

ESA 0232
10/23/01

AMENDMENT AND EXTENSION OF THE
MEMORANDUM OF UNDERSTANDING
BETWEEN
THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
AND
THE EUROPEAN SPACE AGENCY

The United States National Aeronautics and Space Administration (NASA) and the European Space Agency (ESA),

Desiring to continue their cooperation with respect to the Hubble Space Telescope Program under their Memorandum of Understanding of October 7, 1977 (the "MOU"),

Desiring to continue this successful cooperation until the end of operations of the HST,

Deciding to amend and extend the MOU as specified herein,

Hereby agree as follows:

1. All references to "Space Telescope" throughout the MOU shall be replaced with "Hubble Space Telescope," and all references to "ST" throughout the MOU shall be replaced by "HST."

2. Add a new paragraph (h) to ARTICLE 7 of the MOU, as follows:

The science operations facility referred to in Article 7(g) as being established by NASA is the Space Telescope Science Institute (STScI) located in Baltimore, Maryland. The STScI is a NASA contractor-operated facility. NASA and ESA recognize that certain HST activities are supported by the STScI and the Space Telescope European Coordinating Facility (ST-ECF) in Garching, Germany. Both Parties acknowledge that ESA personnel resident at STScI as provided for in Article 4(c) are fully integrated members of the STScI team.

3. Replace the existing paragraph (b)(v) of ARTICLE 8 of the MOU with the following:

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

(1) Transfer of technical data necessary for interface, integration or safety purposes:

The transfer of technical data (excluding software) for the purpose of discharging the Parties' responsibilities with regard to interface, integration, and safety shall normally be made without restriction, except as required by national laws and regulations relating to export control or the control of classified data. If design, manufacturing, and processing data and associated software, which are proprietary but not export controlled, or are necessary for interface, integration, or safety purposes, the transfer shall be made and the data and associated software shall be appropriately marked.

(2) All other transfers of proprietary technical data, export-controlled goods and export-controlled technical data are subject to the following provisions:

In the event a Party finds it necessary to transfer goods which are subject to export control or technical data which are proprietary or subject to export controls, and for which protection is to be maintained, such goods shall be specifically identified and such technical data shall be marked with a notice to indicate that they shall be used and disclosed by the receiving Party and its related entities (e.g., contractors and subcontractors) only for the purposes of fulfilling the receiving Party's responsibilities under the programs implemented by this MOU, and that the identified goods and marked technical data shall not be disclosed or retransferred to any other entity without the prior written permission of the furnishing Party.

The receiving party shall abide by the terms of the notice, and shall protect any such identified goods and marked technical data from unauthorized use and disclosure, and shall also obtain these same obligations from its related entities prior to the transfer.

(3) All goods, marked proprietary data, and marked or unmarked technical data subject to export control, which are transferred under this MOU shall be used by the receiving Party exclusively for the purposes of the programs implemented by this MOU.

(4) The Parties are not required to transfer goods or technical data contrary to national laws and regulations relating to export control or control of classified data.

4. Replace the existing ARTICLES 14 and 15 of the MOU, including their titles, with the following:

Rights in Resulting Data

1. Final results of the experiments 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. Reprints of scientific and technical reports and publications resulting from this project will be exchanged between ESA and NASA. In the event such reports or publications are copyrighted, NASA and ESA shall have a royalty-free right under the copyright to reproduce, distribute, and use such copyrighted work for their purposes. Final reports and publications will be placed in the Data Library of ESA and in the science operations facility at the STScI.

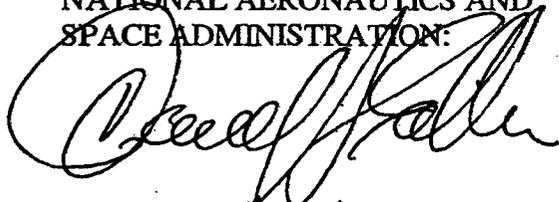
2. Following the period of first publication, records or copies of processed data will be deposited in the HST data archive at STScI and in the Data Library of ESA. It is currently planned that at the end of the HST mission, the processed data would be deposited in the U.S. National Space Science Data Center (NSSDC).

