

REIMBURSABLE SPACE ACT AGREEMENT
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
AND ARIZONA BOARD OF REGENTS FOR AND ON BEHALF OF ARIZONA STATE
UNIVERSITY
FOR MARS ATMOSPHERIC INFRARED DATA ANALYSIS.

ARTICLE 1. AUTHORITY AND PARTIES

In accordance with the National Aeronautics and Space Act (51 U.S.C. § 20113(e)), this Agreement is entered into by the National Aeronautics and Space Administration Goddard Space Flight Center, located at 8800 Greenbelt Road, Greenbelt, Maryland 20771 (hereinafter referred to as "NASA" or "NASA GSFC") and Arizona Board of Regents for and on behalf of Arizona State University located at ORSPA, Box 876011, Tempe, AZ 85287-6011 (hereinafter referred to as "Partner" or "ASU"). NASA and Partner may be individually referred to as a "Party" and collectively referred to as the "Parties."

ARTICLE 2. PURPOSE

This follow-on Agreement is to continue data analysis and development of retrieval algorithms for the Emirates Mars Infrared Spectrometer (EMIRS) for the Emirates Mars Mission (EMM). The EMIRS thermal infrared spectrometer is among the three science instruments on-board EMM. The prime contractor in the United States for EMM science operations and activities is the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado. LASP has contracted with Arizona State University (ASU) to provide science and operations support for the EMIRS instrument, and ASU has in turn requested help from NASA to provide scientific support. ASU has requested NASA's participation based on NASA GSFC's expertise in atmospheric infrared analysis and radiative transfer modeling of planetary atmospheres, combined with more than 30 years of experience in the development and use of algorithms for the retrieval of atmospheric parameters from spacecraft observations of Mars.

EMM arrived at Mars in February 2021 and continues to operate in Mars orbit acquiring new data at the current time. The prior agreement covered activities by GSFC from pre-launch to the end of the nominal mission after one Martian year of science operations at Mars on March 31, 2023. Accomplishments from the prior agreement include the successful completion of an initial operational data pipeline through Level 3 (derived data products such as atmospheric temperatures and aerosol abundance), the presentation of science results at conferences, and the publication of initial science results in refereed scientific journals.

EMM continues operation in Mars orbit collecting new observations of Mars each day as part of the EMM extended mission authorized by the United Arab Emirates Space Agency. Since new data continue to be collected during the EMM extended mission, there is a continued need for the scientific analysis of the new data and continued refinement of the data pipeline as new nuances are uncovered by the new observations. This Agreement supports science activities to be

performed by GSFC during the extended mission of EMM. Because of the key role that NASA GSFC has played in the demonstrated success of the EMM nominal mission through the prior agreement, ASU has determined, through a thorough analysis of available commercial entities and resources, that NASA GSFC is the most highly qualified, if not the only known, entity to undertake and successfully complete the desired science activities during EMM extended mission.

Specifically, the Agreement supports work on EMIRS data pipeline and science closure tasks. GSFC will lead the continued development of the retrieval algorithm for generation of Level 3 data products, provide guidance and support to team members involved in EMM science, and assist in the generation and validation of science data products. This work reflects the goals of NASA's Mars Exploration Program to characterize the current climate of Mars. This work enables a better understanding of both the current Mars climate as well as the physical processes that link conditions in the lower atmosphere to those in the upper atmosphere providing crucial information about the long-term history of the Martian atmosphere.

ARTICLE 3. RESPONSIBILITIES

A. NASA GSFC will use reasonable efforts to:

1. Support the development upkeep and analysis of the pipeline between Level 2 (calibrated radiance spectra) to Level 3 (derived physical quantities) data
 - a. Support the production of archive ready Level 3 data products (results from individual spectra as well as binned maps)
 - b. Support the EMM Science Data Center in archiving of Level 3 data products
 - c. Provide updates to the Level 2 to Level 3 processing pipeline that include new/updated retrieval algorithms (see "Support EMIRS Science Closure" section below)
 - d. Support the processing Level 2 data, generate Level 3 products and upload for release
 - e. Support the documentation of the retrieval algorithms used for the Level 2 to Level 3 processing pipeline.
 2. Support EMIRS Science Closure
 - a. Continued development and refinement of retrieval algorithms and the necessary radiative transfer models to simulate an EMIRS spectrum given the atmospheric state and the inverse algorithms that perform the retrieval of those quantities from EMIRS observations.
 - b. Validation of EMIRS pipeline performance as compared to expected performance.
 - c. Continued evaluation of retrieval algorithm efficiencies and approaches (e.g., determining number of retrievals per footprint, number of streams etc.)
 - d. Development, support, and implementation of scientific investigations that lead to publications in peer-reviewed journals.
 3. EMM Science Team Activities
 - a. Travel to EMM Science Team meetings and instrument level meetings, as required.
 - b. Support the generation of visual aids for public briefings and outreach activities.
- B. Partner will use reasonable efforts to:

1. ASU will provide access to regularly processed EMIRS data
2. ASU will support the implementation of the L3 retrieval
3. ASU will support the archival and dissemination of data and results.

