

Transforming to Open Science in the NASA Science Mission Directorate

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Abstract

For over 30 years, NASA Science Mission Directorate has been a world leader in making the data from its flagship missions available for anyone to use. This data represents a significant public investment and NASA has a mandate to maximize the accessibility of this information for the public good. Along with the data collected by the Missions, NASA has also supported the curation of data that enables ground breaking research in each of our different disciplines. These novel technologies for data access and curation from the different divisions have enabled groundbreaking science. As technology advances and data volumes grow, SMD is working towards even further enhancing the accessibility of the information that NASA produces. This includes new policies to assure that NASA data is FAIR (Findable, Accessible, Interoperable, and Reusable) in the future, leverage techniques and technologies developed by the different divisions for accessing information across the SMD, enabling new technologies like machine learning and cloud processing along with high performance computing, providing support for citation of data through digital object identifiers, creating the ability to search across SMD to enable cross divisional science, and making sure SMD data are accessible to everyone. With these developments, NASA SMD aims to help the community to Transform to Open Science and accelerate the process of scientific discovery. In the process, this will enable SMD science to be even more inclusive, reproducible, and transparent.

National Aeronautics and
Space Administration



EXPLORE SCIENCE

Transform to Open Science Steve Crawford

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Open-Source Science @ SMD

OPEN-SOURCE SCIENCE

Building on the concepts from Open-Source Software, open source science conducts science openly to expand access and uses transformative technology to accelerate science.

- **Transform to OPen Science (TOPS)**
- Investments in open-source science infrastructure
- Cross-divisional AI capabilities and
- Digital Transformation activities
- ROSES elements for open source software
- Open scientific cloud environments
- Data analysis platform prototypes

Prototype **common data catalog** by FY22Q4 and expand Astrophysics Data System

\$130M in Divisional investments in Open-Source Science that are **aligned** with this program.

Fiscal year	OSS Total (\$M)
FY21	\$8
FY22	\$21
FY23	\$20
FY24	\$20
FY25	\$20
FY26	\$20
FY27	\$20

SPD-41: Scientific Information Policy

[SPD-41: The Science Information Policy](#) is the **first SMD-wide policy on data, software and information**. Learn more at the [Science Information Policy Website](#).

- Consolidation of existing policies and laws applicable to SMD.
- Applies to all SMD-funded activities related to producing scientific information. *The policy excludes restricted information such as ITAR, export control, CUI.*
- A new Request for Information (RFI) solicits feedback on SPD-41, including support needed for successful implementation and proposed additions: go.nasa.gov/RFISPD41. **Responses are due Feb 11, 2021.**
- Questions can be sent to HQ-SMD-SPD41@mail.nasa.gov.

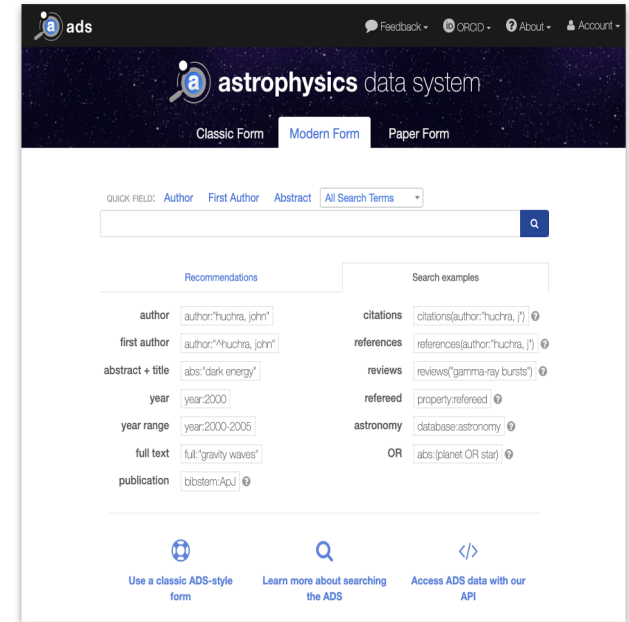
SPD-41: Highlights and *Proposed Additions*

Publications	Data	Software
<ul style="list-style-type: none">● Open and publicly accessible● <i>Open access publications and sharing as preprints are encouraged</i>	<ul style="list-style-type: none">● Mission data will be shared with no period of exclusive access● <i>Data shall be FAIR (Findable, Accessible, Interoperable, and Reusable)</i>	<ul style="list-style-type: none">● <i>Mission software is developed openly</i>● <i>Research software released as open-source software with a permissive license</i>

Increasing Access to SMD Publications

NASA has a mandate to ensure access to and reliable preservation of peer-reviewed publications that arise from NASA-funded research.

- NASA SMD supports publishing as Open Access and encourages using preprint servers.
- SMD is funding ADS to expand its holdings in Heliophysics and Planetary Science.
- NASA STI is working on an agreement with CHORUS and improving the PubSpace interface.
- We will be developing further guidance and services to make it automatic to preserve and make your publications accessible.



Transform to Open Science

Accelerating Scientific Discovery

- > PROTECTING & IMPROVING LIFE ON EARTH
- > LIFE ON OTHER PLANETS
- > MYSTERIES OF THE UNIVERSE

Overview

- TOPS 5-year initiative will act as a catalyst to **jump-start** a suite of coordinated activities designed to rapidly transform science.
- Designate **2023 as the Year of Open Science (YOOS)**.
- Our focus for TOPS will be on early career scientist in NASA SMD communities, and welcome participation and coordination with other groups.

In 5 years, TOPS will:

1. **Increase understanding and adoption of open science principles and techniques in our Mission and Research Communities:** 20K scientists earn open science certifications, achievements, and badges at summer schools, society meetings, & other events
2. **Accelerate major scientific discoveries through supporting the adoption of open science:** ROSES solicitation to support major scientific discoveries using open science methods in each division: 5 major results within 5 years
3. **Broaden participation by historically excluded communities:** Double participation by historically excluded communities in submitted proposals, applications from students, and participation in mission teams.

Please reach out to us to find out more!



More information
about TOPS is
available at the
[website](#) and
[GitHub repository](#)