NONREIMBURSABLE MEMORANDUM OF AGREEMENT
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
AND
THE NATIONAL SCIENCE FOUNDATION (NSF)
AND
THE UNITED STATES DEPARTMENT OF COMMERCE/NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)
AND
THE DEPARTMENT OF THE AIR FORCE (DAF)
FOR
SPACE WEATHER RESEARCH-TO-OPERATIONS-TO-RESEARCH COLLABORATION

ARTICLE 1. AUTHORITY AND PARTIES

The National Aeronautics and Space Administration (hereinafter referred to as "NASA"), enters into this nonreimbursable memorandum of agreement (hereinafter referred to as "MOA") in accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113(e)). The National Science Foundation (hereinafter referred to as "NSF"), enters into this MOA in accordance with the National Science Foundation Act of 1950, as amended (42 U.S.C. 1861 et seq.). The United States Department of Commerce, National Oceanic and Atmospheric Administration (hereinafter referred to as "NOAA") National Weather Service and National Environmental Satellite, Data, and Information Service, enters into this MOA in accordance with 15 U.S.C. § 1532, the Space Weather Authority, and 33 U.S.C. § 883d and 883e, which provide *inter alia* authority to enter into agreements to conduct investigations and research in the geophysical sciences. The Department of the Air Force, comprised of the United States Air Force and the United States Space Force, (hereinafter referred to as "DAF"), enters into this MOA in accordance with the Secretary of the Air Force's authority under 10 U.S.C. § 9013, Executive Order No. 12881 of November 23, 1993, Establishment of the National Science and Technology Council, and Department of Defense (DoD) Instruction (DoDI) 4000.19., Support Agreements. NASA, NSF, NOAA, and DAF may be individually referred to as a "Party" and collectively referred to as the "Parties." All Parties enter into this MOA in accordance with the Promoting Research and Observations of Space Weather to Improve the Forecasting of Tomorrow Act of 2020 or the ''PROSWIFT Act'' (51 U.S.C. § 60601).

ARTICLE 2. PURPOSE AND IMPLEMENTATION

The purpose of this MOA is to encourage and support collaboration among NASA, NSF, NOAA, and DAF to advance the Nation's space weather research and operations capabilities. Space weather comprises a set of naturally occurring phenomena that have the potential to adversely affect critical functions, assets, and operations in space and on Earth. For the purposes of this MOA, research-to-operations (R2O) is defined as the process of fostering the transition of capabilities - models, observations, forecast applications, techniques, and technology - from research sources including government, academia, and industry into operations. Similarly, operations-to-research (O2R) can be broadly defined as the feedback from forecasters and end-users to researchers and the sharing of operational data and information on space weather impacts on infrastructure, in the joint pursuit of improvements of operational capabilities and advancements in related fundamental research. This MOA is intended to provide a structure through which NASA, NSF, NOAA, and DAF can coordinate both R2O and O2R, (collectively, R2O2R) activities in support of space weather research and operational needs.

The PROSWIFT Act was signed on October 21, 2020. The PROSWIFT Act states it is the policy of the United States to prepare and protect against the social and economic impacts of space weather phenomena by supporting actions to improve space weather forecasts and predictions including: sustaining and enhancing critical observations, identifying research needs and promoting opportunities for R2O and O2R collaborations both within and outside of the Federal Government, advancing space weather models, engaging with all sectors of the space weather community, including academia, the commercial sector, and international partners, and understanding the needs of space weather end users. 51 U.S.C. § 60601 defines the role of Federal Agencies, establishes a space weather interagency working group, authorizes the members of the interagency working group to enter into one or more interagency agreements providing for cooperation and collaboration in the development of space weather spacecraft, instruments, technologies, and research to operations and operations to research, and directs NASA and NOAA to enter into one or more interagency agreements providing for cooperation and collaboration in the development of space weather spacecraft, instruments, and technologies. Additionally, 51 U.S.C. § 60604, directs agencies to develop formal mechanisms to advance R2O2R activities.

Prior to PROSWIFT, in October 2015, the National Science and Technology Council in the Executive Office of the President released the National Space Weather Strategy and the National Space Weather Action Plan (SWAP). This was followed in 2019 by the updated National Space Weather Strategy and Action Plan (NSW-SAP). The objectives of the actions described in the SWAP and NSW-SAP are to improve the understanding of, forecasting of, and preparedness for space weather events, recognizing the need for close cooperation among the Federal agencies.

