National Aeronautics and Space Administration

Earth Science Division Update

March 25, 2026

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Director, Earth Science Division

The Upfront:

Increasing the Speed of Earth Science

NASA's Earth Science Division is accelerating functions and simplifying processes with the goal of increasing speed of science and scale of impact.

What to listen for today:

- **Speed to orbit**
- **Speed to science and scientific discovery**
- **Speed and scale of impact of science**
- **Driving interdisciplinary science to go after most complex questions**

NASA HQ
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Earth Action

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Three Major Objectives in Implementing Earth Science in 2026

Drive Alignment with Presidential Priorities

- Advance Gold Standard Science and understanding of the Earth System
- Technology Innovation & Advancement
- Economic Growth
- Strengthen National, Regional and Local Preparedness and Resilience

Focus on Impact

- Reduce programmatic complexity of ES Research and Applied and Responsive Earth Sciences
- *Multisource Integrated Observatory* to maximize science and applications value from NASA and commercial missions
- Modeling integration to answer complex questions
- Engage the broader Earth Observation community including private sector service providers and end-users, academia, commercial EO industry, and state and local governments

Drive Efficiency

- Improved fidelity of planning for DAAC transition to Science Enabling Teams
- Focus on more rapid mission development timelines
- Streamlined and faster ROSES solicitations

Strategic **Approach**

- **Focus on NASA-unique**
  - **Flight:** Prioritize missions for which NASA is the global leader
  - **Technology:** Focus on quantum, targeted advanced sensing, rapid transition to operations and commercialization
  - **Data:** Focus on NASA data discovery and usability
  - **Science & Applications:** Focus on accelerating multi-mission/multisource discovery and pipeline to applications
  - **Applications:** Increase focus on economic sector stakeholder needs
- **Focus on National challenges**
  - Wildland fires
  - Water and food security
  - Economic growth and connections to the private sector
  - Resilience at state and local levels
- **Ensure executability**

Earth Science to Action Strategy

Virtuous Cycle
- User needs inform next iteration of programs, missions and initiatives

Public Understanding & Exchange
- Put more scientific understanding into public sphere
- Deliver applied science to users
- Participate in multi-way info exchange
- Use input to inform subsequent work

Solutions with Value to the Nation
- Offer models, scientific findings and info through Open-Source Science principles
- Support private sector development of applications of Earth observations
- Provide science applications and tools to inform decisions

Earth System Science & Applied Research
- Grow scientific understanding of Earth's systems
- Develop predictive models of dynamic Earth systems and tools to understand and adapt to changes

Foundational Knowledge, Technology, Missions & Data
- Technology innovation
- Earth observations missions
- Data collected from space, air and ground

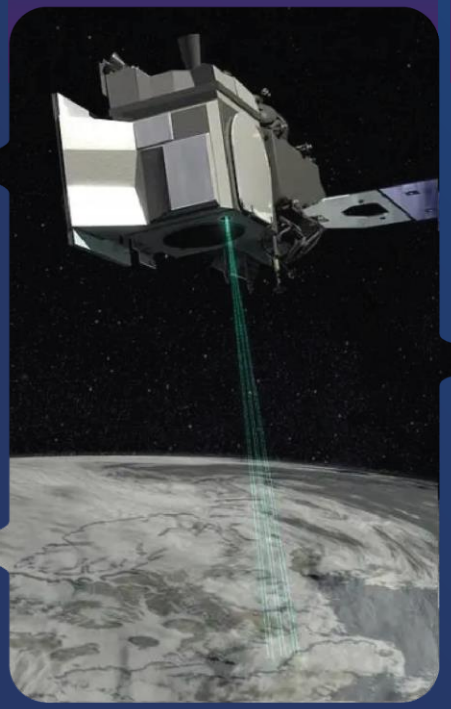
Jan 2026

NASA's End-to-end
Earth System Science Capability

Technology

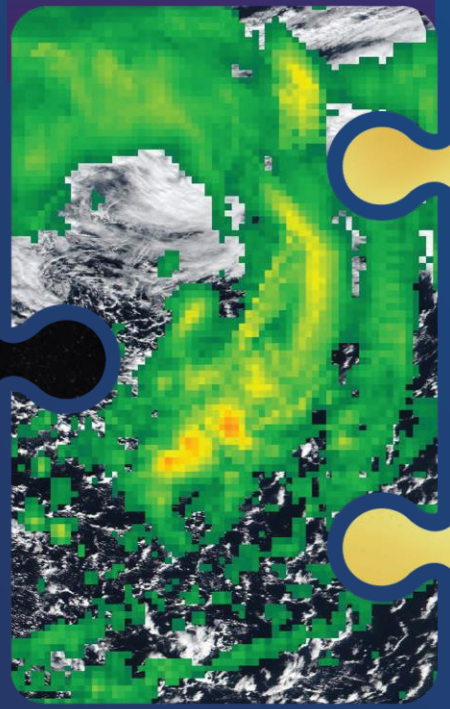
10 tech infusions/year

Flight



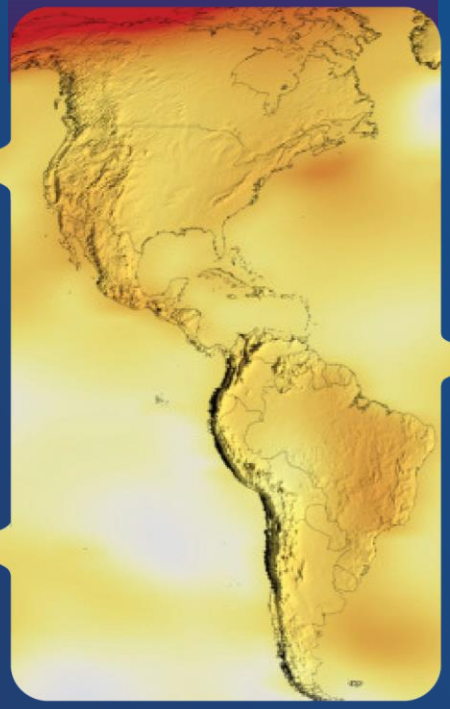
24 missions on orbit

Data and Modeling



Collect 160 TB/Day, serving 600 TB/Day, >10M users of world-class models

Research



Over 1,300 active research projects across the USA

Earth Action

Agriculture, Energy, Disasters, Wildfires, & more

Advancing Satellite Missions
Earth Science Flight Program

Flight Mission Strategy

Reformulate ESO missions aligned with 2026 appropriation and Presidential priorities

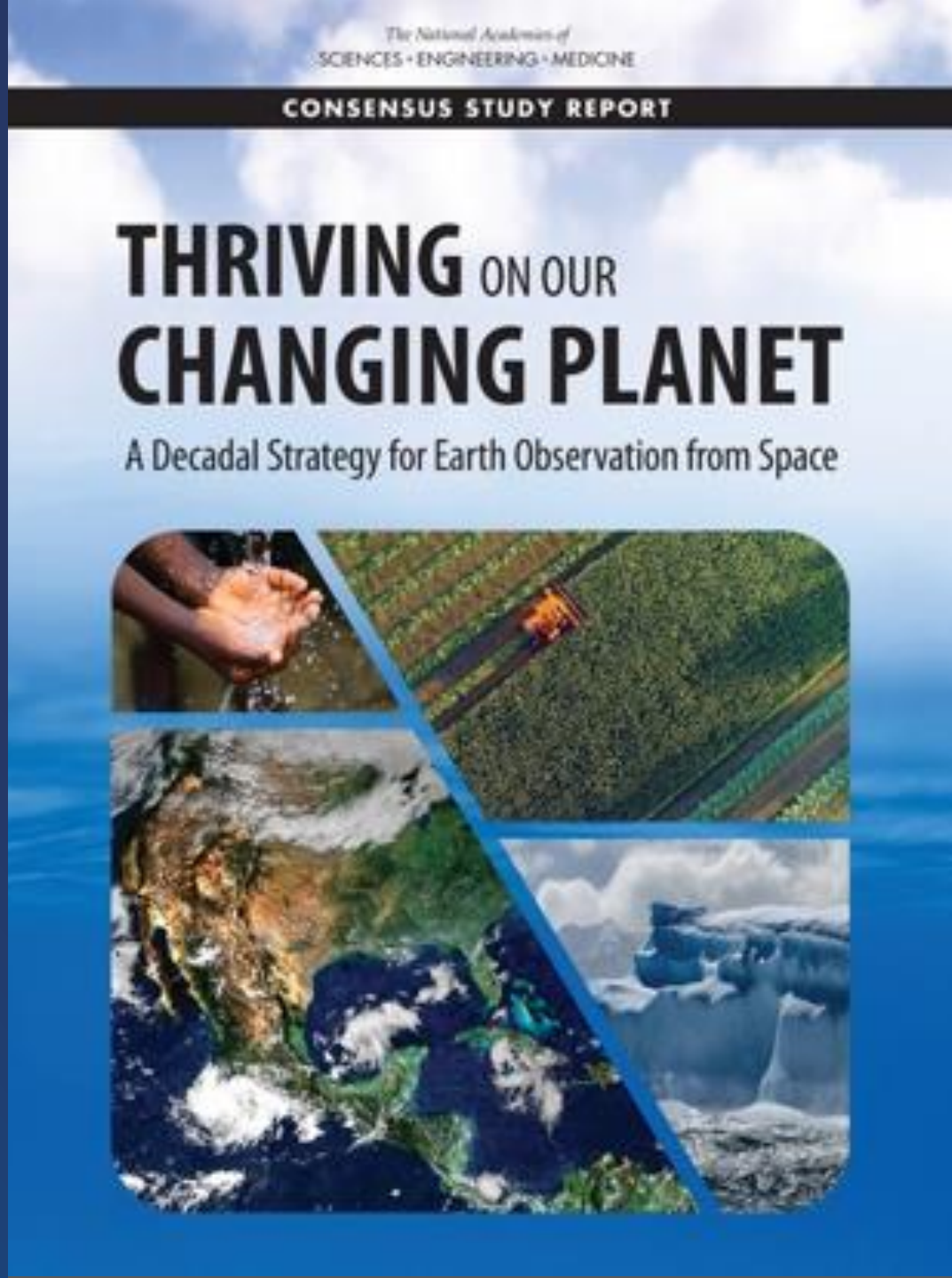
- Directed, streamlined, cost-capped Explorer class missions developed in 36 months
- Linkages to Moon to Mars objectives

