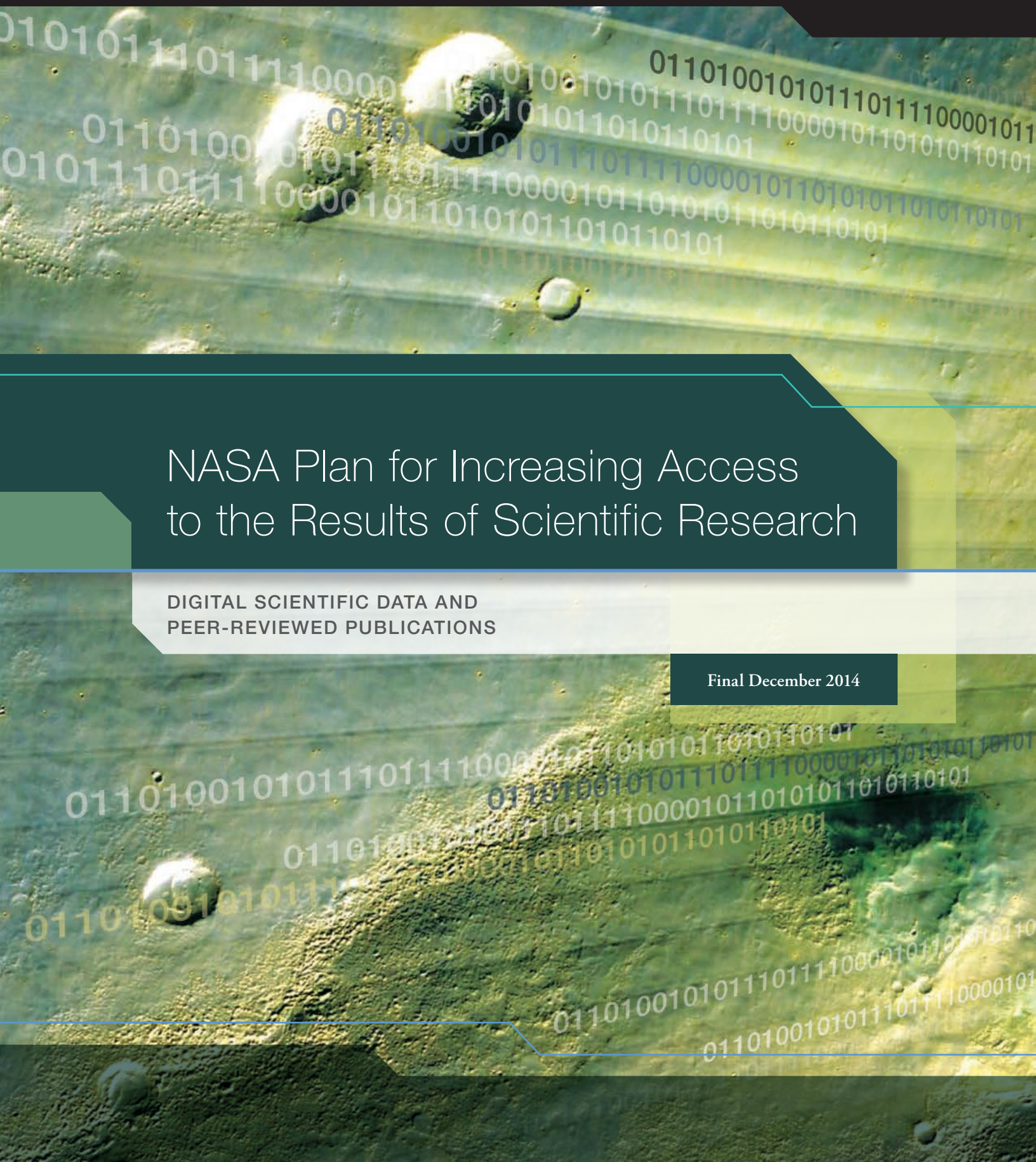
National Aeronautics and Space Administration



NASA Plan for Increasing Access to the Results of Scientific Research

DIGITAL SCIENTIFIC DATA AND PEER-REVIEWED PUBLICATIONS

Final December 2014

NASA Plan for Increasing Access to the Results of Scientific Research

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Introduction

This plan is issued in response to the Executive Office of the President's February 22, 2013, Office of Science and Technology Policy (OSTP) Memorandum for the Heads of Executive Departments and Agencies, "Increasing Access to the Results of Federally Funded Scientific Research." Through this memorandum, OSTP directed all agencies with more than $100 million in annual research and development expenditures to prepare a plan for improving the public's access to the results of federally funded research.

