

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
OF THE UNITED STATES OF AMERICA
AND
THE JAPAN AEROSPACE EXPLORATION AGENCY
FOR
COOPERATION ON THE FORMULATION ACTIVITY OF THE
GLOBAL PRECIPITATION MEASUREMENT PROGRAM

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PREAMBLE

The National Aeronautics and Space Administration of the United States of America (NASA) and the Japan Aerospace Exploration Agency (JAXA) (hereinafter jointly referred to as the "Parties") having expressed their mutual interest in a Global Precipitation Measurement (GPM) program (hereinafter referred to as the "Program");

Desiring to pursue cooperation in the observation of precipitation and the water cycle from space for peaceful purposes; and

Pursuant to paragraph 1 of the agreement between the Government of the United States of America and the Government of Japan concerning the cooperation on the Formulation Activity of the Program, effected by the exchange of notes on June 10, 2005, (hereinafter referred to as the "Exchange of Notes");

Have agreed as follows:

I. PURPOSE

The purpose of this Memorandum of Understanding (MOU) is to establish the terms and conditions under which the Parties will cooperate in the Formulation Activity of the Program for peaceful purposes. This MOU does not constitute a commitment by either Party to proceed to full implementation, which is done after the Formulation Activity of the Program. A subsequent MOU for full implementation of the Program would be expected to be concluded between the Parties only after both Parties have each received authorization to proceed from their respective Governments.

II. DESCRIPTION OF THE GPM MISSION

The GPM mission, the main part of which is the Program, is intended to be a follow-on to the current Tropical Rainfall Measuring Mission (TRMM), and will expand its observations from the tropics and subtropics to the entire globe, improve observing frequency, produce a global precipitation map updated every 3 hours, and enhance measuring methods to identify rain and snow by using a dual-frequency precipitation radar (DPR). The data acquired by the GPM mission are expected to be beneficial for monitoring and predicting climatological and meteorological changes and for improving the accuracy of weather and precipitation forecasts. The GPM mission is expected to provide sufficient measurement sampling to provide high quality rainfall accumulation products needed by many disciplines, including hydrology, meteorology, oceanography and climate model validation.

It is expected that the GPM mission will include a core spacecraft carrying a DPR to be provided by JAXA, based on joint research with the National Institute of Information and Communications Technology (NICT) of Japan, and a multi-channel passive microwave radiometer (a GPM Microwave Imager (GMI)) to be provided by NASA. It is also expected that the GPM mission architecture will include an international constellation of satellites carrying passive microwave radiometers.

The GPM DPR, GMI, core spacecraft, and its launch, are expected to be provided through a partnership between NASA and JAXA. Other foreign partners may be invited to participate in the GPM mission. Foreign partners may offer hardware for the constellation satellites, ground validation sites, supporting instruments, data processing and distribution services, or supporting scientific research.

III. MANAGEMENT AND PROGRAM COORDINATION

The Formulation Activity of the Program will be managed jointly by NASA and JAXA.

The principal points of contact for each Party in the performance of this MOU are designated below:

For NASA:

Mr. Steven Neeck
GPM Program Executive
Science Mission Directorate
NASA Headquarters
300 E Street, SW
Suite 5E39-A
Washington, DC 20546
U.S.A
Phone: (202) 358-0832
Fax: (202) 358-2769
E-mail: steven.neeck@nasa.gov

For JAXA

Mr. Masahiro Kojima
GPM/DPR Project Manager
Office of Space Applications
Japan Aerospace Exploration Agency
2-1-1 Sengen, Tsukuba-city
Ibaraki 305-8505
Japan
Phone: 81-29-868-4018
Fax: 81-29-868-5975
E-mail: kojima.masahiro@jaxa.jp

IV. RESPONSIBILITIES

A. NASA shall use reasonable efforts to:

1. Develop jointly with JAXA the GPM mission concept and architecture;

2. Develop a GPM core spacecraft design that would accommodate a JAXA-provided DPR and a NASA provided GMI;
3. Develop jointly with JAXA a core spacecraft integration and testing plan that would accommodate a JAXA-provided DPR and the launch of the core spacecraft into its low Earth orbit;
4. Develop jointly with JAXA a plan for a ground and data system for the GPM mission that includes mission operations, science data processing, archiving, and distribution including Japan's potential provision of one data center capable of interfacing with other international data centers;
5. Undertake jointly with JAXA interface meetings related to the formulation of hardware and ground system concepts, design, and architecture;
6. Organize jointly with JAXA joint science team meetings, science conferences, and workshops;
7. Develop and exchange with JAXA preliminary interface documentation and engineering data as needed for GPM mission formulation;
8. Develop preliminary science algorithms (mathematical equations) for the calibration and generation of data for the GMI;
9. Develop jointly with JAXA preliminary science algorithms for the GPM core spacecraft combined data product;
10. Develop jointly with JAXA a data validation program to support mission formulation;
11. Support, as mutually agreed, the exchange of scientific and engineering personnel for planning the joint scientific mission; and,
12. Study jointly with JAXA the possible contributions of future U.S. and Japanese satellite missions to GPM carrying passive microwave radiometers.

