MEMORANDUM OF UNDERSTANDING BETWEEN

THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

AND

THE CENTRE NATIONAL D'ETUDES SPATIALES

FOR THE ARGOS DATA COLLECTION AND PLATFORM LOCATION SYSTEM

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1. INTRODUCTION:

1.1 The National Oceanic and Atmospheric Administration (NOAA), of the United States of America, and the Centre National d'Etudes Spatiales (CNES), of France, affirm their desire to conduct a space applications project of mutual interest for peaceful purposes. This Memorandum of Understanding (MOU) will govern the cooperation between NOAA and CNES for the implementation and the use of the Argos Data Collection and Platform Location System (Argos Data Collection System) incorporated in the NOAA Polar-Orbiting Environmental Satellites (POES), beginning with the POES currently in orbit, and at least NOAA D, G, H, I, J, K, L, and M of the current series, of satellites. This MOU supersedes the 1974 MOU, as amended in 1984, between the National Aeronautics and Space Administration of the United States of America, NOAA, and CNES for the the TIROS-N Satellite Data Collection System through the operational life of NOAA POES satellites (TIROS-N and NOAA A-J).

2. BACKGROUND:

2.1 The POES, which collect and transmit environmental data, have six major observation systems. They are:

2.1.1 - the Advanced Very High Resolution Radiometer (AVHRR), which collects data in the infrared, near infrared, and visible parts of the spectrum,

2.1.2 - the Space Environment Monitor (SEM) which measures solar proton flux, electron density, energy spectrum, and the total particulate energy distribution at spacecraft altitude,

2.1.3 - the TIROS Operational Vertical Sounder (TOVS), which provides data on the vertical temperature profile of the atmosphere, water vapor levels, total atmospheric ozone content, and stratospheric temperatures,

2.1.4 - the Solar Backscatter Ultraviolet Radiometer, which provides data on the vertical distribution of ozone in the atmosphere,

2.1.5 - the Satellite-Aided Search and Rescue instrument, which provides the capability to receive and locate emergency signals globally, and

2.1.6 - the Argos Data Collection System, which is described in 2.2 and 3.1.

2.2 The Argos Data Collection System became operational shortly after the on-board instrument was launched on the TIROS-N satellite in 1978. During its seven years of operation the Argos Data Collection System has collected and located data used by biologists, hydrologists, meteorologists, oceanographers, physicists, and others. Argos platforms placed on buoys, icebergs, offshore riggs, and ships have been used to monitor parameters such as ocean currents, air and sea temperatures, winds, and waves. In-situ environmental data from Argos platforms have supplemented the information provided by other satellite systems. The system has also provided surface meteorological, hydrological, and geological data for areas that are not covered by other systems. Animal-borne transmitters have been used to study the distribution of species and their migrations. Balloon platforms, used in atmospheric studies, have provided data about the physical-chemical phenomena of the different atmospheric levels.

3. SCOPE OF THE PROJECT:

3.1 The Argos Data Collection System collects environmental data from fixed and moving platforms and locates the moving platforms. The current system consists of platforms, the Argos instrument on board the POES, a ground processing system, and three telemetry ground stations. The platforms are equipped with sensors and a transmitter.

4. STATEMENT OF OBJECTIVES:

4.1 This MOU continues and expands the joint effort by NOAA and CNES to provide a system for the location, acquisition, and dissemination of environmental data. The continued use of the Argos Data Collection System will improve and expand the capabilities of the global operational weather system. It will also support research and development in ocean, weather, and other environmental disciplines.

4.2 To achieve the above objectives NOAA will continue to be responsible for and fund the procurement, launch, and operation of the POES. These responsibilities include providing CNES with access to the global Argos data stream and providing CNES with the necessary satellite ephemeris. CNES will continue to provide Argos instruments for flight on NOAA spacecraft, operate the Argos data processing system and serve as the focal point of the Argos Data Collection System management, monitoring, and operations.

