREX, CARVE, DISCOVER-AQ, HS3)	5 Suborbital Airborne Campaigns	2009	2010	Completed KDP-F
EVM-1 (CYGNSS)	Class D SmallSat Constellation	2011	2012	Launched Dec. 2016
EVI-1 (TEMPO)	Class C Geostationary Hosted Instrument	2012	2012	Delivered to storage Dec. 2018
EVI-2 (ECOSTRESS & GEDI)	Class C & Class D ISS-hosted Instruments	2013	2014	Launched June & Dec. 2018
EVS-2 (ACT-America, ATOM, NAAMES, ORACLES, OMG, CORAL)	6 Suborbital Airborne Campaigns	2013	2014	Completed KDP-F
EVI-3 (MAIA & TROPICS)	Class C LEO Hosted Instrument & Class D CubeSat Constellation	2015	2016	MAIA Delivery 2022; TROPICS Launch 2022
EVM-2 (GeoCarb)	Class D Geostationary Hosted Instrument	2015	2016	Launch TBD
EVI-4 (EMIT & PREFIRE)	Class C ISS-hosted Instrument & Class D Twin CubeSats	2016	2018	Delivery NLT 2021
EVS-3 (ACTIVATE, DCOTSS, IMPACTS, Delta-X, SMODE)	5 Suborbital Airborne Campaigns	2017	2018	4 in deployment. Delta-X is in post-deployment phase.
EVI-5 (GLIMR)	Class C Geostationary Hosted Instrument	2018	2019	Delivery NLT 2024
EVC-1 (Libera)	Class C JPSS-Hosted Radiation Budget Instrument	2018	2020	Delivery NLT 2025
EVM-3 (INCUS)	Full Orbital	2020	2021	Launch ~2026
EVI-6	Instruments and SmallSats	2022	2023	Delivery NLT 2027
ESE	Explorer Mission	2022	2024	Launch ~2029 & ~2031
EVC-2	Continuity Measurements	2023	2024	Delivery NLT 2028
EVS-4	Suborbital Airborne Campaigns	2023	2024	N/A
ESE	Explorer Mission	2024	2026	Launch TBD
EVI-7	Instrument Only	2024	2025	Delivery NLT 2030
EVM-4	Full Orbital	2024	2025	Launch ~2030
EVC-3	Continuity Measurements	2026	2027	Delivery NLT 2031
EVS-5	Suborbital Airborne Campaigns	2027	2028	N/A

EVS
Sustained sub-orbital investigations (~4 years)