ARTICLE 4. SCHEDULE AND MILESTONES

The planned major milestones for the activities defined in the "Responsibilities" Article are as follows:

NASA: Documentation of the retrieval algorithms used for the Level 2 to Level 3 processing pipeline as listed above in Article 3, Section A. 1. including publication in refereed journal	End of Agreement
NASA: Production of publication worthy science	End of Agreement
NASA: Regular presentation of instrument status and science results at Science Team meetings (in person and remotely)	As needed through duration of Agreement

ARTICLE 5. FINANCIAL OBLIGATIONS

A. Partner agrees to reimburse NASA an estimated cost of \$168,483 for NASA to carry out its responsibilities under this Agreement. In no event will NASA transfer any U.S. Government funds to Partner under this Agreement. Payment must be made by Partner in advance of initiation of NASA's efforts on behalf of the Partner.

B. Payment shall be payable to the National Aeronautics and Space Administration through the NASA Shared Services Center (NSSC) (choose one form of payment):

- (1) U.S. Treasury FEDWIRE Deposit System, Federal Reserve Wire Network Deposit System;
- (2) pay.gov at <https://paygov.nssc.nasa.gov/> and select the appropriate NASA Center for the agreement from the drop down; or
- (3) check. A check should be payable to NASA and sent to:

NASA Shared Services Center
 FMD – Accounts Receivable For the Accounts of: Goddard Space Flight Center
 Building 1111,
 Jerry Hlass Rd., Stennis Space Center, MS 39529

Payment by electronic transfer (#1 or #2, above), is strongly encouraged, and payment by check is to be used only if circumstances preclude the use of electronic transfer. All payments and other communications regarding this Agreement shall reference the Center name, title, date, and number of this Agreement.

C. NASA will not provide services or incur costs beyond the existing payment. Although NASA has made a good faith effort to accurately estimate its costs, it is understood that NASA provides no assurance that the proposed effort under this Agreement will be accomplished for the above estimated amount. Should the effort cost more than the estimate, Partner will be advised by NASA as soon as possible. Partner shall pay all costs incurred and has the option of canceling the remaining effort, or providing additional funding in order to continue the proposed effort under the revised estimate. Should this Agreement be terminated, or the effort completed at a cost less than the agreed-to estimated cost, NASA shall account for any unspent funds within one (1) year after completion of all effort under this Agreement, and promptly thereafter return any unspent funds to Partner. Return of unspent funds will be processed via Electronic Funds Transfer (EFT) in accordance with 31 C.F.R. Part 208 and, upon request by NASA, Partner agrees to complete the Automated Clearing House (ACH) Vendor/Miscellaneous Payment Enrollment Form (SF 3881).

D. Notwithstanding any other provision of this Agreement, all activities under or pursuant to this Agreement are subject to the availability of funds, and no provision of this Agreement shall be interpreted to require obligation or payment of funds in violation of the Anti-Deficiency Act, (31 U.S.C. § 1341).

ARTICLE 6. PRIORITY OF USE

Any schedule or milestone in this Agreement is estimated based upon the Parties' current understanding of the projected availability of NASA goods, services, facilities, or equipment. In the event that NASA's projected availability changes, Partner shall be given reasonable notice of that change, so that the schedule and milestones may be adjusted accordingly. The Parties agree that NASA's use of the goods, services, facilities, or equipment shall have priority over the use planned in this Agreement. Should a conflict arise, NASA in its sole discretion shall determine whether to exercise that priority. Likewise, should a conflict arise as between two or more non-NASA Partners, NASA, in its sole discretion, shall determine the priority as between those Partners. This Agreement does not obligate NASA to seek alternative government property or services under the jurisdiction of NASA at other locations.

ARTICLE 7. NONEXCLUSIVITY

This Agreement is not exclusive; accordingly, NASA may enter into similar agreements for the same or similar purpose with other private or public entities.