4.3 The operation of the Argos Data Collection System will remain under the joint supervision of NOAA and CNES through the Operations Committee (as described in section 5.5). The day-to-day management of the Argos Data Processing System will be the responsibility of CNES, subject to the over-sight of the Operations Committee.

4.4 NOAA and CNES recognize their common interest in promoting maximum use of the Argos system through enhanced service and cost-effective operations. In this connection, a CNES objective is to achieve a self-sustaining system with revenues from users fully offsetting operating costs.

5. RESPONSIBILITIES:

5.1 This project will be implemented under the general direction of the Director General of CNES and the Deputy Assistant Administrator for Satellites of NOAA.

To accomplish this cooperative project each participating agency will use its best efforts to meet the following responsibilities:

5.2 NOAA and CNES will:

5.2.1 jointly determine the operational requirements for the Argos Data Collection System which will be consistent with their respective program requirements and spacecraft limitations,

5.2.2 jointly determine general policy requirements governing use of the System,

5.2.3 jointly determine the terms and conditions to be included in agreements with users of the System,

5.2.4 develop a Joint Project Plan which will set out the delivery schedules and details of the Argos Data Collection System instruments provided by CNES, the services and technical documents provided by the participants pertaining to instrument-spacecraft interface, ground processing, configuration management, and flight readiness determination,

5.2.5 ensure that the necessary technical information is exchanged in accordance with the Joint Project Plan, and

5.2.6 each designate a Space Segment Project Manager and a Ground Segment Project Manager who will assure technical coordination between NOAA, CNES, and other parties in the implementation of the Joint Project Plan. The Project Managers will meet as required.

5.3 NOAA will:

5.3.1 be responsible for and fund the procurement and launch of operational POES spacecraft and backups as required,

5.3.2 determine the scheduling and requirements for launches,

5.3.3 be responsible for and fund the integration of the Argos Data Collection System into the spacecraft,

5.3.4 operate the satellite system and be responsible for the acquisition of all satellite telemetry data,

5.3.5 make available to CNES the satellite ephemeris in a time-frame compatible with the operational requirements of the Argos Data Collection System, and

5.3.6 be responsible for the tasks assigned to the NOAA Preprocessing Facility by this MOU and the Joint Project Plan.

5.4 CNES will:

5.4.1 deliver to NOAA flight-qualified models of the Argos Data Collection System instrument. They will be designed to meet the agreed specifications and scheduling contained in the Joint Project Plan,

5.4.2 provide assistance and personnel, as necessary, to participate in the integration, and launch operations of the Argos Data Collection System,

5.4.3 be responsible for the post-launch test of the Argos Data Collection System following the launch of each satellite,

5.4.4 be the focal point for the management, operations, and monitoring of the Argos Data Collection System as defined in the Joint Project Plan,

5.4.5 be responsible for fulfilling the tasks assigned to the Argos Data Processing System defined in section 8, and

5.4.6 designate the point of contact for Argos Data Collection System users.

5.5 OPERATIONS COMMITTEE:

5.5.1 An Operations Committee, with equal representation from France and the United States of America as designated by NOAA and CNES, will review the implementation and supervise the operations of the Argos Data Collection System. The Operations Committee, will be co-chaired by NOAA and CNES. NOAA and CNES will alternate as hosts of Committee meetings. The host country will determine the place of the meeting and will preside over that meeting. The Committee will determine the frequency of its meetings, which will occur, in principle, annually.

The Operations Committee will:

5.5.2 review the development and operation of the NOAA Preprocessing Facility and the Argos Data Processing System and make appropriate recommendations to the signatories to this MOU to assure the proper operation and use of the Argos Data Collection System,

5.5.3 review the Argos Data Collection System development and implementation activities and recommend to the Project Managers and the signatories to this MOU appropriate measures for accomplishing the objectives of the project as described elsewhere in this MOU,

5.5.4 review and approve applications and formulate criteria for approval of applications received from prospective platform operators for the use of the Argos Data Collection System. It is understood that in exercising its right to disapprove applications, each party will take into account the objectives set forth in section 4,

5.5.5 review and concur in CNES proposals for the structure of the tariffs for the processing of data by the Argos Data Processing System. Such tariff proposals will be developed in light of guidelines agreed by NOAA and CNES, and updated as appropriate, and

5.5.6 resolve issues that may arise with respect to the implementation and operation of the Argos Data Collection System.

