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THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

30 MAY 1983

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Commercialization of Remote Sensing Satellites
-- ACTION MEMORANDUM

The enclosed letter (Tab B) from Jack Brooks, Chairman of the Legislation and National Security Subcommittee, Committee on Government Operations, US House of Representatives, requests extensive data on the Administration's proposal to commercialize remote sensing satellites. Tab A contains a detailed response which addresses all of Congressman Brooks' questions. I recommend your signature on the forwarding letter to Tab A.

Jim Wade

James P. Wade, Jr.
Acting

Coordination: See Attached

Enclosures 2
Tabs A and B

Prepared by: Dr. Hamilton/X-71375:30Mar83

13-M-4756

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THE SECRETARY OF DEFENSE

WASHINGTON, THE DISTRICT OF COLUMBIA

Honorable Jack Brooks
Chairman, Legislation and National
Security Subcommittee
Committee on Government Operations
US House of Representatives
Washington, D. C. 20515

Dear Mr. Chairman:

Thank you for your letter of 11 March 1983. I am pleased to provide you the Department's views on the President's decision to transfer to the US private sector the Government's civil operational weather satellites as well as the present civil operational land remote sensing satellites (LANDSAT). While the implementation of the President's initiative is the responsibility of the Department of Commerce, DOD is keenly interested in this activity. DOD will take an active role in the implementation process to ensure that DOD concerns are satisfactorily resolved. DOD does not rely heavily on the civil land or weather sensing satellites to satisfy Defense data requirements. There is, however, a strong role played especially by the civil weather satellites. While LANDSAT provides data of added value to the Corps of Engineers and the Defense Mapping Agency, the DOD concerns for civil land remote sensing fall primarily in the areas of data control and technology transfer.

Enclosed is a summary paper that addresses your questions (Encl 1). I have also enclosed a copy of the memorandum from the Deputy Secretary of Defense to the Secretary of Commerce (Encl 2) stipulating the DOD position on commercialization of the land and weather satellites.

Sincerely,

Enclosures

~~UNCLASSIFIED UPON REMOVAL OF ENCLOSURES~~

~~SECRET~~

Coordination Sheet

Robert K Rankin, Jr.

USAF

USN

USA

OJCS

USD (P)

ASD (LA)

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS
WASHINGTON, DC 20350

IN REPLY REFER TO

Ser 094/3U345059
MAY 10 1983

MEMORANDUM FOR DEPUTY UNDER SECRETARY OF DEFENSE (COMMUNICATIONS, COMMAND, CONTROL AND INTELLIGENCE)

Subj: Commercialization of Civil Operational Remote Sensing and Environmental Satellite

Ref: (a) DUSD(C3I) memo of 25 Apr 83, subject as above

1. I do not concur with proposed response to Congressman Brooks because statement that "DoD does not rely" on these systems is not entirely correct. I recommend that the cover letter to Congressman Brooks be changed to read:

"DoD does not rely heavily on the civil land or weather sensing satellites to satisfy Defense data requirements."

Rationale:

a. Navy is spending considerable money to redesign its meteorological satellite receiver (SMQ-11) to receive civil data as adjunct to DMSP. We rely on civil meteorological satellite data as a back-up to DMSP, including using the civil data to reduce time between DMSP direct readout passes. Additionally, Navy relies totally on civil meteorological satellite data in support of the National Science Foundation in Antarctica.

b. Navy relies heavily on LANDSAT data for worldwide shipping safety by providing information on newly surfaced reefs, etc. It also uses the data to more efficiently manage ocean survey operations, significantly reducing scarce ship survey time and associated costs.

c. Navy is investigating use of LANDSAT data in support of amphibious and special operations. If this proves fruitful -- and it appears that it will -- someone else could also use this data if there are no controls available.

2. In view of our present use of above systems, I recommend that the following concerns be satisfied during implementation development of civilian systems' commercialization:

a. Navy does not want to lose information presently obtained from commercial satellites.

b. Navy does not want to have to pay more than it is already already paying for the same information.

3. Subject to incorporation of change cited in paragraph 1, I concur with the paper.

G. R. Nagler
Vice Admiral, U.S. Navy
Director, Command and Control

Coordination Sheet

USAF

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USA JAMES M. ROCKWELL, MG, GS, ADCSOPS-C4

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[redacted]

COMMERCIALIZATION OF CIVIL OPERATIONAL REMOTE SENSING AND ENVIRONMENTAL SATELLITES (U)

(U) The following addresses a series of questions raised by the Honorable Jack Brooks in a letter to the Secretary of Defense, dated 11 March 1983, on the commercialization of civil land and meteorological remote sensing satellites.

I. (U) CIVIL LAND REMOTE SENSING SYSTEM (LANDSAT)

(U) Use by the Department of Defense: At the present time, the DOD is not a major user of LANDSAT data. The principal users within Defense are the Defense Mapping Agency (DMA) and the Corps of Engineers, Civil Works. The DMA use of LANDSAT data is largely supplemental to other sources within DOD. The Defense Mapping Agency has had some success in using LANDSAT-1, 2, and 3 data to revise hydrographic charts and this may be one of the most productive future uses for LANDSAT-4 data. However, the low ground resolution of these early systems has limited the use of sensed data in producing other products.

(U) An evaluation of the data available from the LANDSAT-4 system may show an increased utility for LANDSAT data in the production and revision of maps and charts of scales of 1:250,000 and smaller. Data from the civil systems may also have some utility for producing special data bases to support the production of terrain simulations, for use in target positioning systems and in performing terrain analysis when the metric accuracy of 1:50,000 and larger scale maps and charts is not essential.

(U) The Corps of Engineers' use of LANDSAT data supports civil works efforts in the flood prediction, damage assessment and permit program; and as a cost-effective alternative data source for environmental, river basin, floodplain management, and urban studies; flood, navigation, and coastal engineering projects; and dam safety and research programs.

(U) Based on the data prices established by National Oceanic and Atmospheric Administration (NOAA), the DOD will spend approximately $350,000 for LANDSAT data in FY 1983. The Department of Defense has commenced evaluation activities focused on LANDSAT-4 and will similarly evaluate SPOT data when it becomes available. These activities will better define projected DOD requirements for data products.

(U) Other Sources of Data: At the present, LANDSAT data is unique. The combination of resolution (spectral, spatial, and radiometric), multiple band, and frequent revisit time made this satellite a one-of-a-kind resource. In 1985, the French plan to launch an earth resources satellite designated "SPOT."

Classified by: Multiple Sources
Declassify: OADR

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[redacted]

This satellite will provide data different from LANDSAT-4. SPOT data evaluation efforts will determine the utility of the data to the DOD.

(U) Future Cost: It is not possible to estimate future data costs to the DOD until the commercial land remote sensing regime is established.