5. Replace the existing ARTICLE 22 of the MOU as follows:

This Memorandum of Understanding shall remain in force until April 24, 2006. At least 1 year before the expiration of this Memorandum of Understanding, the Parties agree to consult as to continuation of this Memorandum of Understanding. This Memorandum of Understanding may be terminated by either Party after 6 months notice of its intention to terminate.

This amendment shall enter into force on the date of the last signature below:

FOR THE UNITED STATES
NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION:



Date:

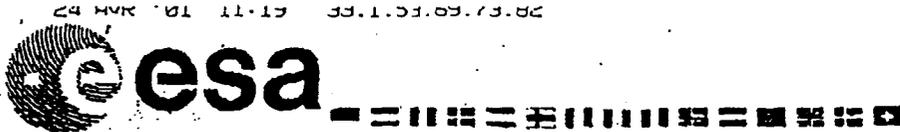
10/19/01

FOR THE EUROPEAN SPACE AGENCY:



Date:

23/10/01



THE DIRECTOR GENERAL

DG/av/131

Mr Daniel S. Goldin
Administrator
NASA Headquarters
Washington, D.C. 20546-0001
U.S.A.

Paris, 23 AVR. 2001 :

Dear Mr Goldin,

I refer to your letter of 20 April 2001 proposing that the Memorandum of Understanding (MoU) between the European Space Agency (ESA) and the National Aeronautical Space Administration (NASA) for cooperation on the Hubble Space Telescope of 7 October 1977 be amended, extending its current expiration date of 24 April 2001 for six months, that is, until 24 October 2001, and that in the intervening time period NASA and ESA will continue to negotiate additional amendments to the MoU permitting the cooperation to continue for an additional 4 ½ years from the date of expiration of this extension, that is, until 24 April 2006.

I am pleased to inform you that your proposal is acceptable to ESA and therefore consider that your above-referenced letter, together with this affirmative reply, constitute an extension of the MoU.

Yours sincerely,

P.O.



ACTING DIRECTOR GENERAL

Antonio Rodotà

European Space Agency
Agence spatiale européenne

Headquarters - Siège

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National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001



APR 20 2001

Mr. Antonio Rodota
Director General
European Space Agency
8-10, rue Mario Nikis
75738 Paris Cedex 15
France

Dear Mr. Rodota:

Pursuant to Article 21 of the Memorandum of Understanding (MOU) between the European Space Agency (ESA) and the United States National Aeronautics and Space Administration (NASA) for cooperation on the Hubble Space Telescope (HST) signed on October 7, 1977, and in order to continue our beneficial collaboration on the HST, I propose that we amend the MOU extending its current expiration date of April 24, 2001, for 6 months, that is, until October 24, 2001. In the intervening time period, NASA and ESA will continue to negotiate additional amendments to the MOU permitting the cooperation to continue for an additional 4 ½ years from the date of expiration of this extension, that is, until April 24, 2006.

If this proposal is acceptable to ESA, I propose that this letter, together with your affirmative written reply, constitute an amendment of the MOU.

Sincerely,

A handwritten signature in black ink, appearing to read "Daniel S. Goldin". The signature is fluid and cursive, with a large loop at the beginning.

Daniel S. Goldin
Administrator

ESA 0039
10/07/1977

Oct. 7 1977

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MEMORANDUM OF UNDERSTANDING
BETWEEN
THE EUROPEAN SPACE AGENCY
AND
THE UNITED STATES NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

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ARTICLE 1

Purpose

The European Space Agency (ESA) and the United States National Aeronautics and Space Administration (NASA), desiring to extend the fruitful cooperation developed in previous space projects, agree that ESA will participate in the NASA ~~2.1~~ Meter ~~Space Telescope (ST)~~ Project, as described below.

ARTICLE 2

Mission

The mission of the ST Project is to provide a space observatory for use by the international astronomy community to extend the sensitivity, resolving power and spectral range of astronomical observations decisively beyond those achievable from earth observatories.