Greater efficiencies and cost management

- Technology maturation
- Rapid on-orbit testing
- Cost and schedule caps

Demonstrate rapid development across the portfolio

- Reducing time to science
- Using commercial products and services



EARTH SYSTEM OBSERVATORY

INTERCONNECTED CORE MISSIONS

CLOUDS, CONVECTION AND PRECIPITATION

INCUS
PolSIR
PMM
FALCON-Lidar
FALCON-Radar

AEROSOLS

FALCON-Lidar
STRIVE

SURFACE BIOLOGY AND GEOLOGY

EAGLE-VSWIR
EDGE
EAGLE-TIR

SURFACE DEFORMATION AND CHANGE

NISAR

MASS CHANGE

GRACE-C

*contributing, competitively-selected missions

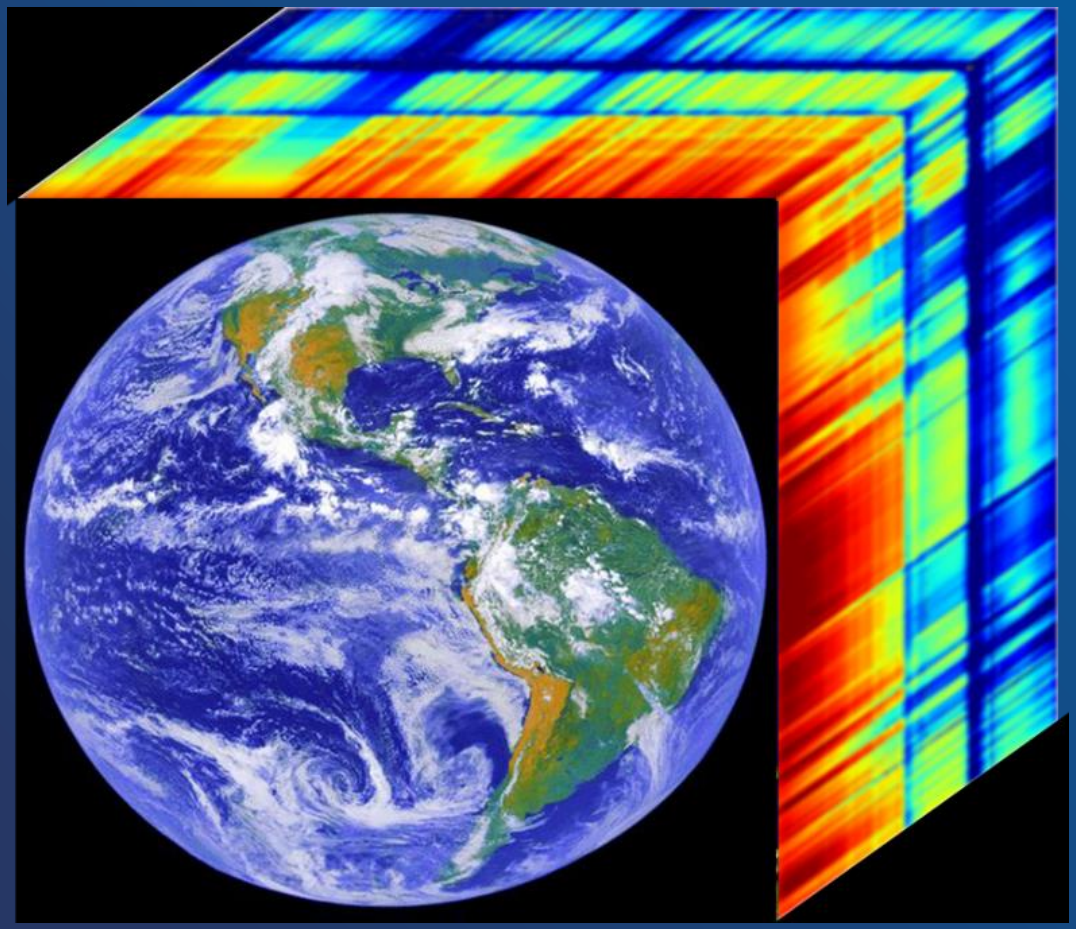
Explorer for Artemis Geology Lunar and Earth
EAGLE
Directed Explorer Class Missions

EAGLE-VSWIR (JPL)

- Best-in-class imaging spectrometer
- Versatile technology that also supports lunar and Mars missions
- 36-month schedule cap, $310M cost cap

EAGLE-TIR (JPL)

- Instrument redesign study to reduce cost
- Tech maturation of the thermal-unique TIR technology in 2026
- Reformulation for a future mission with a delay of 2-3 years



Fleet for the Atmosphere Linking Commercial Observations with NASA

FALCON

PMM (JAXA/GSFC)
Precipitation profiles

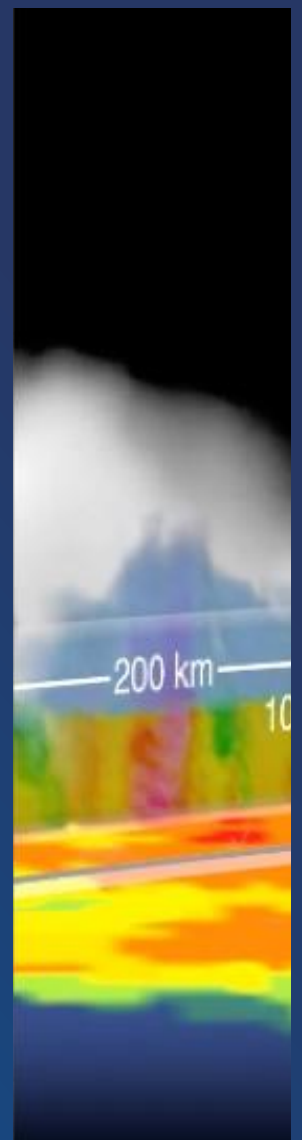
FALCON-Lidar (GSFC/LaRC)
Atmospheric structure and composition measurements

FALCON-Radar (JPL)
Cloud profiles to improve understanding of severe weather drivers.

