

National Aeronautics and
Space Administration

NASA earth

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We are at a pivotal moment



A new strategy to meet the moment: Earth Science to Action





Setting the stage

The image features a central dark blue horizontal band containing the text "Setting the stage" in white. The background is a composite of two aerial photographs of a river delta. The top-left portion shows a wide, shallow river channel with a light blue overlay. The right and bottom-right portions show a more complex, branching river network with a darker blue overlay. The terrain is depicted in shades of green and brown, indicating vegetation and land elevation.

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

CONSENSUS STUDY REPORT

THRIVING ON OUR CHANGING PLANET

A Decadal Strategy for Earth Observation from Space



Key National Academies Guidance

**Increase the impact of Earth science
for the response to climate change**

“Pursue increasingly ambitious objectives and innovative solutions that enhance and accelerate the science/applications value of space-based Earth observations and analysis to the nation and the world in a way that delivers great value, even when resources are constrained, and ensures that further investment will pay substantial dividends.”

*- Thriving on Our Changing Planet: A Decadal Survey for
Earth Observations from Space, 2017*

Earth Science to Action: the basics

The Earth Science to Action strategy is the Earth Science Division's 2024-2034 strategic plan. This strategy is our plan of action designed to achieve our vision, mission and strategic goals.

- ESD's response to 2017 Decadal Survey and other national priorities
- Drives next iteration of programs, missions, initiatives
- Informs budget approach
- Informs employee performance expectations



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Earth Science: who's included

When we refer to “Earth science” we’re referring to our very large Earth science community, which represents a broad and diverse array of talent, disciplines and approaches, including but not limited to:

Disciplines

- Agronomy
- Atmospheric sciences
- Biogeochemistry
- Biology
- Cryospheric sciences
- Ecology
- Geology
- Geophysics
- Human geography
- Hydrology
- Land use science
- Meteorology
- Oceanography
- Physics
- Radiation sciences

Approaches

- In situ measurements
- Airborne observations
- Remote sensing
- Research
- Modeling
- User engagement
- Decision support
- Capacity building