ARTICLE 3

Participation

1. To carry out this project, NASA plans to launch the ST by means of the Space Shuttle in 1983/1984 and to operate it for a period of 10 to 15 years. ESA agrees to assist in the provision of scientific instruments and subsystems for the ST, in the operation of the ST and related facilities, in the in-orbit maintenance, major refurbishments and reflights, at anticipated intervals of two or three years, and to arrange for participation of ESA-sponsored astronomers in the observation programs.
2. ESA will carry out its participation in accordance with the plans, specifications and schedules contained in the NASA/ESA ST Project Plan annexed to this Memorandum of Understanding. This plan may be subject to change as defined in Article 7 (d) below.

ARTICLE 4

ESA responsibilities

To implement the cooperation in this project ESA will :

- (a) Provide the Faint Object Camera (FOC), a scientific instrument of high sensitivity for high resolution imagery in the ultraviolet, visual, and near

infrared portions of the spectrum. The performance specification for this instrument is included in the NASA/ESA ST Project Plan annexed to this Memorandum of Understanding.

With respect to the provision of the FOC, ESA will :

- (i) design, fabricate, test, calibrate and deliver for integration into the ST the FOC, comprising the camera optics and an Imaging Photon Counting System (IPCS). The FOC models and associated hardware together with the schedule for their delivery are defined in the NASA/ESA ST Project Plan ;
- (ii) provide personnel and equipment to support NASA activities relating to testing, integration of the FOC with the ST, and launch site operations, as defined in the NASA/ESA ST Project Plan ;
- (iii) set up an ESA Instrument Science Team (IST) to ensure the scientific integrity of the definition and design of the FOC, and its compatibility with the telescope, and to provide scientific advice for the ESA project management, which will manage FOC development. It is agreed that at least one NASA-appointed scientist will be a member of the IST ;
- (iv) provide participation in NASA reviews in accordance with Article 8 (b) (iii) below ;
- (v) develop the ground and flight software packages uniquely required for the FOC, as defined in the NASA/ESA ST Project Plan ;
- (vi) provide a team of two to four instrument and data scientists to support the operations of the FOC after launch, as mutually agreed ; and,
- (vii) refurbish the FOC for reflight, and provide necessary support for maintenance or modification of the FOC in-orbit, when mutually agreed. In the event NASA wishes to refurbish or modify the FOC and ESA does not desire to do either, ESA will provide the available documentation and other support as agreed between the Project Managers.

(b) Provide the ST Solar Array. In this respect, ESA will :

- (i) design, fabricate, test and deliver to the NASA Support Systems Module (SSM) contractor for integration with the Space Telescope a complete solar array and associated hardware, the performance specification, interface requirements, number of models and hardware parts and their delivery schedule being defined in the NASA/ESA ST Project Plan ;

- (ii) provide personnel and equipment to support the handling and testing of the solar arrays while they are not attached to the ST spacecraft, as defined in the NASA/ESA Project Plan ;
- (iii) provide appropriate representation in NASA reviews in accordance with Article 8 (b) (iii) below ;
- (iv) maintain continuing engineering liaison with NASA ST project elements which interface with the ESA solar array ;
- (v) provide personnel and equipment to support NASA activities relating to testing, integration of the solar array with the ST, and launch site operations, as defined in the NASA/ESA ST Project Plan ; and
- (vi) refurbish, repair, and/or replace the solar array and provide support to NASA for its maintenance or modification in-orbit, as mutually agreed and reflected in the NASA/ESA ST Project Plan.

(c) Participate in the activities of the science operations facility as described in Article 7 (g) below. In this respect ESA will, in particular :

- (i) provide a team of approximately six persons to support one shift of the scientific planning and operation tasks of the science operations facility ;
- (ii) provide a team of approximately seven persons to support the ST scientific data reduction shift of the science operations facility ;
- (iii) provide membership to this facility, as mutually agreed, in order to participate in the definition and implementation of the ST science activities ; and
- (iv) provide a representative to NASA to serve as a focal point for NASA/ESA consultations regarding the establishment and operation of the science operations facility ;

it being understood that the members of the ESA teams mentioned in (i) and (ii) above will be considered functionally as members of the science operations facility.