Among the results of the SWAP was the creation of the Memorandum of Understanding between NASA, NSF, and NOAA for Operations-to-Research Collaboration (MOU 18-061323), signed November 30, 2018 (hereinafter referred to as the "Tri-Agency MOU") to jointly manage targeted O2R efforts with NASA administering the associated grants and funding. In March 2022, the Executive Office of the President, National Science and Technology Council, Committee on Homeland and National Security, Space Weather Operations, Research and Mitigation (SWORM) Subcommittee issued a report entitled Space Weather Research-To-Operations and Operations-to-Research Framework (Space Weather R2O2R Framework). This Framework was issued in response to the National Space Weather Strategy and Action Plan, Action 2.7: Identify mechanisms for sustaining and transitioning models and observational capabilities from research to operations. Under Part 4 (Governance) of this Framework, the National Science and Technology Council directs the R2O2R Steering Committee to write a new MOA that encompasses the scope of the existing 2018 NASA-NSF-NOAA MOU for O2R Collaboration, includes the Department of the Air Force (DAF), and implements this R2O2R Framework. Further, NASA, in consultation with and on behalf of NOAA, NSF, and the DAF, annually releases the Research Opportunities in Space and Earth Sciences (ROSES) R2O2R solicitation in order to advance and coordinate the Nation's space weather research and operations capabilities.

This new MOA between the four Parties advances the objectives of the PROSWIFT Act by creating an interagency arrangement that encapsulates the objectives of the Tri-Agency MOU (superseded by this MOA) and the Space Weather R2O2R Framework. It is aimed at enhancing national space weather preparedness by coordinating, integrating, and expanding existing policy efforts, and engaging a broad range of sectors.

ARTICLE 3. RESPONSIBILITIES

NASA, NSF, NOAA, and DAF will use reasonable efforts to perform the following:

A. Governance

1. The Parties will each identify up to two agency civil servant Executives to serve on the interagency R2O2R leadership board (hereafter referred to as the "Executive Board") responsible for:
    a. Overall execution of the elements of the Space Weather R2O2R Framework detailed below,
    b. Approval of recommendations of the R2O2R Steering Committee, and
    c. Ensuring that R2O2R decisions are congruent to agency policies, rules, and guidelines for respective agencies.
2. The Parties will each identify one or more civil servant agency scientist(s) with the appropriate expertise to act as the point(s) of contact and lead program officer(s) (hereafter referred to as "Principal Representatives") to serve on a steering committee (hereafter referred to as the "R2O2R Steering Committee" or "Steering Committee") that is responsible for various coordinating functions as outlined in Article 3, section B: Coordinating Functions Performed by the R2O2R Steering Committee.

B. Coordinating Functions Performed by the R2O2R Steering Committee

1. Recommending coordinated multi-agency activities to facilitate the development of operationally-relevant capabilities that include research models, observations, techniques, and technologies and their transition to operations;
2. Coordinating activities of the civil and national security research and development enterprise to address space weather challenges that cross borders of academic, commercial, and national security interests
3. Identifying operations centers' current needs and capability gaps for inclusion in future solicitations;
4. Recommending pathways for infrastructure, missions, and facilities intended primarily for research to be supported and sustained for operational use;
5. Recommending pathways for infrastructure, missions, and facilities intended primarily for operations to be made available for research purposes;
6. Recommending capabilities for Proving Grounds validation and demonstration;
7. Maintaining communication with established advisory groups and forums, such as the Space Weather Advisory Group and National Academies Roundtable;
8. Coordinating with the relevant activities within the National Space Weather Strategy and Action Plan, such as NSW-SAP actions 2.3 through 2.7;
9. Conducting annual reviews of accomplishments and plans for the Space Weather R2O2R Framework;
10. Making recommendations regarding R2O2R processes and ensuring that R2O and O2R are part of a single, continuous process; and
11. Consulting with non-government technical experts for the purpose of gathering feedback on whether the R2O2R ROSES solicitations and other relevant solicitations are meeting the needs of the operations centers, and the Space Weather R2O2R Framework processes are effective in leveraging the research and commercial space weather community capabilities.

C. Pertaining to Activities of the R2O2R ROSES Solicitation

1. Solicitation Development
    a. The Principal Representatives are responsible to provide input:
        1. to the development of the focus of solicitations to be issued by NASA on behalf of the agencies and aimed at developing improved space weather capabilities through improved scientific understanding and improved numerical models, and/or data utilization techniques, and/or technologies
        2. for supporting the review process of the proposals received in response to the solicitations, and
        3. for contributing to the award recommendation process.
    b. NASA will develop, on an annual or biannual basis, each year during the term, the solicitations, provisionally titled "Space Weather Research-to-Operations-to-Research," which will describe the goals of the solicitations and the NASA-managed proposal submission and award process.
        1. The solicitations will be issued by NASA and may also be noted on NSF, NOAA, and DAF websites, as well as on Grants.gov.
        2. Subject to the terms of this MOA, the Principal Representatives will review and provide input on the relevant language in the solicitations before they are submitted for NASA clearance.
        3. The solicitations may mandate that each proposal involving software development submitted in response to the solicitations describes the software license for distribution of the software proposed to be developed by the proposing organization(s). If mandated, the choice of a specific software license shall be justified in the proposal with emphasis on the sustainability of the software and subject to criteria such as the following:
            a. The solicitations shall stipulate that software developed as a result of funding provided by awards in response to the solicitations is to be made available to the public by the awardee free of charge for non-commercial use.
            b. The software license shall permit modification and redistribution of the software free of charge by the public for non-commercial use.