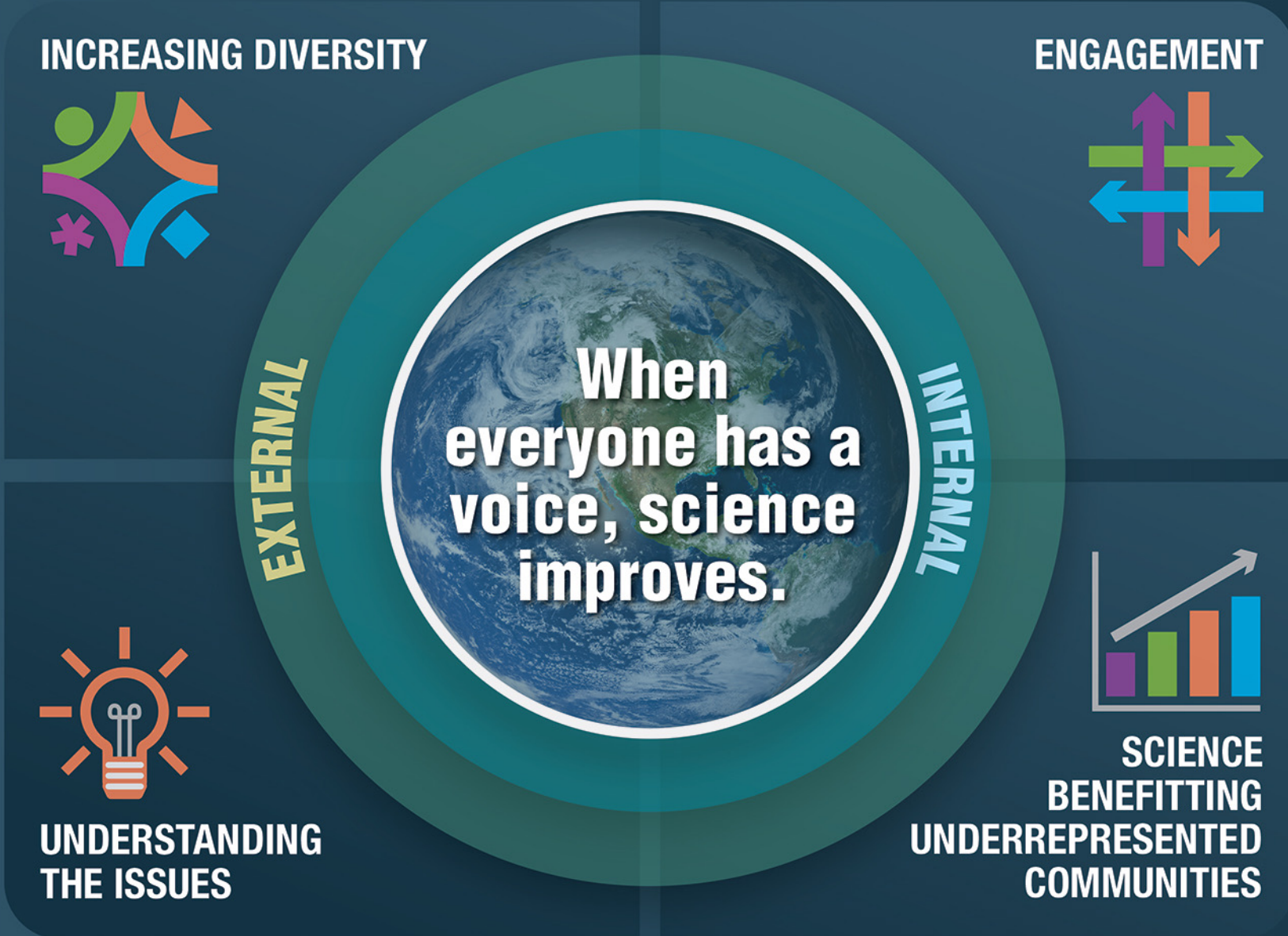
EVM
Complete, self-contained, small missions (~4 years)

EVI
Full function, facility-class instruments Missions of Opportunity (MoO) (~3 years)

EVC
Complete missions or hosted instruments targeting “continuity” measurements (~3 years)

ESE (NEW)
Medium-size instruments and missions (~2 years)

ESD Justice, Equity, Diversity, and Inclusion (JEDI)



You may have heard...