ARTICLE 5

NASA responsibilities

To carry out the cooperation in this project, NASA will :

- (a) Design, fabricate, test, integrate and prepare for launching the complete ST assembly.
- (b) Define jointly with ESA the solar array interfaces, design requirements, and test and handling specification, and provide this information to ESA in accordance with the schedule defined in the NASA/ESA ST Project Plan.
- (c) Test the solar array when it is integrated on the ST and supply ESA with relevant engineering data. NASA is responsible for handling of the solar array after its acceptance at the integration site.
- (d) Provide appropriate representation at ESA reviews in accordance with Article 8 (b) (iv) below.
- (e) Provide and transport to the launch site all necessary ST ground support equipment, including items delivered by ESA to the test and integration sites to support the FOC and the solar array.
- (f) Transport to the launch site the flight qualified ST and perform necessary tests and checkout prior to launch.
- (g) Provide initial launching of the ST on a Space Shuttle, release the ST into the designated orbit, and conduct, with ESA participation, checkout of the ST as required for a period of approximately 30 days following launch.
- (h) Provide all tracking and data acquisition services during the lifetime of the project.
- (i) Exercise all in-orbit control functions. To accomplish this, NASA will organise, equip, staff, train and operate an operations center.
- (j) Include the FOC in the payload of the first flight of the ST and operate it in accordance with the provisions of Article 6 below.
- (k) Establish a science operations facility to conduct scientific operations as outlined in Article 7 (g) below.

- (1) Provide in-orbit maintenance, and retrieve and relaunch the ST when necessary according to operations plans, and conduct refurbishment and in-orbit modification operations assisted by ESA as provided in Articles 4 (a) (vii) and 4 (b) (vi) above.

ARTICLE 6

Flight and Operation of the ESA-supplied FOC

1. The following principles shall apply to the flights of the ESA-supplied FOC :
 - (a) Assuming normal functioning, it will be operated by NASA for a nominal initial period of thirty months.
 - (b) Following this period, it will be flown as long as it is decided to be a component of the scientifically optimum payload.
 - (c) Following the initial or subsequent operating periods, both parties may nevertheless agree that NASA will continue to fly it in modified form, in application of Article 4 (a) (vii), or replace it for a given period by another scientific instrument.
 - (d) If the FOC fails to meet the minimum scientific requirements laid down in the performance specification as defined in the NASA/ESA ST Project Plan, or if the delivery by ESA would substantially delay the first flight, NASA may decide, after consultation with ESA, to launch the ST without the FOC. In this event, provided that, at the relevant time, the FOC does meet the minimum scientific requirements referred to above, NASA will take its availability into account when funding the development of ST instruments for subsequent flights and accept it as a candidate instrument for those flights.
2. Decisions concerning the implementation of the provision of the foregoing paragraph shall be made by the NASA Associate Administrator for Space Science and the appropriate Director at ESA Headquarters, subject to the application of the provisions of Article 18 of this Memorandum of Understanding.

ARTICLE 7

Management and Organisation

Unless otherwise provided in this Memorandum of Understanding, the management arrangements are understood by NASA and ESA to be as follows :

- (a) NASA will establish a ST Project Office to provide for project planning and management, with the following responsibilities :
- (i) Overall responsibility for the design, fabrication, test, integration, launch, in-orbit verification, and operation of the ST ;
 - (ii) flight performance evaluation, and planning for and carrying out in-orbit maintenance and modification ; and
 - (iii) planning and carrying out ST refurbishments.
- (b) The Project Office will be headed by a NASA Project Manager. To carry out the ST Project, the Project Manager will be supported by a full-time staff of managers and engineers. Full responsibility for management of the ST Project resides with the NASA Project Manager. The Project Office provides the principal means for carrying out these management responsibilities.
- (c) ESA will :
- (i) Designate an ESA Project Manager for overall coordination, planning and execution of the ESA tasks described in this Memorandum of Understanding, and will assign appropriate representation to the ST Project Office, as mutually agreed ; and
 - (ii) appoint an ESA Project Scientist.
- (d) Management and technical decisions which have a bearing on the execution of ESA tasks as described under this Memorandum of Understanding or affect the contents of the annexed NASA/ESA ST Project Plan, and items with respect to which mutual agreement is necessary in accordance with provisions of this Memorandum, shall be taken in common by the NASA and the ESA Project Managers. If they are unable to come to an agreement on a particular issue, it shall be referred to the NASA Associate Administrator for Space Science for resolution in consultation with the appropriate Director at ESA Headquarters, subject to the application of the provisions of Article 18 of this Memorandum of Understanding.
- (e) NASA will establish a Space Telescope Science Working Group (ST-SWG) which will be the principal mechanism for scientific input to the Project Office during the development of the ST. The ST-SWG will be chaired by the ST Project Scientist designated by NASA. The ESA membership on the ST-SWG will consist of the ESA Project Scientist referred to in paragraph (c) of this Article and of the Chairman of the ESA IST referred to in Article 4 (a) (iii), who will be assisted by such members of his team as he desires to be present for specific ST-SWG meetings.

