National Aeronautics and Space Administration

Office of the Chief Science Data Officer

YEAR IN REVIEW

2025

Message from NASA's Chief Science Data Officer

Dear Colleagues and Friends,

As we look back on 2025, I am proud of the progress we have made in strengthening the data and computing foundation that supports NASA's missions. This year, the Office of the Chief Science Data Officer (OCSDO) advanced key work in high-end computing, data modernization, cloud architecture, artificial intelligence, and open science, ensuring the entire agency has the tools it needs to meet its most complex challenges.

NASA's missions are producing more data than ever before. Our focus is on making that information easier to find, easier to use, and easier to share. In 2025, we expanded access to open science training and streamlined how scientific data and software are released.

Growing demand for modeling and other computationally-intensive workloads make NASA's on-premises supercomputers and cloud computing environments essential to achieving the agency's goals. From advanced simulations that supported Artemis II to the arrival of Athena, NASA's newest supercomputer, and the development of a modern cloud environment for research, we strengthened the capabilities that underpin mission design, scientific analysis, and exploration.

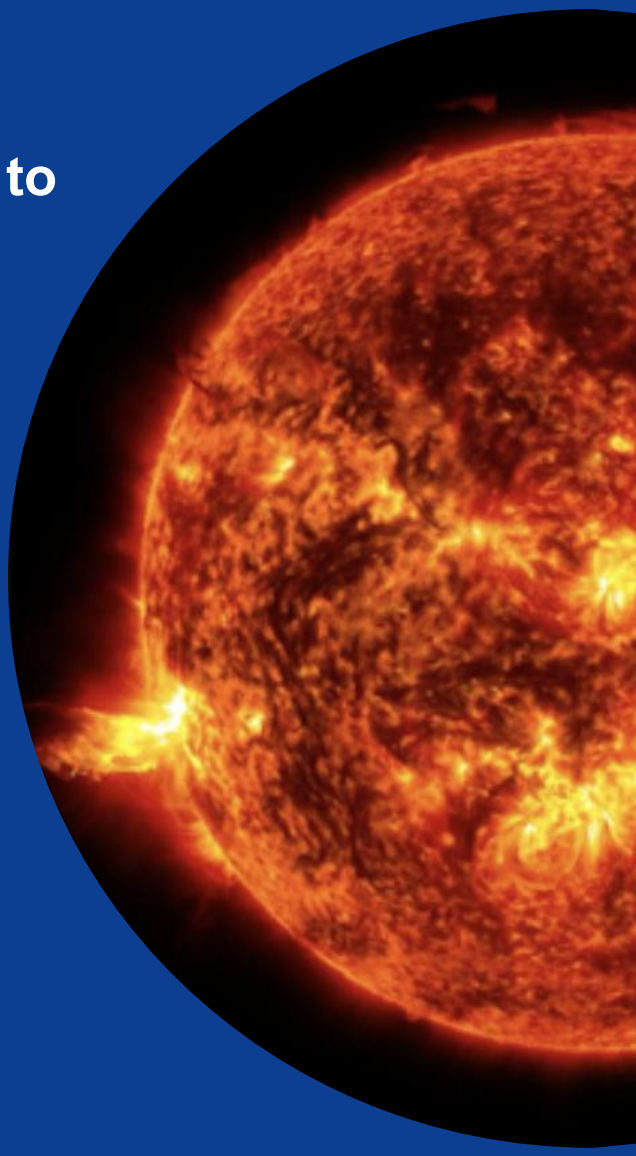
Open science continued to guide our efforts as we refreshed and expanded public learning resources and improved how researchers make their work available to the community. These efforts support the Administration's goal of Gold Standard Science, ensuring that federally funded research is shared openly, documented clearly, and released in ways that maximize transparency and help ensure NASA's science is reusable and accessible to all.

I am grateful for the dedication of our teams and the collaboration across NASA that made this year's progress possible. Together, we are building the data and computing ecosystem that will support the next era of discovery.