The National Aeronautics and Space Administration (NASA) invests on the order of $3 billion annually in fundamental and applied research and technology development[1] across a broad range of topics, including space and Earth sciences, life and physical sciences, human health, aeronautics, and technology. Promoting the full and open sharing of data with research communities, private industry, academia, and the general public is one of NASA's longstanding core values. For example, NASA's space and suborbital mission personnel routinely process, archive, and distribute their data to researchers around the globe. This plan expands the breadth of NASA's open-access culture to include data and publications for all of the scientific research that the Agency sponsors.

1 Report Regarding America Competes Act Pursuant to Section 1008(c) of the America Competes Act (Public Law 110-69).

This plan establishes objectives to ensure public access to publications and digital datasets arising from NASA research, development, and technology (RD&T) programs in order to:

- affirm and enhance NASA's commitment to public access to scientific research results;
- ensure access to and reliable preservation of NASA-funded scholarly publications and digital datasets for research, development, commercialization, and educational purposes, within available resources;
- preserve and increase the use of scientific research results to enhance scientific discovery and application of research results;
- affirm NASA's commitment to its scientific integrity policy and support the reproducibility of scientific research results;
- ensure that all extramural researchers receiving NASA grants, cooperative agreements, and contracts for scientific research and intramural researchers develop data management plans, as appropriate, describing how they will provide for the long-term preservation and access of scientific data in digital format;
- optimize archival and dissemination of data and publications, including long-term stewardship;
- support training, education, and workforce development related to scientific data management, analysis, storage, preservation, and stewardship; and
- support governance of and best practices for managing public access to peer-reviewed scholarly publications and digital data across NASA.

The February 22, 2013, OSTP memorandum's objectives are provided in two distinct areas: digital scientific data and peer-reviewed publications. NASA's plan addresses these objectives separately, in Parts A and B below, respectively.

PART A

Digital Scientific Data

1.0 Purpose and Background

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The sections that follow comprise the data component of the *NASA Plan for Increasing Access to the Results of Scientific Research*. The purpose of Part A is to increase the accessibility of digital data produced by NASA intramural researchers and by recipients of NASA grants, cooperative agreements, and contracts.

NASA is committed to following Federal guidelines that all data from federally funded research should be made as widely and freely available as possible while safeguarding the privacy of participants and protecting confidential and proprietary data. To facilitate increased access to such data, NASA will update its research data policy to require all investigators submitting a research proposal or research project plan[2] to NASA to include a plan for managing and providing access to final research data or to state why their data cannot or need not be made publicly available.

NASA conducts and supports research across a broad range of topics, including space and Earth sciences, life and physical sciences, human health research, aeronautics, and technology development. The types of data and the needs for sharing and preserving data across the fields vary considerably. For this reason, NASA has taken the approach

2 In the case of directed, intramural research, project plans are submitted in place of proposals.

of developing a high-level, overarching policy allowing flexibility within the research program areas to determine specific requirements and needs.

NASA has a long-standing culture of promoting the full and open sharing of data with research communities, private industry, academia, and the general public. NASA space and airborne mission personnel routinely process, archive, and distribute their data to researchers around the globe. Data from all NASA spacecraft are currently available through the individual mission and theme archives (e.g., the Earth Observing System Data and Information System [EOSDIS], which is one of the largest repositories of Earth science data in the world—over 7 petabytes—and to which new data are added at a rate of 5 terabytes per day). Similarly, the Human Research Program shares its astronaut crew medical data (adhering to appropriate privacy restrictions) with the medical research community. This plan extends NASA's culture of open data access to all NASA-funded research.

2.0 Principles

This plan is based on the following set of principles:

- Effective data management has the potential to increase the pace of scientific discovery and promote more efficient and effective use of Government funding and resources.
- Sharing and preserving data are central to protecting the integrity of science by facilitating validation of results and to advancing science by broadening the value of research data to other disciplines and society at large.
- Data management should be an integral part of research planning.
- The degree to which research data needs to be shared or preserved varies across and within scientific disciplines; flexibility must be allowed for program-specific needs/requirements and consideration of benefits and costs, including preserving and promoting U.S. competitiveness.
- Proprietary interests, business confidential information, intellectual property rights, and other relevant rights will continue to be recognized and appropriately protected.
- Protecting confidentiality and personal privacy are paramount, and no change will be made to existing policies that would reduce current protections.