6. SYSTEM ACCESS:

6.1 Access to the Argos Data Collection System will be allowed to prospective platform operators whose proposed uses follow the guidelines listed below:

6.2 Data collection and location must be for the purpose of environmental monitoring. Data used to monitor the environment are defined as observations and measurements of physical, chemical, or biological properties of oceans, rivers, lakes, solid earth, and atmosphere (including wildlife tracking and outer space).

6.3 Data collection and location activities beyond the scope of environmental monitoring may be authorized by the Operations Committee if:

(a) the activities are limited in duration (normally less than one year),

(b) the total data handling capability allowed these activities shall not exceed 5 per cent of the Argos Data Collection System capability,

(c) the activities are under the general oversight of NOAA or CNES, and

(d) in the case of third country platform operators, the use is determined in advance to be of interest to France and/or the United States of America, and be acceptable to both NOAA and CNES.

6.4 In the event Argos Data Collection System capacity limitations require that priority determinations be made in approvals for access, priority will be given to those platforms providing data of broad international interest, especially of an operational nature, and to those requiring the unique capability of the Argos Data Collection System, such as platform location or polar coverage.

7. NOAA PREPROCESSING FACILITY:

7.1 NOAA will operate a preprocessing facility according to the guidelines set forth in the Joint Project Plan. The Operations Committee will oversee the Argos Data Collection System activities of the Facility.

7.2 The NOAA Preprocessing Facility will extract the Argos Data Collection System portion of the POES data stream (including housekeeping data) and make it available in a suitable form for transmission to CNES in a time frame compatible with agreed upon operational requirements for the Argos Data Collection System.

8. ARGOS DATA PROCESSING SYSTEM:

8.1 CNES will be responsible for the Argos Data Processing System according to the principal guidelines and procedures described below. The Operations Committee will oversee these activities and responsibilities and will provide general policy guidance as appropriate, in accordance with the objectives set forth in section 4.

8.2 The Argos Data Processing System will perform the functions that are necessary for the support of user services. These functions include the establishment of the refined ephemeris of the satellite, the identification and location of each platform, and the conversion of telemetry data into a suitable form for dissemination as agreed between the user and CNES.

8.3 To fulfill some of its responsibilities under this MOU relating to the Argos Data Processing System, CNES has decided to establish and manage the operation of a processing center in the United States. CNES agrees to ensure appropriate opportunities for U.S. entities to participate in the U.S. processing center. NOAA and CNES will jointly review and approve the plans for establishing and operating the U.S. processing center.

8.4 NOAA will be the single controller of the operational satellite system and will retain the right to process and use all data received from the Argos Data Collection System. In order to avoid duplication of effort, to insure system continuity and quality, and to support the objectives described in section 4, NOAA will not promote direct access to the global Argos data stream by other parties. NOAA will encourage current and potential users in the United States, and in particular U.S. Government agencies, to use the Argos Data Processing System.

9. DATA PROCESSING COST PRINCIPLES:

9.1 Platform allocation, verification of the calibration data, system quality control, conversion of telemetry data into physical parameters, and computations for platform location involve significant expense. The arrangements, including cost considerations, for the performance of these functions will be made by CNES with platform operators according to the tariff structure and other guidelines submitted to and approved by the Operations Committee.

9.2 Tariffs associated with these functions shall be collected to offset the operating costs of the Argos Data Processing System. Tariff receipts that exceed these costs shall be used for Argos Data Processing System improvements and/or to reduce tariffs to System platform users as approved by the Operations Committee.

9.3 CNES has negotiated with NOAA a preferential tariff for data processing to be done by the Argos Data Processing System for U.S. Government users. This preferential tariff agreement will be updated annually in negotiations between NOAA and CNES, taking into account existing practices and the objectives described in section 4.