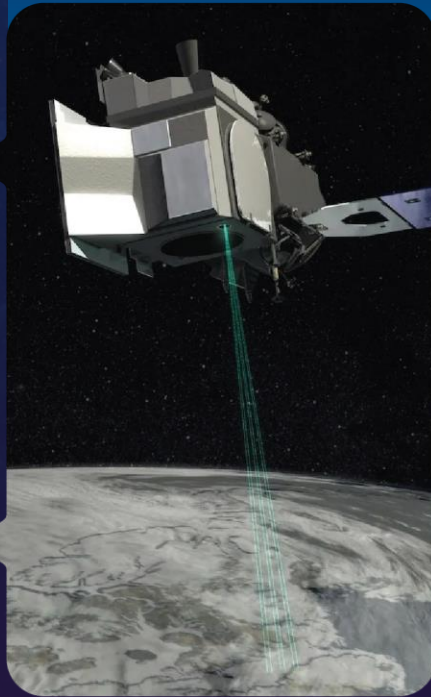


Earth Science: who's included

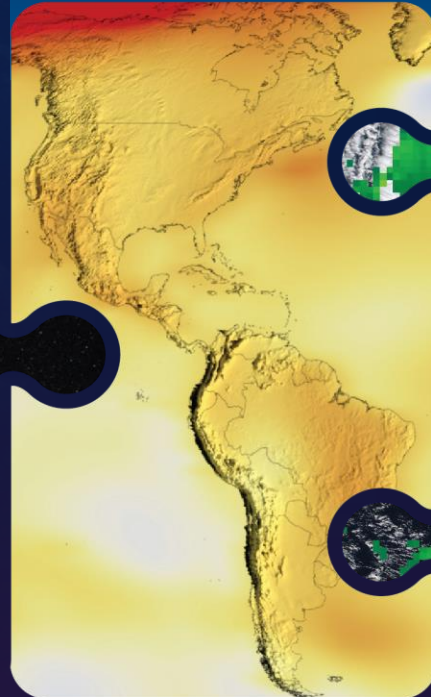
Technology



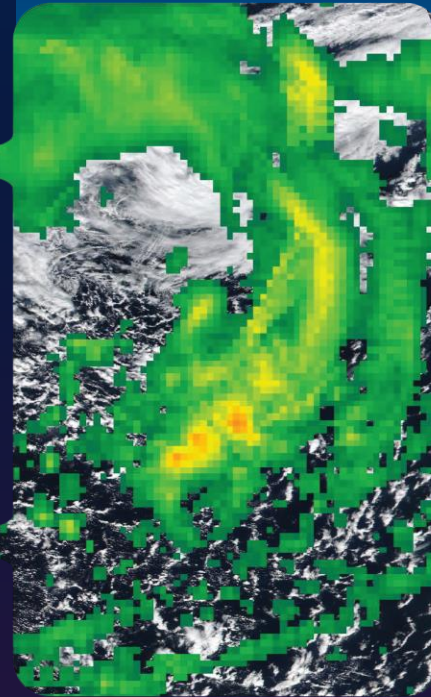
Flight



Research and Analysis



Data and Compute



Earth Action



What do we mean by “action”?

Our definition of action is accelerating the use of Earth science to support policy and decision-making for society’s well-being

- **Scale up:** Scale up existing efforts to get NASA science and data into hands of end users to solve real-world challenges
- **Build bridges:**
 - Build structural and cultural bridges between research, technology, flight, data, and Earth action elements
 - Identify and remove barriers to collaboration
- **Be user centered:** Prioritize info exchange with end users to allow their experiences to inform future programs



Are we cutting the research budget to do this?

○ **No!** The strategy does not call for defunding some efforts to start others. Work to implement this strategy will take place across all elements.

- R&A is a critical part of the strategy
- In some parts of ESD, implementation will be shared between R&A and Earth Action elements
- The overall goal is to realign responsibilities to enable deeper integration



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An aerial photograph of a river delta, likely the Colorado River, showing a complex network of channels and distributaries. The land is colored in shades of green and brown, indicating vegetation and terrain. Overlaid on the image are several semi-transparent blue shapes: a large, irregular shape in the upper left, a long, narrow shape in the upper center, and a large, irregular shape in the lower left. The text 'Strategy content' is centered in a dark blue horizontal band across the middle of the image.