3.0 Scope

Part A of the plan focuses on digital unclassified scientific research data, which are research data that can be stored digitally and accessed electronically. Part A follows the Office of Management and Budget (OMB) Circular A110 definition of research data:

> *Research data are defined as the recorded factual material commonly accepted in the scientific community as necessary to validate research findings*, but not any of the following: preliminary analyses, drafts of scientific papers, plans for future research, peer reviews, or communications with colleagues. This "recorded" material excludes physical objects (e.g., laboratory samples).
>
> Research data also do not include:
>
> (A) Trade secrets, commercial information, materials necessary to be held confidential by a researcher until they are published, or similar information which is protected under law; and
>
> (B) Personal and medical information and similar information[,] the disclosure of which would constitute a clearly unwarranted invasion of personal privacy, such as information that could be used to identify a particular person in a research study.

Data are understood to include not only the recorded technical information, but also metadata (describing the data), descriptions of the software required to read and use the data, associated software documentation, and associated data (e.g., calibrations).

Exclusion: NASA creates and provides a large suite of scientific and engineering "data products" whose dissemination to the research community and the general public advance the Agency's core mission objectives. These "data products" come from NASA missions, instruments, and projects and typically have well-established scientific or technological goals and requirements. Subject to Federal laws regarding sensitive data and privacy, these data products are captured and archived by NASA for public access and use and are thus already compliant with the OSTP February 22, 2013, memorandum on access to research results. This plan therefore excludes these types of data.

Implementation of this plan will be prospective and will not apply to any digital dataset established before this plan's effective date, unless that digital dataset is augmented by federally funded research activities undertaken on or after this plan becomes effective.

4.0 Requirements

This plan expands the existing policy and will impose requirements on all NASA scientific programs and intramural and extramural researchers. The Implementation section below provides the detail, but the conceptual requirements are as follows:

- All proposals or project plans submitted to NASA for scientific research funding will be required to include a *Data Management Plan* (DMP). The DMP should describe whether and how data generated through the course[3] of the proposed research will be shared and preserved (including timeframe), or explain why data sharing and/or preservation are not possible or scientifically appropriate. At a minimum, DMPs must describe how data sharing and preservation will enable validation of published results or how such results could be validated if data are not shared or preserved.
- DMPs must provide a plan for making research data that underlie the results and findings in peer-reviewed publications digitally accessible *at the time of publication or within a reasonable time period*[4] *after publication*. This includes data (or how to access data) that are displayed in charts and figures. This does not include preliminary data; laboratory notebooks; drafts of scientific papers, plans for research; peer-review reports; communications with colleagues; or physical objects, such as laboratory specimens. This requirement could be met by including the data as supplementary information to the published article, through NASA archives, or other means. The published article should indicate how these data can be accessed.
- DMPs will be reviewed as part of the overall NASA research proposal/project plan review process.
- NASA program managers will provide guidance to proposers and awardees, as well as monitor compliance with DMPs.

3 Per the scope (section 3) and definition of data, only the data used to support, validate, and corroborate published research findings are required to be shared, per this plan. Preliminary data, trial data, etc., are not included.

4 Data displayed in charts and figures must be available at the time of publication. Other data may be made available later, consistent with the approved DMP.

5.0 Applicability

This NASA research data policy will apply to the following individuals:

- all NASA employees, including full- and part-time employees; as well as support-service contract employees, consultants, and temporary and special Government employees; and
- awardees from non-NASA organizations that publish scientific research or compile digital datasets resulting from research, development, and technology programs funded through a NASA grant, contract, or other agreement. This includes but is not limited to nonprofit organizations, contractors, cooperative agreement holders, grantees, intergovernmental organizations, universities, and other educational institutions.

Additionally, the policy will apply:

- to basic and applied scientific research across all NASA organizations;
- to all research proposals or project plans submitted after this plan becomes effective; and
- to both intramural and extramural research projects, regardless of the funding mechanism (grants, cooperative agreements, contracts, or internal Agency funding processes).

Exceptions

All researchers receiving Federal funding would be required to submit DMPs; however, in some cases, it is expected that the data will not be made public. Such data would include but are not limited to the following categories:

- educational grants and grants to individual students;
- work that is proprietary;
- work that results in personally identifiable human subjects research;
- export-controlled data;
- Sensitive But Unclassified (SBU; Controlled Unclassified Information [CUI]) data;
- national security classified data; and
- Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) contracts.