FALCON-Radiometry (Commercial)
RFI Released this week for contribution options

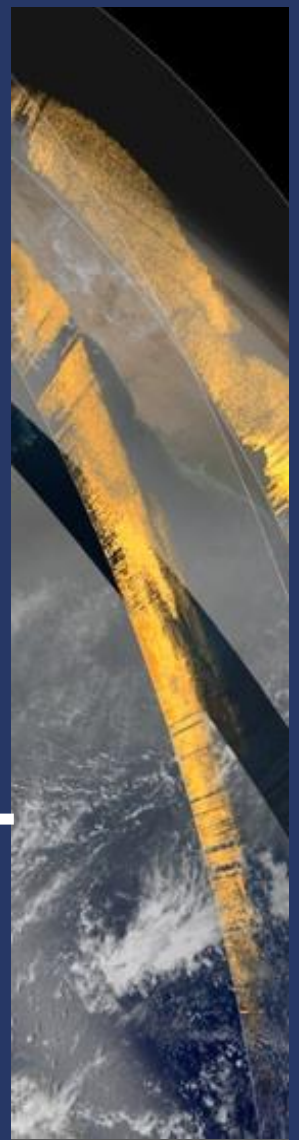
Joining the FALCON fleet

- INCUS (CSU/JPL)
- PolSIR (Vanderbilt/GSFC)
- STRIVE (UW/GSFC)



Profiles

Structure



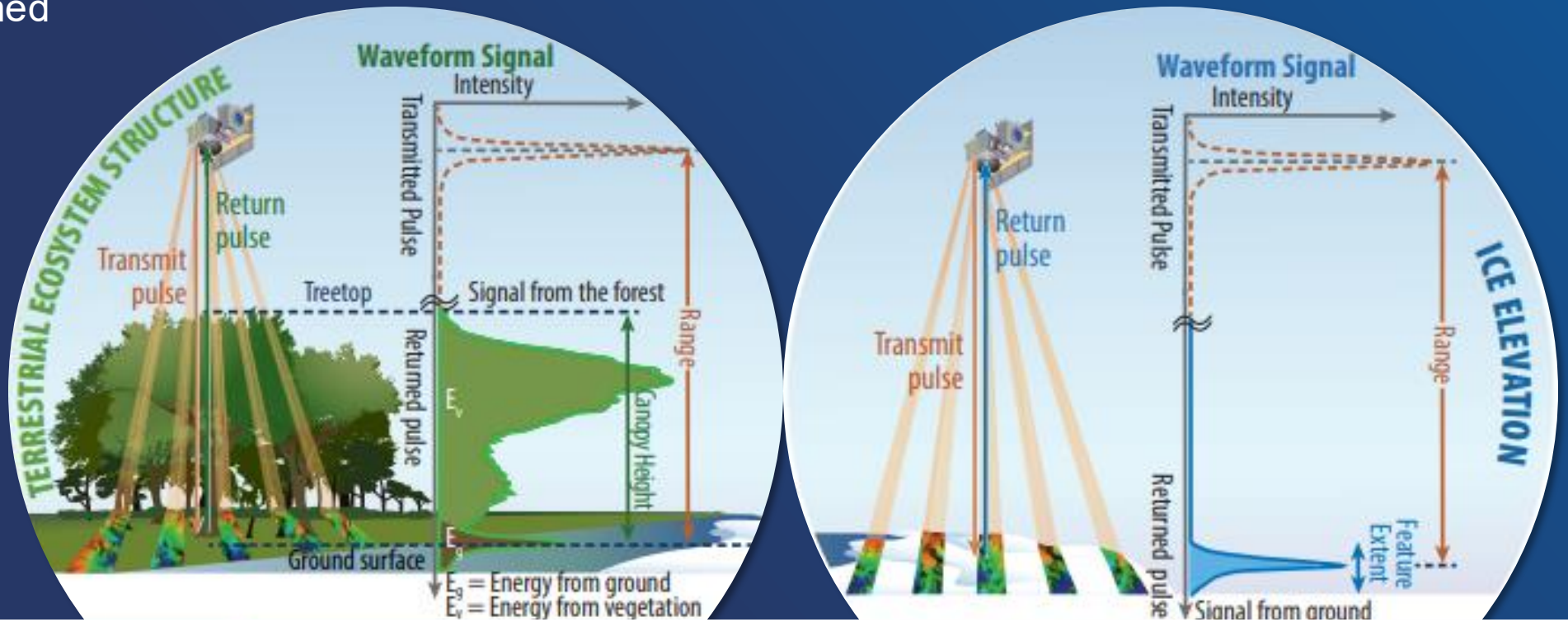
Composition

Earth Science Flight Program

EDGE: Advancing Global Monitoring Land, Ice, and Coastal Regions

Competed Explorer Class Mission (UCSD/GSFC)

EDGE (Earth Dynamics Geodetic Explorer) will track dynamic Earth processes and produce the nation's next-generation global baseline elevation map, delivering greater global coverage than all prior missions combined



Safer communities

Water security

Navigable seas & access to essential resources

Full accounting of forests & rangeland ecosystems

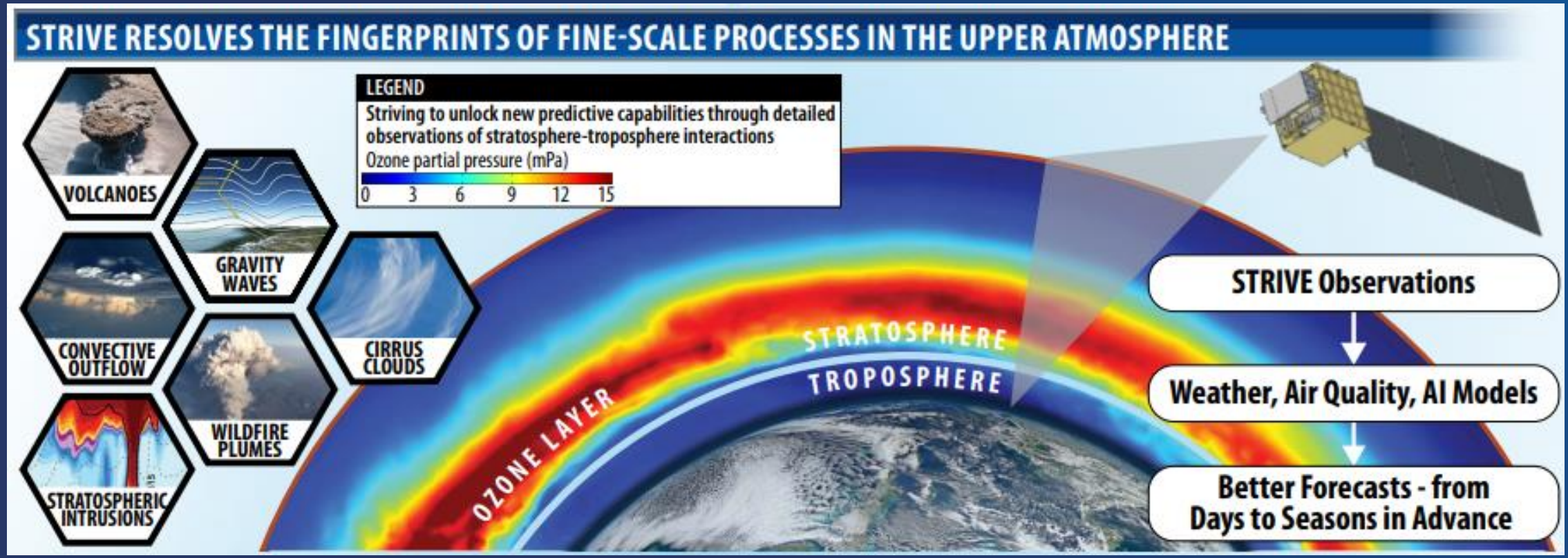
Disaster mitigation

Technological advantage

STRIVE: Opening a New Window on Stratosphere-Troposphere Interactions

Competed Explorer Class Mission (UW/GSFC)