(U) Departmental View of Commercialized LANDSAT: Civilian remote sensing satellite system's design parameters must be reviewed prior to construction to ensure that the resulting data will not reveal information that would be harmful to the national security of the United States. There is also a danger that unexpected sensor phenomenology may result which would be harmful to national defense even though the system design is within the critical parameters established in advance. Therefore DOD must have the authority to protect or embargo any data acquired by a new sensor before the data are distributed. Additionally, in times of crises or national emergency, DOD must be able to assume control over the systems in order to deny data distribution to hostile forces, deny or delay dissemination of data to any private or foreign use, and to ensure that specified data be delivered only to specific allies and United States national security organizations.

(S) In regard to technology transfer, we must ensure that no sensitive technology associated with commercialized satellite remote sensing is licensed for export without a deliberative United States Government review process. We must also ensure that any sharing or transfer of technology for private commercial use to ensure continuous United States commercial leadership or to meet a desired market place need does not compromise national security.

II (U) METEOROLOGICAL SATELLITES (METSAT)

(U) The civil METSAT system consists of two separate satellite systems -- the geostationary satellites Geostationary Operational Environmental Satellite (GOES) and the polar orbiting satellites (NOAA).

(U) The two GOES satellites are at geosynchronous altitude over the equator, providing coverage of the Western Hemisphere between 60° north and south (see Figures 1 and 2). The command and control and data acquisition center is at Wallops Island, Virginia. Data processing is done at Suitland, Maryland. In addition to "raw" data directly from the satellite, the GOES satellites rebroadcast processed imagery to any user with an appropriate ground terminal. Each satellite provides two images per hour. In addition to visible images, GOES also provides infrared (IR) images, IR atmospheric sounding, space environmental monitoring, and a data collection system. The spatial resolution of GOES is 0.6 miles (visible) and 4.3 miles (IR).

(U) The NOAA polar orbiter system, initially developed by NASA as TIROS-N, consists of two satellites in 450 nautical mile sun synchronous orbits. This means that each time the satellite crosses the equator, called the ascending (going north) or descending (going south) node, it is the same local sun time on the ground. For example, a satellite with a 0730 descending node, orbiting the earth 14.3 times per day, will cross the equator going south 14 times per day and each time it crosses the equator it will be 0730 on the ground below the satellite. The NOAA operational constellation consists of two satellites, one with a 0730 descending node and one with a 1430 ascending node. The NOAA ground systems include command, control and data acquisition stations at Gilmore Creek, Alaska and Wallops Island, Virginia. Data processing is done at Suitland, Maryland. This system of two satellites provides complete coverage of the earth four times per day with 0.5 to 2.0 nautical mile resolution in both the visible and infrared portions of the spectrum. In addition to the imagery, the NOAA satellites carry an extensive array of secondary sensors: infrared and microwave temperature sounders, solar and space monitoring systems, a data collection system, and data directly to users worldwide -- this service is called Automatic Picture Transmision (APT).

(U) Meteorological satellite data is used in nearly every facet of military operations in peacetime and wartime. During times of conflict, the need for satellite data increases as ground based information from enemy territory is turned off to deny the data to us. For example, in the Falkland Islands fighting, one of the first actions taken by Argentina was to withhold weather data of value to the British Forces. The only sources left to the British were local observations from their own ships or satellite data. They found satellite data to be crucial in the air, troop landing and ASW operations. Typical military uses of satellite meteorological data are airfield forecasts for launch and recovery of aircraft, aircraft and ship route forecasts, point area forecasts for air strikes and reconnaissance operations, and aerial refueling operations.

(U) Use by the Department of Defense: The DOD makes extensive use of meteorological satellite information. To support its unique requirements, the DOD has established and maintains its own polar orbiting meteorological satellite activity, the Defense Meteorological Satellite Program (DMSP). This system has its own satellites, command and control centers, and data processing center. (Attachment 1)

(U) The civil METSATs form a very important supplement to the DMSP. They provide back-up support to the DMSP in the event that the DMSP is disabled.

(U) In addition to back-up support, the civil satellites also provide support during normal operations. METSAT data is routinely shared between the Air Force, the Navy and NOAA, with each developing its own area of specialization to minimize cost

(Attachment 2). The Air Force is responsible for global cloud imagery, the Navy for sea surface temperature and other oceanography measurements, and NOAA for atmospheric sounding. These data are routinely "traded" and used in centralized processing (Air Force Global Weather Central, Offutt AFB Nebraska; Navy Fleet Numerical Oceanography Center, Monterey, California; NOAA, Suitland, Maryland) to develop mission specific products. Another example of shared data is the Joint Ice Center, Suitland, Maryland. Under this agreement, the Navy and NOAA share responsibilities, data, and research dealing with ice forecasts in the north Atlantic and Pacific (Attachment 3). This is another example of the Government obtaining increased effectiveness at reduced cost by sharing resources. The military tactical systems (Air Force, Navy, and Marine Corps air transportable vans and Navy ship-board receivers) also use data from civil systems. The resolution of the civil systems is less than that of the DMSP and requires different computer processing than DMSP. The civil polar METSATs typically have different ascending node times than the DMSP, which gives more frequent coverage than that available with just the DMSP. The geostationary METSAT resolution is also less than DMSP and does not have coverage outside of 60° north and south and 15° and 109° west (170° east) (see Figures 1 and 2). Within this area, however, the system provides coverage every 30 minutes. This is very valuable in tracking the development and motion of severe weather. These data are particularly important in locating and tracking hurricanes and typhoons.

(U) Other Sources of Data: The only polar orbiting METSATs are the US civil and military systems and the Russian system (Meteor). Data from Meteor would not be available in time of crisis. In normal times, US civil data would be available to help fill gaps in data if DMSP data were unavailable or to supplement DMSP in time of emergency.

(U) GOES is the only source for geostationary data over North and South America and the surrounding oceans.

(U) Current Cost of Data: Currently NOAA data and DOD data are exchanged without cost under the data sharing agreements -- there is no direct cost to the DOD.

(U) Future Cost of Data: It is not possible to estimate the future cost to DOD until the commercialization legislation is drafted and final proposals are received and negotiated. However, Defense would be viewed by a private vendor as a customer with unique demands resulting in extensive additive costs to Defense ranging from possible system modifications to operationally tailored data products.

(U) Departmental View of Commercialized Civil METSAT: For the civil weather satellites there is a broad set of issues that include those of land remote sensing and extend into such areas as priority data use for national security customers,

operational continuity to ensure that labor disputes and market vagaries do not stop the flow of critical data, backup to the Defense Meteorological Satellite System should there be a major failure, and maintaining the international free flow of weather data. The defense weather forecasting and advisory systems use and rely upon a large body of all-source environmental data. Some of this is supplied by foreign entities in an international free exchange of data in which the US participates. This foreign data is important to satisfying the worldwide weather support requirements of US forces. The US Government must, therefore, continue to control distribution and exchange of weather data; and no change of the weather exchange policy can be made unilaterally by a private operator. The contractual arrangements between the Government and a private operator must recognize this need.

