

**No. 23564**

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**BRAZIL  
and  
UNITED STATES OF AMERICA**

**Memorandum of Understanding for the global tropospheric  
experiment (GTE)/Amazon boundary layer experiment  
(ABLE)-2. Signed at Brasília on 17 July 1985**

*Authentic texts: Portuguese and English.*

*Registered by Brazil on 19 September 1985.*

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**BRÉSIL  
et  
ÉTATS-UNIS D'AMÉRIQUE**

**Mémorandum d'accord relatif à l'étude de la troposphère  
terrestre (GTE)/Expérience relative à la limite de l'at-  
mosphère dans la région de l'Amazone (ABLE)-2.  
Signé à Brasília le 17 juillet 1985**

*Textes authentiques : portugais et anglais.*

*Enregistré par le Brésil le 19 septembre 1985.*

MEMORANDUM<sup>1</sup> OF UNDERSTANDING BETWEEN THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA) AND THE BRAZILIAN COMMISSION FOR SPACE ACTIVITIES (COBAE) FOR THE GLOBAL TROPOSPHERIC EXPERIMENT (GTE)/AMAZON BOUNDARY LAYER EXPERIMENT (ABLE)-2

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1. The United States National Aeronautics and Space Administration (NASA) and the Brazilian Commission for Space Activities (COBAE) agree to conduct studies of the tropospheric chemistry in the planetary boundary layer over the tropical rain forest of the central Amazonia to be implemented on the Brazilian side by the Institute for Space Research (INPE) of the National Council on Scientific and Technological Development (CNPq) to determine the influence of the tropical forests of the central Amazonia in the gas exchange, chemistry, and budgets of carbon monoxide, ozone, nitrous oxide and methane through a joint NASA-COBAE/CNPq/INPE program of ground, aircraft and, in the future, space-based measurements. It is planned that a first expedition be conducted from a base of operations at Manaus, Brazil, during 45 days, from July through August, 1985. Mission flights in Brazil will be coordinated through COBAE/CNPq/INPE. A second expedition is being prepared for 1987, and for this second mission an Additional Memorandum will be proposed.

2. NASA, for its part, will use its best efforts to fulfill the following responsibilities of the participating U.S. agencies and institutes:

- A. Participate with CNPq/INPE in the planning of the ground-based and aircraft measurements to be obtained in order to fulfill the joint GTE/ABLE-2 scientific objectives;
- B. Provide an aircraft (NASA Electra) equipped exclusively with instrumentation for the scientific purposes previously described which will include space for two Brazilian experiments and for scientists and/or observers who will conduct CNPq/INPE airborne measurements;
- C. Organize and conduct the GTE/ABLE-2 aircraft expeditions and ground-based campaigns. It is noted that since CNPq/INPE assistance will be required for NASA to carry out its responsibilities, NASA will provide transportation, per diem and other mutually agreed upon support to the Brazilian participants assisting in this task;
- D. Provide a tethered balloon system for low altitude meteorological observations;
- E. Provide additional radiosonde and ozonesonde systems necessary to adequately support the expedition;
- F. Comply with the Brazilian government regulations and legislation with respect to aircraft flight activities and surface level operations;
- G. Provide to CNPq/INPE and any other organization designated by the Brazilian government copies of all the scientific data and results obtained during the GTE/ABLE-2 missions; and
- H. Participate jointly with CNPq/INPE in the analysis and publication of the data and results obtained from this bilateral cooperative project.

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<sup>1</sup> Came into force on 17 July 1985 by an exchange of notes, in accordance with the provisions of the said notes.

3. CNPq/INPE, for its part, will use its best efforts to fulfill the following responsibilities of the participating Brazilian organizations and agencies:

- A. Participate with NASA in the planning of the ground-based and aircraft measurements to be obtained in order to fulfill the scientific objectives of the joint GTE/ABLE-2;
- B. Participate with NASA in the organization and conduct of the GTE/ABLE-2 aircraft expeditions and ground-based campaigns;
- C. Provide meteorological data obtained from the existing CNPq/INPE 45-meter tower located northeast of Manaus;
- D. Provide space, power, and personnel to assist in operations of NASA supplied tethered balloons in the Ducke Forest Reserve;
- E. Obtain from Brazilian authorities necessary authorization in order to conduct the subject scientific project. In addition, CNPq/INPE will assist and guide NASA in complying with Brazilian government legislation and regulations with respect to aircraft activities and surface level operations;
- F. Assist in obtaining logistical support for NASA operations. This may include but it is not limited to:
  - (a) An airport near Manaus for aircraft (NASA Electra) operations and associated ground support (e.g. fuel, ground power, security);
  - (b) Laboratory and storage space at the airport;
  - (c) Four-wheel drive vehicles;
  - (d) A light aircraft;
  - (e) A small boat;
  - (f) Laboratory supplies;Cost associated with this support will be borne by NASA;
- G. Provide GOES cloud images for the duration of the expedition;
- H. Provide to NASA copies of all scientific data and results obtained during the GTE/ABLE-2 missions; and
- I. Participate jointly with NASA in the analysis and publication of the data and results obtained from this bilateral cooperative project.

4. The following additional understandings are established:

- A. NASA and CNPq/INPE agree to designate persons who will be responsible for carrying out the agreed upon cooperative project;
- B. NASA and CNPq/INPE will each bear the costs of discharging its respective activities, including travel and subsistence expenses of its own personnel and transportation of its equipment, except when noted in items 2 and 3 above;
- C. The ability of NASA and CNPq/INPE to carry out their activities under this Memorandum is subject to their respective funding procedures;
- D. Release of public information regarding activities related to the execution of this joint project may be made as appropriate by NASA and CNPq/INPE for their respective activities and after mutual consultation;
- E. The GTE/ABLE-2 investigators will have a period of nine months from the completion of each GTE/ABLE-2 field expedition to perform verification, calibration and initial analyses of their data. Each GTE/ABLE-2 investigator will provide copies of their data to the GTE Project Office for deposit in the GTE/

ABLE-2 Data Archive and to CNPq/INPE on a schedule that will permit the data to be released to the international scientific community nine months after each GTE/ABLE-2 field expedition and after mutual consultation;

- F. Results of the GTE/ABLE-2 investigations will be made available to the scientific community in general through publication in appropriate journals or other established channels and after consultation between NASA and CNPq/INPE. In the event such reports or publications are copyrighted, NASA and CNPq/INPE shall have a royalty-free right under the copyright to reproduce and use such copyrighted work for their own purpose;
  - G. Without prejudice to any individual rights, NASA and CNPq/INPE agree that neither shall make any claim with respect to injury or death of personnel or to damage or loss of property of NASA or CNPq/INPE, their contractors or sub-contractors arising out of or connected with this project, whether such injury, death, damage or loss arises through negligence or otherwise;
  - H. In the event of damage to other persons or property arising from the execution of this cooperative project, CNPq/INPE and NASA shall consult promptly on any payment that may be made;
  - I. NASA undertakes to assure that the U.S. participants assume full responsibility for any damage to the U.S. equipment. CNPq/INPE assumes full responsibility for any damage to Brazilian equipment and assures that all appropriate actions will be undertaken to protect the U.S. equipment during its stay in Brazil at the selected site(s), so that it can be returned in the same condition as when it was sent, less normal wear and tear;
  - J. NASA and COBAE will use their best efforts to arrange for free customs clearance in their respective countries of equipment required for this project.
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