10. DATA USE AND DISSEMINATION:

10.1 NOAA and CNES will have the right to process and use all operational data received from the Argos Data Collection System at no cost except as provided for in the tariff agreement for processing services from the Argos Data Processing System. NOAA and CNES will use these data in a manner consistent with any agreements or terms and conditions established pursuant to section 10.2 and Annex I of this MOU.

10.2 Platform operators will make data collected available without reservation, except for provision for the right of intellectual property as provided in the access agreement and except for certain commercial data protected in accordance with the Terms and Conditions for Privileged or Confidential Treatment of Data, as defined in Annex I to this MOU. Consistent with NOAA and CNES responsibilities to widely disseminate the data, provision for intellectual property rights normally will not exceed one year.

11. LIABILITY

11.1 Except as provided in paragraph 11.2, NOAA and CNES will not be responsible to each other or to other U.S. or French national agencies for damage resulting from delays in the execution of this cooperative project or from defective operation of the operational system. The parties will not make claim or bring action against each other for injury or death to their employees, contractors, subcontractors or agents, or damage to their property or the property of their employees, contractors, subcontractors or agents, arising out of activities under this MOU.

11.2 In the event of damage for which there may be liability to a third party (i.e., other than to a U.S. or French national agency) under either international law, including the Convention on International Liability for Damage caused by Space Objects, or the national law of either party, because of defective operation of the operational system, the parties will consult promptly to consider equitably sharing any payments that may be agreed to in settlement. To the extent that liability for such damage results from operations under the control of one party, that party will indemnify and hold harmless the other party from any judgment which may be entered, provided that the other party tenders control over the defense of the litigation in a timely manner.

11.3 NOAA and CNES will ensure that any agreement for use of the system expressly provides that neither agency can guarantee the timeliness or suitability of data from the system for any purpose, and will not be liable for any damage which may result from defective operation of the system. It is understood that nothing in the foregoing is intended to diminish the obligation of each party to the other party to exercise its best efforts to develop on a timely basis and to maintain in operation, a defect-free system that is responsive to users needs.

12. OTHER MATTERS:

12.1 NOAA and CNES will exercise their best efforts to arrange free customs clearance for equipment required for the Argos Data Collection System project.

12.2 Satellite launches in the POES series will not necessarily be delayed due to the unavailability of the Argos Data Collection System spacecraft units. If NOAA deactivates a POES in orbit that carries an operable Argos Data Collection System instrument, and if the Argos instrument carried on board the replacement POES placed in the same orbit for any reason fails to become or ceases to be operable, NOAA will consult with CNES and both agencies will use their best efforts to reactive the original POES and Argos instrument.

12.3 Both NOAA and CNES may freely release information regarding their own activities under this MOU; and insofar as the activities of the other are concerned, after the approval of the other agency.

12.4 NOAA and CNES will each bear the costs of discharging their own responsibilities including travel and subsistence of personnel, and the transportation charges on all equipment for which it is responsible. The ability of NOAA and CNES to carry out their obligations is subject to their respective national laws and the availability of appropriated funds.

12.5 This MOU will apply from the date of signature by the last signatory, and shall remain in effect until the last operational spacecraft referred to in this MOU has failed. Prior to the latter date this MOU may be extended, modified, or terminated by written agreement of the signatories.

12.6 This MOU consists of sections 1 through 12 and one annex.

For the
National Oceanic and
Atmospheric Administration

26 March 1986
Date Place

Le Directeur Général
F. d'ALLEST

For the
Centre National
d'Etudes Spatiales

11 MARS 1986
Date Place

ANNEX I

TERMS AND CONDITIONS FOR PRIVILEGED OR CONFIDENTIAL TREATMENT OF DATA OBTAINED FROM THE ARGOS DATA COLLECTION SYSTEM

I. NOAA and CNES may agree to a proposal from a commercial user to restrict dissemination of all or part of data collected from the user's platform(s) through the Argos Data Collection System if the NOAA Assistant Administrator for Environmental Satellite, Data, and Information Services (the Assistant Administrator) with the advice of the NOAA General Counsel and other interested Federal officers, and the Director of the CNES Toulouse Space Center, (the Director) find that:

A. These data are trade secrets or commercial information obtained from a user and privileged or confidential, and

B. A U.S. and a French governmental agency or program would benefit by gaining access to the data to be collected.

II. For purposes of this agreement, data shall be considered privileged or confidential if disclosure is likely either to impair the U.S. or French Government's ability to obtain similar information in the future or to cause substantial harm to the competitive position of the party from whom the information was obtained. Users requesting confidential treatment of data shall:

A. Identify the portion(s) of the data claimed to be confidential and,

B. State how release of these data would be likely to cause substantial harm to the user's competitive position.

III. All data for which the Assistant Administrator and the Director grant privileged or confidential treatment shall not be publicly disclosed without the user(s) authorization except:

A. In accordance with provisions set forth in paragraph V B, or

B. For those data which have been identified by either the United States or France as required to protect life and property.

Whenever possible, data identified as required to protect life and property will be combined and publicly disclosed in such formats as general statistical studies, environmental warnings and forecasts, or aggregated reports or summaries to protect the identity of the user(s) furnishing such information.

IV. The co-chairmen of the Operations Committee shall be responsible for assuring appropriate review in their respective agencies of requests for privileged or confidential treatment of data and shall notify the user in writing of the results. The co-chairmen may represent the Assistant Administrator and the Director in the negotiation of the required agreements.

V. Each agreement providing for privileged or confidential data shall be signed by the Assistant Administrator and the Director and shall specify:

A. The precise portion(s) of these data that shall be treated as confidential.

B. The conditions under which all or part of those identified portions may be publicly disclosed either by the United States or France.

C. Any requirements which have been agreed to by NOAA or CNES for control systems to be instituted either by NOAA or CNES for safeguarding these data and for ensuring that only authorized government officers and employees have access to these data and only for authorized purposes.

D. Any requirements such as timeliness of data, which the sponsoring French and U.S. agencies may impose on the user for supplying such agencies with portions of the privileged or confidential data required to protect life and property.

E. Any costs for which the user shall be responsible in connection with the privileged or confidential treatment of data.

F. That neither NOAA nor CNES shall be liable for the unauthorized divulgence of any privileged or confidential data by the other party nor for any injury to the user resulting from fourth parties' obtaining or deriving the user's data or platform location through use of direct readout facilities. NOAA and CNES can protect data only in accordance with direct U.S. and French law, particularly the Freedom of Information Act in the United States.

G. That failure by the user to fulfill the terms of the agreement will result in termination of the agreement.

VI. This Annex shall remain in effect for three years from the date of signature. Prior to that date, this Annex may be modified or terminated by mutual agreement of the signatories. The provisions for privileged or confidential treatment of data granted to users under this Annex by the signing of an agreement with NOAA and CNES, will remain valid notwithstanding modification or termination of this Annex. Toward the end of three years, from date of agreement to this Annex, NOAA and CNES will review the policy of restricting dissemination of data collected by the Argos Satellite Data Collection System and jointly determine whether these provisions should be extended.

For the
National Oceanic and
Atmospheric Administration

26 Mar - 1986
Date Place

For the
Centre National
d'Etudes Spatiales
Le Directeur Général
F. d'ALLEST

Date 11 MARS 1986 Place

ENCLOSURE N° 1

ORGANIZATION IN THE US - INVOLVEMENT OF US INDUSTRY

To help meet the increasing use of the Argos system, CNES is currently setting up a special unit with responsibility for daily management of the Processing Centers and user interfacing. This is materializing, on the French side, as a Société Anonyme (approximately equivalent to an incorporated company under US law). All management responsibilities are clearly defined. CNES will be the main shareholder.

After carefully studying the various possible structures for managing US activities, CNES chose the option of establishing a "subsidiary corporation", wholly owned by the French company ; this is not only the most conventional arrangement, but also the most efficient as far as day-to-day running, general management and tax aspects are concerned.

