No. 26945

UNITED STATES OF AMERICA
and
FEDERAL REPUBLIC OF GERMANY

Memorandum of Understanding on the project of active magnetospheric particle tracer explorers. Signed at Washington on 15 October 1981

Authentic texts: English and German.

Registered by the United States of America on 29 November 1989.

ÉTATS-UNIS D'AMÉRIQUE
et
RÉPUBLIQUE FÉDÉRALE D'ALLEMAGNE

Mémorandum d'accord relatif au projet d'explorateurs traceurs de particules magnétosphériques actives. Signé à Washington le 15 octobre 1981

Textes authentiques : anglais et allemand.

Enregistré par les États-Unis d'Amérique le 29 novembre 1989.

MEMORANDUM OF UNDERSTANDING[1] BETWEEN UNITED STATES NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND THE FEDERAL MINISTER FOR RESEARCH AND TECHNOLOGY OF THE FEDERAL REPUBLIC OF GERMANY ON THE PROJECT OF ACTIVE MAGNETOSPHERIC PARTICLE TRACER EXPLORERS

The National Aeronautics and Space Administration (NASA) of the United States of America and the Federal Minister for Research and Technology (BMFT) of the Federal Republic of Germany as the Parties to this Memorandum of Understanding:

Recalling with satisfaction the considerable amount of cooperation already conducted between them in the area of space science;

Desiring to extend the fruitful cooperation developed in previous space projects;

Convinced that such cooperation will continue to produce benefits to both Parties:

Have agreed as follows:

Article 1

PURPOSE

NASA and BMFT each set forth in this Memorandum of Understanding their general understandings as to the general responsibilities of the Parties and the terms and conditions under which they have agreed to undertake a cooperative spacecraft project, the Active Magnetospheric Particle Tracer Explorers (hereinafter referred to as AMPTE), which utilizes two spacecraft to investigate sun-earth coupling by active experimentation.

Article 2

MISSION

The primary scientific objective of the mission is to study the entry of solar wind ions into the magnetosphere and the processes by which particles are energized in the magnetospheric tail. Tracer ions (lithium and barium) will be released and measured in the solar wind and within the distant magnetosphere. The AMPTE mission will also seek to obtain comprehensive measurements of the composition and dynamics of the natural charged particle populations within the Earth's magnetosphere. Furthermore, it is intended to study, by *in-situ* measurements and by remote optical observations, the interactions of released and ambient plasmas.

[1] Came into force on 15 October 1981 by signature, in accordance with article 16.

In addition, the mission will serve to establish values of physical parameters necessary for planning and execution of active experiments on Shuttle/Spacelab missions.

To carry out this project, NASA and BMFT plan to develop and launch two spacecraft. The Charge Composition Explorer (CCE) will be launched in 1984 on a Delta vehicle into a highly elliptical orbit with an apogee of eight Earth radii. The Ion Release Module (IRM) will be launched on the same vehicle with an additional kick stage to place it in a highly elliptical orbit with an apogee of about twenty Earth radii. Ion releases will be made by the IRM and ions will be detected by the CCE. Ground observations will supplement the spacecraft data.

Article 3

RESPONSIBILITIES OF NASA

To implement this cooperative project, NASA will use its best efforts to carry out the following responsibilities:

(*a*) Design, fabricate, test, integrate and prepare for launching a complete CCE spacecraft, including its apogee kick stage.

(*b*) Provide the CCE Medium Energy Particle Analyzer (MEPA).

(*c*) Provide the CCE Hot Plasma Composition Experiment (HPCE).

(*d*) Provide the collimator, time-of-flight section, and the high voltage power supplies for the CCE Charge Energy Mass Spectrometer (CHEM).

(*e*) Provide specifications of the environmental conditions in the launch vehicle and the appropriate mechanical and electrical interfaces to the BMFT for use in preparing the IRM for launch.

(*f*) Launch the CCE and the IRM on the same Delta launch vehicle.

(*g*) Conduct tracking and telemetry operations for the CCE as defined in the NASA/BMFT AMPTE Project Plan (as defined in Article 5*d*) and the Support Instrumentation Requirements Document (SIRD).

(*h*) Provide periodic tracking and telemetry support for the IRM as mutually agreed and defined in the NASA/BMFT AMPTE Project Plan and SIRD.

(*i*) Process CCE science data, and provide these data to the Investigators in a form suitable for scientific analysis.