Strategy content

OUR VISION

A thriving world, driven
by trusted, actionable
Earth science

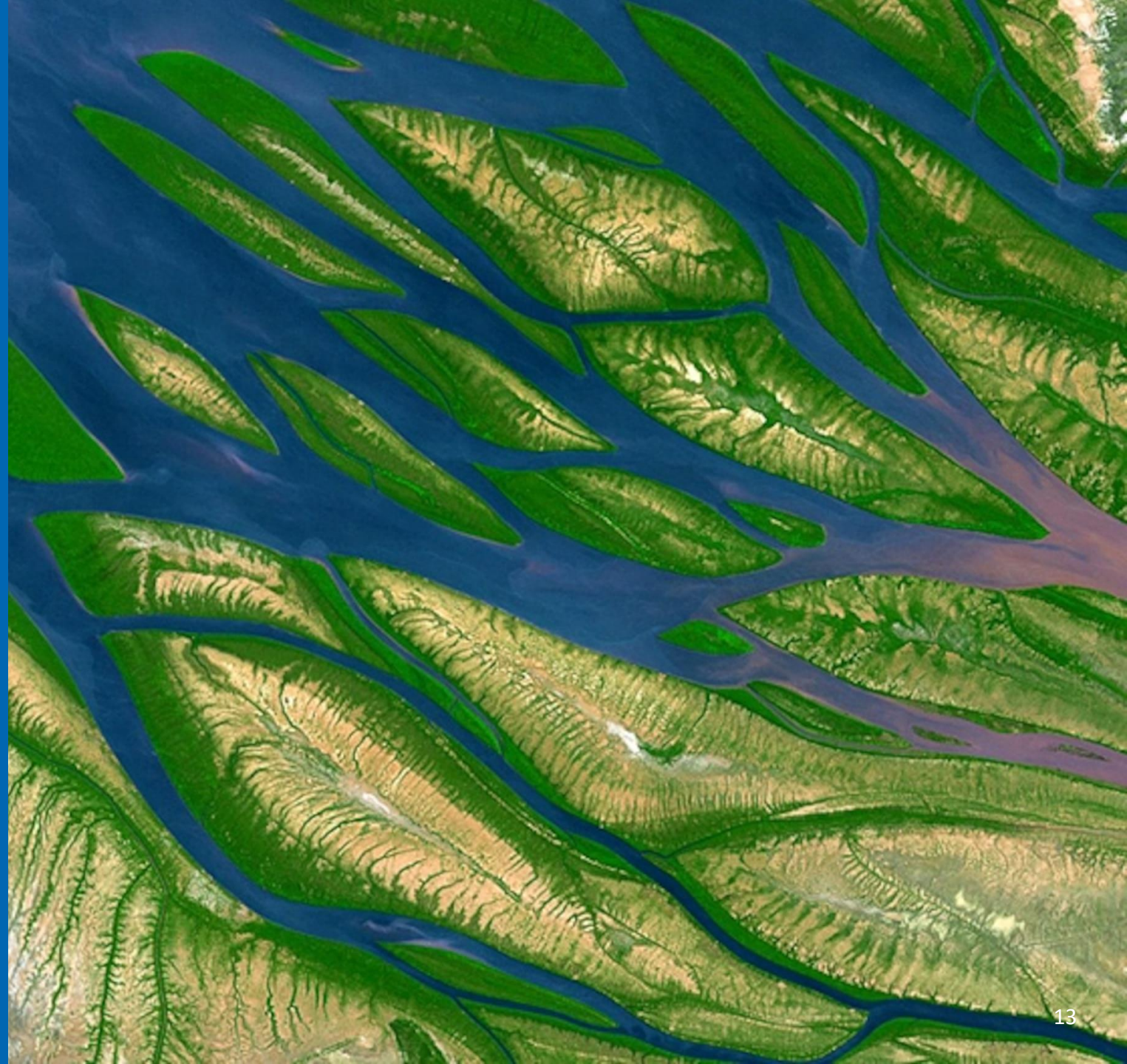


OUR VISION

A thriving world, driven by trusted, actionable Earth science

OUR MISSION

Compelled by our planet's rapid change, we innovate and collaborate to explore and understand the Earth system, make new discoveries, and enable solutions for the benefit of all



We are

Innovating
Collaborating
Discovering
Delivering

**Tapping the power of Earth
science to benefit all**





Aren't we already doing this?

Our work has been excellent to date. Here are some examples to paint a picture of why change is still needed



A farmer managing crops

- Successfully used tools and techniques learned from previous generations to manage crops
- With increased frequency of drought and flooding, these tools, while previously effective, no longer suffice
- Makes changes and upgrades to remain successful under new conditions



Cascading effects

- Global warming is changing growing regions, impacting what grows where
- To address this new changing landscape, we must connect in ways we haven't needed to before
- For example, moving from one mission at a time, to building integrated observatories that must work together

STRATEGIC GOAL

Within a decade, we will advance and integrate Earth science knowledge to empower humanity to create a more resilient world.