6.0 Roles and Responsibilities

The Chief Information Officer will

- establish and coordinate an implementation team with representation from NASA's four research-conducting Mission Directorates, the Offices of the Chief Scientist, the Chief Technologist, and the General Counsel;
- coordinate the implementation of the Research Data Access Policy with NASA research organizations and the Office of the Administrator; and
- coordinate collaboration and cooperation on implementation of this policy with other Federal agencies.

The heads of NASA Mission Directorates will

- include the requirements of this plan as terms and conditions of funding for grants, contracts, directed research projects, and other agreements established after January 1, 2015; and
- ensure organizational compliance with the Research Data Access Policy.

Program managers, program scientists, and program executives will

- ensure that DMPs are included in the proposal and properly evaluated;
- ensure that all projects comply with the NASA Research Data Access Policy;
- develop specific DMP guidance for reviewers, proposers, and awardees; and
- develop specific guidelines for intramural or extramural research projects.

Research investigators and their institutions as well as NASA Centers will

- ensure full compliance with DMPs.

7.0 Implementation

This section outlines the steps to be taken to implement this plan, addressing the processes and procedures to be followed by proposers as well as by program managers and reviewers.

7.1 NASA Research Data Policy

NASA will expand upon its existing data policies as follows:

- All research proposers, intramural and extramural, will be required to submit DMPs with their proposals or project plans. DMPs will describe how the proposed research plan conforms to NASA policy on the dissemination and sharing of research results and will address:

1. the types of data to be produced in the course of the project[5];
2. the standards to be used for data and metadata format and content;
3. the policies for accessing and sharing the data, including provisions for the appropriate protection of privacy, confidentiality, security, intellectual property, and other rights or requirements;
4. the policies and provisions for reuse, redistribution, and the production of derivatives;
5. the plans for providing access to the data used in any science publication; and
6. the plans for archiving and preserving the data, as appropriate (use of existing databases or public repositories will be strongly encouraged), including how long the data will be preserved and accessible.

- All research proposers should explicitly state that reasonable costs of data sharing may be included in the proposal or project plan budget; reasonable costs of data sharing should be included in the proposal or project plan budget.
- All investigators are to share their data at the time of publication, as defined in the DMP. This rule applies to data that are displayed in charts and figures. This requirement could be met by including the data as supplementary information to the published article or through other means. The published article should indicate how these data can be accessed.[6]
- Community-based standards should be promoted. NASA policy should encourage all supported investigators to make use of existing data and metadata standards (format and content standards) whenever feasible.
- NASA program managers are to include in research opportunity announcements (1) specific data requirements and expectations, (2) an example DMP or outline for the specific type of data likely to result from the funded projects, or (3) a statement that a DMP is not required because of the nature of the activity (e.g., no data or proprietary or personally identifiable data are expected).

7.2 Develop Guidance and Training

NASA will develop guidance, including an overarching DMP template, to assist researchers in developing and implementing their DMPs. Example DMPS will be made available whenever possible.

5 Refer to section 4.

6 It is anticipated that the Program Manager (or designee) would be part of the official approval process (signature process) for data release at the time of publication.

Additionally, specific guidance will be provided by program managers in the research solicitations. A few examples of such specific guidance include the following:

- minimum metadata requirements, including appropriate attribution (owner of the data and funding source) and conformance/interoperability with the common core research metadata required under the recent Open Data Policy;[7]
- expectations for planned repositories, including the ability of a repository to provide persistent identifiers for digital data, the standards that a repository should follow for implementation of those identifiers, and the ability of the repository to provide for appropriate-term access; and
- the interaction among the Principal Investigator, the data repository, and the NASA program manager to ensure that:
  - appropriate attribution is included;
  - data meet minimum quality standards; and
  - data are appropriately evaluated for and secured to prevent disclosure of personally identifiable information and to protect proprietary interests, confidentiality, and intellectual property rights.

Finally, NASA will provide guidance for program managers to enable them to effectively and efficiently assess and monitor DMPs in their programs. Knowledgeable and proactive program managers will be key to successful implementation of this plan. The evaluation of DMPs will consider the relative value of long-term preservation and access and the associated costs and administrative burden.

7.3 Amend Current Documents/Policies/Web Sites

The revised research data policy will be added to NASA Procedural Requirement 1080.1 A, *Requirements for the Conduct of NASA Research and Technology (R&T)*. NASA will also amend its *NASA Grants Handbook*, *NASA Headquarters Science Mission Directorate Management Handbook*, and any other relevant documents or policies to reflect the research data policy.