(U) As can be seen, the relationship between defense and civil weather satellite systems requires flexibility and responsiveness. Satellites are only one element, although an important one, of global cooperative weather observing and forecasting systems. Best utilization of that system involves control and modification of criteria for satellite replacement (i.e., what instrument failure or combination of failures necessitates replacement), orbital parameters (to fit the need of synoptic analyses or other requirements), and satellite instrument complements. The civil and military polar-orbiting satellite systems currently share the use of the same satellite design, although the instrument complements flown on the satellite differ, and interlocked shared data processing systems are being implemented to reduce overall costs. The Government must have a mechanism to ensure that Defense concerns are accommodated -- particularly such critical parameters as equator crossing time. Unilateral control of instrument, satellite, or orbital parameters by a private firm could adversely affect operations extending well beyond the weather satellites. Changing circumstances in either the military or civil systems can require rapid changes -- and often in an unpredictable manner that cannot be anticipated in simple data purchase contracts.

(U) The DOD, NASA, and NOAA work closely on the development of our METSATs (Attachment 4). Improvements made by one agency are studied by the other agencies and adopted as appropriate. This saves in the cost of development and allows a "leap frogging" in the technology. A commercial vendor would, most likely, not want to risk funds, and profit, on R&D without an immediate economic return. NASA, therefore, must continue to be charged with the responsibility of providing advanced research and development in civil weather, land and ocean satellite remote sensing technology areas. They should work closely with NOAA, Agriculture, Defense, and other Government agencies to determine national need and future directions of systems to provide the US with the benefits of space-derived data in these areas. NASA has

the technical competence and engineering skill to move these research areas forward while no other agency outside of Defense does.

III. (U) DOD AS THE SUPPLIER OF CIVILIAN WEATHER DATA

(U) If a commercial civil weather satellite failed, the DMSP data would be available to NOAA for use. The imagery is different than that of TIROS-NOAA, the atmospheric sounding sensors are not as extensive as those on TIROS-NOAA, there is no search and rescue package, there is no data collection system, and the data is not as frequent as that provided by GOES, but it would serve for severe storm warning and basic forecasting information. The data would have to be processed at Air Force Global Weather Central (AFGWC) and distributed to the National Weather Service (NWS). While this would work in concept, planning and testing would be needed to insure uninterrupted service to NWS.

5 Attachments:
1. DMSP Operations ~~(S)~~
2. Shared DATA Processing MOAs, 31 Dec 80 and 30 Aug 81
3. Joint Ice Center MOA, 15 Dec 76
4. Polar METSAT MOA, 24 Sep 74
5. List of Additional Non-DOD Information

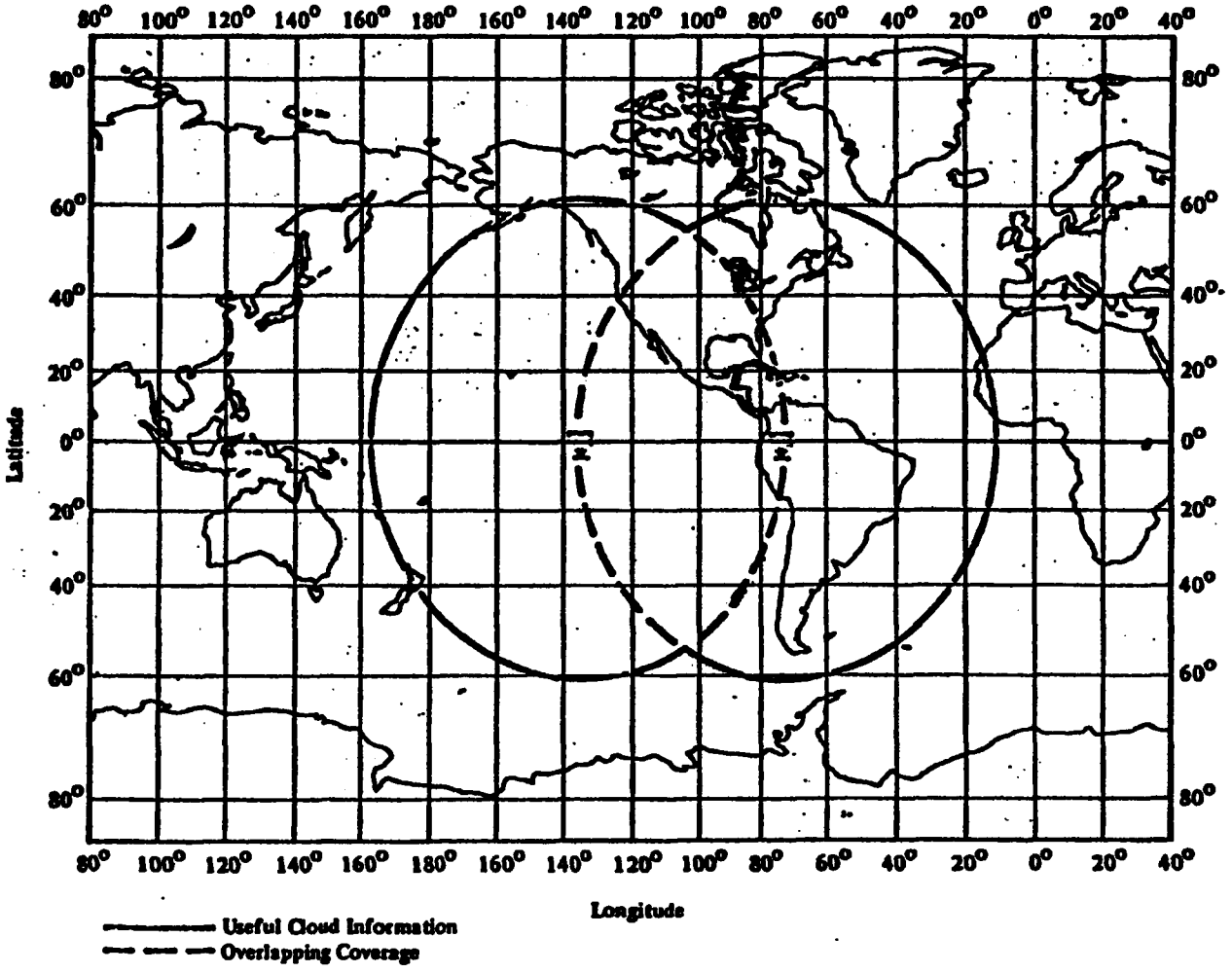
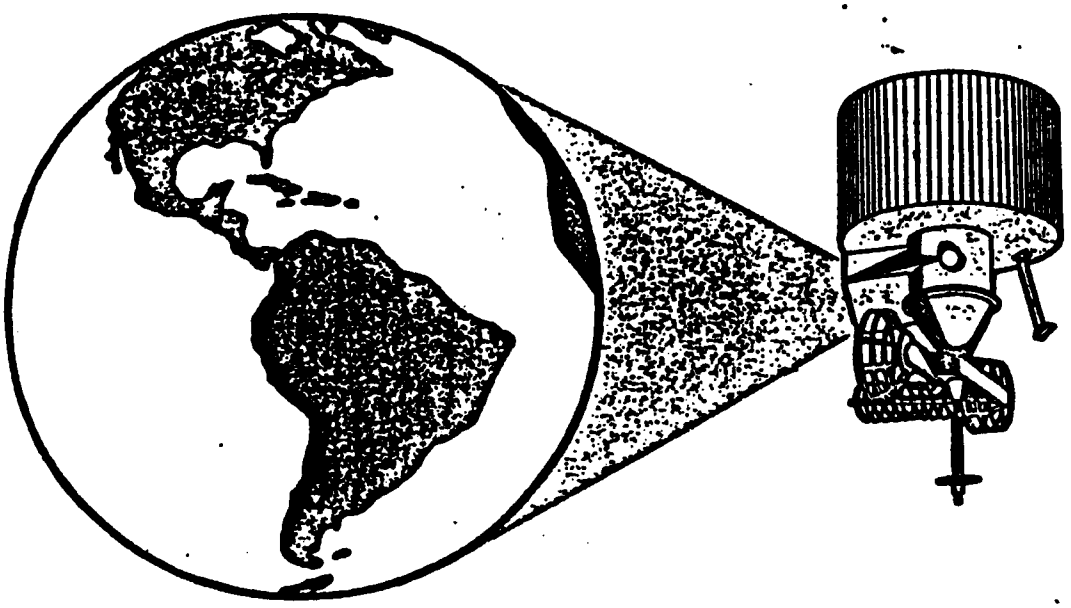
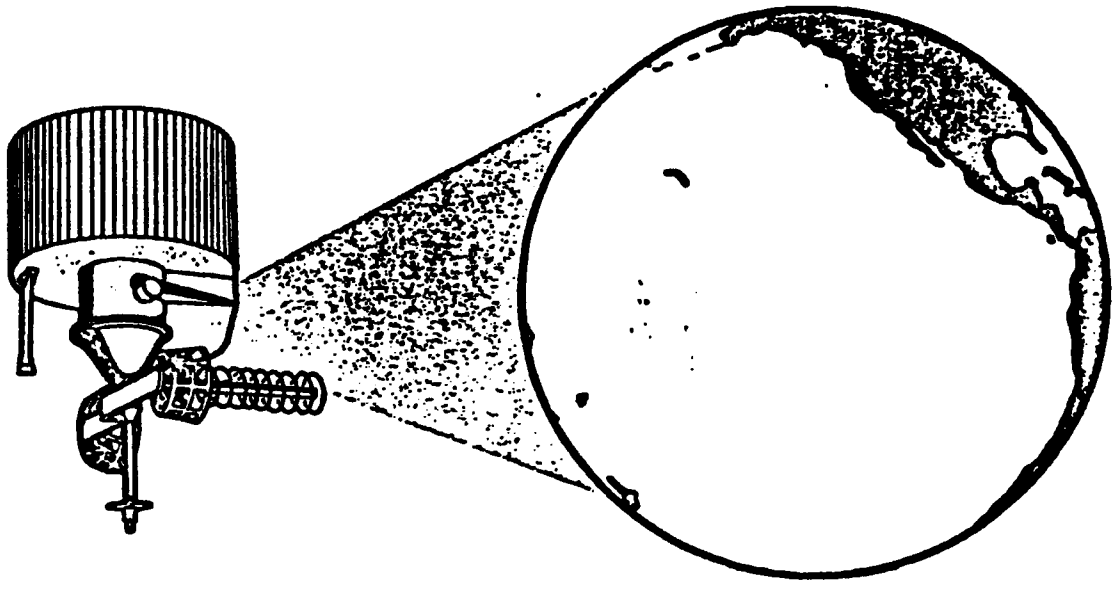