Objective 1

Holistically observe, monitor and understand the Earth system

Key Result 1.1: The most advanced Earth observing system in the world

Key Result 1.2: Cutting-edge technology

Key Result 1.3: Integrated and trusted Earth system data

Key Result 1.4: Scientific breakthroughs to better understand Earth



Objective 2

○ Deliver trusted information to drive Earth resilience activities

Key Result 2.1: Models that capture the intricacies of the Earth system

Key Result 2.2: Co-designed solutions and tools to support users

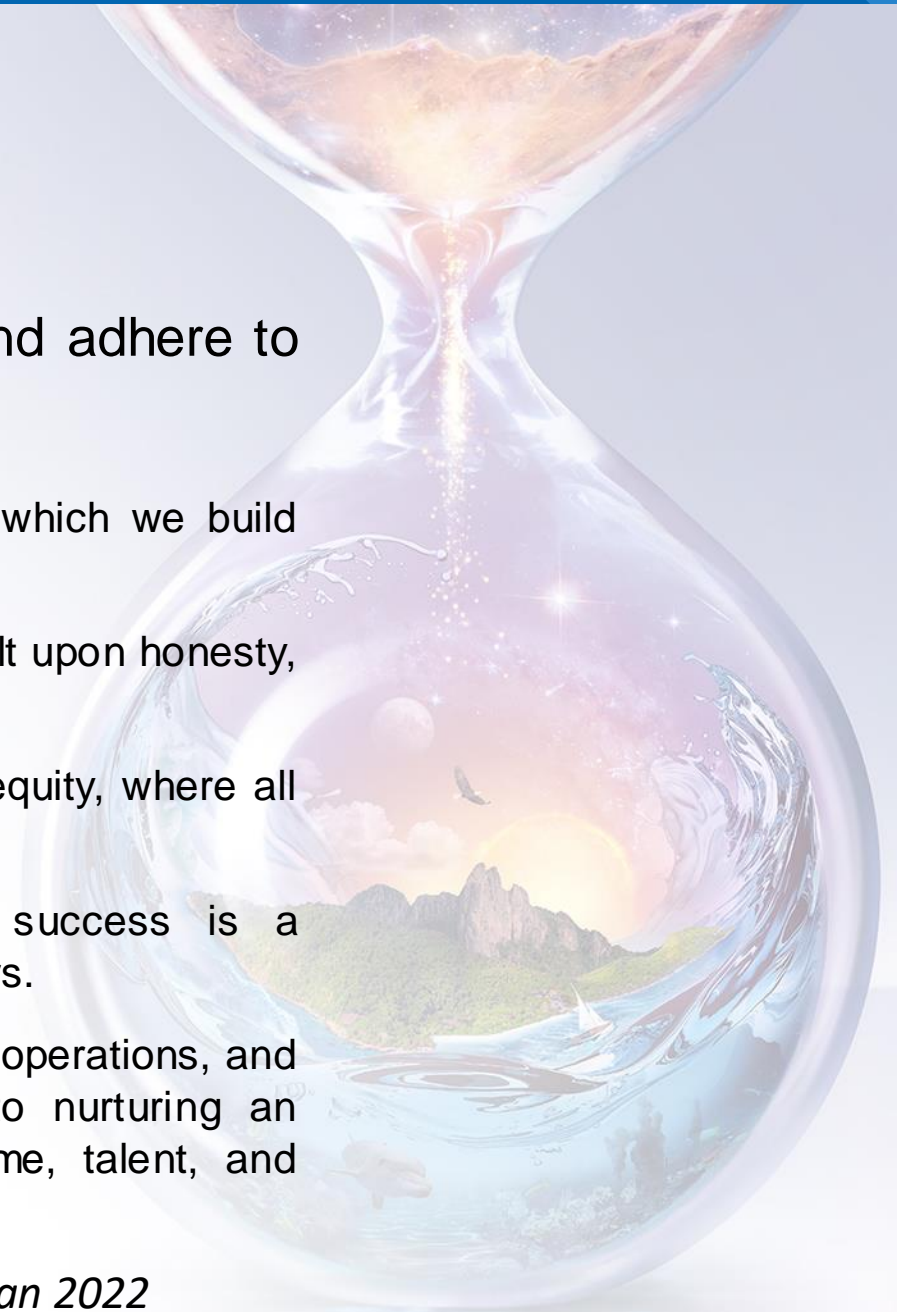
Key Result 2.3: Science-based information we can trust and act on

