

MOU ID: 20230647

**MEMORANDUM OF UNDERSTANDING BETWEEN NATIONAL
INSTITUTE FOR SPACE RESEARCH AND UNIVERSITY CORPORATION
FOR ATMOSPHERIC RESEARCH ACTING ON BEHALF OF THE
NATIONAL CENTER FOR ATMOSPHERIC RESEARCH**

This Memorandum of Understanding (MOU), effective as of the date of last signature ("Effective Date"), is entered into by and between the University Corporation for Atmospheric Research (UCAR), acting on behalf of the National Center for Atmospheric Research (NCAR), and the National Institute for Space Research, hereinafter referred to simply as INPE (INPE), a research unit of the Ministry of Science, Technology, and Innovation (MCTI), qualified as a Scientific, Technological, and Innovation Institution (ICT), pursuant to art. 2 of its Internal Regulations, approved by MCTI Ordinance n° 6,568, of 22/11/2022, with its headquarters at Av. Dos Astronautas, 1758, Jardim da Granja, São José dos Campos, São Paulo, registered with CNPJ/MF n° 01.263.896/0005-98, in this act represented by its Director, Antonio Miguel Vieira Monteiro, registered with the CPF/MF under n° ***.716.537-**, appointed by MCTI Ordinance n° -216, of 02/20/2025, published in the Federal Official Gazette of 02/21/2025.

NCAR and INPE may be alternately referred to herein as party, individually, or parties, collectively.

1 - Purpose:

The purpose of this Memorandum of Understanding (hereinafter referred to as "MOU") is to facilitate collaboration on further development of the Model for Prediction Across Scales -Atmosphere (MPAS-A) to accommodate research and operational numerical weather prediction, climate, and regional-climate applications within INPE and their collaborators in Brazil, and to make available to the community these developments through NCAR's release and support of MPAS-Atmosphere.

2 - Cooperative Activities:

Subject to the availability of funds, personnel and the mutual agreement of both parties, cooperative activities will be for specific projects between INPE and NCAR, and may be undertaken in the following general areas:

- A. Development of configurations and extensions of MPAS-A for numerical weather prediction, regional climate, and climate applications, including both regional and global configurations. This includes dynamics, physics, and land model components, chemistry and aerosols.
- B. Testing and evaluation of these configurations and modeling system extensions, including post-processing extensions to facilitate this work.
- C. Testing and development of data assimilation extensions for the MPAS-A forecast system.
- D. Development of ensemble capabilities for MPAS-A.
- E. Advanced technological aspects for MPAS-A and applications, including GPU coding and couplers between MPAS components (atmosphere – ocean – cryosphere).
- F. Application of AI and machine learning techniques to the MPAS-A system and applications.

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- G. Development of verification, evaluation and diagnostics capabilities for numerical weather and climate predictions with MPAS-A.
- H. High resolution (~ 1 km) and short-range (2-6h) forecasts assisted with radar data assimilation on local scales.
- I. Collaboration on ocean modeling and coupling.

NCAR may host visits from INPE staff and INPE may host visits from NCAR staff as part of this collaboration. NCAR may carry out MPAS-A community releases of these collaborative developments.

Specific collaborative activities shall be described in subsequent written proposals, which provide detailed description of actual tasks to be performed, the funding requirements and the amount of staff devoted to support specific tasks from both parties, and are duly executed by the authorized officials of the Parties.

3 - Term of MOU/Extensions:

The Term of this MOU shall be for a period of 5 years from the Effective Date, unless earlier terminated under the termination provisions of Article 7. If the parties mutually agree that it would be to the benefit of the parties to extend the Term of this MOU, the parties shall execute an amendment, which extends the Term under the same terms and conditions as recited herein. No amendment or modification of this MOU shall be valid unless made in writing and signed by duly authorized representatives of INPE and UCAR. INPE and UCAR further acknowledge that electronic signatures are fully binding and constitute a legal method of executing this MOU.

4 - Laws/Regulations:

This MOU and the respective performance of the parties hereunder, shall be subject to all applicable laws and regulations of the United States of America. This MOU does not create any legally binding rights or obligations for either Parties, and it does not create any legal rights or financial obligations under international or national law. Activities under this MOU will be conducted in accordance with the applicable laws and regulations of the Parties' countries, respectively.

Any dispute between the Parties arising out of the interpretation or execution of this MOU that cannot be settled by the designated coordinators shall be referred to the Directors of INPE and UCAR.

5 - Responsibility of Each Party:

Subject to the availability of funds and personnel, the activities, as outlined in Article 2, shall be supported by both parties, and each party shall be responsible for providing facilities, and other mutually agreed upon support.

6 - Other Agreements:

In the event any additional understandings such as, but not limited to, those related to the licensing of technology for research or commercialization purposes, or the need to enter into a separate agreement for the transfer of funds, the parties shall in good faith enter into negotiations to reduce to a mutually agreeable writing the obligations and terms associated with such understandings.