The US subsidiary will, of course, draw considerable support from American industry, in particular in the following areas :

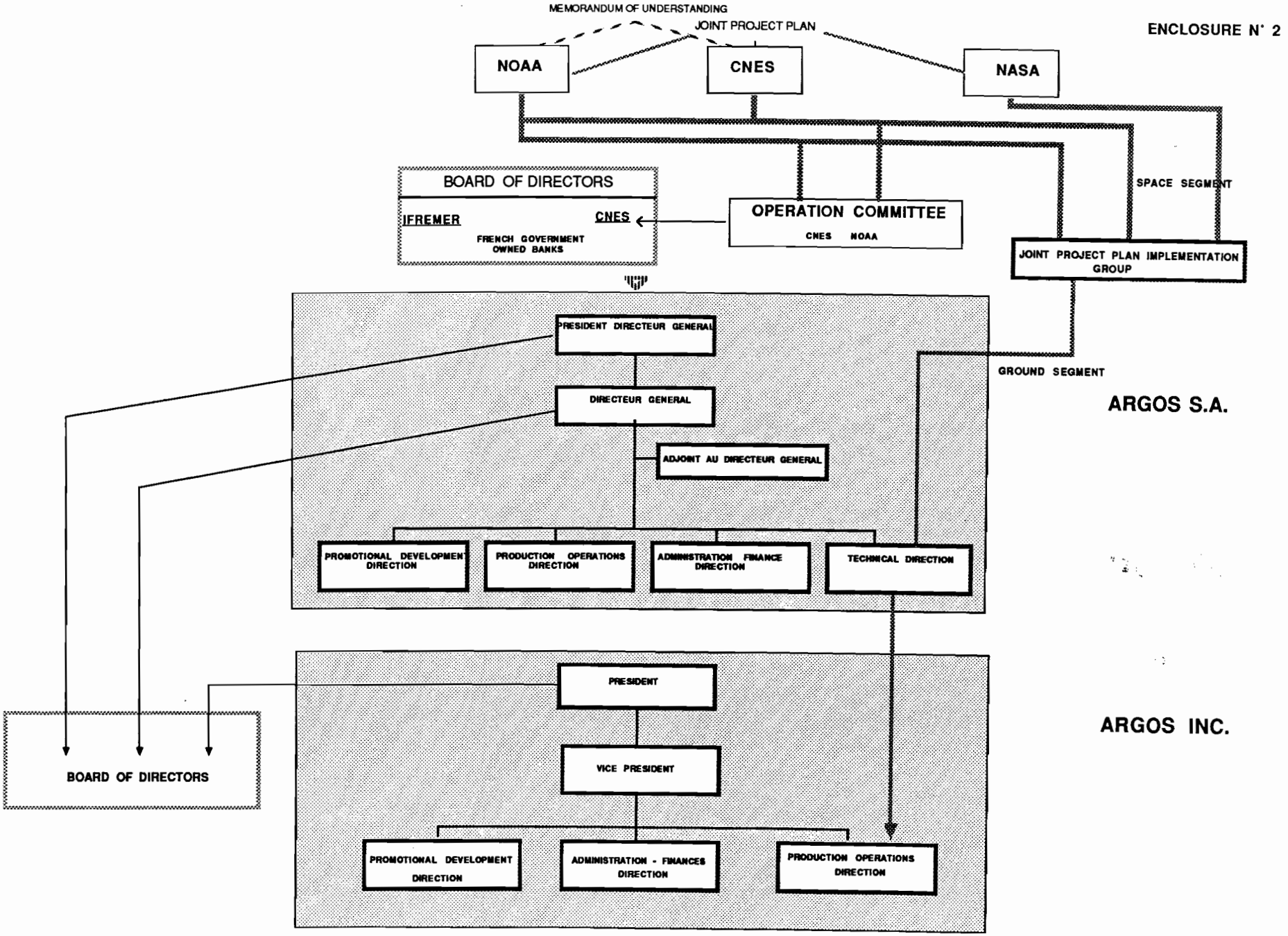
- site preparation
- implementation of processing center
- operation and maintenance of processing center

Given the need for full compatibility and redundancy between the US and the French systems, CNES also recently chose U.S. made computers for both centers.