7.4 Involvement of Stakeholders and the Public

A plan for rollout of the policy has been developed. Appropriate training and guidance related to data management, storage, and preservation will be conducted in coordination with other Federal agencies and according to NASA best practices. The development of

7 OMB Memorandum M-13-13 is available at *http://www.whitehouse.gov/sites/default/files/omb/memoranda/2013/m-13-13.pdf.*

NASA's final Research Data Access Plan will be conducted in a transparent manner, with solicitation of views from stakeholders and full disclosure to the science community and other interested parties. Stakeholders include libraries, federally funded researchers and users of their research results, and civil society groups. NASA will solicit opportunities for implementing public-private partnerships and will participate in relevant multiagency public-private partnerships and stakeholder engagement activities.

7.5 Improving Public Access to Scientific Data

NASA will develop a catalog of datasets generated via NASA-sponsored research to enable researchers to locate and cite datasets and to link those datasets to the scientific literature. This catalog is expected to be part of the comprehensive public listing of Agency data that is required by the May 9, 2013, Executive Order and OMB Memorandum M-13-13. The NASA data catalog will serve not as a repository of study data, but as a registry that will have information describing the dataset (i.e., metadata) and information about where and how to access the data. The development of this catalog will begin at the time of implementation of the policy. The public will have access to the catalog and associated data free of charge.

NASA will continue to identify additional approaches involving public and private sector entities and will continue efforts to improve public access to research data. NASA will explore the development of a research data commons—a federated system of research databases—along with other departments and agencies for the storage, discoverability, and reuse of data, with a particular focus on making the data underlying the conclusions of federally funded peer-reviewed scientific research publications available for free at the time of publication.

7.6 Establish Compliance Process and Metrics

Appropriate mechanisms and metrics will be developed to ensure that funding recipients are made aware of their obligations and to monitor whether awardees have complied with their DMPs. Compliance will be verified by program officers by evaluation of required project reports; if necessary, continuing funds may be withheld in cases of noncompliance.

8.0 Update and Reevaluation of this Plan

Implementation of this plan will involve significant changes for both program managers and research investigators. To ensure that the lessons learned are captured and that NASA continually improves its procedures/policies with respect to research data management, a steering committee composed of all of the research organizations and the Office of the Chief Information Officer (OCIO) has been established. This steering committee will meet on a regular basis to share experience and will conduct an annual assessment of the policy and its implementation for the first 5 years after the policy takes effect.

Recognizing that extensive data management will require funding, NASA has developed a cost model consistent with the plan (as outlined above) and has incorporated these needs into the Agency's ongoing annual budget development process.

PART B

Peer-Reviewed Publications

1.0 Background: Goals, Constraints, Options, and Strategy

1.1 Goals and Constraints

NASA's strategy for planning and executing its implementation of the memorandum's provisions for research publications must respond to several goals and constraints.

First, the systems and processes developed and deployed must meet the memorandum's requirements; more generally, the solution will make information easily discoverable, accessible, and usable by researchers and other users and effective in meeting their diverse needs. Through doing so, it will also enhance innovation and competitiveness.

Second, the information management environment for scientific publications, as complex as it is, is evolving dynamically as these plans are being developed. Public and private institutions, as well as consortia among them, are developing repository and access services for their own needs; many of these services could be directly applicable to the objectives of the memorandum and consistent with its endorsement of public-private partnership arrangements.

Third, the memorandum makes clear that agencies should not expect additional resources for the execution of their implementations. Since support for the initiative must therefore be subtracted from agencies' program budgets, cost must be diligently managed and minimized. Since implementation risk translates into increased costs, a corollary is that risk also must be held to a minimum.

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The plan is subject to law, agency mission, and resource constraints; national, homeland, and economic security; and the objectives laid out in the February 22, 2013, memorandum.

1.2 Options

Thus, NASA's strategy has led to an implementation that (1) is responsive to the memorandum and truly useful; (2) incorporates flexibility to take advantage of ongoing developments in publishing, research literature utilization, and mass information access; and (3) minimizes both cost and risk.

NASA commissioned an independent Analysis of Alternatives study comparing three public-private partnerships: the National Institutes of Health's (NIH) PubMed Central (PMC) system; the Department of Energy's (DOE) Public Access Gateway for Energy and Science (PAGES); and the Clearinghouse for the Open Research of the United States (CHORUS), which is provided by the publishing community. The analysis also considered NASA's internal document tracking system: the NASA Scientific and Technical Information (STI) Program's NASA Technical Reports Server (NTRS).