B. JAXA shall use reasonable efforts to:

1. Develop jointly with NASA the GPM mission concept and architecture;
2. Develop a DPR design for the GPM core spacecraft;
3. Provide a preliminary plan concerning the launch of the GPM core spacecraft into its low Earth orbit, including definition of proposed mass allocation;
4. Develop jointly with NASA a core spacecraft integration and testing plan that would accommodate DPR and a launch of the core spacecraft into its low Earth orbit;

5. Develop jointly with NASA a plan for a ground and data system for the GPM mission that includes mission operations, science data processing, archiving and distribution, including Japan's potential provision of one data center capable of interfacing with other international data centers;
6. Develop preliminary science algorithms (mathematical equations) for calibration and generation of data for DPR;
7. Develop jointly with NASA preliminary science algorithms for the GPM core spacecraft combined data product;
8. Undertake jointly with NASA interface meetings related to the formulation of hardware and ground system concepts, design, and architecture;
9. Organize jointly with NASA joint science team meetings, science conferences and workshops;
10. Develop and exchange with NASA preliminary interface documentation and engineering data as needed for GPM mission formulation;
11. Develop jointly with NASA a data validation program to support GPM mission formulation;
12. Support, as mutually agreed, the exchange of scientific and engineering personnel for planning the joint scientific mission; and,
13. Study jointly with NASA the possible contributions of future Japanese and U.S. satellite missions to GPM carrying passive microwave radiometers.

V. FINANCIAL OBLIGATIONS

NASA and JAXA will each bear the costs of discharging their respective responsibilities under this MOU, including travel and subsistence of personnel and transportation of all equipment and other items for which each is responsible. The obligations of each Party under this MOU are subject to its funding procedures and to the availability of appropriated funds. Should either Party encounter budgetary problems which may affect the activities to be carried out under this MOU, the Party encountering the problems will notify and consult with the other Party as soon as possible.

VI. INVENTION AND PATENT RIGHTS

Nothing in this MOU shall be construed as granting or implying any rights to, or interest in, patents or inventions of the Parties or their contractors or subcontractors. In the event that an invention is jointly made by employees of the Parties, their contractors, or subcontractors during the implementation of this MOU, the Parties shall consult and agree as to the responsibilities and costs of actions to be taken to establish and maintain patent protection (in any country) for such invention and on the terms and conditions of any license or other rights to be exchanged or granted by or between Parties.

VII. TRANSFER OF TECHNICAL DATA AND GOODS

The Parties are obligated to transfer only those technical data (including software) and goods necessary to fulfill their respective responsibilities under this MOU, in accordance with the following provisions:

1. All activities of the Parties will be carried out in accordance with their national laws and regulations pertaining to export control and the control of classified information.
2. The transfer of technical data for the purpose of discharging the Parties' responsibilities with regard to interface, integration, and safety shall normally be made without restriction, except as provided in paragraph 1 above.
3. All transfers of goods and proprietary or export-controlled technical data are subject to the following provisions: In the event a Party or its related entity finds it necessary to transfer goods or to transfer proprietary or export-controlled technical data, for which protection is to be maintained, such goods shall be specifically identified and such proprietary or export-controlled technical data shall be marked. The identification of goods and the marking on proprietary or export-controlled technical data will indicate that the goods and proprietary or export-controlled technical data shall be used by the receiving Party or its related entities only for the purposes of fulfilling the receiving Party's or its related entity's responsibilities under this MOU and that the identified goods and marked proprietary technical data or marked export-controlled technical data shall not be disclosed or retransferred to any other entity without the prior written permission of the furnishing Party or its related entity. The receiving Party or its related entity shall abide by the terms of the notice and protect any such identified goods and marked proprietary technical data or marked export-controlled technical data from unauthorized use and disclosure. The Parties to this MOU will cause their related entities to be bound by the provisions of this Article related to use, disclosure, and retransfer of goods and marked technical data through contractual mechanisms or equivalent measures.
4. All goods exchanged in the performance of this MOU shall be used by the receiving Party or its related entity exclusively for the purposes of the MOU. Upon completion of the activities under this MOU, the receiving Party or its related entity shall return or, at the request of the furnishing Party or its related entity, otherwise dispose of all goods and marked proprietary technical data or marked export-controlled technical data provided under this MOU, as directed by the furnishing Party or its related entity.