FIGURE 1: AREA COVERAGE OF GOES SATELLITES



GOES East
Coverage



GOES West
Coverage

FIGURE 2: GOES COVERAGE

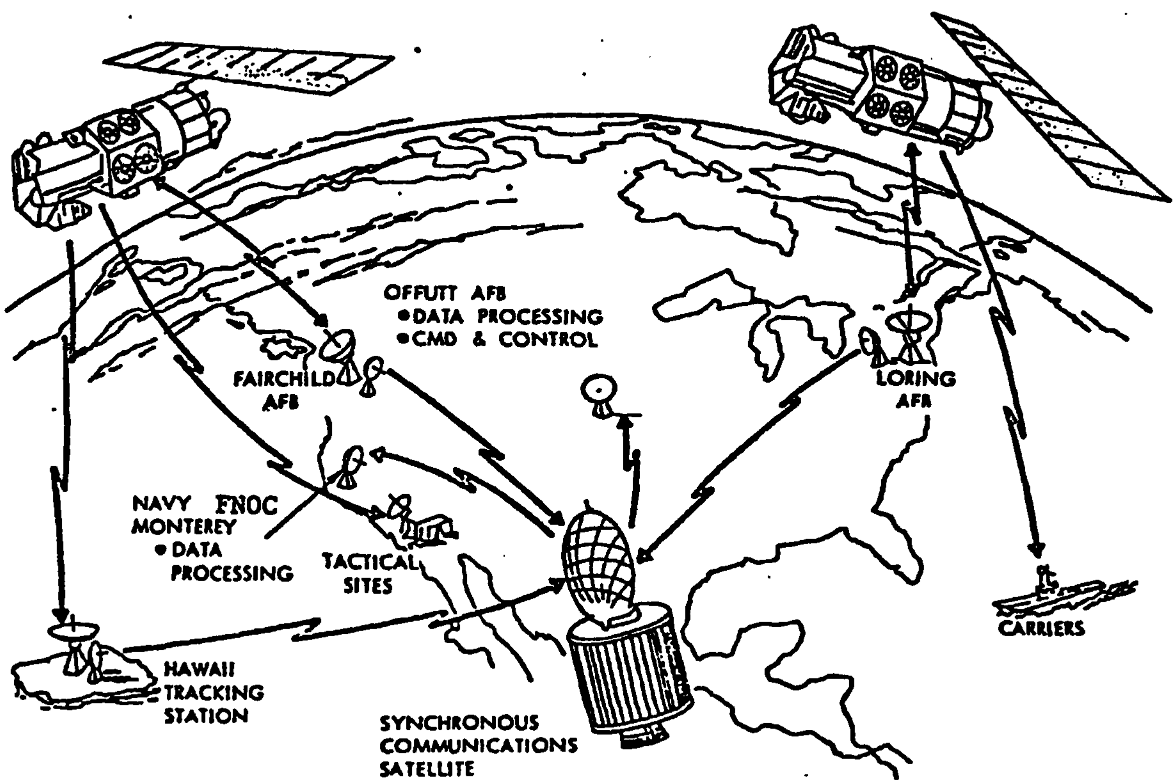
Defense Meteorological Satellite Program

(U) The mission of the Defense Meteorological Satellite Program (DMSP) is to provide global visual and infrared cloud imagery and other specialized meteorological, oceanographic, and solar-geophysical data required to support worldwide DOD operations and high-priority programs. Worldwide data are supplied to the Air Force Global Weather Central, Offutt AFB, NE, and the Navy Fleet Numerical Oceanography Center, Monterey, CA. The Air Force, Navy, and Marine Corps have worldwide land and carrier based tactical terminals which receive direct satellite transmission of local area visual and infrared cloud data.