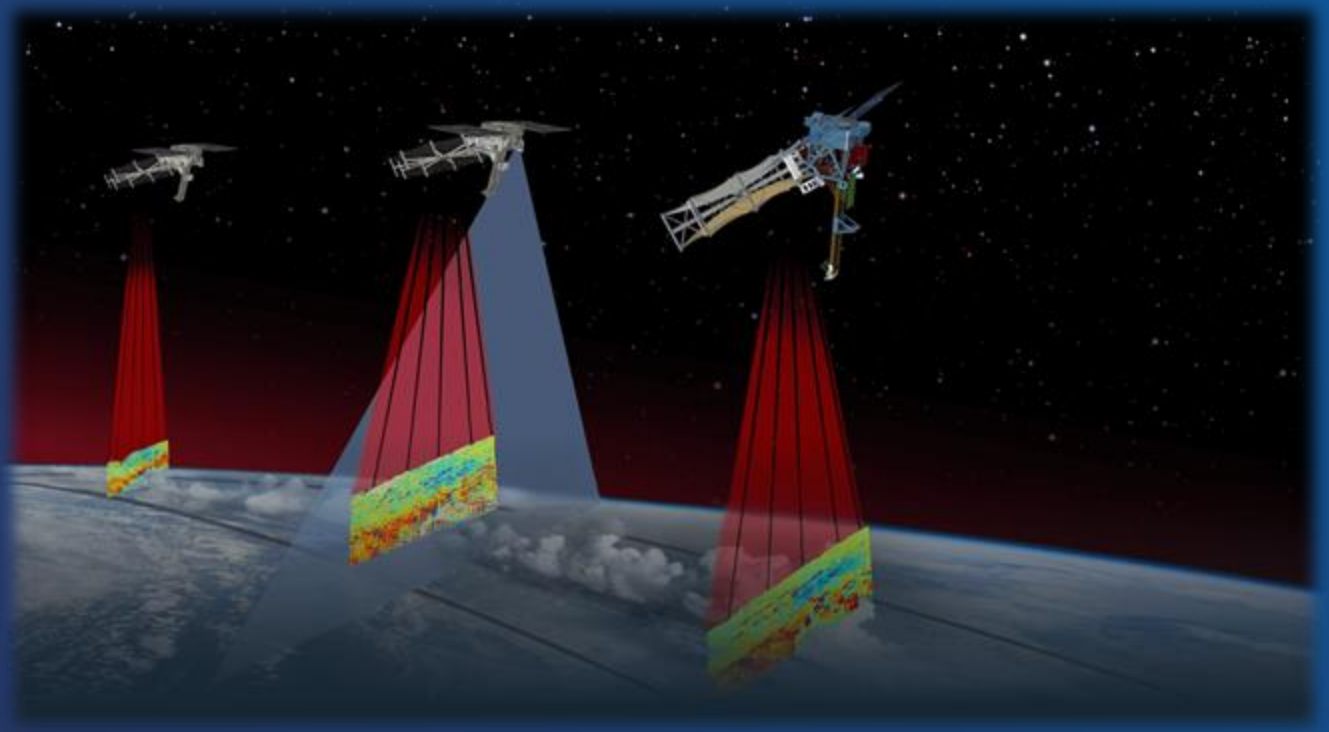
STRIVE (Stratosphere Troposphere Response using Infrared Vertically-resolved light Explorer) will deliver an unprecedented view of the atmosphere, transforming our understanding and enabling a leap in the accuracy of atmospheric predictions including weather patterns, extreme events, air quality, and the future of the ozone layer.



INvestigation of Convective UpdraftS **INCUS**

Competed Venture Class Mission (CSU/JPL)

- Why convective storms, heavy precipitation and clouds occur exactly when and where they do
- First ever measurements of how much water and air is lifted (convective mass flux) into the atmosphere to understand and improve prediction of severe weather



Polarized Submillimeter Ice-cloud Radiometer **PolSIR**

Competed Venture Class Mission (Vanderbilt/GSFC)

- Diurnal variability of tropical and sub-tropical ice clouds to reduce a fundamental uncertainty in Earth system understanding of how and why ice clouds change throughout the day
- Deep convection re-distributes energy around the Earth, and its evolution in a changing climate is an incredibly complicated process
- Observations from PolSIR's two CubeSats will increase understanding of the diurnal cycle of deep convection

Flight Missions
In Development

Other Developments Continuing

- CLARREO Pathfinder (ISS National Lab partnership for operations)
- CRISTAL A (instrument delivered) and B (in development)
- GLIMR (instrument nearly complete)
- GRACE-C (instrument integration)
- TSIS-2 (spacecraft integration)
- Libera (spacecraft integration)
- MAIA (instrument complete)
- OMPS-Limb (integrated to spacecraft and in storage)

Earth Science Flight Competed Missions

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 December 2016
EVI-1 (TEMPO)	Class C Geostationary Hosted Instrument	2012	2012	Launched April 2023
EVI-2 (ECOSTRESS & GEDI)	Class C & Class D ISS-hosted Instruments	2013	2014	Launched June & December 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 completed KDP-F
EVM-2 (GeoCarb)	Class D Geostationary Hosted Instrument	2015	2016	Cancelled
EVI-4 (EMIT & PREFIRE)	Class C ISS-hosted Instrument & Class D Twin CubeSats	2016	2018	EMIT launched to ISS July 2022; PREFIRE launched May/June 2024
EVS-3 (ACTIVATE, DCOTSS, IMPACTS, Delta-X, SMODE)	5 Suborbital Airborne Campaigns	2017	2018	All in post-deployment phase
EVI-5 (GLIMR)	Class C Geostationary Hosted Instrument	2018	2019	Delivery NLT 2026
EVC-1 (Libera)	Class C JPSS-Hosted Radiation Budget Instrument	2018	2020	Delivery NLT 2026
EVM-3 (INCUS)	Class D SmallSats	2020	2021	Launch ~2027
EVI-6 (PolSIR)	Class D CubeSats	2022	2023	Delivery NLT 2027
EVS-4 (FORTE, INSPYRE, HAMAQ, LACCE, Snow4FLow, FarmFlux)	Suborbital Airborne Campaigns	2023	2024	Active campaign planning
ESE-1 (STRIVE & EDGE)	Explorer Mission (2-Step Proposal Process)	2023	2026	Launches NET 2030
EVO-1	Venture, Community Announcement Released	2027	TBA	TBA

EVS
Sustained sub-orbital investigations

EVx
Small-size orbital instruments and missions

ESE
Medium-size orbital instruments and missions

Open solicitation/In review

Completed solicitation

Click here to download the latest version of the chart

Observables and Future NASA Earth Science Mission Selections

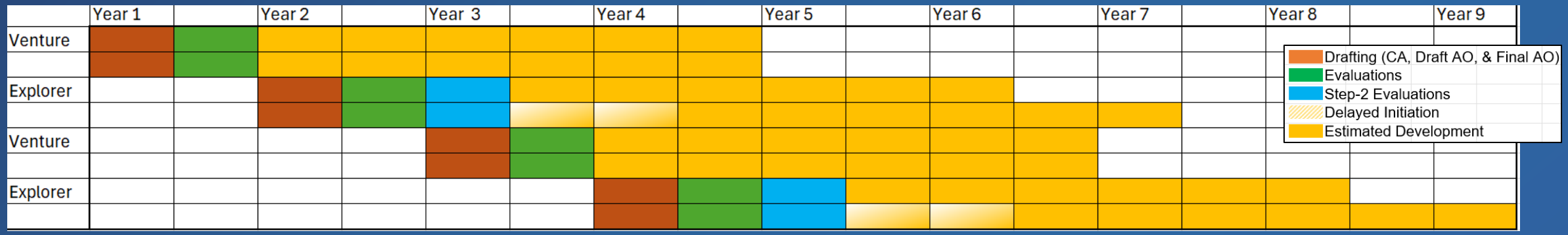
An Innovative NASA Earth Science Enterprise:

- Frequent opportunities for innovation to enable a rapidly evolving EO ecosystem
- Opportunities for American leadership, first to missions with new-to-science observations, and then to science as a service in the commercial sector
- More rapid decisions from proposal to selection, and more rapid mission development

Observables from the next Decadal drive opportunities & innovative partnerships

- Mission proposals every year encourages innovation → Either Explorers or Ventures as budget permits
- Multiple selections → Explorers and Ventures may offer multiple selections
- Technology demonstrations deliver science and have direct transition path-ways → Venture Tech Accelerators
- Critical measurements for science collected routinely → Operational agencies or commercial purchases

Idealized Cadence of Venture/Explorer class opportunities:



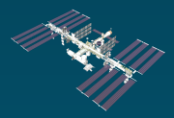
Partnerships on Some Current Missions

NASA is exploring partnerships with external organizations for operation and data collection of Earth Science satellite missions to enable more impactful exploitation of NASA resources and advance commercial remote sensing industry

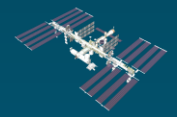
Missions on ISS:
- NRA: NASA Research Announcement
- Full Proposals received Dec 12

Free Flyer Missions:
- AFPP: Announcement For Partnership Proposals
- Full Proposals received Feb 26 for OCO-2 and CYGNSS
- RFI responses received Feb 12 for Aqua, Terra and Aura