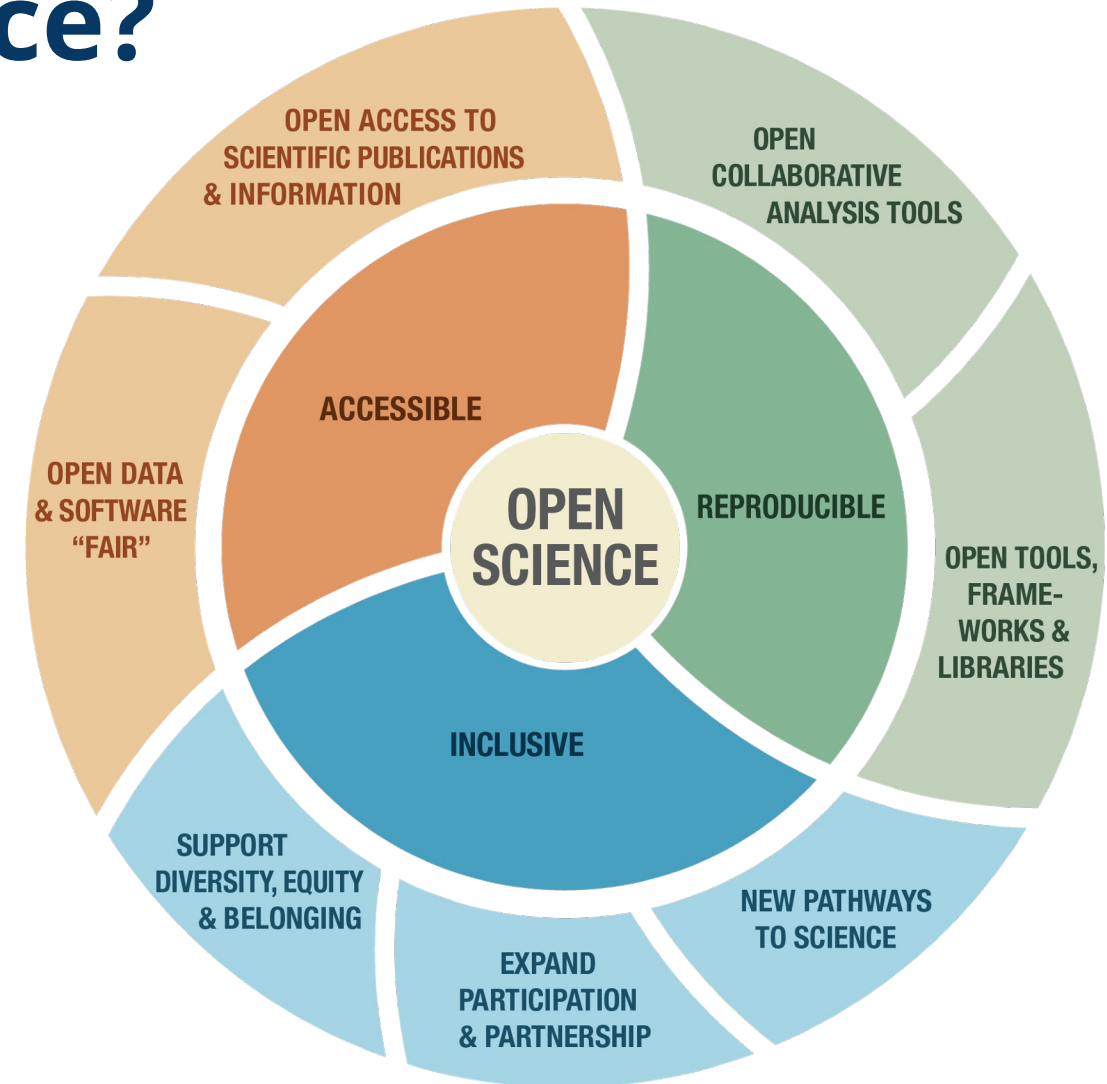


- New Deputy Director for Earth Science, Dr. Julie Robinson.
- Chief Scientist and Senior Climate Advisor, Dr. Katherine Calvin
- Terra/Aqua: ESD is evaluating possibilities as input into decision process for extended operations. RFI on the street, closes 7 October.
- Dual Anonymous Peer Review: Some elements of ROSES continue to be reviewed via the DAPR process.
- High-Risk/High-Impact (HR/HI): NASA continues to collect information on which proposed science could be considered HR/HI (cover sheet).
- From the White House: Ensuring Free, Immediate, and Equitable Access to Federally Funded Research: Delivering Equitable Access to America's Research
 - NASA is already implementing most of the policy guidance imparted to federal agencies related to public access policies.
 - Make publications and supporting data resulting from federally funded research publicly accessible without an embargo on their free and public release → **OBB will require at least one (1) open access peer review publication from each award** starting in ROSES23.