Based on the criteria listed in the OSTP memo dated February 22, 2013, and the need for flexibility in incorporating future upgrades, NASA has chosen the NIH PMC platform. NIH has led in information retrieval for many years, and the PMC is a capable, mature, and low-risk platform that has evolved over time. NASA will arrange, on a reimbursable basis, to acquire the necessary ingest, Extensible Markup Language (XML) conversion, and accessibility services, as well as other collateral support, for compliance with OSTP memo requirements. Also on a reimbursable basis, NIH PMC will provide a NASA-branded portal to access the full functionality of the PMC system.

2.0 Scope

The scope of applicability of this plan includes all peer-reviewed scientific research publications authored or coauthored by investigators funded for this research by NASA-appropriated funds. This includes both civil servant and non–civil servant investigators.

Publications that contain material governed by personal privacy, export control, proprietary restrictions, or national security law or regulations are excluded. Patents are excluded.

The policy and required implementation actions are expected to go into effect first for publications authored or coauthored by civil servant investigators. Since full implementation for publications without civil servant authorship depends on the establishment of necessary copyright licenses to be incorporated into the awards, the implementation of the policy for these publications will take effect for research conducted and publications

developed with support by awards that establish those licenses. That is, for non–civil servants, publications from research funded by awards prior to any necessary copyright and license modifications will not be subject to the policy.

3.0 Requirements

Responsibility for submission of a publication and metadata to a designated repository will be the responsibility of the lead author or NASA-supported coauthor, if not the lead author (herein, the "corresponding author"). The metadata standard will conform to requirements of the designated repository and is expected to be coded in XML. These responsibilities will be established in provisions of the award that supports the investigation. The corresponding author may satisfy this requirement either by submitting or having his or her NASA Center STI office submit an exact copy of the as-accepted manuscript on acceptance by the publisher; or, if the publisher has an agreement in place with the repository to later transmit the edited and formatted Version of Record (VoR) to the repository, by this means without other action.

Awards of NASA funding by any instrument (e.g., grant, contract, or cooperative agreement) may be made conditional upon the recipient's granting to the Government a broad license that enables the repository to transfer more limited rights to users of publications drawn from the repository. An alternative would be an award requirement for the recipient to ensure that any publishing agreement would allow the as-accepted manuscript to be posted to the centralized archive under its Terms of Service.

In addition to imposition at the time of initial award, any license provisions can be changed when incremental funding is released to awardees.

Required annual and final reporting requirements for awardees regarding publications will be defined in the award instrument.

4.0 Applicability

The plan is applicable to peer-reviewed publications authored or coauthored by NASA civil servants or other researchers who perform research and publish results that are funded by NASA directly or indirectly (e.g., as Government employees or via grants, contracts, or cooperative agreements), including subawards. The defined applicability to "peer-reviewed publications" focuses on journal articles. Applicability to peer-reviewed conference abstracts and proceedings, which may experience a less rigorous standard of review, will be determined.

5.0 Authority

Section 20113 of the National Aeronautics and Space Act (51 U.S.C. §20113)

6.0 Roles and Responsibilities

The NASA OCIO will be the implementing arm of the Agency supported by a steering committee made up of representatives from the four research organizations.

Program and project managers will be responsible for compliance by principal investigators funded by NASA.

7.0 Implementation

7.1 Planning

Planning activities are described in sections 9, 10, 12, and 13. The use of standards and existing systems is discussed in sections 7, 8, and 9.

7.2 Submission

The submission process will comply with NASA standard practices and follow all accepted protocols.

7.3 Management

The development and operation of the NASA research publication access program deriving from this plan will be managed by the NASA OCIO. The Agency has established a governance steering committee with representation from NASA's four research-conducting Mission Directorates, the Office of the Chief Scientist, the Office of the Chief Technologist, and the Office of the General Counsel. Other organizations such as the Office of Procurement will be engaged as required.

This plan lays out a provisional program structure that may be modified in consultation with the steering committee in response to new information, technology, or user requirements.

Technological evolution of repository hardware and software will be the responsibility of the NIH PMC repository manager. Standards for NASA-sponsored metadata and citations will conform to prevailing Government-wide standards.

The system will ensure that the public can read, download, and analyze in digital form final peer-reviewed manuscripts or final published documents. Texts and associated content (images, video, and supporting data) will be stored in nonproprietary or widely distributed formats.

7.4 Access and Discoverability

7.4.1 Embargoes. Metadata should be made accessible as soon as possible after final acceptance of a paper, even if the full text is subject to an embargo period. The metadata should be coded as XML so that it can be crawled by automated search engines in order to facilitate discovery. Metadata will be available promptly and without charge and will provide a link to the full text and supplemental materials when possible.