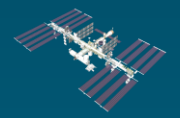
Missions on ISS



OCO-3: Orbiting Carbon Observatory-3

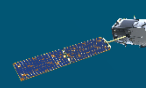


SAGE III: Stratospheric Aerosol and Gas Experiment

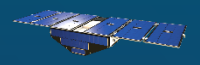


CLARREO-Pathfinder (planned for ISS)

Free-Flyer Missions

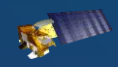


OCO-2: Orbiting Carbon Observatory-2

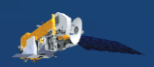


CYGNSS: Cyclone Global Navigation Satellite System

Terra



Aqua



Aura

Multisource Integrated Observatory (MIO)

Maximize our science through integration

Multisource Integrated Observatory Goal and Objectives

ESD sees growing opportunity in integrated Earth-observing to answer complex Earth system science questions

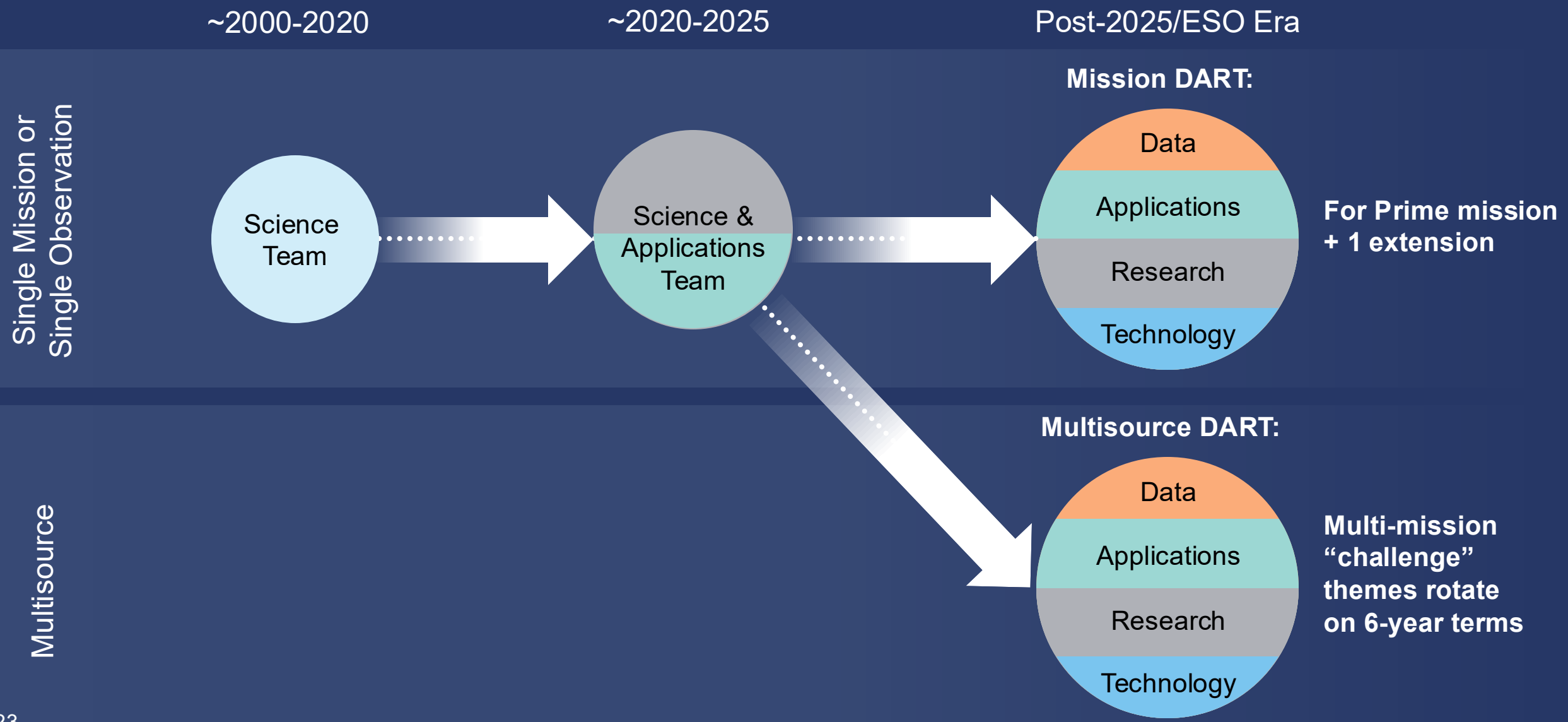
Goal: Maximize science and applications from individual missions and observations combined across NASA, partner and commercial fleets

Objectives

- Integrate the broad spectrum of activities required to accelerate the pace of scientific discovery and innovation
- Deliver high-impact, actionable applications based on multisource data, technology, and science
- Advance science-to-application pipelines across public and private sectors

Evolution of NASA Mission Science Teams

18 Mission Teams to 10 DART Teams, including 3 interdisciplinary multisource DART teams



Advancing Technology
Earth Science Technology Office

Earth Science Technology Office (ESTO) Strategy

ESTO executes the nation's premier program for developing Earth observation and intelligent systems technologies.

Widely emulated within NASA and beyond, ESTO's strategy is innovative, analytics-driven, and continually-evolving to retire risk, generate groundbreaking capabilities, and ensure U.S. leadership for science, national security, and commercialization.

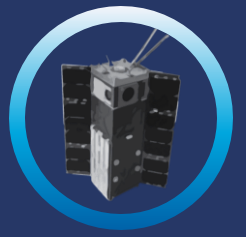
ESTO investments inject novel, cost-effective technologies into missions across NASA, other Federal agencies, and the commercial space sector

Current Technology **Validation Program**

Since 2011, the In-Space Validation of Earth Science Technologies (InVEST) program has validated 16 new technologies on orbit, proving the viability of new concepts and approaches, buying down risk, and infusing into Earth science and commercial missions. Examples include:

Arcstone – Calibration of Lunar Spectral Reflectance from Space / Launched Jun 2025

MURI – Multiband Radiometric Imager / Launched Jan 2023



HARP – HyperAngular Rainbow Polarimeter / Launched Nov 2019, deorbited Apr 2022

RAVAN – Radiometer Assessment using Vertically Aligned Nanotubes / Launched Nov 2016, no longer operational

ARGOS – Aerosol Radiometer for Global Observation of the Stratosphere / Launched Mar 2025

CTIM – Compact Total Irradiance Monitor / Launched Jul 2022, deorbited Apr 2024

RainCube – Radar in a CubeSat / Launched May 2018, deorbited Dec 2020

Launching the **Venture Tech Accelerator**

The Venture Technology Accelerator (VTA) program is a new ESTO 'Faster to Science' initiative designed to accelerate transition of next-generation Earth observation technologies to science missions, operational agencies, and/or commercial providers

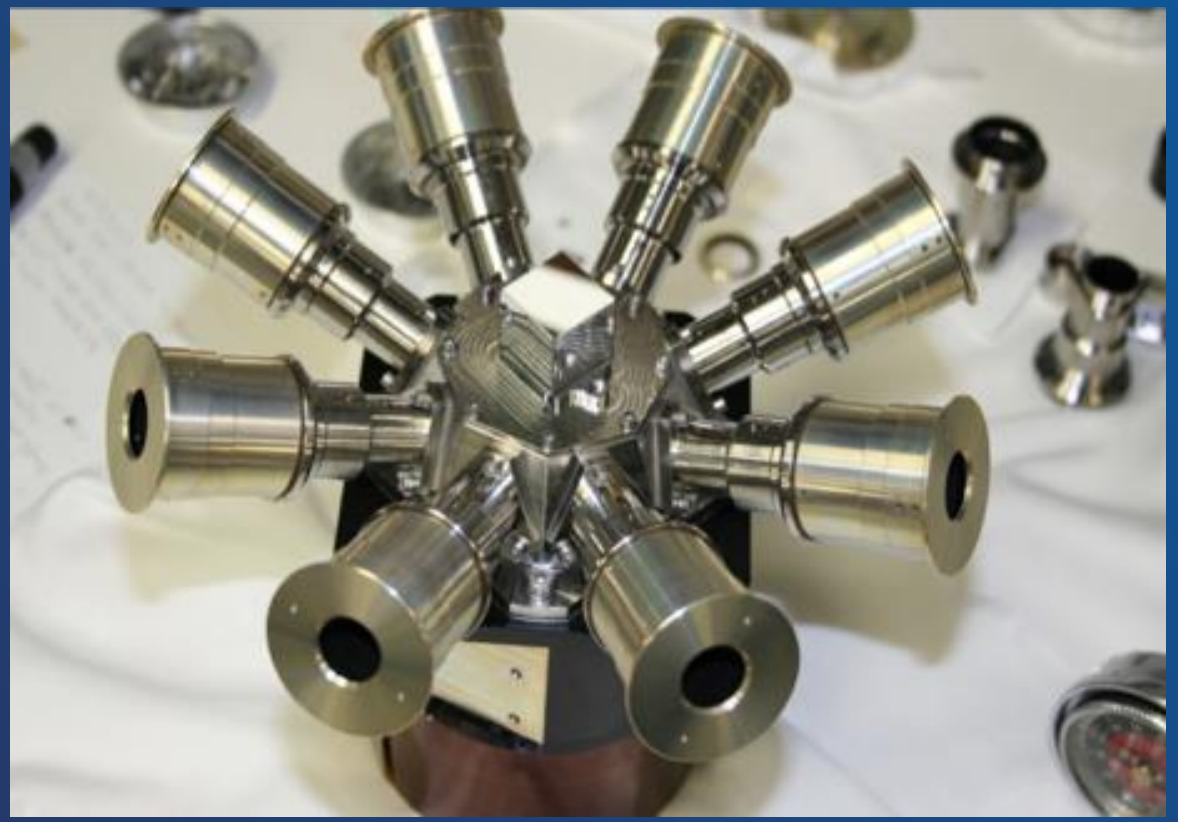
Building upon the success of the In-Space Validation of Earth Science Technology (InVEST) program model, VTA aims to further accelerate tech impact and adoption by:

- Maturing high-potential Earth-observing technologies;
- Identifying transition pathways early;
- Engaging potential end users in targeted flight demonstrations and on-orbit validation planning;
- Serving as a bridge to commercialization, infusion, and operations

ARGOS Tech Demo
Transitioned from Industry, Infused into STRIVE

Aerosol Radiometer for Global Observation of the Stratosphere

- Commissioned in October, now in continuous operations taking science-quality data
- ARGOS is an InVEST project onboard a Loft Orbital hosted payload
- New capability for stratospheric aerosol measurements, simultaneously collecting limb scattering data from eight different directions
- ARGOS has transitioned from a tech demonstration to a key instrument for the STRIVE Earth System Explorer mission



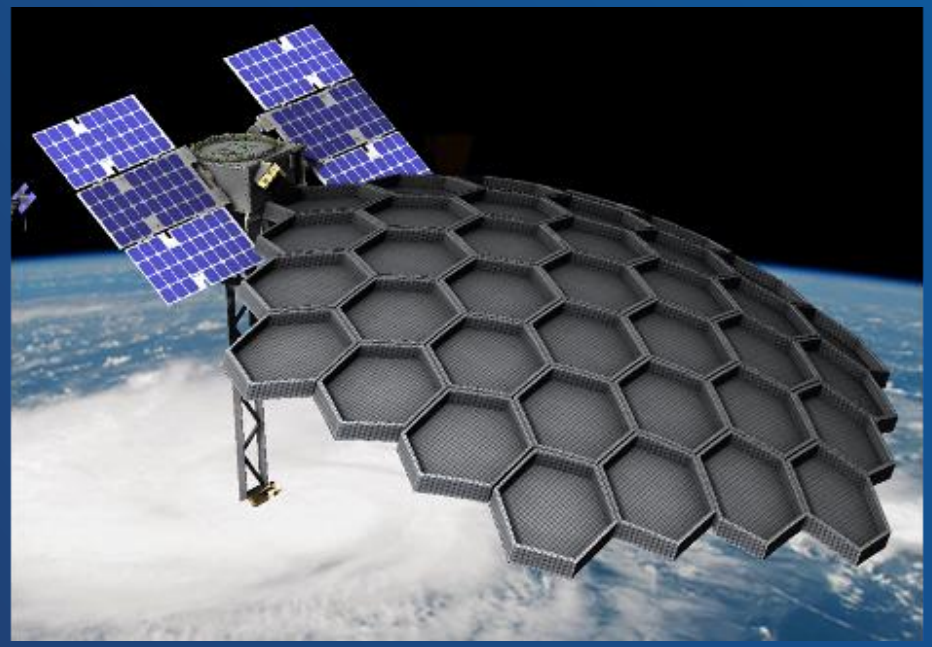
ARGOS flight hardware. Note the eight apertures arrayed around a central optical hub containing the prism. Credit: NASA GSFC.

Principal Investigator: Matthew DeLand, GSFC (InVEST-20)

Solid Underconstrained Multi-Frequency (SUM) Deployable Antenna

Antenna Demo on Commercial Satellite

- Under development through a 2022 Advanced Component Technology grant
- Flying as a tech demonstration on the commercial Mercury One (M1) spacecraft built by Proteus Space
- Large (2.4 m), multi-segment, parabolic aperture that can deploy from a compact volume
- Potentially enable low-cost constellations of radars and radiometers for a variety of Earth and planetary observations



Top Left: JPL engineer Maya Roman stands in front of the Proteus Mercury-1 spacecraft system at the vibration facility. The SUM joint is mounted on the "left" surface of the bus, just behind Maya's shoulder. (Credit: NASA JPL)

Top Right: Artist's depiction of the overall SUM antenna concept. (Credit: NASA JPL)

Principal Investigator: Nacer Chahat, JPL (ACT-22)

Driving
Earth Science Data

Data Systems Strategy

- **Focus on Core Data Systems mission**
  - Quality and Efficiency
  - Technological Evolution
  - Community Support and Open Science
- **Emphasis on**:
  - Ground-breaking science products
  - Foundational data products used by many different parts of the enterprise from research and modeling to applications
  - Near Real Time (NRT) products
- Consolidation of DAACs from 11 independent locations to thematic science enabling teams
- Structure data systems to support AI/ML and processing innovation
- Coordination with other agencies to sustain and enhance data discovery and utility

Evolving Earth Science
User Support

PO.DAAC
Ocean circulation
Air-sea interactions

OB.DAAC
Ocean biology
biogeochemistry

NSIDC DAAC
Cryosphere, polar processes

ASF DAAC
SAR products, sea ice, polar processes

ORNL DAAC
Biogeochemical dynamics, EOS land validation

LAADS DAAC
Atmosphere

ASDC DAAC
Radiation budget, clouds, aerosols, tropo. composition

GES DISC DAAC
Atmos composition and dynamics, global modeling, hydrology, radiance

GHRC DAAC
Hydrological cycle and severe weather

CDDIS DAAC
Crustal dynamics, solid earth

LP DAAC
Land processes and features

From: 11 Geographically-Distributed Full Stack Archives (DAACs)

To: Thematic Support Teams:
no anchoring physical team locations, best support regardless of geography

Centralized services:
Cloud-based ingest, archive, distribution, metrics, and cataloging

Sustaining Products that Serve the Community

CONTEXT

EOS missions are transitioning
Terra, Aqua, and Aura defined two decades of Earth data records

Continuity is increasingly distributed
NOAA, ESA, and other partners' data now contribute to key measurements

An opportunity to plan ahead
Defining which data products NASA should steward for sustained scientific value and high-impact applications

APPROACH

Prioritized investment
Decadal Survey alignment, community need, and available resources

Science-first resourcing
Improving processing efficiency frees investment for the data products that matter

Focus on the measurement
Organize around the data product, not the satellite that produced it

GOALS

Long-record integrity
Science-quality data records that remain coherent across missions

Products Only NASA Can Make
Authoritative records requiring NASA's unique mission heritage

Filling the gap
Products where no commercial or partner path exists

Advancing Scientific Understanding of Earth
Earth Science Research

Research Strategy

Advance scientific breakthroughs to better understand Earth and advance models that capture the intricacies of the Earth system

- Focus on things that only NASA can do
- Sustain our community as a premier knowledge incubator
- Understand Earth's complex and interconnected systems
- Strengthen the linkage between discovery and impact of science

ESD Research Strategy Provides Flexibility

- Simplify Research organization structure (transition to Spheres)
- Use directed funds to maintain community-serving capabilities
- Provide steady cadence of ROSES opportunities for all
- Streamline and accelerate the ROSES application, evaluation, and award processes
- Enhance communication to our science community