ARTICLE 8. LIABILITY

A. Partner hereby waives any claims against NASA or one or more of its Related Entities for any injury to, or death of, Partner or one or more of its Related Entities, or for damage to, or loss of, Partner's property or the property of its Related Entities, arising from or related to activities conducted under this Agreement, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct on the part of NASA or one or more of its Related Entities. For purposes of this Agreement, "Related Entities" shall mean contractors and subcontractors of a Party at any tier;

grantees, investigators, customers, and users of a Party at any tier and their contractors or subcontractor at any tier; or, employees of the Party or any of the foregoing.

B. Partner further agrees to extend this unilateral waiver to its related entities by requiring them, by contract or otherwise, to waive all claims against NASA and its Related Entities for injury, death, damage, or loss arising from or related to activities conducted under this Agreement. In the event the U.S. Government incurs any liability based upon Partner's failure to provide for the waiver by Partner's Related Entities set out above, Partner agrees to the extent permitted by law, to be responsible for, and hold the U.S. Government harmless against such liability, including costs and expenses incurred by the U.S. Government in defending against any suit or claim for liability by Partner's Related Entities.

C. In the event U.S. Government property is damaged as a result of activities conducted under this Agreement, except in the case of gross negligence or willful misconduct by NASA, Partner shall be solely responsible for the repair and restoration of such property subject to NASA direction. Prior to issuing such direction, NASA will consider input from Partner and other factors such as the extent to which damage was attributable to the activity and the respective responsibilities of each party as described in the agreement.

D. Notwithstanding the other provisions of this Article, the waiver of liability set forth in this section shall not be applicable to: i. Claims between Partner and its own Related Entity or between its own Related Entities; ii. Claims made by a natural person, his/her estate, survivors, or anyone claiming by or through him/her (except when such person or entity is a Party to this Agreement or is otherwise bound by the terms of this waiver) for bodily injury to, or other impairment of health of, or death of, such person; iii. Claims for damage caused by willful misconduct; iv. Intellectual property claims; v. Claims for damage resulting from a failure of Partner to extend the waiver of liability to its Related Entities, pursuant to paragraph B of this Article; or vi. Claims by Partner arising out of or relating to NASA's failure to perform its obligations under this Agreement.

ARTICLE 9. INTELLECTUAL PROPERTY RIGHTS - DATA RIGHTS

Information and data exchanged under this Agreement is exchanged without restrictions unless required by national security regulations (e.g., classified information) or as otherwise provided in this Agreement or agreed to by the Parties for specifically identified information or data (e.g., information or data specifically marked with a restrictive notice). Notwithstanding the foregoing, if the Parties exchange Data disclosing an invention for which patent protection is being considered, and the furnishing Party identifies the Data as such when providing it to the Receiving Party, the Receiving Party shall withhold it from public disclosure for a reasonable time (six months unless otherwise agreed, or the Data is restricted for a longer period herein).

ARTICLE 10. INTELLECTUAL PROPERTY RIGHTS - RIGHTS IN RAW DATA GENERATED UNDER THE AGREEMENT

1. Raw Data (i.e., unanalyzed data) and related Data produced under this Agreement is reserved to Principal Investigators (and Co-Investigators if any) named in this Agreement for scientific analysis and first publication rights for 12 months beginning with receipt of the Data in a form

suitable for analysis. Subject to the provisions of the Intellectual Property Rights - Data Rights Article of this Agreement, NASA and Partner may also use the Data during the restricted period (in NASA's case, for U.S. government purposes only). This use will not prejudice the investigators' first publication rights or Partner's protection of reported inventions. 2. Final Results (a) Final results shall be made available to the scientific community through publication in appropriate journals or other established channels as soon as practicable and consistent with good scientific practice. Under the Publication of Results provision of the Intellectual Property Rights - Data Rights clause of this Agreement, the Parties shall coordinate proposed publications allowing a reasonable time for review and comment. (b) NASA and Partner have a royalty-free right to reproduce, distribute, and use published final results for any purposes. Partner must notify publisher of NASA's rights.

ARTICLE 11. INTELLECTUAL PROPERTY RIGHTS - INVENTION AND PATENT RIGHTS

- A. "Related Entity" as used in this Invention and Patent Rights Article means a contractor, subcontractor, grantee, or other entity having a legal relationship with NASA or Partner assigned, tasked, or contracted with to perform activities under this Agreement.
- B. The invention and patent rights herein apply to employees and Related Entities of Partner. Partner shall ensure that its employees and Related Entity employees know about and are bound by the obligations under this Article.
- C. NASA has determined that 51 U.S.C. § 20135(b) does not apply to this Agreement. Therefore, title to inventions made (conceived or first actually reduced to practice) under this Agreement remain with the respective inventing party(ies). No invention or patent rights are exchanged or granted under this Agreement. NASA and Partner will use reasonable efforts to report inventions made jointly by their employees (including employees of their Related Entities). The Parties will consult and agree on the responsibilities and actions to establish and maintain patent protection for joint invention, and on the terms and conditions of any license or other rights exchanged or granted between them.