The default embargo period for full text open access under the OSTP memorandum is 12 months from appearance in the published journal. This standard embargo period is also the maximum and most common period for PMC and would be retained by NASA in utilization of that system. Publishers may petition for a longer embargo period, although strong evidence for the benefits would be needed. NASA will provide a Web site conduit where such petitions can be directed; if no uniform interagency policies and procedures are established, NASA will develop and implement its own.

7.4.1 Search. NASA recognizes that search capabilities are important. The approaches to optimization of accessibility and interoperability, while ensuring long-term stewardship of publications, will be those of PMC's evolutionary technical advances.

It is expected that some provision will be identified or developed to support the cross-repository discovery and aggregated retrieval of multiple items identified in response to a single query.

7.4.2 Acceptable-Use Policies. The system will facilitate analysis of publications ensuing from Federal funding, subject to its acceptable-use policies. Acceptable-use policies will reflect the provisions of PMC's public license or repository Terms of Service. Attribution to authors, journals, and original publishers will be required in all uses, except in analyses where the identity and contribution of individual items are suppressed (e.g., in bulk analyses of aggregations of many works. Attribution will be attached to individual articles via their metadata.

Copyright and license provisions for reproduction, redistribution, and reuse will be aligned with PMC's. It is the sole responsibility of repository users to conform to applicable terms and conditions.

If legal restrictions for enforcing a ban on mass distribution of publications are not effective, a technical solution may need to be devised and implemented.

7.4.4 **Bulk Downloads for Research, and Managing the Restriction on Unauthorized Bulk Downloads.** Bulk downloads for research purposes should be permitted as an acceptable use; the use of bulk downloads for creation of derivative products and/or commercial purposes will depend on user license or Terms of Service provisions.

7.4.5 **Exposure to Third-Party Services.** Primarily, this concerns access to the corpus by automated Web crawlers for third-party search engines. Since this can amplify access by interested users, it is in NASA's interest to support them.

This effort requires that holdings be coded in XML. As a result, for full-text holdings received once the policy goes into effect, PMC requires as-accepted manuscripts to be submitted in XML or converted to XML to enable crawler access.

7.4.6 **508 Compliance.** 508 compliance will be furnished by the repository manager on a paper-by-paper basis on demand; costs will be borne by NASA via its negotiated per-publication reimbursement.

7.5 Preservation

Publications and metadata will be stored in a NASA domain within the PMC system, which will provide long-term preservation and access to the content without charge.

An advantage of storage in XML format is its technology independence and reliable migration as technology evolves.

7.6 Integration into Other Systems

During implementation, integration into other systems will be analyzed and a methodology will be developed to ensure seamless interfacing to the greatest extent possible.

8.0 Metrics, Compliance, and Evaluation

Compliance requirements and consequences for noncompliance will be clearly detailed in award instruments and enforced. Publications cited in required reports (e.g., annual progress and final reports) must be present in the repository. Publications absent from the repository will result in a request to the corresponding author to remedy the defect. Ongoing evaluation of compliance and alerting noncompliant authors will be accomplished using progress and final reports and FundRef.

Compliance with the requirement for deposition of as-accepted papers and metadata into PMC for NASA authors will be strengthened via clear promulgation and vigorous enforcement of an appropriate Agency NASA Policy Directive (NPD) and NASA Procedural Requirement (NPR).

9.0 Public Consultation

NASA participated in the open meeting hosted by the National Academy of Sciences in May 2013; representatives also participated in numerous meetings conducted by OSTP for the purpose of discussions and negotiations with representatives of the publishing industry, professional societies, and other interested parties. These contacts, as well as materials submitted by PMC, DOE/PAGES, NASA/STI-NTRS, CDC/Stacks,[8] CHORUS, Google Scholar, and AAU-APLU-ARL/SHARE,[9] were considered in formulating the strategy presented in this plan. Of those presented, the PMC solution emerged as the most mature and the lowest risk for NASA, but attractive features of the distributed solutions (CHORUS, Google Scholar, and SHARE) warrant further attention in Phase 2 as they mature and are demonstrated.

NASA will use its established Federal Advisory Committee Act (FACA)-chartered advisory committees and its standing committees at the National Research Council to inform its constituent communities and obtain guidance relevant to the selected PMC public access system.

10.0 Interagency Coordination

NASA has participated in discussions with other agencies and will continue to collaborate to ensure that a consistent Government-wide approach is achieved.

11.0 Public Notice

NASA will adhere to established standards for formal public notice of implementation of the publication access system. Funded investigators will be informed and bound by provisions in their award instruments.