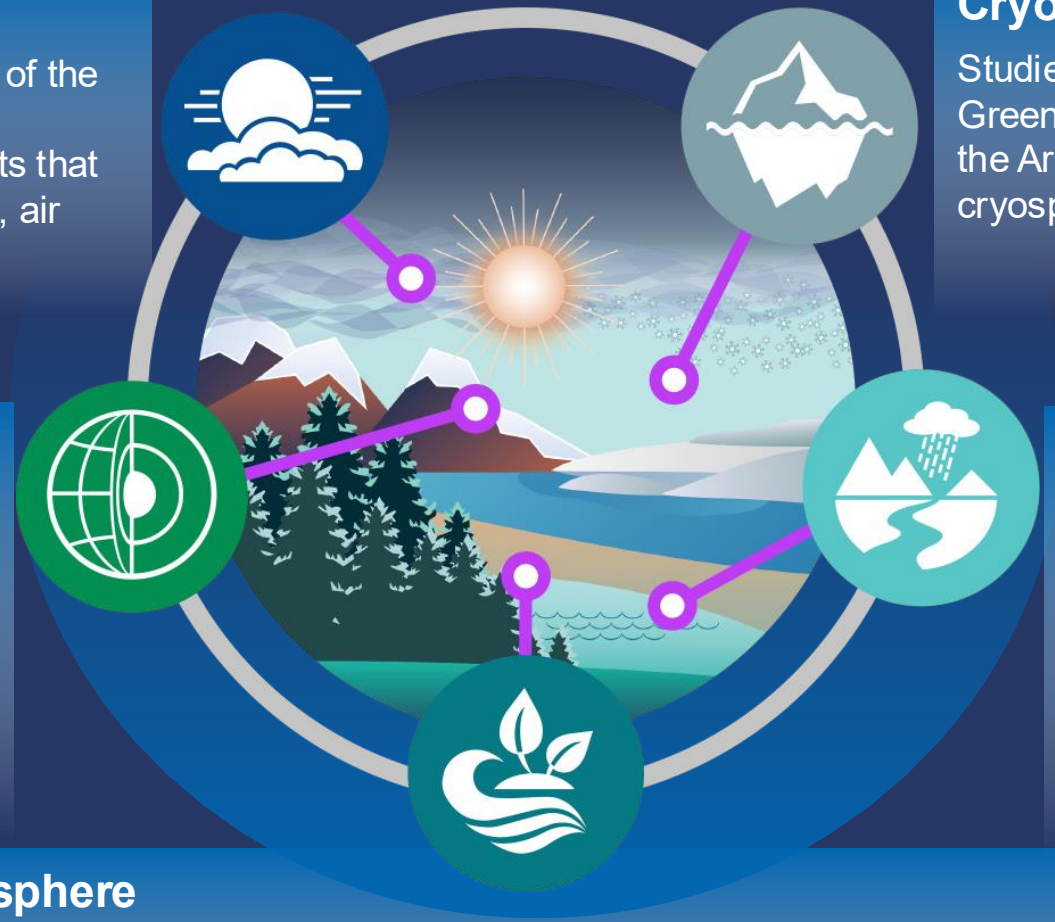
ESD Research advances Earth system science by enabling the use of satellite, airborne, and ground-based observations, along with modeling approaches, to improve understanding of Earth processes.

Atmosphere

Studies the dynamics and thermodynamics of the atmosphere, its physical and chemical composition, and the interdependent impacts that these have on the Earth's radiative balance, air quality, and weather.

Cryosphere

Studies polar ice, including the Antarctic and Greenland ice sheets, polar glaciers, sea ice in the Arctic and Southern Oceans, and the cryosphere's link to Earth system



Geosphere

Studies processes and changes in the Earth's core, mantle, and crust along with surface topography and geology, and the hazards they generate, along with studying geodesy and geodynamics.

Hydrosphere

Improves the observation, understanding, and prediction of water and energy in the Earth System across land, ocean, and the atmosphere through the integration of measurements from satellites, surface networks, and airborne campaigns.

Biosphere

Studies the interactions between/within terrestrial and aquatic ecosystems, along with changes in their biogeochemistry and biodiversity, to further understand the Earth system in which both human-induced and natural changes influence productivity and the availability of natural resources.

Integrated Earth System Modeling Strategy

Models underpin state-of-the-art prediction and global analyses that support economic growth, national priorities and security:

- **Streamline**: Engage leading experts in the field nationwide to identify streamlined modeling approaches and consolidated workflows for greater effectiveness
- **Prioritize**: Align investments around advanced technologies, mission needs, and new modeling techniques, including AI/ML
- **Flexible and scalable**: Define modular and connected modeling approaches that maximize scientific computing systems

Integrated Modeling Virtual Institute (IMVI): From Independent to Integrated

INDEPENDENT MODELS TODAY

Land

Atmosphere

Ocean

Ice

Earth System
Reanalysis and short-term and seasonal prediction

Earth System
Decadal and long-term prediction and planetary atmospheres

LIS (Land Information System)

Ex.: Chemistry, turbulence, cloud processes

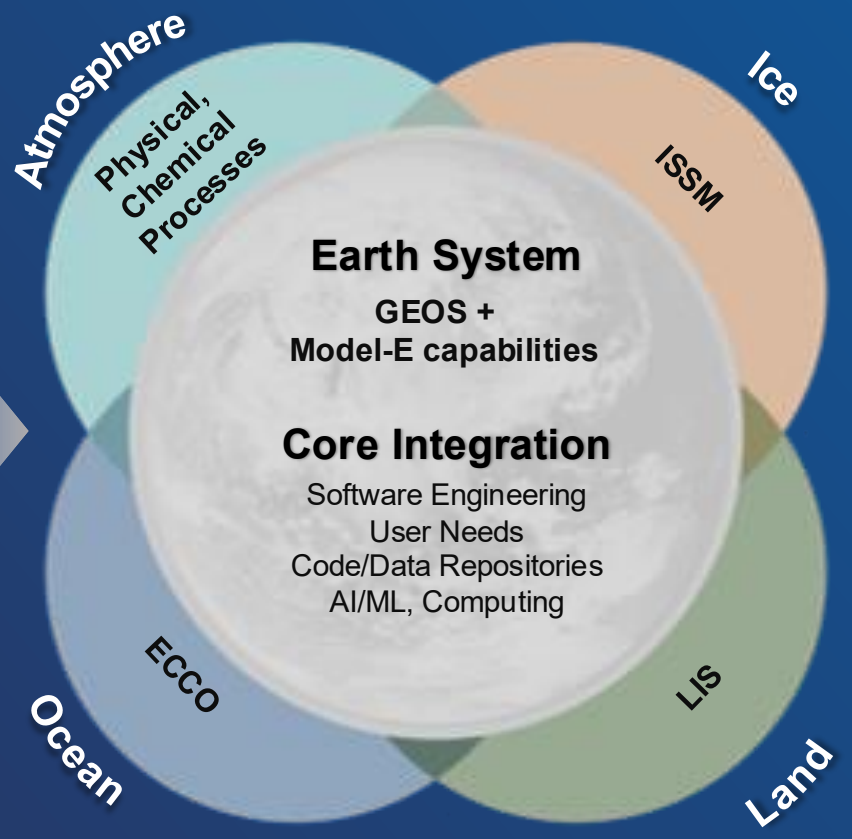
ECCO (Estimating the Circulation and Climate of Oceans)

ISSM (Ice Sheet and Sea-Level System Model)

GEOS (Global Earth Observing System Model)

Model E (Global Earth Observing System Model)

INTEGRATED MODELING WITH IMVI



Foundation Models

Partnerships

Advancing Use of Actionable Science
Applied Science and Responsive Science Initiatives

Earth Action Strategy

Drive U.S. economic growth: Help U.S. businesses, from farms to the space economy, use Earth data to compete and innovate

Equip leaders to act: Deliver trusted data and tools to local, state, and federal partners to increase resilience, security, and prosperity

Accelerate AI for Earth: Apply AI to widen access to Earth data and speed insight