~~(S)~~ The DMSP has a required operational capability of two operational satellites continuously on orbit. Typically, one satellite has an ascending node time of 0630 ("morning") and the other satellite has an ascending node time of 1100 ("noon").

(U) Command and control and stored data receipt/relay are accomplished from a command and control center at Offutt AFB, NE, with ground stations near Loring AFB, ME, and Fairchild AFB, WA. Commands, telemetry, and data are relayed via a geostationary communications satellite. The Air Force Satellite Control Facility station in Hawaii is capable of receiving and relaying stored data playbacks.

DMSP DATA SYSTEM



(U) Some of the land based tactical terminals are air transportable and can be shipped to any location to support U.S. military operations. For example, a unit was shipped to Egypt in 1982 to support operation BRIGHT STAR, the combined U.S./Egyptian military exercise. A unit is permanently assigned to U.S. Central Command (formerly the Joint Rapid Deployment Task Force).

(S) The DMSP has not been meeting its directed mission requirements since August, 1980 when the early failure of one orbiting satellite and the launch failure of a replacement satellite deprived the program of assets. The first Block 5D-2 was launched in December, 1982 to replace the partially operational early morning satellite. The second Block 5D-2 will be launched in September, 1983 to fill the noon orbit.

(S) Since the 1980 failures, DMSP support of the strategic and tactical missions has been supplemented by the national civil polar orbiting weather system, TIROS-NOAA, although the data are far from satisfactory to meet DOD requirements.

(C) After the 1980 failures, the Joint Chiefs of Staff (J-3) made an inquiry to the unified and specified commands to determine the extent of the impact of loss of DMSP data to those commands. The following is a summary of the operational impacts.

- (S) Special missions such as antisubmarine warfare, photo reconnaissance, and MAC classified missions suffer major impacts at all times, including peacetime, limited contingency, or war.

- (S) There is a major impact during wartime on the commands' ability to fulfill certain missions when no satellite data is available and conventional weather data is denied from enemy controlled areas.

- (S) The operational impact is also major during contingencies when no DMSP or conventional data is available from the contingency area.

- (S) There is generally only a minor impact on peacetime operations, except for those extremely critical missions noted in subparagraph above.

- (S) The reliance on DMSP data increases as the spectrum of conflict increases and the availability of other sources of data decreases.

(S) The above impacts became especially significant in time of war when U.S. tactical forces may be operating in close proximity to enemy forces. Weather data becomes an essential tool in the successful prosecution of the war, so the ability to receive data and to deny our data to the enemy becomes critical. DMSP tactical (direct real time) data is encrypted, so it can be used. Data from the civil satellites is not encrypted, so it is denied to the enemy and to U.S. forces by turning off the real time transmission. (Stored data are still available for centralized processing since it is played back over the U.S.).

(S) These factors make the availability of DMSP tactical data to U.S. forces and the capability to selectively provide or deny TIROS-NOAA and GOES data critical to the U.S. in the event of war or crisis.

MEMORANDUM OF AGREEMENT ON THE SHARED PROCESSING OF SATELLITE DATA

1. Purpose.

This Memorandum of Agreement (MOA) establishes the management policy and the areas of expertise whereby the National Oceanic and Atmospheric Administration (NOAA), the Department of the Navy, and the Department of the Air Force will jointly share the central processing of satellite data and will pass certain raw data and processed products to each other as agreed upon. This will be accomplished in a manner that is most cost effective to all three agencies.

2. Scope.

This agreement is applicable to the National Earth Satellite Service (NESS) representing NOAA, the Naval Oceanography Command (NAVOCEANCOM) representing Navy, and the Air Weather Service (AWS) representing the Air Force. The Fleet Numerical Oceanography Center (FLENUMOCEANCEN) is the processing center for Navy and the Air Force Global Weather Central (AFGWC) for the Air Force. Processing of data is restricted to Polar orbiting meteorological satellite data at the Centers of Expertise (COE) for the present but may be expanded later if desired and agreed upon.

3. Data Levels.

The following definitions will be used for this MOA:

Level IA - Raw sensor data as transmitted by the satellite.

Level IB - Data that is preprocessed at a processing central. This data is earth located and calibrated but not put into a map projection. This is equal to a Sensor Data Record (SDR). Level IA data can be recovered at this level.

Level II - Processed data that equates to a Geophysical Data Record (GDR). Level I data cannot be recovered at this level.

Level III - Products that are analyzed, subjectively or objectively, geophysical units in a specific map projection. The product can contain conventional or satellite data only or a combination of conventional and satellite data.

4. Centers of Expertise.

The concept of COE is developed to define the areas of primary emphasis of each of the three participants. The COE for atmospheric sounders is designated as NESS, for oceanography as FLENUMOCEANCEN, and for satellite imagery as AFGWC. In general, data from individual satellite instruments will be processed at the respective COE in relation to the instrument's primary function.

5. Communications.

A high speed (approximately 1 mbps) satellite communications network will be initiated between the COE's. Either existing or future Earth stations and communications satellites will be used. As future requirements dictate, the capacity and data rate of the system may be expanded.

6. Management Concept.

Management of this MOA will be accomplished at two levels. The Executive Committee, which determines policy and general guidance, consists of the Technical Director of NESS, the

Commander NAVOCEANCOM, and the Commander AWS. Joint meetings are to be called as required. Chairmanship will rotate annually starting with the Air Force.

The second level of management will be the Agency Coordinators. These representatives are appointed by the member agencies to initiate the MOA and present action issues for resolution by the Executive Committee. The Agency Coordinators generally will meet at least quarterly. They will form working groups of technical experts who will be responsible for developing the detailed, operational aspects of the MOA. Annexes developed by these working groups which describe what data will be processed, and how the data will be transferred between the COE's will be added to the basic MOA after approval by the Executive Committee. This will include Levels IA, IB, II, and III data which will be of mutual benefit to the operations of the COE's. The COE's, will provide, as required, representatives at the other COE's in order to facilitate the day to day operation of data and products transfer.