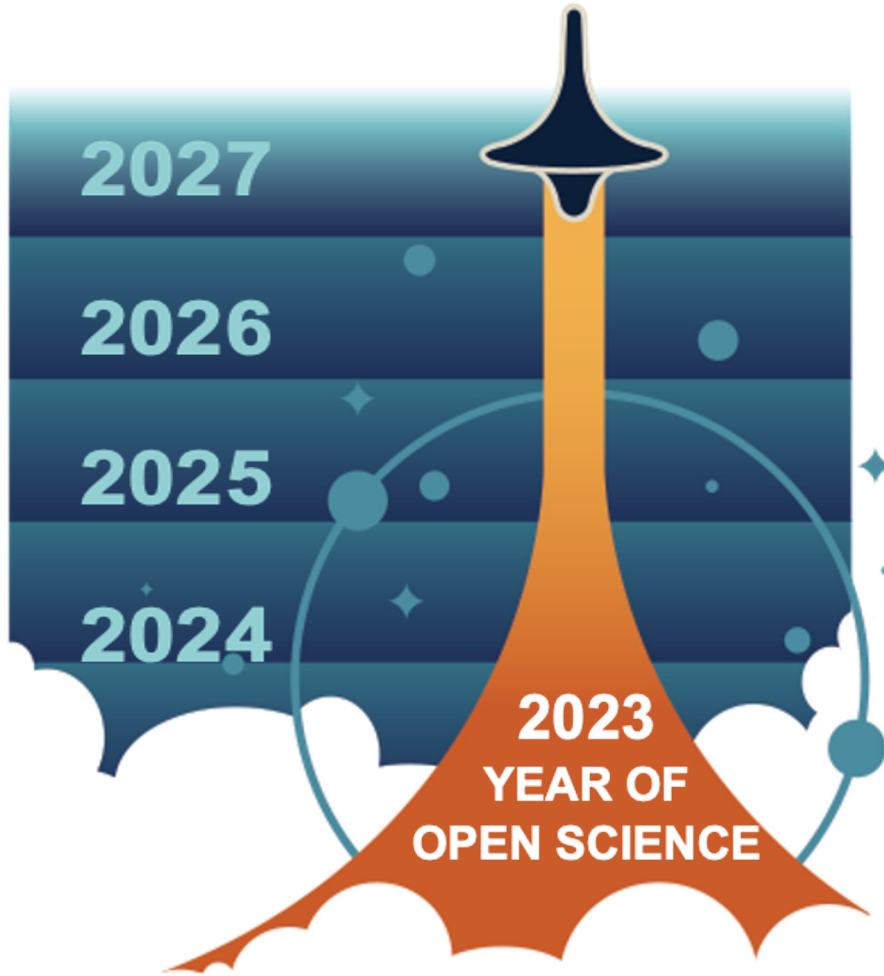


What is Open Science?

- **Open** the entirety of the scientific process, *from start to finish*
- **Broaden** community involvement in the scientific process
- **Increase** accessibility of data, software, & publications
- **Facilitate** inclusion, transparency, and reproducibility of science



Leading the Path to Open-Source Science



Transform to Open Science (TOPS) is a \$40 million* 5-year NASA Science Mission Directorate mission geared towards accelerating the adoption and understanding of open science

Key Goals:

- Increase understanding & adoption of open science
- Accelerate major scientific discoveries.
- Broaden participation by historically underrepresented communities

Ways to get involved:

- Join the mailing list: <https://go.nasa.gov/3Lwlb87>
- Upcoming ROSES solicitation (out soon - stay tuned)
- Community forums