(f) NASA will establish a mission operations center, as defined in the NASA/ESA Project Plan to :

- (i) Carry out mission operations planning ;
- (ii) execute ST command and control ;
- (iii) acquire data on and evaluate ST engineering performance ;
- (iv) report ST anomalies ;
- (v) reduce ST engineering data ; and
- (vi) acquire and process ST scientific data.

(g) NASA will establish a science operations facility to carry out scientific management of the observatory in orbit. Operational support of the investigators by this facility will include, but is not limited to :

- (i) Planning long-term scientific operations ;
- (ii) scheduling daily scientific observations ;
- (iii) conducting real time scientific observations ; and
- (iv) performing ST scientific data management, including making available ST scientific data to investigators in a form suitable for analysis.

ESA will be represented and participate in this facility in accordance with the provisions of Article 4 (c).

ESA participation in the daily activities of the science operations facility will include, but will not be limited to the provision of the support provided under Article 4 (a) (vi) and 4 (c) above.

ARTICLE 8

Technical interfaces

The management of the technical interfaces on the ST will be carried out with a minimum of documentation and formal reviews. It is understood between ESA and NASA that the following principles and procedures will apply :

(a) General Responsibilities for Technical Interfaces :

- (i) The NASA Project Manager, in accordance with Article 7 (b) above, is responsible for the management of the interfaces, including documentation, general control of the use of such documentation, and the conduct of technical reviews on all systems for which NASA is responsible.
- (ii) The ESA Project Manager is responsible to work to such requirements and interfaces as he and the NASA Project Manager have mutually agreed to, and for the conduct of technical reviews to insure that all systems and hardware for which ESA is responsible comply with ST interface requirements.

(b) Specific Responsibilities and Procedures :

- (i) The NASA Project Manager will review and mutually agree with the ESA Project Manager, as to which standards and specifications will be considered to constitute the requirements for control purposes in the ST Project. The agreed standards and specifications, if any, will be referenced as part of the NASA/ESA ST Project Plan.
- (ii) ESA will supply data to NASA for the generation of appropriate Interface Requirements Documentation (IRD's), Interface Control Drawings (ICD's) and Contract End Item (CEI) Specifications Part I for the Solar array and the FOC. The CEI Specifications Part II for the Solar array and the FOC will be generated by ESA. The Project Managers will mutually agree on these documents, and the NASA Project Manager will approve them in accordance with a schedule in the NASA/ESA ST Project Plan. Subsequent modifications to either the IRD's, the ICD's, or the CEI Specifications will be approved by appropriate change control procedures identified in the NASA/ESA ST Project Plan. Should such modifications seem unacceptable to either Project Manager for financial or schedule reasons, the provisions of Article 18 will apply.
- (iii) NASA will make final determination of the overall readiness of the ST for launching. This determination will be based on periodic reviews chaired by NASA to address the concept, design, and readiness for flight of the ST. ESA will have appropriate representation at selected reviews and will furnish engineering data as agreed by the Project Managers.
- (iv) Determination of the readiness for integration of the solar array and the FOC will be based on periodic reviews, chaired by ESA, of the concept, design and readiness for flight of the hardware. NASA will have

appropriate representation at these reviews as agreed between the Project Managers and will furnish engineering data as agreed by the Project Managers. Final determination of the readiness for integration of the solar array and the FOC will be the responsibility of the NASA Project Manager, based on recommendations from the ESA Project Manager and review committees.