7. Funding.

Each participant of this MOA is expected to fund for the operation of its respective COE. However, there may be instances where joint contracting, such as with the Satellite Communications Network, may be accomplished for mutual benefit. In these cases, funding will be apportioned among the participants as mutually agreed upon.

8. Implementation.

The Executive Committee will approve any implementating instructions either as annexes to this MOA or as separate instructions.

9. Termination.

This MOA, executed in triplicate original, will be effective on the date the last signature is affixed and will remain in effect until terminated. This MOA will be reviewed by the Executive Committee on an annual basis to determine if it should be continued, modified, or terminated.

H. W. Yates, Acting Technical Director, National Earth Satellite Service	[redacted] CAPT, USN Commander Naval Oceanography Command	ALBERT J. KAEHN, JR. BGEN, USAF Commander, Air Weather Service
Date: 31 Dec 1980	Date: 20 Nov 80	Date: 12 Dec 80

OSD 5 U.S.C. § 552 (b)(6)

NAVY 5 U.S.C. § 552 (b)(6)

IMPLEMENTATION ANNEX TO THE MEMORANDUM OF AGREEMENT ON THE SHARED PROCESSING OF SATELLITE DATA

1. INTRODUCTION

a. This Annex provides implementation guidance to AWS, NAVOCEANCOM and NESS for Shared Processing of NOAA and DMSP polar orbiting meteorological satellite data. Each Center of Expertise (COE) may retain the capability for supplemental processing to meet its wartime, contigency, and emergency requirements as deemed necessary.

b. Several benefits can be realized by implementation of a COE. It can reduce redundant processing, release computer time, improve products, concentrate expertise, and provide backup.

c. Processing is divided into the three generic areas of visual and infrared imagery, microwave imagery for ocean and land parameters, and atmospheric temperature and moisture soundings. AFGWC will be the COE for visual and infrared imagery, processing data from the DMSP Operational Line Scanner (OLS), the NOAA Advanced Very High Resolution Radiometer (AVHRR), and future sensors in this generic class. FLENUMOCEANCEN will be the COE for microwave imagery for ocean parameters, processing data from the microwave imager (SSM/I) and future sensors in this generic class. NESS will be the COE for atmospheric soundings, processing data from the NOAA TIROS Operational Vertical Sounder (TOVS), DMSP infrared and microwave sounders, and future sensors in this generic class.

2. IMPLEMENTATION - A milestone chart will be included as Appendix A. The partitioning of products and services to be shared provides for implementation in a phased manner. Phased implementation will provide valuable COE experience in shared processing, reduce the risk of implementing an unresponsive system, spread committment of resources over a longer period of

time, and provide a method for evaluation of the COE concept. Implementation of Phase I will be in the following three steps:

a. AFGWC will process and transmit visual and infrared imagery with an initial operational capability (IOC) of FY83.

b. NESS will process and transmit atmospheric soundings with an IOC of FY84.

c. FLENUMOCEANCEN will process and transmit microwave brightness temperatures, microwave GDR's, and global sea surface temperatures (SST's) with an IOC of FY85.

3. MANAGEMENT - Specific instructions will be contained in Appendix B.

a. The Executive Committee - The current committee will remain in existence and meet annually to review overall development and operation. Agency coordinators will meet as required to staff budget and policy issues.

b. Operational Management - The operational management at each COE will be the responsibility of a COE coordinator and a liaison officer from each of the other two agencies through the COE Commander/Operational Head. These three individuals will compose a COE Working Group. NESS and FLENUMOCEANCEN liaison officers will be in place and center coordinators identified by the middle of CY82. AFGWC liaison officers are in place at NESS and FLENUMOCEANCEN, and the FLENUMOCEANCEN liaison officer is in place at AFGWC.

c. Changes - The requesting COE will forward suggested changes to the producing COE. The COE Working Group at the producing COE will evaluate the requirements and;

(1) Submit the change request to the executive committee if a request exceeds the scope of the MOA,

(2) or submit this requirement to the producing COE management for approval/disapproval for implementation. If disapproved due to lack of resources, the item will be returned to requesting COE who may withdraw it, modify the request, or provide resources to the producing COE.

4. COMMUNICATIONS - Specific instructions will be contained in Appendix C.

a. Phase I. Wideband satellite communications will be used for COE data exchange. The Shared Processing Network (SPN) will use non-contact time on the NOAA Wallops Command and Data Acquisition (CDA) frequency through the RCA Americom satellite on a time-sharing basis. This frequency is a 1.3308 million bits per second channel. NESS will be the SPN manager. All transmissions will be unclassified. Data transmission will be in the NESS Limited Area Coverage (LAC)/High Resolution Picture Transmission (HRPT) format.

b. Phase II. The planned transmissions will not fill the non-contact time available. However, because of the manual mode of operation, the time will be filled with additional transmissions, activation of backup, or increased NESS communications requirements. Therefore, a dedicated SPN must be developed. In addition to funds needed to obtain and maintain a send/receive capability at each COE, each agency will develop budget initiatives for a dedicated, automated SPN with implementation in FY86 to support orbit-by-orbit transmissions.

5. PRODUCT PERFORMANCE - Specific timelines formats, etc., to meet stated requirements will be contained in Appendix D.

a. The general description of basic products and the IOC for each COE is as follows:

(1) AFGWC - IOC in FY83 (assumes concurrent IOC of the Satellite Data Handling System (SDHS)).

(a). The visual and infrared portions of the Satellite Global Data Base (SGDB) in polar stereographic and Mercator projections derived from the DMSP OLS and/or the NOAA AVHRR will be transmitted every 6 hours.

(b). The three dimensional cloud analysis (3DNEPH) will be transmitted every 6 hours.

(2) NESS - IOC in FY84

(a). Atmospheric temperature and moisture soundings derived from the TOVS and DMSP infrared and/or microwave sounders will be transmitted every 6 hours. DMSP microwave level 1A sounder data will be transmitted to NESS by AFGWC every 6 hours.

(3) FLENUMOCEANCEN - IOC in FY85

(a). Brightness temperature fields derived from the DMSP microwave imager will be transmitted every 6 hours.

(b). GDR's derived from the DMSP microwave imager will be transmitted every 6 hours.

(c). Level II and/or III SST's derived from the DMSP microwave imager, SGDB, processed NESS water vapor soundings, and other data will be transmitted every 6 hours.

b. With implementation of FLENUMOCEANCEN as the third COE, Phase I of shared processing will have been achieved. Phase II will be achieved when the SGDB, atmospheric soundings, microwave brightness temperatures, and microwave GDR's are transmitted orbit-by-orbit or on a demand basis. This will coincide with the implementation of the automated, dedicated SPN with a target date of FY86. Each agency will program intra-agency manpower, hardware, and software to reach Phase II.