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7 - Termination:

Either INPE or UCAR may terminate this MOU, at any time during the term stated herein without cause provided the terminating party gives the terminated party thirty (30) day written notice.

8 - Export:

Parties acknowledges that neither Party may export any export controlled information or technology ("Controlled Technology") to the other Party without fully complying with all applicable export control laws and regulations of the United States of America ("U.S. Export Requirements"). Parties agrees not to disclose to the other Party any information nor provide the other Party with any item(s) that are either export-controlled under the International Traffic in Arms Regulations, or appear on the Commerce Control List (except as EAR99) of the Export Administration Regulations. Neither party shall export, directly or indirectly, any such information or items to any country which at the time of export requires an export license or approval without first obtaining such license or approval. Prior permission must be obtained from UCAR before providing any such export controlled information or materials to UCAR or any third party.

9 - Government Not a Party:

This MOU does not bind or purport to bind the U.S. Government or the National Science Foundation, an independent agency of the U.S. Government. Consequently, any claims or disputes arising from or in performance of this MOU shall solely be between the parties of this MOU and no others.

10 - Publication:

Both Parties may plan to make the results of their collaborative work fully and openly available in either open-source environments and/or publications in accordance with existing copyrights and their respective data policies and practices, provided that the publishing Party will provide the other Parties with a thirty (30) day period in which to review each publication to identify and remove any confidential or proprietary information prior to publication. If no comment or response is provided within thirty (30) days, the publishing Party shall deem proposed publication as reviewed and will move forward with publication.

11 - Non-Exclusivity:

This MOU is non-exclusive. Each Party is free to carry out similar activities with third parties. The Parties are independent contractors/organizations and may not act nor bind the other in any way nor may either represent that it is in any way responsible for the acts of to the other.

12 - Publicity:

- A. Use of any of the Parties' name, trademarks, or other logos in any publicity, advertising, or news release ("Information Releases") shall occur only after prior written approval of the other Party(ies) mentioned in the Information Release. The Parties agree that each Party may use factual information regarding the existence and purpose of the relationship that is the subject of this MOU for legitimate business purposes, to satisfy any reporting obligations, or as required by

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applicable law or regulation without written permission from the other Party. In any such statement, the relationship of the Parties shall be accurately and appropriately described.

- B. If a Party wishes to issue any communication directed outside of their organization concerning this MOU through print, broadcast, digital media, social platforms, or other means, the Party must send the communication to the other Party(ies) before release for review and written approval of the other Party(ies) representative(s).
- C. Written approval of Information Releases shall be sought from the following representatives:
- UCAR and UCAR: Rachael Drummond, UCAR Communications Director. rachael.d@ucar.edu, cc: fedaward@ucar.edu.
 - INPE: José Aravéquia, General Coordinator of Earth Sciences. jose.aravequia@inpe.br, cc: cgct@inpe.br

13 - Notices:

All written notices between INPE and UCAR with reference to this MOU shall be sent to the respective address of the party, or to such other individuals as the parties may designate in writing from time to time, as follows:

NCAR/UCAR TECHNICAL CONTACT	INPE TECHNICAL CONTACT
Name: William C. Skamarock	Name: Saulo Ribeiro de Freitas
Title: Senior Scientist	Title: Head of the Earth System Numerical Modeling Division
Address: Mesoscale and Microscale Meteorology Laboratory 3090 Center Green Drive Boulder, CO 80301	Address: Avenida dos Astronautas, 1.758 Jd. Granja 12227-010 São José dos Campos - SP - Brasil
Phone:	Phone: +55 12 3208-6671
E-mail:	E-mail: saulo.freitas@inpe.br

NCAR/UCAR ADMINISTRATIVE CONTACT	INPE ADMINISTRATIVE CONTACT
Name: Beth Mason	Name: Saulo Ribeiro de Freitas
Title: Contract Administrator	Title: Head of the Earth System Numerical Modeling Division
Address: UCAR 3090 Center Green Drive Boulder, CO 80301	Jd. Granja 12227-010 São José dos Campos - SP - Brasil
Phone: (303) 497-8887	Phone: +55 12 3208-6671
E-mail: bmason@ucar.edu cc: Fedaward@ucar.edu	E-mail: saulo.freitas@inpe.br

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In WITNESS WHEREOF, the parties, as evidenced below by the signatures of each party's duly authorized representative, hereto have agreed to understandings recited in this MOU in English and duplicate original in Portuguese, all of them of the same content, for the only one and the same effect, in two copies. In case of divergence of interpretation, the English text shall prevail.

National Institute for Space Research

Name:

Title:

Signature:

Date:

University Corporation for Atmospheric Research

Name: Tony Busalacchi

Title: President

Signature:

Date:

DocuSigned by:

Tony Busalacchi 5/2025

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National Center for Atmospheric Research

Name: Everette Joseph

Title: NCAR Director

Signature:

Date:

DocuSigned by:

Everette Joseph 5/2025

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