2. Proposal Submission, Review, Funding, and Award Administration
    a. The NASA Heliophysics Division will manage the submission, review, and funding of proposals submitted in response to the solicitations.
        1. Proposals will be evaluated in accordance with the standard NASA merit review criteria. Merit review criteria will be specified in the solicitation, including additional review criteria if needed.
        2. The review process may include use of *ad hoc* reviewers, as needed, in combination with a review panel. The panel will provide an evaluation of all compliant proposals based on the review criteria specified in the solicitations.

3. NASA is responsible for carrying out the review process. The Principal Representatives will recommend ad hoc and/or panel reviewers, assist in selection of reviewers, and may participate in the review panel.
4. After the panel review has concluded, the Principal Representatives will meet to consider the findings of the peer reviewers and to discuss which proposals are suitable for recommendation to the selecting official. NASA will follow its customary practice in presenting the proposals, peer review findings and recommendations to the selecting official.
5. Official selection of the funded proposals will be made by the NASA Heliophysics Division Director.
6. It is anticipated that NASA will provide funding each year to support selections made as a result of the solicitations. No funding will be provided by NSF, NOAA, or DAF for the solicitations.

b. Reporting requirements will be administered by NASA, and reports of the research results will be made available to and considered collectively by the Parties to guide future solicitations.
c. Post-award grant administration will be managed by NASA.

3. Schedule and Milestones
   a. Set topics for R2O2R solicitation: Annually by the Second Friday in December
   b. R2O2R Solicitation Release Date: The initial solicitation will be released within 60 days of the MOA signature. For following years during the term, solicitations are expected to be released on an annual or biannual basis as an element of NASA ROSES.
   c. Full Proposals submission deadline: Determined annually by the NASA ROSES schedule
   d. Determine Review Panel Members: 90 days after each submission deadline
   e. Conduct one-week Panel meeting and complete review of proposals: 120 days after each submission deadline
   f. Awards/Declines decisions: 60 days after each review complete

ARTICLE 4. FINANCIAL OBLIGATIONS

There will be no transfer of funds between the Parties under this MOA. Each Party will fund its own participation in the coordination and administrative activities. All activities under or pursuant to this MOA are subject to the availability of funds, and no provision of this MOA shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act (31 U.S.C. § 1341).

ARTICLE 5. PRIORITY OF USE

Any schedule or milestone in this MOA is estimated based upon the Parties' current understanding of the projected availability of its respective goods, services, facilities, or equipment. In the event that either Party's projected availability changes, the other Agencies shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's, NSF's, NOAA's, and DAF's use of its own goods, services, facilities, or equipment shall have priority over the use planned in this MOA.

ARTICLE 6. LIABILITY AND RISK OF LOSS

Each Party agrees to assume liability for its own risks arising from or related to activities conducted under this MOA.

ARTICLE 7. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

The Parties agree that the information and data exchanged in furtherance of the activities under this MOA will be exchanged without use and disclosure restrictions unless required by national security regulations (e.g., classified information) or as otherwise provided in this MOA or agreed to by the Parties for specifically identified information or data (e.g., information or data specifically marked with a restrictive notice).

ARTICLE 8. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

Unless otherwise agreed upon by the Parties, custody and administration of inventions made (conceived or first actually reduced to practice) under this MOA will remain with the respective inventing Party. In the event an invention is made jointly by employees of the Parties (including by employees of a Party's contractors or subcontractors for which the U.S. Government has ownership), the Parties will consult and agree as to future actions toward establishment of patent protection for the invention.

ARTICLE 9. RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA

Each Party may, consistent with Federal law and this MOA, release general information regarding its own participation in this MOA as desired. Insofar as participation of the other Parties in this MOA is included in a public release, the Parties will seek to consult with each other prior to any such release, consistent with the Parties' respective policies.

Pursuant to Section 841(d) of the NASA Transition Authorization Act of 2017, Public Law 115-10 (the "NTAA"), NASA is obligated to publicly disclose copies of all agreements conducted pursuant to NASA's 51 U.S.C. §20113(e) authority in a searchable format on the NASA website within 60 days after the agreement is signed by the Parties. The Parties acknowledge that, if this MOA is entered into pursuant to NASA's 51 U.S.C. §20113(e) authority, this MOA will be disclosed in accordance with the NTAA.