- (v) NASA and ESA shall have full access to, and the right to use and disclose, non-proprietary data necessary to discharge their respective responsibilities under this Memorandum of Understanding. In principle, there will be no transfer of documents bearing proprietary or other restrictive markings. To achieve this, optimal use will be made of mathematical models, mock ups and simulators, as appropriate to assure hardware interface and operations compatibility. Should either party consider that the above limitation prevents it from carrying out a particular responsibility under this Memorandum of Understanding, the Project Managers will determine a mutually agreeable solution on a case-by-case basis. In the event that the solution must involve the transfer of proprietary data, the furnishing party, with the consent of the proprietor, shall furnish the data and shall mark them with a notice limiting the use and disclosure of the information for ST Project purposes only, and the receiving party will use its best efforts to comply with such limitations.
- (vi) Detailed arrangements for working level technical interfaces, including NASA and ESA contractors, are defined in the NASA/ESA ST Project Plan.

ARTICLE 9

Apportionment of Observing Time

1. The term "observing time" as used in this Article is understood to mean that time during which the ST instruments are in operation, less idle time and time necessary for calibration, testing and maintenance.
2. NASA and ESA agree that ST observing time will be made available to investigators from the international community of astronomers on the basis of the scientific merit of proposals made.
3. Subject to the application of this principle, and in consideration of ESA's participation as defined in this Memorandum of Understanding, ESA will obtain, for use by ESA-sponsored astronomers, a portion of the observing time on the total complement of scientific instruments of the ST. It is expected and intended that this portion will be not less than 15 % of the observing time on the average over the lifetime of the ST Project.

ARTICLE 10

Selection of Observing Programs

1. All proposals for observing programs from astronomers in ESA member States will be submitted in accordance with ESA procedures to the ST Proposal Review Committee (STPRC), which will be the primary body for the review and evaluation of all proposals for observing programs to be carried out on the ST.
2. The STPRC will have an appropriate European membership (minimum of two) the number to be agreed between ESA and NASA Headquarters. It will make recommendations for observing programs to the NASA Associate Administrator for Space Science, who, after consultation with ESA as necessary, will make a final determination of the observing programs.
3. Should ESA consider that the observing programs so determined are inconsistent with the provisions of Article 9, or should there be a major alteration in the ESA participation in the ST Project, either party may request a joint review of the evaluation and selection process.

ARTICLE 11

Deposit Accounts

Should ESA desire that NASA procure goods and services on ESA's behalf to assist ESA in carrying out an ESA responsibility under this Memorandum of Understanding, NASA is prepared to consider such requests on a case-by-case basis under the provisions of a Deposit Account Agreement to be negotiated separately. Similar requests from NASA will be treated by ESA accordingly.

ARTICLE 12

Funding Arrangements

Each Agency will arrange to meet the cost of discharging its responsibilities, including travel and subsistence for its own authorized personnel and transportation charges on all equipment and flight hardware for which it is responsible. Other than deposit account transactions referred to in Article 11, there will be no exchange of funds between ESA and NASA.

ARTICLE 13

Customs and Visas

ESA and NASA will use their best efforts to arrange free customs clearance for equipment required in the ST project. NASA will use its best efforts to facilitate the issuance of visas to European astronomers and ESA contractors collaborating in the ST Project.

ARTICLE 14

Data rights

Use of ST scientific data for scientific analysis will be reserved to investigators for a twelve month period, beginning with the receipt of data and any associated spacecraft data in a form suitable for analysis. Investigators may occasionally be requested to share data to enhance efficient utilisation of the observatory and of ground observing operations. Immediately after the period reserved to the investigator, reduced data will be deposited with the National Space Science Data Center (NSSDC) and with the science operations facility. In addition, European investigators will deposit their data in the Data Library of the European Space Operations Center (ESOC). Such records will then be available to the international scientific community through the World Data Center for Rockets and Satellites. It is agreed that a listing of all observations will be published at least every six months in sources readily available to astronomers.