Key Result 2.4: Promotion of Earth information as a national asset

NASA Core Values

As part of our NASA Earth science enterprise, we adopt and adhere to the fundamental five NASA core values:

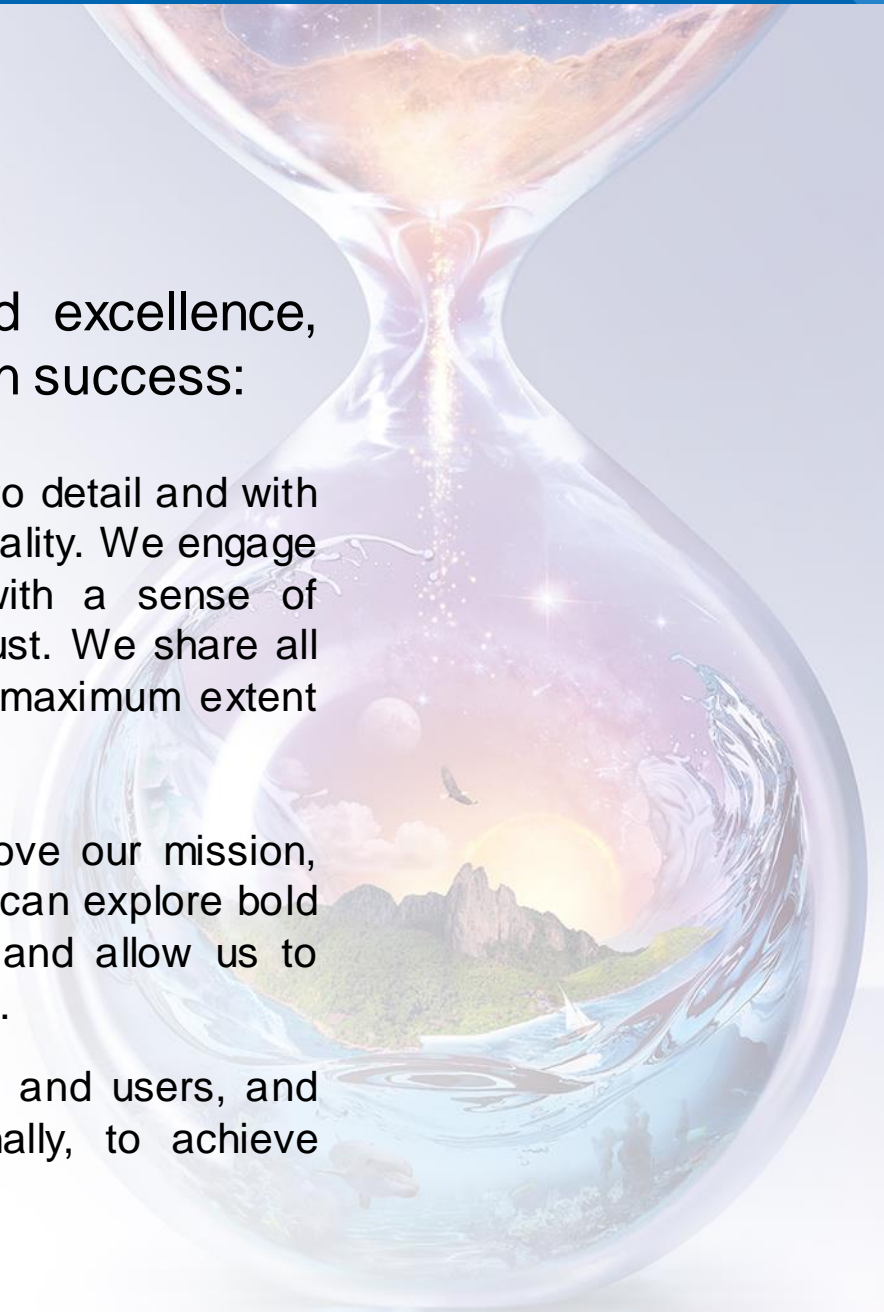
- **Safety:** NASA's constant attention to safety is the cornerstone upon which we build mission success.
- **Integrity:** NASA is committed to maintaining an environment of trust, built upon honesty, ethical behavior, respect, and candor.
- **Inclusion:** NASA is committed to a culture of diversity, inclusion, and equity, where all employees feel welcome, respected, and engaged.
- **Teamwork:** NASA's most powerful asset for achieving mission success is a multidisciplinary team of diverse, talented people across all NASA Centers.
- **Excellence:** To achieve the highest standards in engineering, research, operations, and management in support of mission success, NASA is committed to nurturing an organizational culture in which individuals make full use of their time, talent, and opportunities to pursue excellence in conducting all Agency efforts.