ARTICLE 12. USE OF NASA NAME AND NASA EMBLEMS

A. NASA Name and Initials

Partner shall not use "National Aeronautics and Space Administration" or "NASA" in a way that creates the impression that a product or service has the authorization, support, sponsorship, or endorsement of NASA, which does not, in fact, exist. Except for releases under the "Release of General Information to the Public and Media" Article, Partner must submit any proposed public use of the NASA name or initials (including press releases and all promotional and advertising use) to the NASA Associate Administrator for the Office of Communications or designee ("NASA Communications") for review and approval. Approval by NASA Office of Communications shall be based on applicable law and policy governing the use of the NASA name and initials.

B. NASA Emblems

Use of NASA emblems (i.e., NASA Seal, NASA Insignia, NASA logotype, NASA Program Identifiers, and the NASA Flag) is governed by 14 C.F.R. Part 1221. Partner must submit any proposed use of the emblems to NASA Communications for review and approval.

ARTICLE 13. RELEASE OF GENERAL INFORMATION TO THE PUBLIC AND MEDIA

NASA or Partner may, consistent with Federal law and this Agreement, release general information regarding its own participation in this Agreement as desired. 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 a copy of this Agreement will be disclosed, without redactions, in accordance with the NTAA.

ARTICLE 14. DISCLAIMER OF WARRANTY

Goods, services, facilities, or equipment provided by NASA under this Agreement are provided "as is." NASA makes no express or implied warranty as to the condition of any such goods, services, facilities, or equipment, or as to the condition of any research or information generated under this Agreement, or as to any products made or developed under or as a result of this Agreement including as a result of the use of information generated hereunder, or as to the merchantability or fitness for a particular purpose of such research, information, or resulting product, or that the goods, services, facilities or equipment provided will accomplish the intended results or are safe for any purpose including the intended purpose, or that any of the above will not interfere with privately-owned rights of others. Neither the government nor its contractors shall be liable for special, consequential or incidental damages attributed to such equipment, facilities, technical information, or services provided under this Agreement or such research, information, or resulting products made or developed under or as a result of this Agreement.

ARTICLE 15. DISCLAIMER OF ENDORSEMENT

NASA does not endorse or sponsor any commercial product, service, or activity. NASA's participation in this Agreement or provision of goods, services, facilities or equipment under this Agreement does not constitute endorsement by NASA. Partner agrees that nothing in this Agreement will be construed to imply that NASA authorizes, supports, endorses, or sponsors any product or service of Partner resulting from activities conducted under this Agreement, regardless of the fact that such product or service may employ NASA-developed technology.

ARTICLE 16. COMPLIANCE WITH LAWS AND REGULATIONS

A. The Parties shall comply with all applicable laws and regulations including, but not limited to, safety; security; export control; environmental; and suspension and debarment laws and regulations. Access by a Partner to NASA facilities or property, or to a NASA Information

Technology (IT) system or application, is contingent upon compliance with NASA security and safety policies and guidelines including, but not limited to, standards on badging, credentials, and facility and IT system/application access, including use of Interconnection Security Agreements (ISAs), when applicable.

B. With respect to any export control requirements:

1. The Parties will comply with all U.S. export control laws and regulations, including the International Traffic in Arms Regulations (ITAR), 22 C.F.R. Parts 120 through 130, and the Export Administration Regulations (EAR), 15 C.F.R. Parts 730 through 799, in performing work under this Agreement or any Annex to this Agreement. In the absence of available license exemptions or exceptions, the Partner shall be responsible for obtaining the appropriate licenses or other approvals, if required, for exports of hardware, technical data and software, or for the provision of technical assistance.

2. The Partner shall be responsible for obtaining export licenses, if required, before utilizing foreign persons in the performance of work under this Agreement or any Annex under this Agreement, including instances where the work is to be performed on-site at NASA and where the foreign person will have access to export-controlled technical data or software.

3. The Partner will be responsible for all regulatory record-keeping requirements associated with the use of licenses and license exemptions or exceptions.

4. The Partner will be responsible for ensuring that the provisions of this Article apply to its Related Entities.

C. With respect to suspension and debarment requirements:

1. The Partner hereby certifies, to the best of its knowledge and belief, that it has complied, and shall comply, with 2 C.F.R. Part 180, Subpart C, as supplemented by 2 C.F.R. Part 1880, Subpart C.

2. The Partner shall include language and requirements equivalent to those set forth in subparagraph C.1., above, in any lower-tier covered transaction entered into under this Agreement.