(*j*) Arrange for procurement of the IRM perigee kick stage. The cost will be shared equally by NASA and BMFT. A Deposit Account at NASA will be used for this purpose.

Article 4

RESPONSIBILITIES OF BMFT

BMFT will use its best efforts to carry out the following responsibilities:

(*a*) Design, fabricate, test, integrate and prepare for launching a complete IRM spacecraft, including the chemical release canisters and a magnetometer, and deliver it to the Kennedy Space Center.

(*b*) Provide additional diagnostic instrumentation on the IRM, provided the agreed primary mission objectives and the presently scheduled launch date are not impacted.

(*c*) Select, integrate and prepare for launching the IRM perigee kick stage.

(*d*) Provide analog electronics and data processing unit (DPU) for the CHEM instrument and support the participation of the Max Planck Institute for Aeronomy (MPAE) in the CHEM operations and analysis.

(*e*) Support the participation of the Max Planck Institute for Physics and Astrophysics in the part development of electron sensors of the HPCE.

(*f*) Support the participation of German personnel in Joint Working Group and review meetings, integration, launch, and operations activities and observation campaign in the U.S. and elsewhere.

(*g*) Conduct tracking and telemetry operations for the IRM as defined in the NASA/BMFT AMPTE Project Plan.

(*h*) Process and provide IRM orbital and science data to the Investigators in a form suitable for scientific analysis.

(*i*) Coordinate, in consultation with NASA, ground-based, airborne and other geophysical observations prior to and during the chemical releases.

(*j*) Support the procurement of the IRM perigee kick stage on a cost-shared basis as noted in Article 3, paragraph (*j*).

Article 5

MANAGEMENT

(*a*) The NASA will establish an AMPTE Project Office to provide for project planning and management. This office will be responsible for the overall design, fabrication, test, integration, in-orbit verification and operation of the CCE as well as the launch of both the CCE and the IRM spacecraft. The Project Office will be headed by an AMPTE Project Manager, designated by NASA. Responsibility for management of the AMPTE project resides with the AMPTE Project Manager.

(*b*) The NASA AMPTE Project Manager will be responsible for representing the AMPTE payload 'CCE and IRM' in all payload/Delta vehicle integration activities at the Kennedy Space Center.

(*c*) The BMFT will designate an AMPTE Project Manager, who will be responsible for the overall design, fabrication, test, integration, delivery, in-orbit verification and operation of the IRM.

(*d*) The two Project Managers will prepare and agree to a NASA/BMFT AMPTE Project Plan, which will then be approved by NASA and the BMFT. This Plan will contain detailed statements as to how this cooperative project is to be carried out, including mission planning, spacecraft and instrument description, interface requirements, number of models and hardware parts, necessary documentation and software, delivery schedules, planned testing, provisions for configuration control, data format compatibility and such other technical information as the Project Managers, or NASA and the BMFT, deem to be necessary for project control. The Project Plan may be amended by mutual agreement of the Project Managers. In

case of conflict between the Project Plan and this Memorandum of Understanding (MOU), the MOU will prevail.

(*e*) An AMPTE Joint Working Group (JWG) will be established under the co-chairmanship of the Project Managers. The NASA and BMFT Program Managers and Program Scientists will be Ex-Officio members of the JWG. Its purpose will be to assure technical coordination between NASA and BMFT during implementation of the Project and to assist in resolving questions of mutual interface. The JWG may form committees as appropriate to assist in carrying out its responsibilities.

(*f*) The Project Managers will decide all issues where this Memorandum of Understanding calls for mutual agreement. If they are unable to come to an agreement on a particular issue, the issue will be resolved by mutual agreement between the NASA Director of the Solar Terrestrial and Astrophysics Division and the responsible BMFT official. If agreement is not reached, the matter will be referred to the responsible NASA Associate Administrator and the responsible BMFT official, subject to the application of the Provisions of Article 15 of this Memorandum of Understanding.

(*g*) Each party will designate a Principal Investigator. They are responsible for the development of the scientific investigations for the mission and for assuring that the data are effectively used and that the results are expeditiously produced.

(*h*) A Joint Science Working Group will be established under the co-chairmanship of the two Principal Investigators. This group will discuss all scientific aspects of the mission and advise the Project Managers in the fulfillment of their responsibilities.