*pending appropriations

THE OFFICIAL MAGAZINE OF THE OCEANOGRAPHY SOCIETY

Oceanography

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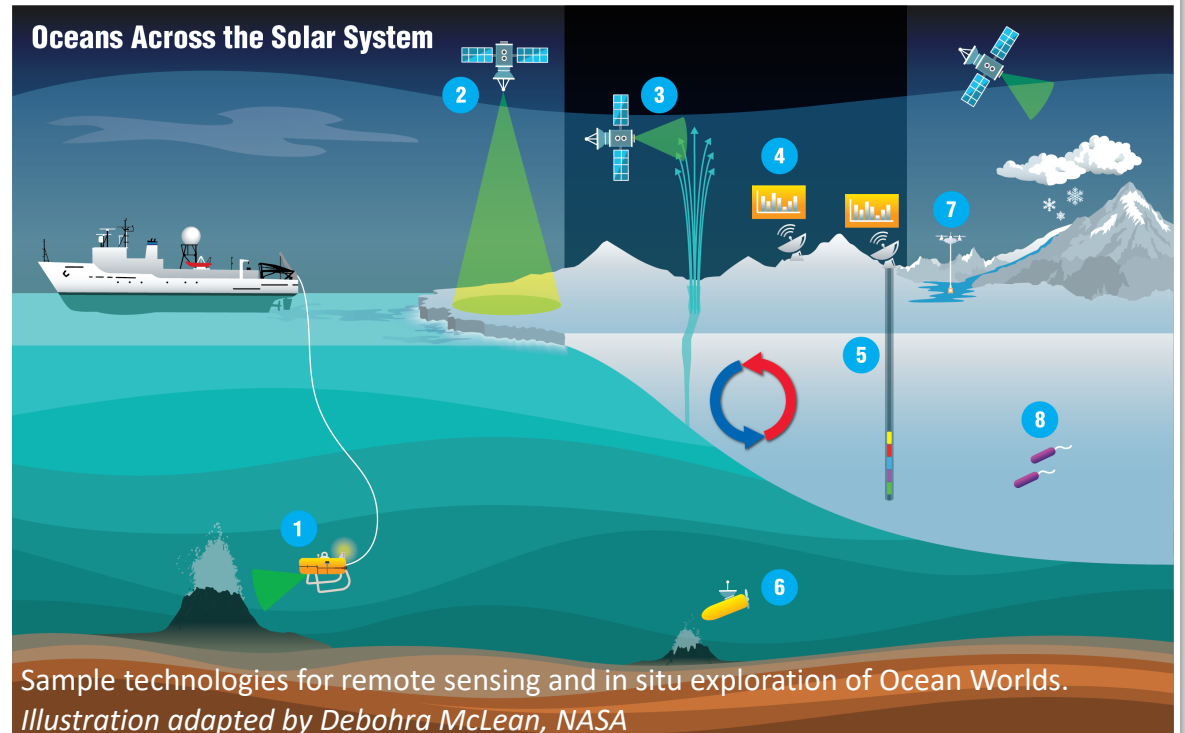


OCEANS ACROSS THE SOLAR SYSTEM

Artistic rendering of ocean worlds. *Illustration by Jenny Mottar, NASA*

NOW

Network FOR
Ocean Worlds



Sample technologies for remote sensing and in situ exploration of Ocean Worlds.

Illustration adapted by Debohra McLean, NASA

Funding Opportunities

Research Opportunities in Space and Earth Sciences <http://nspires.nasaprs.com/>
Annual release mid-February

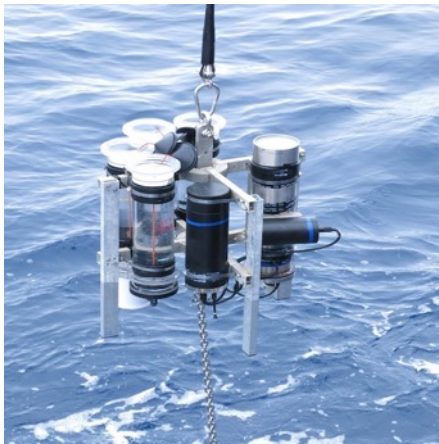
- Rapid Response and Novel Research in Earth Science – ROSES 2022 A.24
[rolling deadline] - No budget for this –funded out of core programs.
- Topical Workshops, Symposia, Conferences – ROSES 2022 F.2 – (Max Bernstein, POC)
[rolling deadline] - No budget for this –funded out of core programs.
- Carbon Monitoring System – ROSES 2022 A.6 [NOIs due Aug. 2; proposals due Oct. 28]
- Interdisciplinary Science – ROSES 2022 A.28 [NOIs due Oct. 14; proposals due Nov. 16]
- PACE Validation – [Solicitation coming in the Fall 2022, due date Spring 2023]



Opportunities in the horizon

- Arctic-COLORS Science Definition Team - applications will be solicited in September 2022
- Future Investigators in NASA Earth and Space Science and Technology – ROSES-22 (Fall)
- Ocean Biology and Biogeochemistry – ROSES-23
- Carbon Cycle Science – ROSES-23
- PACE Science and Applications Team 3 – *Likely* ROSES-23
- New (Early Career) Investigator Program in Earth Science (NIP) – ROSES-23

PACE Validation



- Competed in ROSES 22 (late amendment).
- Will include in situ measurements
- Perform validation for all PACE data products including calibration/validation of polarimetry data products as possible
- Anticipated to be selected in late 2023, before PACE launches
- Anticipated to be in the field after PACE first light (spring 2024)