ARTICLE 10. TERM OF AGREEMENT

This MOA becomes effective upon the date of the last signature below ("Effective Date") and shall remain in effect until the completion of all obligations of all Parties hereto, or five (5) years from the effective date, whichever comes first.

ARTICLE 11. RIGHT TO TERMINATE

Any Party may unilaterally terminate its participation in this MOA by providing thirty (30) calendar days written notice to the other Parties, who may then decide whether or not to continue their activities under the MOA without the terminating Party. This agreement is non-transferable.

ARTICLE 12. CONTINUING OBLIGATIONS

The rights and obligations of the Parties that, by their nature, would continue beyond the expiration or termination of this MOA, e.g., "Liability and Risk of Loss" and "Intellectual Property Rights" and related clauses shall survive such expiration or termination of this MOA.

ARTICLE 13. POINTS OF CONTACT

The following personnel are designated as the Points of Contact between the Parties in the performance of this MOA.

Management Points of Contact

NASA	NSF	NOAA	DAF
James "Jamie" Favors Heliophysics Division 300 E Street SW Washington, DC 20546 Phone: (202) 358-0062 james.e.favors@nasa.gov	Mangala Sharma Division of Atmospheric and Geospace Sciences 2415 Eisenhower Ave. Alexandria, VA 22314 Phone: (703) 292-4773 msharma@nsf.gov	Brent Gordon Space Weather Prediction Center, NWS 325 Broadway Boulder, CO 80305 Phone: (303) 497-4468 brent.gordon@noaa.gov	Anil Rao AF/A3W 1490 Air Force Pentagon Washington, DC 20330 Phone: (321) 848-4569 p.rao@us.af.mil
		Elsayed Talaat Office of Projects, Planning, and Analysis, NESDIS 1335 East West Highway SSMC 1, Suite 6200 Silver Spring, MD 20910 Phone: (301) 713-0100 elsayed.talaat@noaa.gov	Nackieb "Nick" Kamin SF/CTIO 2800 Crystal Dr. Pentagon AFB VA 22202 Phone: (202) 706-4820 nackieb.kamin@spaceforce

ARTICLE 14. DISPUTE RESOLUTION

Should disagreement arise under this MOA, or amendments and/or revisions thereto, that cannot be resolved at the Division Director level, the area(s) of disagreement shall be stated in writing by each Party and presented to the other Parties at the Assistant/Associate Director, Associate Administrator or other equivalent level for consideration.

ARTICLE 15. MODIFICATIONS

Any modification to this MOA shall be executed, in writing, and signed by an authorized representative

of the Parties.

ARTICLE 16. APPLICABLE LAW

U.S. Federal law governs this MOA for all purposes, including, but not limited to, determining the validity of the MOA, the meaning of its provisions, and the rights, obligations and remedies of the Parties.

ARTICLE 17. MID-POINT REVIEW

This MOA will be reviewed no less often than mid-point on or around the anniversary of its effective date in its entirety.

ARTICLE 18. SIGNATORY AUTHORITY

Approved and authorized on behalf of each Party by:

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

Nicola J. Fox Digitally signed by Nicola J. Fox Date: 2023.08.01 18:21:47 -04'00'

Nicola J. Fox, Ph.D.
Associate Administrator
Science Mission Directorate

DATE: August 1, 2023

NATIONAL SCIENCE FOUNDATION

ALEXANDR A R ISERN Digitally signed by ALEXANDRA R ISERN Date: 2023.06.16 11:24:45 -04'00'

Alexandra Isern, Ph.D.
Assistant Director
Directorate for Geosciences

DATE: June 16,2023

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

GRAHAM.KENNETH.EARL.1365881142 Digitally signed by GRAHAM.KENNETH.EARL.1365881142 Date: 2023.06.28 17:19:00 -04'00'

Ken Graham
Assistant Administrator for Weather Services and
Director, National Weather Service

DATE: June 28, 2023

VOLZ.STEPHEN.MICHAEL.1504223694 Digitally signed by VOLZ.STEPHEN.MICHAEL.1504223694 Date: 2023.06.29 17:56:16 -04'00'

Stephen Volz, Ph.D.
Assistant Administrator for Satellite and Information Services

DATE: _____

DEPARTMENT OF THE AIR FORCE

Lieutenant General James C. Slife
Deputy Air Force Chief of Staff for Operations

DATE: 6 July 2023

LISA A. COSTA, SES, DAF
Chief Technology and Innovation Officer

DATE: 26JUL2023