VIII. RISK ALLOCATION

1. With regard to activities undertaken pursuant to this MOU, neither Party shall make any claim against the other, employees of the other, the other's related entities (e.g., contractors, subcontractors, investigators, or their contractors or subcontractors) or employees of the other's related entities for any injury to, or death of, its own employees or employees of its related entities, or for damage to, or loss of, its own property or that of its related entities, whether such injury, death, damage, or loss arises through negligence or otherwise, except in the case of willful misconduct.
2. The Parties further agree to extend this cross-waiver to their own related entities by requiring them, by contract or otherwise, to waive all claims against the other Party, related entities of the other Party, and employees of the other Party or of its related entities for injury, death, damage, or loss arising from or related to activities undertaken pursuant to this MOU.
3. This cross-waiver of liability shall not be applicable to:
 - (a) claims between a Party and its related entity, or between its own related entities;
 - (b) claims made by a natural person, his/her estate, survivors or subrogees for bodily injury or other impairment of health, or death of such natural person;
 - (c) claims for damage caused by willful misconduct;
 - (d) intellectual property claims;
 - (e) claims for damage based upon a failure of the Parties to extend the provision as set forth above or from a failure of the Parties to ensure that their related entities extend the provision as set forth above; or
 - (f) contract claims between the Parties based on expressed contractual provisions.
4. Nothing in this section shall be construed to create the basis for a claim or suit where none would otherwise exist.
5. JAXA shall purchase insurance coverage to hold harmless the Government of the United States of America, NASA, and its related entities against liability arising from any and all claims, including subrogated claims, of the Government of Japan against the Government of the United States of America, NASA, and its related entities based on damage arising from activities undertaken pursuant to this MOU. In any event, JAXA shall ensure that the Government of the United States of America, NASA and its related entities are reimbursed for any costs incurred by them relating to any such claims. NASA waives any and all claims, including subrogated claims, of the Government of the United States of America against the

Government of Japan, JAXA, and its related entities based on damage arising from activities undertaken pursuant to this MOU.

IX. RELEASE OF GENERAL INFORMATION TO THE PUBLIC

Releases of general information to the public may be made by the appropriate Party for its own portion of the cooperation as desired. Insofar as participation of the other Party is involved, the Parties will seek to consult with each other prior to any releases, consistent with relevant laws and policies.

X. CUSTOMS AND TAXES

Each Party shall seek to arrange free customs clearance and waiver of all applicable customs duties and taxes for equipment and related goods necessary for the implementation of this MOU. In the event that any customs duties or taxes of any kind are nonetheless levied on such equipment and related goods, such customs duties and/or taxes shall be borne by the Party of the country levying such customs duties and/or taxes. Such arrangements are fully reciprocal and subject to the laws and regulations of the Parties' respective countries.

XI. PERSONNEL EXCHANGE

Each of the Parties shall facilitate the movement of persons necessary to carry out the activities under this MOU into and out of its territory, subject to relevant laws and regulations.

XII. OWNERSHIP OF EQUIPMENT

Any equipment provided by NASA pursuant to this MOU shall remain the property of NASA. Any equipment provided by JAXA pursuant to this MOU shall remain the property of JAXA.

XIII. CONSULTATIONS/SETTLEMENT OF DISPUTES

Pursuant to paragraph 3 of Exchange of Notes, the Parties shall consult promptly with each other on all issues involving interpretation or implementation of this MOU. Any matter that is not settled shall be referred to the Parties' points of contact identified herein. The points of contact will attempt to resolve all issues arising from the implementation of this MOU. If they are unable to resolve such issues, then the dispute will be referred to the NASA Administrator and JAXA President, or their designated representative(s) for joint resolution.

XIV. DURATION AND TERMINATION

This MOU shall enter into force upon signature by the Parties and shall remain in force for a period of 3 years, provided that the Exchange of Notes remains in force, unless the subsequent MOU for full implementation of the Program, which is done after the Formulation Activity of the Program, as referred to in Article 1, enters into force, in which case this MOU shall terminate. If this MOU is still in force at the end of the initial 3-year period, this MOU shall be automatically extended annually under the same terms and conditions for additional 1-year periods, provided that the Exchange of Notes is in force.

This MOU may be amended by mutual written agreement of the Parties or terminated by either Party at any time by providing written notice to the other Party at least three months prior to the intended termination date.

Termination of this MOU shall not affect a Party's continuing obligations under Articles VI, VII, VIII, and IX unless otherwise agreed to by the Parties.

FOR THE NATIONAL
AERONAUTICS AND SPACE
ADMINISTRATION OF THE
UNITED STATES OF AMERICA



Michael F. O'Brien
Assistant Administrator
for External Relations

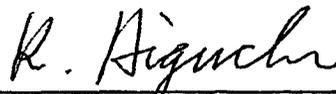
6/21/05

Date

Washington, DC

Place

FOR THE JAPAN
AEROSPACE EXPLORATION
AGENCY



Kiyoshi Higuchi
Executive Director

6/29/05

Date

Tokyo

Place

I CERTIFY THIS TO BE A TRUE COPY OF THE SIGNED ORIGINAL.