6. BACKUP - Specific instructions addressing emergency and scheduled backup will be contained in Appendix E.

a. Backup to the products list will meet the timelines described in paragraph 5a, above (transmission every 6 hours). Only level II, satellite derived products, will have backup as follows:

(1) AFGWC will produce and transmit microwave imager brightness temperatures and GDR's.

(2) FLENUMOCEANCEN will produce and transmit DMSP microwave sounder data. The backup of NOAA sounders is under study.

(3) NESS will produce and transmit NOAA AVHRR imagery. The backup of DMSP OLS imagery is under study.

(4) NESS will produce and transmit SST's using AVHRR and TOVS.

b. The SPN will not have a backup due to the high (99.9 percent) reliability of the NOAA RCA frequency.

7. FUNDING

a. The AFGWC transmit capability will be funded by NESS under the existing SDHS contract in FY83.

b. The NESS transmit capability will be programmed for funding by the Air Force in FY84.

c. The FLENUMOCEANCEN receive capability will be funded by the Navy in FY83 and the transmit capability in FY84.

d. COE manpower, hardware and software to reach Phase I and Phase II will be programmed by the implementing agency.

e. A dedicated, automated SPN to achieve Phase II will be jointly funded by the three agencies.

f. All hardware and software for new products will be funded by the requesting agency/agencies.

8. Effective Date. This Annex, executed in triplicate original, will become effective on the date the last signature is affixed and will become an integral part of the basic MOA.

DAVID S. JOHNSON
Assistant Administrator
For Satellites,
National Earth
Satellite Service

Date: 20 August 1981

[redacted]
CAPT, USN
Commander Naval
Oceanography Command

Date: 9 June 81

ALBERT J. KAEHN, JR.
BGEN, USAF
Commander, Air
Weather Service

Date: 2 July 81

OSD 5 U.S.C. § 552 (b)(6)

NAVY 5 U.S.C. § 552 (b)(6)

MEMORANDUM OF AGREEMENT

BETWEEN THE

DEPT OF THE NAVY AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

FOR THE

JOINT ICE CENTER, WASHINGTON, D.C. (SUITLAND)

Background:

The Department of the Navy, through its Fleet Weather Facility, Suitland, has for many years provided sea ice forecasts and advisories to support DOD missions. In addition, it has become the principal provider of sea ice information for scientific and commercial activities both domestic and foreign, both Arctic and Antarctic. These services include highly specialized and tailored information to support specific operations. Fleet Weather Facility, Suitland, has routinely made available to National Weather Service Forecast Offices pertinent sea ice data advisories.

The National Weather Service (NOAA) provides generalized sea ice advisories as a part of its marine weather responsibilities in Alaskan waters. The requirement for ice advisories and related services can be expected to increase as the resources of the Alaskan area are further developed. Responsibilities for these services are shared by Weather Service Forecast Offices in Anchorage and Fairbanks supported by guidance from the National Meteorological Center.

The National Environmental Satellite Service provides the Navy with satellite imagery of ice both in the Arctic and Antarctic, primarily from VHRR. The NOAA Environmental Research Laboratories are engaged in ice research which can support ice forecasting techniques development.

Purpose:

To establish a Joint Sea Ice Center composed of personnel from the Department of the Navy and the National Oceanic and Atmospheric Administration. Establishment of this Joint Center recognizes the unique capability resident within the Navy and the continuing responsibility the Navy has to the Department of Defense for sea ice forecasting while also recognizing the increasing requirements of the civil sector. Joint Operations by Navy and NOAA will achieve economic benefits and increased effectiveness in carrying out the respective missions of the two agencies.

Operation:

a. Personnel - The Department of the Navy will provide the principal staffing of the Joint Center from personnel assigned to FWF, Suitland, for sea ice duties. One of the Naval personnel shall be designated as Director of the Joint Center. The National Weather Service (NOAA) shall assign one meteorologist with appropriate technical qualifications and security clearances to the Joint Center. This meteorologist shall participate in formal functions of the Joint Center as appropriate for a professional meteorologist. This meteorologist also has responsibilities for liaison duties between the National Weather Service and the Joint Ice Center to assure effective coordination of data inputs and product utilization.

In addition to the foregoing, the National Environmental Satellite Service (NOAA) shall provide support to the Joint Ice Center in the applications of satellite information to the mission of the Joint Center at a level of approximately 1 man year of effort per year. Tasks and

projects will be jointly agreed upon by the Director of the Joint Ice Center and the Director of Operations, National Environmental Satellite Service (NOAA).

b. Mission - The Joint Ice Center will function to provide specialized and tailored products as required for specified DOD operations and to provide ice data, analyses, predictions and other advisory information as guidance to National Weather Service Forecast and service offices with sea/lake ice responsibilities.

NOAA, through the Joint Ice Center, will make information available to private consultants and other civil interests according to existing policies of the National Weather Service and as agreed to by the Department of the Navy. In general, such data and products are furnished on a not-to-interfere basis, with no cost to the Government.

c. Policy - All policy matters relative to the joint operations will be resolved between the Chief of Naval Operations (OP-945) and the NOAA Associate Administrator for Environmental Monitoring and Prediction, or their designees.

Coordination:

For coordination of operational matters, including the specification of ice services requirements, a point of contact will be designated by each service.

The Associate Director, Meteorology and Oceanography (W1), National Weather Service, is designated the NOAA point of contact.

The Director, Environmental Services Division, Office of the CNO (OP-945) is designated the Navy point of contact.

Technical and Research Support:

Ice imagery and its interpretation as presently supplied by NOAA's National Environmental Satellite Service (NESS) will be continued. Changes to or additional support from NESS for the Joint Ice Center will be coordin with the NESS Director of Operations.

Research support on ice dynamics and for improvement of ice forecasting can be arranged from NOAA's Environmental Research Laboratories (ERL). Negotiations for such support will be coordinated by the NOAA point of cont

Ice research in the Navy which supports the development of prediction techniques is conducted at the Naval Oceanographic Research and Development Activity (NORDA), at the Naval Undersea Center (NUC), and through academic institutions under the Office of Naval Research Arctic Programs. In additi the Navy works closely with the Army's Cold Regions Research and Engineerin Laboratory (CREEL).

Implementation:

The terms of this Memorandum take effect upon the date when both parties to the agreement have signed this document; the agreement continues until six months after either party submits a notice of intention to terminate.