Areas of Emphasis

Augmenting NASA's core values of integrity, teamwork, and excellence, Earth science identifies three additional values critical to mission success:

- **Trustworthiness:** Our work is undertaken with transparency and attention to detail and with quality-control processes in place to ensure a high level of credibility and quality. We engage with our partners, users, and stakeholders, as well as the public, with a sense of responsibility, truthfulness, and humility to establish and maintain social trust. We share all aspects of what we do (data, science, knowledge, methodologies) to the maximum extent possible to ensure high confidence in our findings.
- **Innovation:** We initiate and encourage activities with a potential to improve our mission, even if the end result is uncertain. We take thought-out risks to ensure we can explore bold and innovative ideas, keep us at the edge of science and technology, and allow us to advance the state of the art and remain an innovation hub for Earth science.
- **Collaboration:** We work collaboratively, we co-develop with our partners and users, and reach out across agencies, across sectors, nationally and internationally, to achieve maximum value and build added-value partnerships.



Guiding Principles

1. Amplify impact and augment our capabilities through enhanced partnerships
2. Engage a diverse workforce and the wider Earth science community
3. Use a balanced approach when faced with competing factors
4. Encourage innovation to maintain cutting edge capabilities
5. Ensure robustness and resilience in our programs



An aerial photograph of a river network, likely a delta or a large confluence, with blue overlays highlighting specific channels and their tributaries. The background is a natural color satellite image showing green vegetation and brownish terrain. The blue overlays are semi-transparent and follow the main channels and their immediate tributaries, illustrating a specific flow path or strategy.

Visualizing the strategy at work

Earth Science to Action Strategy

Earth Science to Action



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 & Societal Value

- Offer models, scientific findings and info through Open-Source Science principles
- Support climate services
- Provide science applications and tools to inform decisions

Earth System Science & Applied Research

- Grow scientific understanding of Earth's systems
- Develop predictive modeling for science applications and tools to mitigate, adapt and respond to climate change

Foundational Knowledge, Technology, Missions & Data

- Technology innovation
- Earth observations missions
- Data collected from space, air and ground

Example: Landsat to Landsat Next

Earth Science to Action



Virtuous Cycle

- User needs inform development of Landsat Next

Public Understanding & Exchange

- Seeking input from end users at Commodity Classic conference

Solutions & Societal Value

- OpenET

Earth System Science & Applied Research

- Ensemble of satellite-driven models used to map evapotranspiration

Foundational Knowledge, Technology, Missions & Data

- Landsat satellite data

What Do We Mean by Collaboration/Partnership



Urgency

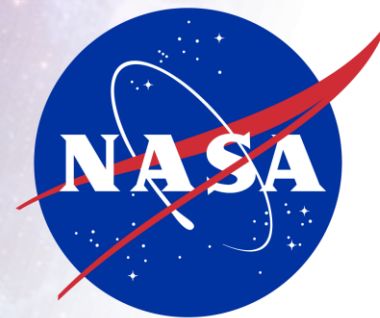
Responsibility

Leadership





OF DIVISION



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Your Home. Our Mission.