Article 6

FLIGHT READINESS

NASA after consultation with the BMFT, will make final determination of the overall readiness of AMPTE for launching. This determination will be based on periodic reviews such as concept, design, acceptance, safety and flight readiness reviews. The CCE reviews will be conducted and chaired by NASA with BMFT in attendance. The IRM reviews will be co-chaired by BMFT and NASA. These reviews will address the concept of design and readiness for flight of both AMPTE spacecraft. Both sides will furnish engineering and programmatic data as agreed by the Project Managers.

Article 7

DATA RIGHTS

(*a*) The information concerning environmental conditions, safety requirements, peaceful purposes, interface and integration to be exchanged between the Parties will be provided without restrictions.

(*b*) All AMPTE Investigators will be expected to share data with one another, under procedures to be decided by the AMPTE Joint Science Working Group, in order to obtain the planned scientific return from the mission. The investigator team will have a period of one year from acquisition of the data to perform verification and calibration in order to provide suitable data sets for general release to the scien-

tific community and summaries for deposit in the National Space Science Data Center. Such records will then be available to the international scientific community through the World Data Center for Rockets and Satellites.

(*c*) The results obtained from AMPTE will be made available to the scientific community in general through publication in appropriate journals or other established channels as soon as practicable and consistent with good scientific practice. In the event such reports or publications are copyrighted, BMFT and NASA shall have a royalty free right under the copyright to reproduce and use such copyrighted work for their purposes.

(*d*) Without prejudice to the first publication rights of Investigators, raw scientific data from AMPTE will be available for use by NASA and BMFT.

Article 8

SPECIFICATIONS AND STANDARDS

The AMPTE Project Managers will review and mutually agree as to which standards and specifications will be considered to constitute the requirements for control purposes in the AMPTE Project. The agreed standards and specifications, and their exceptions, if any, will be referenced as part of the NASA/BMFT AMPTE Project Plan.

Article 9

FUNDING ARRANGEMENTS

NASA and BMFT will each bear the costs of discharging their respective responsibilities, including travel and subsistence of its own personnel and transportation charges on all equipment for which it is responsible.

Article 10

CUSTOMS

NASA and BMFT will each use their best efforts to arrange in their respective countries for free customs clearance of equipment required in this project.

Article 11

PUBLIC INFORMATION

Release of public information regarding the joint project may be made by NASA and BMFT for their own portion of the project as desired and, insofar as the participation of the other is involved, after suitable consultation.

Article 12

LIABILITY

NASA and BMFT agree that, with respect to injury or damage to persons or property involved in operations undertaken pursuant to this cooperative effort,

neither NASA or BMFT shall make any claim with respect to injury to or death of its own or its contractors' or its subcontractors' or other users' employees or damage to its own or its contractors' or its subcontractors' or other users' property caused by NASA, BMFT or any other person involved in such operations, whether such injury, death or damage arises through negligence or otherwise.

In the event of damage to other persons or property, for which damage there is liability under international law or the principles of the Convention on International Liability for Damage caused by Space Objects,[1] NASA and BMFT shall consult promptly on an equitable sharing of any payments that have been or may be agreed in settlement.

Each Party shall be liable and agrees to indemnify the other Party, for any patent infringement costs incurred as a result of items and processes provided by it or its contractors or subcontractors in the course of this project.

Article 13

LIMITS OF OBLIGATION

It is understood that the ability of the BMFT and NASA to carry out their obligations is subject to their respective funding procedures.

Article 14

SCOPE OF APPLICABILITY

This agreement shall also apply to Land Berlin, provided that the Government of the Federal Republic of Germany does not make a contrary declaration to the Government of the United States of America within three months of the date of entry into force of this agreement.

Article 15

AMENDMENTS

Each Party may propose to the other amendments to this Memorandum of Understanding in writing. Such amendments shall be established by mutual agreement of the Parties.

Article 16

ENTRY INTO FORCE AND TERMINATION

This agreement shall enter into force on the date of signature thereof, and shall remain in effect until three years after launch of the AMPTE and thereafter, unless after that date either Party should terminate. Notice to terminate is to be given with one-year's notice

[1] United Nations, *Treaty Series*, vol. 961, p. 187.

DONE the 15th day of October 1981, in duplicate in the English and German languages, both texts being equally authentic.

[*Signed — Signé*][1]

The Administrator
of the United States National
Aeronautics and Space Administration

[*Signed — Signé*][2]

The Federal Minister
for Research and Technology
of the Federal Republic
of Germany

[1] Signed by James M. Beggs — Signé par James M. Beggs.
[2] Signed by Andreas von Bulow — Signé par Andreas von Bulow.