D. With respect to the requirements in Section 889 of the National Defense Authorization Act (NDAA) for Fiscal Year 2019, Public Law 115-232: 1. In performing this Agreement, Partner will not use, integrate with a NASA system, or procure with NASA funds (if applicable), “covered telecommunications equipment or services” (as defined in Section 889(f)(3) of the NDAA). 2. The Partner will ensure that the provisions of this Article apply to its Related Entities.

ARTICLE 17. TERM OF AGREEMENT

This Agreement becomes effective upon the date of the last signature below (“Effective Date”)

and shall remain in effect until the completion of all obligations of both Parties hereto, or one year from the Effective Date, whichever comes first.

ARTICLE 18. RIGHT TO TERMINATE

Either Party may unilaterally terminate this Agreement by providing thirty (30) calendar days written notice to the other Party. In the event of such termination, Partner will be obligated to reimburse NASA for all costs for which the Partner was responsible and that have been incurred in support of this Agreement up to the date the termination notice is received by NASA. Where Partner terminates this Agreement, Partner will also be responsible for termination costs.

ARTICLE 19. CONTINUING OBLIGATIONS

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

ARTICLE 20. POINTS OF CONTACT

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

Management Points of Contact

NASA Goddard Space Flight Center
Stephanie Getty
Director Solar System Exploration Division
Mail Stop: 690
8800 Greenbelt Road
Greenbelt, Maryland 20771
Phone: 301-614-5442
stephanie.a.getty@nasa.gov

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Mail Suite: 6004
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phil.christensen@asu.edu

Principal Investigator Point of Contact

NASA Goddard Space Flight Center
Michael Smith
AST atmospheres and ionspheres
Mail Stop: 693
8800 Greenbelt Road
Greenbelt, Maryland 20771

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ORSPA, Box 876011
Tempe, AZ 85287-6011

Phone: 301-286-7495
michael.d.smith@nasa.gov

ARTICLE 21. DISPUTE RESOLUTION

Except as otherwise provided in the Article entitled “Priority of Use,” the Article entitled “Intellectual Property Rights – Invention and Patent Rights” (for those activities governed by 37 C.F.R. Part 404), and those situations where a pre-existing statutory or regulatory system exists (e.g., under the Freedom of Information Act, 5 U.S.C. § 552), all disputes concerning questions of fact or law arising under this Agreement shall be referred by the claimant in writing to the appropriate person identified in this Agreement as the “Points of Contact.” The persons identified as the “Points of Contact” for NASA and the Partner will consult and attempt to resolve all issues arising from the implementation of this Agreement. If they are unable to come to agreement on any issue, the dispute will be referred to the signatories to this Agreement, or their designees, for joint resolution. If the Parties remain unable to resolve the dispute, then the NASA signatory or that person’s designee, as applicable, will issue a written decision that will be the final agency decision for the purpose of judicial review. Nothing in this Article limits or prevents either Party from pursuing any other right or remedy available by law upon the issuance of the final agency decision.

ARTICLE 22. MODIFICATIONS

Any modification to this Agreement shall be executed, in writing, and signed by an authorized representative of NASA and the Partner.

ARTICLE 23. ASSIGNMENT

Neither this Agreement nor any interest arising under it will be assigned by the Partner or NASA without the express written consent of the officials executing, or successors, or higher- level officials possessing original or delegated authority to execute this Agreement.

ARTICLE 24. APPLICABLE LAW

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

ARTICLE 25. INDEPENDENT RELATIONSHIP

This Agreement is not intended to constitute, create, give effect to or otherwise recognize a joint venture, partnership, or formal business organization, or agency agreement of any kind, and the rights and obligations of the Parties shall be only those expressly set forth herein.

ARTICLE 26. LOAN OF GOVERNMENT PROPERTY

The parties shall enter into a NASA Form 893, Loan of NASA Equipment, for NASA equipment loaned to Partner.

ARTICLE 27. SIGNATORY AUTHORITY

The signatories to this Agreement covenant and warrant that they have authority to execute this Agreement. By signing below, the undersigned agrees to the above terms and conditions.

NATIONAL AERONAUTICS AND SPACE
ADMINISTRATION
GODDARD SPACE FLIGHT CENTER

ARIZONA BOARD OF REGENTS FOR AND
BEHALF OF ARIZONA STATE
UNIVERSITY

BY: _____
Christa D. Peters-Lidard
Director of Sciences and Exploration

BY: Kristy Macdonald
Kristy Macdonald
Assistant Director, Research Operations

DATE: _____

DATE: 3/7/2024