Kevin Murphy
Chief Science Data Officer

CHIEF SCIENCE DATA OFFICER

NASA and IBM Release First Heliophysics AI Foundation Model to Study Space Weather



In 2025, NASA and IBM introduced the Surya Heliophysics Foundation Model, an open-source AI model trained on nine years of Solar Dynamic Observatory data. As part of the OCSDO's 5 + 1 AI Strategy, Surya is the dedicated foundation model for NASA's Heliophysics Division, designed to advance solar science and improve space weather forecasting by detecting solar activity and predicting flares with high accuracy.

By enabling earlier and more reliable space weather warnings, Surya supports critical applications such as satellite operations, power grid protections, GPS functionality, communications, and astronaut safety. It represents a key step in leveraging AI to accelerate scientific discovery and enhance decision-making for exploration.

Modernizing How NASA Shares Scientific Software and Data

The OCSDO initiated a pilot to allow more projects to be shared under widely used open-source licenses with NASA's scientific software release policy. This makes it easier for educators, developers, and research teams to reuse and adapt NASA-created tools. These updates broaden the reach of NASA software and strengthen collaboration across the scientific community.

The office, working with NASA's Science and Technical Information Repository, also streamlined the processes for releasing scientific data and software, improving guidance and reducing delays that previously made it difficult for researchers to share their work. The result is a clearer, faster path for making NASA science available to the public—supporting transparency, reuse, and the growing demand for open scientific resources.

High-End Computing: Fueling Discovery and Exploration Across NASA

In 2025, NASA's high-end computing resources played a critical role in supporting some of the agency's most important exploration, aeronautics, and science activities. A key example is the work done to prepare NASA's Space Launch System (SLS) rocket for the upcoming Artemis II mission. NASA engineers used ultra-fast supercomputer simulations alongside testing in the Unitary Plan Wind Tunnel at NASA's Ames Research Center in Mountain View, California, to understand how the rocket would perform under a wide range of flight conditions. By combining high-fidelity digital models with real-world aerodynamic testing, the team reduced analyses that once took weeks to just hours—improving accuracy, accelerating design decisions, and strengthening safety for the astronauts who will fly.

This year also marked an important step forward for NASA's computing future with the arrival of Athena, NASA's newest supercomputer, which came online in December. Athena expands NASA's capacity for advanced modeling and simulation, supporting research across science, aeronautics, and mission design, and positions the agency for the future of exploration and discovery. Athena is expected to significantly enhance NASA's computational capacity supporting a wide range of scientific and engineering workloads across all mission directorates. In addition to performance gains, the system is projected to reduce utility costs by about $3.6 million annually, delivering an estimated 177% increase in compute capability per kilowatt-hour as compared to the legacy Pleiades supercomputer that Athena replaces.

Together, these efforts strengthen NASA's ability to solve complex challenges, test mission concepts, and explore environments that are difficult or impossible to recreate anywhere else while creating a more efficient and sustainable computing environment.

Strengthening Skills Through Open Science Training

In 2025, the OCSDO expanded and refreshed its open science training resources with the release of **Open Science Essentials (OSE)** and a fully updated version of **Open Science 101**. OSE offers a streamlined introduction to the core principles of open science, covering topics such as open data, open peer review, and collaborative research practices, making it easier for learners to quickly build foundational skills.

The updated Open Science 101 course provides a more in-depth exploration of open science concepts, featuring improved navigation, modernized content, and clearer guidance for researchers who want to apply open practices in their work.
Both courses are free and self-paced. They are available to the public on the online learning platform and internally through SATERN for NASA employees and contractors.

To learn more about **Open Science 101** and **Open Science Essentials**, and to take the courses, visit go.nasa.gov/**os101**.

New Ways to Explore NASA Data

OCSDO continued expanding the use of artificial intelligence to help researchers navigate and understand the agency's growing library of scientific information by focusing on tools that make it easier for scientists, students, and the public to work with NASA data. The team delivered major upgrades to the **Science Discovery Engine**, adding AI-assisted features that help the team quickly curate related datasets, research papers, and scientific software. These improvements enable efficiencies by reducing the time the team spends manually curating information. Well curated information reduces the time research spend searching for information and make NASA's science data easier to explore.