User relations and management of the various industrial contracts will come under the responsibility of the American subsidiary, so that the system can be successfully promoted in the US and users specific requirements can be serviced.

However, CNES control over and support for the French subsidiary will help insure its activities are consistent with the terms of the CNES/NOAA M.O.U. and that, in turn, the interests of North American users will be properly served.

ENCLOSURE N° 2



ENCLOSURE N°3

ARGOS PROCESSING COST RECOVERY

1 - CNES ensures the specific start-up costs indicated in the table (studies, software development, project management and quality control, site preparation costs, ...).

2 - OPERATING COSTS : Each year CNES may recover all its operating costs from revenues for basic services In that year (if revenues are sufficient).

: Until revenues are equal (or greater) to operating costs CNES will sustain operating losses and absorb 30 % of them.

: When revenues in one year are greater than operating costs for that year CNES may retain the surplus to offset the remaining 70% of any accumulated losses adjusted for inflation from the period 1984 to that time.

: Once CNES has recovered 70 % of accumulated losses starting in 1984, it must ensure that any excess revenues from users that exceed operating costs are used for system improvements or that tariffs are reduced as agreed by the Operations Committee. For example if revenues exceed losses in 1991, then CNES could apply excess revenues to up to 70 % of losses incurred during the period 1984-1990 :This means that if the attached projections are correct up to (71.9) x (0.70) x (adapted inflation) could be recovered.

ARGOS PROCESSING COST RECOVERY (page 2)

REF/OPS.COM. REPORT (SAN FRANCISCO MARCH 1985)

EXPENSES BY CENTER (MF)**	1984	1985	1986	1987	1988	1989	1990
FRANCE	17.50	26.80	24.2	31.6	27.0	29.1	31.6
USA	1.76	8.99	15.0	13.6	16.4	17.8	16.7
"INVESTMENTS" :							
SPECIFIC START-UP COSTS	1.77	12.81	8.12	4.42			
NEW CENTERS							
COMPUTER RENTAL		0.50	2.80	5.14	5.67	5.75	5.95
BY KIND OF EXPENSES							
START UP COSTS	1.77	12.81	8.12	4.42			
FRANCE OPERATING COSTS	15.80	20.20	23.00	26.00	24.0	26.2	28.7
		0.50	2.80	2.80	2.9	3.0	3.1
FRANCE TOTAL (MF)**	15.80	20.70	25.80	28.80	26.9	29.2	31.8
US OPERATING COSTS	1.63	2.19	5.21	10.80	13.6	14.9	16.0
				2.35	2.8	2.8	2.9
US TOTAL (MF)**	1.63	2.19	5.21	13.10	16.4	17.7	18.9
TOTAL OP. COSTS (MF)**	17.40	22.90	31.00	41.90	43.3	46.9	50.7

INCOME	1984	1985	1986	1987	1988	1989	1990
TARIFF PTT/YEAR (KF)*	24	23	23	23	23	23	23
NUMBER OF PTT/YEAR	313	414	505	616	752	917	1119
RATE OF INCREASE (%)		32	22	22	22	22	22
GLOBAL CONTRACT (MF)**	7.51	9.52	11.6	14.2	17.3	21.1	25.7
TARIFF PTT/YEAR (KF)*	62	66	66	66	66	66	66
NUMBER OF PTT/YEAR	39	42	61	98	161	243	351
RATE OF INCREASE (%)		8	45	61	64	51	44
OTHERS (MF)**	2.42	2.79	4.05	6.46	10.7	16.0	23.2
OTHERS + RACES (MF)**	4.15	4.09	5.42	7.90	12.1	17.3	24.3
INCOME : TOTAL (MF)**	11.7	13.6	17.0	22.1	29.4	38.4	50.0
ANNUAL BALANCE (MF)**	-5.7	-9.3	-14.0	-19.8	-13.9	-8.5	-0.7

* KF : 1000 F
**MF : Millions de Francs