ARTICLE 15

Publication of Results

Subject to the provisions of Article 14 above, results of the experiments will be made available to the scientific community in general through publication in appropriate journals or other established channels as soon as possible and consistent with good scientific practice. Reprints of scientific and technical reports and publications resulting from this project will be exchanged between ESA and NASA. In the event that such reports or publications are copyrighted, ESA and NASA shall have a royalty free right under the copyright to reproduce and use such copyrighted work for their purposes. Final reports and publications will be placed in the Data Library of ESOC and in the science operations facility.

ARTICLE 16

Public Information

Each Agency may release information to the public regarding its own activities covered by this Memorandum of Understanding. Each Agency undertakes to coordinate with the other in advance those public information activities which relate to the other Agency's responsibilities or performance in the ST project. Implementing arrangements for these public information activities will be agreed separately.

ARTICLE 17

Limits of obligation

It is understood that the ability of ESA and NASA to carry out their obligations under this Memorandum of Understanding is subject to the availability of appropriate funds.

ARTICLE 18

Disputes

1. Any dispute as to the interpretation or implementation of the terms of this Memorandum of Understanding shall be referred to the NASA Administrator and the Director General of ESA for settlement.
2. Should the NASA Administrator and the Director General of ESA be unable to resolve such disputes, they will be submitted to such other form of resolution or arbitration as they may agree.

ARTICLE 19

Liability

1. NASA shall bear responsibility for damage to US nationals in the course of this cooperative project, unless such nationals are employees of ESA.
2. ESA shall bear full responsibility for such damage to ESA employees.
3. NASA shall be liable for damage to those items delivered to it by ESA in accordance with Article 4, after the accomplishment of the relevant receiving inspections defined in the NASA/ESA ST Project Plan, but shall not be liable for damage occurring to such items in connection with the Space Shuttle launch, flight or descent.
4. 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, NASA and ESA shall

consult promptly on an equitable sharing of any payments that have been or may be agreed in settlement. If agreement is not reached within 180 days, the two Agencies will act promptly to arrange for early arbitration to settle the sharing of such claims following the 1958 model rules on arbitral procedure of the International Law Commission.

ARTICLE 20

Patent use - Authorization, Consent and Indemnification

1. In order to avoid any possible interruption to the conduct of this cooperative project which might arise from patent infringement litigation in U.S. Courts, NASA hereby gives authorization and consent (without prejudice to any rights of indemnification) for all use and manufacture by ESA of any invention described in and covered by a patent of the United States in the performance of any obligations under this Memorandum of Understanding, including the performance of any such obligations by any contractor or subcontractor, providing such use and manufacture is confined entirely to the discharge of the obligations of this Memorandum of Understanding.
2. In the event any liability is incurred by the US Government for the practice of inventions covered by privately owned U.S. patents, either as royalties owed under an existing patent license inuring to the benefit of NASA or as judgement and litigation costs resulting from a suit for patent infringement in the U.S. Court of Claims, and such liability is incurred as a result of ESA's and/or any of its contractors' or subcontractors' performance of obligations under this Memorandum of Understanding, or as a result of NASA's use under this Memorandum of Understanding of the items furnished by ESA under this Memorandum of Understanding, ESA agrees to indemnify NASA or any other U.S. Agency against, and make reimbursement for, such royalties and/or costs. ESA shall provide such information and assistance as it has available in the defense of any such patent infringement suit brought in the U.S. Court of Claims.

ARTICLE 21

Amendments

Each party may propose to the other amendments to this Memorandum of Understanding, in writing. Agreements on such amendments shall be established by the parties in the form of riders to this Memorandum of Understanding.

ARTICLE 22

Termination

This Memorandum of Understanding shall enter into force when both the NASA Administrator and Director General of ESA have signed it, and it shall remain in effect for a first period of eleven years from the first launching of the ST. It is anticipated that this period will include at least ten years of ST space operations. At least one year before the expiration of the eleven year period, the parties agree to consult as to continuation or termination of this Memorandum of Understanding. The Memorandum of Understanding will continue in its present form unless it is terminated or amended.

For the National Aeronautics and
Space Administration



Date : 7 Oct 1977

For the European Space
Agency



Date : 7 x. 77