The office also advanced initiatives aimed at **using AI throughout the scientific workflow**, supporting everything from data organization to analysis and visualization. These efforts ensure that AI strengthens scientific discovery by improving access, streamlining tasks, and helping users work more effectively with NASA's open data.

Science Cloud Modernization

NASA continued making progress toward a unified science cloud environment that will give researchers more flexible, scalable ways to access and analyze the agency's growing collection of scientific data. This work is laying the foundation for a modern digital ecosystem where data, tools, and computing resources can operate together more seamlessly.

OCSDO advanced core elements of this environment by improving cloud access pathways and supporting the onboarding of early users across the agency. These efforts make it easier for researchers to work with large volumes of NASA data directly in the cloud—reducing the need to download massive files and enabling more efficient, collaborative workflows.

The office also strengthened the underlying infrastructure that will support future cloud-based tools and services, including shared components that improve consistency, reduce duplication, and streamline how teams interact with NASA's data resources. These improvements create a more integrated experience for scientists and open new opportunities for analysis at scale.

Together, these advancements are part of NASA's effort to create an integrated computing landscape using both cloud and on-premises computing to improve accessibility, enhance collaboration, and support the next generation of discovery.

2025 Awards

Several members of the OCSDO team won awards for their efforts in 2025, these include:

- **2025 AGU Open Science Award:**
  - Chelle Gentemann, OCSDO Open Science Program Scientist
  - Prithvi Earth Observation Foundation Model Team
- **NASA Agency Honor Awards**
  - Agency Innovation Mission Award Coin: Fred Kepner, Education Specialist
  - Exceptional Achievement Medal: Manil Maskey, Office of Data Science and Informatics Manager
  - Agency Group Achievement Award: AI Foundation Model for Science Team
  - Marshall Space Flight Center Group Achievement Award: INDUS Team
  - NASA Early Career Achievement Medal: Sujit Roy, AI Implementation Lead, IMPACT AI Team
  - Group Achievement Award: Advanced Computing Hyperwall Commissioning Team

Sharing NASA Science With More People Than Ever

The OCSDO strengthened its connection with the public and scientific community through more than **40 conferences, workshops, and events** across the country. These engagements included co-hosting the **ESA–NASA International AI Workshop** in Italy, launching an **AI "Ask Me Anything" tour** at NASA centers, and gathering scientists and data managers for a **Data Repositories Workshop** to discuss ways to make NASA's datasets more accessible and user-friendly.

Online participation also grew significantly, with a **65% increase in visits** to OCSDO-related pages on the NASA Science website. The office launched the **Science Data Portal blog**, expanding opportunities for people to learn about NASA's data, tools, and open-science resources.

Additionally, NASA's Chief Science Data Officer filmed **Smart Talks with IBM, hosted by Malcolm Gladwell**, highlighting how data, computing, and AI are shaping the future of NASA exploration. Look for the episode, coming soon!

Science Explorer Adds More Than 1.4 Million Open-Access Papers

Science Explorer (SciX), a cooperative agreement between NASA and the Smithsonian Astrophysical Observatory, added **1.4 million green open-access links** to PubMed Central, dramatically increasing public access to research literature. The platform also indexed thousands of NASA data products and hundreds of thousands of National Science Foundation awards.

What's Next?

Our achievements in 2025 are a testament to the dedication, creativity, and collaboration of our teams and partners. As we look ahead to 2026, we remain committed to:

- Expanding NASA's use of responsible AI tools to support research and data exploration.
- Strengthening the Science Cloud environment to improve access to data and computing resources.
- Preparing new capabilities for next-generation high-end computing and advanced modeling.
- Enhancing data discovery tools to make NASA's science easier to find and use.
- Improving how scientific data and software are shared to support transparency and collaboration.

Learn More:

- **About the OCSDO**
- **Open Science at NASA**
- **AI for Science**
- **Science Data Portal**
- **High End Computing Capability**