8 CDC: Center for Disease Control and Prevention

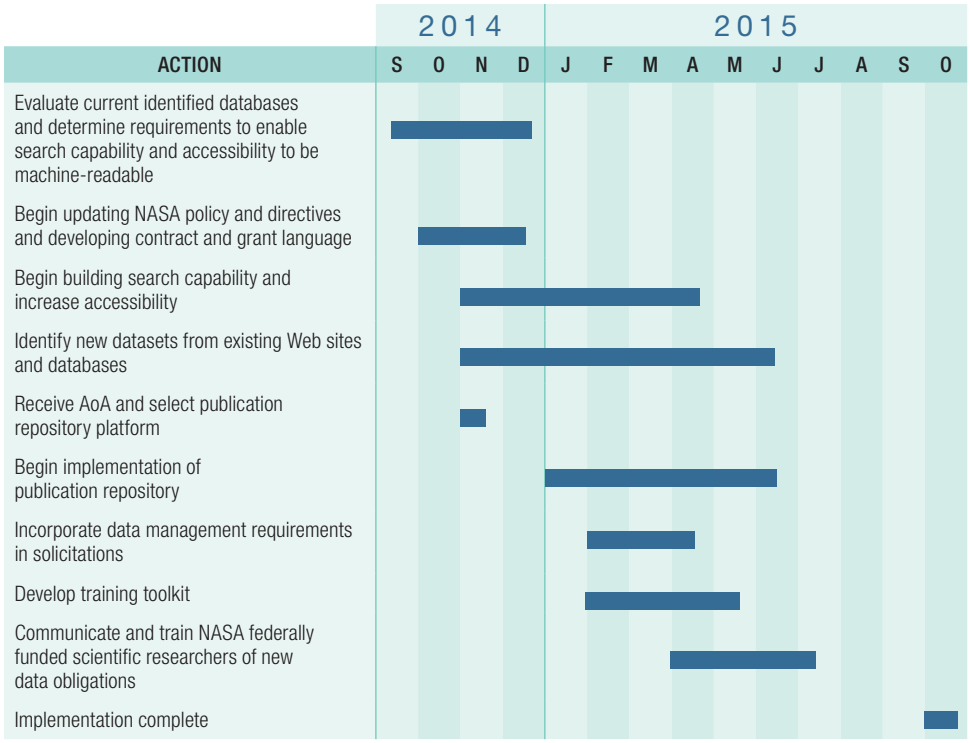
9 AAU: Association of American Universities; APLU: Association of Public and Land-grant Universities; ARL: Association of Research Libraries; SHARE: SHared Access Research Ecosystem

12.0 Update and Reevaluation of the Plan

The plan will be reevaluated and revised as needed with the recommendations of the steering committee in order to provide maximum public access. On initiation of regular operation of the repository implementation within PMC, NASA will benefit from NIH's long-range management planning and sustaining engineering and augmentation of that system as well as evaluation of new technologies and/or evolving system architectures.

13.0 Timeline for Implementation

NASA Implementation and Schedule on Data and Publication Access



14.0 Resources

An estimated budget to support implementation of this policy was requested through the Agency's normal budget development cycle.

15.0 Additional Material

Acronym List

AAU	Association of American Universities
APLU	Association of Public and Land-grant Universities
ARL	Association of Research Libraries
CDC	Centers for Disease Control and Prevention
CHORUS	Clearinghouse for the Open Research of the United States
CUI	Controlled Unclassified Information
DOE	Department of Energy
EOSDIS	Earth Observing System Data and Information System
FACA	Federal Advisory Committee Act
NASA	National Aeronautics and Space Administration
NIH	National Institutes of Health
NPD	NASA Policy Directive
NPR	NASA Procedural Requirement
NTRS	NASA Technical Reports Server
OCIO	Office of the Chief Information Officer
OMB	Office of Management and Budget
OSTP	Office of Science and Technology Policy
PAGES	Public Access Gateway for Energy and Science (DOE)
PMC	PubMed Central (NIH)
R&T	Research and Technology
RD&T	Research, Development, and Technology
SBIR	Small Business Innovation Research
SBU	Sensitive But Unclassified
Scholar	Not an acronym (Google)
SHARE	SHared Access Research Ecosystem (AAU, APLU, ARL)
Stacks	Not an acronym (CDC)
STI	Scientific and Technical Information (NASA)
STTR	Small Business Technology Transfer
VoR	Version of Record
XML	Extensible Markup Language

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