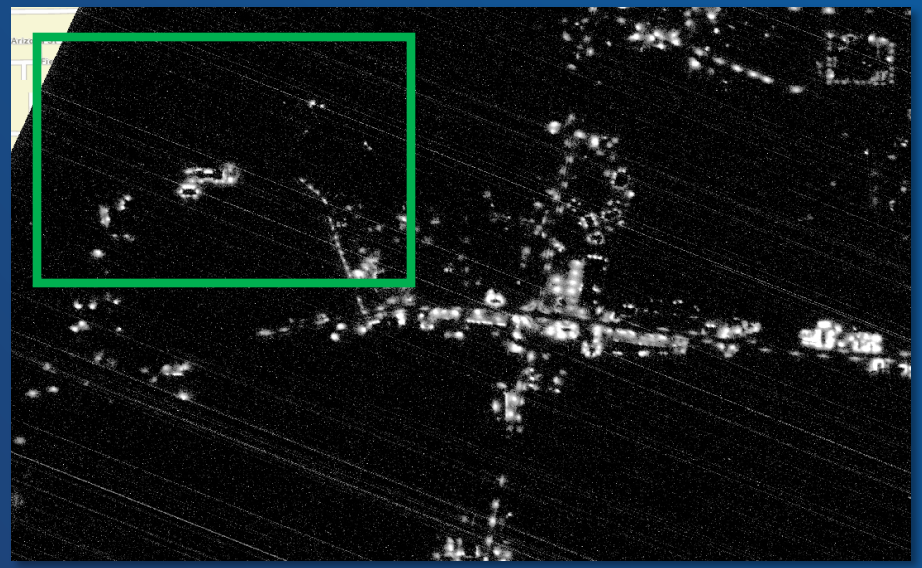
Strengthen American resilience to hazards: Target fire, flood, drought, heat, and health threats

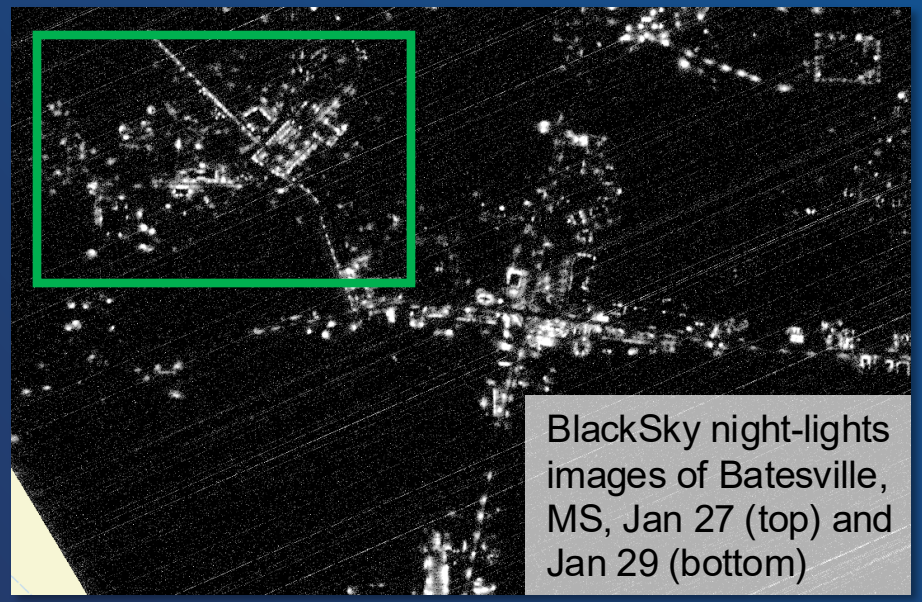
Scale what works: Support efficient solutions that work across regions and missions

Stay adaptive: Build programs that adjust as budgets, risks, and national priorities evolve

Response
Disasters Program & CSDA

For the first time, NASA's Disasters Response Coordination System used the new CSDA Disasters-specific Task Order during an activation — drawing on commercial assets to support federal, state, and local partners

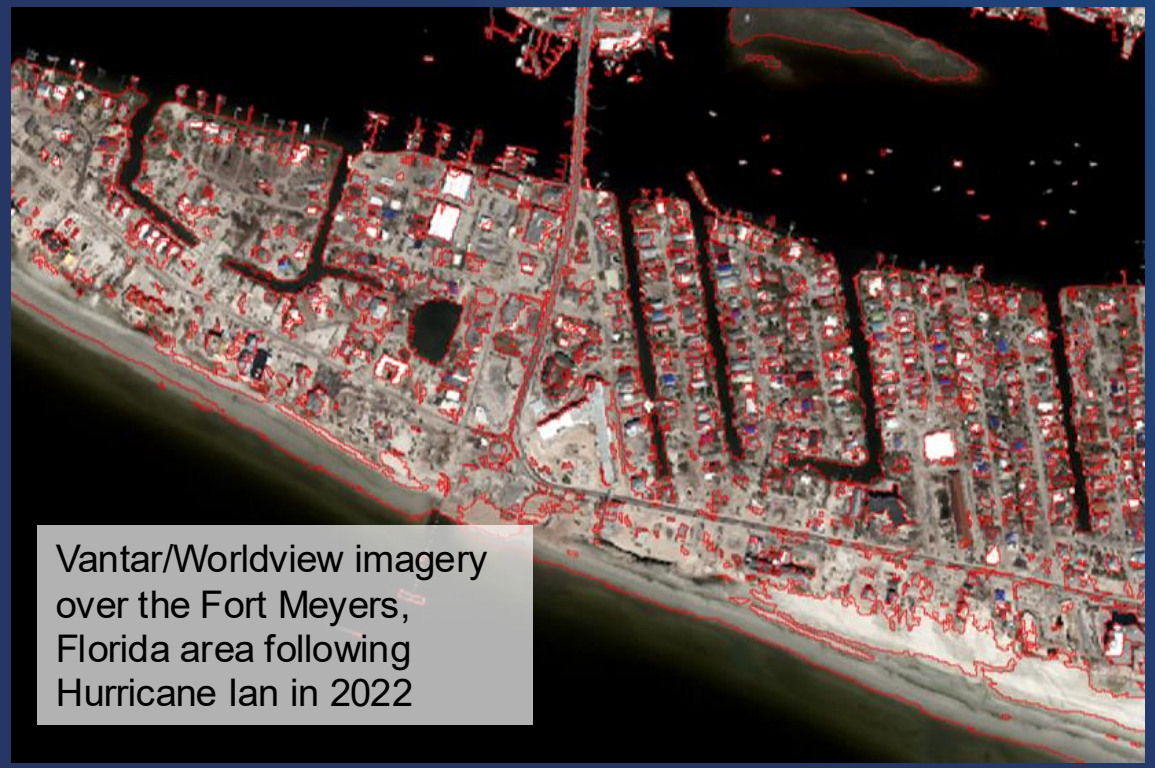




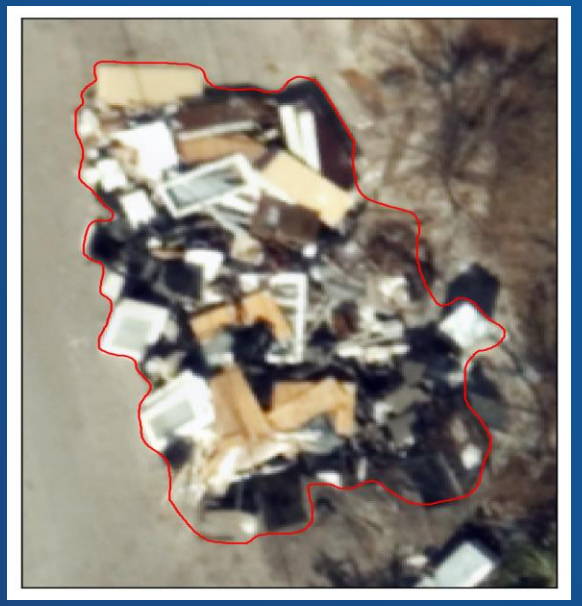
BlackSky night-lights images of Batesville, MS, Jan 27 (top) and Jan 29 (bottom)

The Future of Disaster Resilience

AI-enabled tools, commercial data, and cutting-edge science



Vantar/Worldview imagery over the Fort Meyers, Florida area following Hurricane Ian in 2022



ESD's Private Sector Engagement Strategy

Harness the power of **Earth Observations** to bolster America's **national security, safety, and economic prosperity**.

Unlock economic potential of NASA's Earth science cutting-edge capabilities.

Increase **awareness and use** of NASA Assets

Build a thriving **Commercial User Community**

Identify **private-sector needs** and inform future NASA priorities

Foster **innovation** through collaborative projects

We are a part of an **ecosystem**

Users & Decision-makers
Fed, state & local gov, general public, private sector, & others

Private Sector LLMs/GeoAI, Consultancies, and Value-added Data Services

Commercial Satellite Data Providers

Other public EO providers

USGS science for a changing world

NOAA

esa

Copernicus Europe's eyes on Earth

Researchers and Applications developers

NASA

NASA Earth Science

Questions?

NASA Earth

Your Home.

Our Mission.

science.nasa.gov/earth