For the National Oceanic and Atmospheric Administration

Dr. Edward S. Epstein
Associate Administrator for
Environmental Monitoring and Prediction

For the Department of the Navy

J. Edward Snyder, Jr.
Rear Admiral, U.S. Navy
Director, Environmental Services Division for the Chief of Naval Operations
and
Oceanographer of the Navy

December 15, 1976

AGREEMENT BETWEEN U.S. DEPARTMENT OF COMMERCE, THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, AND THE DEPARTMENT OF DEFENSE CONCERNING POLAR OPERATIONAL METEOROLOGICAL SATELLITE SYSTEMS

SECTION I. PURPOSE

A. The Department of Commerce (DoC) and the Department of Defense (DoD) both operate polar orbiting meteorological satellite systems to fulfill civil and military requirements pursuant to policy and law. The long range intent of the participating agencies is to achieve maximum technical convergence of the polar orbiting systems and sub-systems commensurate with the unique mission requirements of the separate systems. In the near term, maximum efficiency and economy will be achieved through the use of common system components and the exchange of satellite-derived meteorological data wherever possible. Specifically, the DoC/NASA use of the DoD developed Block 5D spacecraft is to be considered for the next generation civil system (TIROS-N).

B. The purpose of this agreement is to provide for the necessary coordination of the United States polar operational meteorological satellite systems, and to define the necessary mechanism for coordination among the participating agencies and determination of the specific functions to be performed by each in achieving the convergence discussed in Paragraph A above.

SECTION II. MANAGEMENT AND FUNDING RESPONSIBILITIES

A. Agency Responsibilities

1. The management of the Department of Commerce portion of this agreement is a responsibility of the National Oceanic and Atmospheric Administration (NOAA). The NOAA shall provide the necessary DoC resources and shall serve as the official DoC contact for this agreement.

2. The management of the NASA portion of this agreement is the responsibility of Headquarters, Office of Applications. This office shall serve as the focal point for providing the necessary NASA resources and shall serve as the official NASA contact for this agreement.

3. The management of the DoD portion of this agreement is the responsibility of Department of the Air Force. Headquarters USAF shall provide the appropriate DoD resources and shall serve as the official DoD contact for this agreement.

B. Functional Responsibilities

The functions of the DoC, NASA, and the Air Force in the conduct of the operational meteorological satellite program are as follows:

1. For the civil system, the Department of Commerce and NASA shall continue to perform those functions delineated in the bilateral "Basic Agreement Between the U.S. Department of Commerce and the National Aeronautics and Space Administration Concerning Operational Environmental Satellite Systems of the Department of Commerce" dated July 2, 1973.

2. Specifically, for the next generation civil system (TIROS-N),

a. The National Aeronautics and Space Administration shall:

(1) Make available to the Air Force the specifications of the TIROS-N spacecraft and its components.

(2) Procure and qualify flight spacecraft for the civil system, using the Block 5D spacecraft modified as may be necessary, and serve as the single governmental interface with the spacecraft contractor. DoC and Air Force personnel shall be invited by NASA to participate, as appropriate, as observers in NASA meetings with the NASA contractor.

(3) Procure launch vehicles and services.

(4) Consider Air Force procurement planning when formulating NASA procurement plans, and insure that the Air Force is kept informed of such NASA plans.

b. The Air Force shall:

(1) Make available to DoC and NASA the general specifications of the Block 5D spacecraft, detailed specifications of such components of this spacecraft as may be candidates for inclusion on DoC spacecraft, and general specifications of subsequent spacecraft which may be developed through the DMSP.

(2) Act in an advisory capacity in procurement of DoC/NASA spacecraft. NASA and DoC personnel shall be invited by the Air Force to participate, as appropriate, as observers in Air Force meetings with the DoD contractor.

(3) Consider NASA procurement planning when formulating Air Force procurement plans, and insure that NASA is kept informed of such Air Force plans.

(4) Provide launch vehicles and services and maintain and operate launch sites suitable for launch of DoC spacecraft and NASA operational prototypes as may be requested, subject to reimbursement under the provisions of DoD Directive 4000.19.

C. Funding

1. The DoC and the Air Force will separately develop, submit, and defend requests for annual appropriations to procure and operate their own operational satellite systems. Each agency will exchange budget estimates with the other agencies, as appropriate. Where transfers of funds are involved, the receiving agency will provide appropriate budget estimates and account for the funds transferred in accordance with agreed reporting procedures.

2. The Air Force and NASA will continue to submit and defend requests for annual appropriations for the development of necessary prototype spacecraft in support of their respective missions.

SECTION III. COORDINATION BOARD

A. To facilitate the above, a DoC-NASA-DoD Polar Orbiting Operational Meteorological Satellite Coordination Board (POOMSCOB) is hereby established. The Board will:

1. Insure the coordination of those aspects of individual agency plans which are relevant to the implementation of this agreement.

2. Take all possible measures to achieve a high degree of commonality between the systems and sub-systems where mission requirements permit, while recognizing the unique requirements of DoC and DoD.

3. Meet at least quarterly or at the call of any of the three members.

4. Establish Working Groups as required and mutually agreed to.

5. Refer to the signatories any unresolvable issues coming before the Board.

B. Board members are the Associate Administrator, NOAA; the Associate Administrator for Applications, NASA; and the Deputy for Space Programs to the Assistant Secretary of the Air Force (R&D). Chairmanship of the Board will rotate, with the active chairman being that member in whose facility the meetings take place. NASA shall furnish an Executive Secretary for the Board.

SECTION IV. RELEASE OF PUBLIC INFORMATION

A. Release of public information on the operational systems may be initiated by each of the agencies. Before any release is issued to the public, however, clearance and final approval must be given by the agency having the assigned functions listed above for the segment or segments of the program concerned in the release. Wherever possible, coordinated or joint releases should be issued.

SECTION V. INTERNATIONAL RELATIONS

All international arrangements relating to the civil system shall be made by NASA and NOAA in accordance with the terms of the "Basic Agreement Between the U.S. Department of Commerce and the National Aeronautics and Space Administration Concerning Operational Environmental Satellite Systems of the Department of Commerce" dated July 2, 1973. All international arrangements relating to the military system shall be made by the Department of Defense. Due regard should be given, in making these arrangements, to the following provisions:

1. Where such arrangements imply obligations or place commitments upon another agency, that agency's coordination will be obtained in advance of such international agreement or commitment.

2. Design of the civil operational satellite systems covered by this agreement will give due consideration to the commitments already expressed or implied by the United States.

SECTION VI. EFFECTIVE DATE, AMENDMENT, AND TERMINATION OF AGREEMENT

A. This agreement shall become effective when it has been signed on behalf of all of the three signatory agencies.

B. Each signatory agency may at any time recommend amendment of this agreement which will become effective if approved by the other two signatory agencies. The agreement will be reviewed formally at the request of any signatory agency, and may be terminated by any signatory agency after giving the other two signatory agencies a 30-day notice of intent to terminate.

Administrator, NASA	Administrator, NOAA	Under Secretary, Air Force
September 3, 1974	Sept 24	Sept 24 '74
Date	Date	Date

List of Additional Non-DOD Information on Remote Sensing

1. GAO/RCED-83-111
   14 March 83
   "Costs and Uses of Remote Sensing Satellites"

2. NOAA/NESDIS Report
   March 83
   W. John Hussey
   "The Economic Benefits of Operational Environmental Satellites"

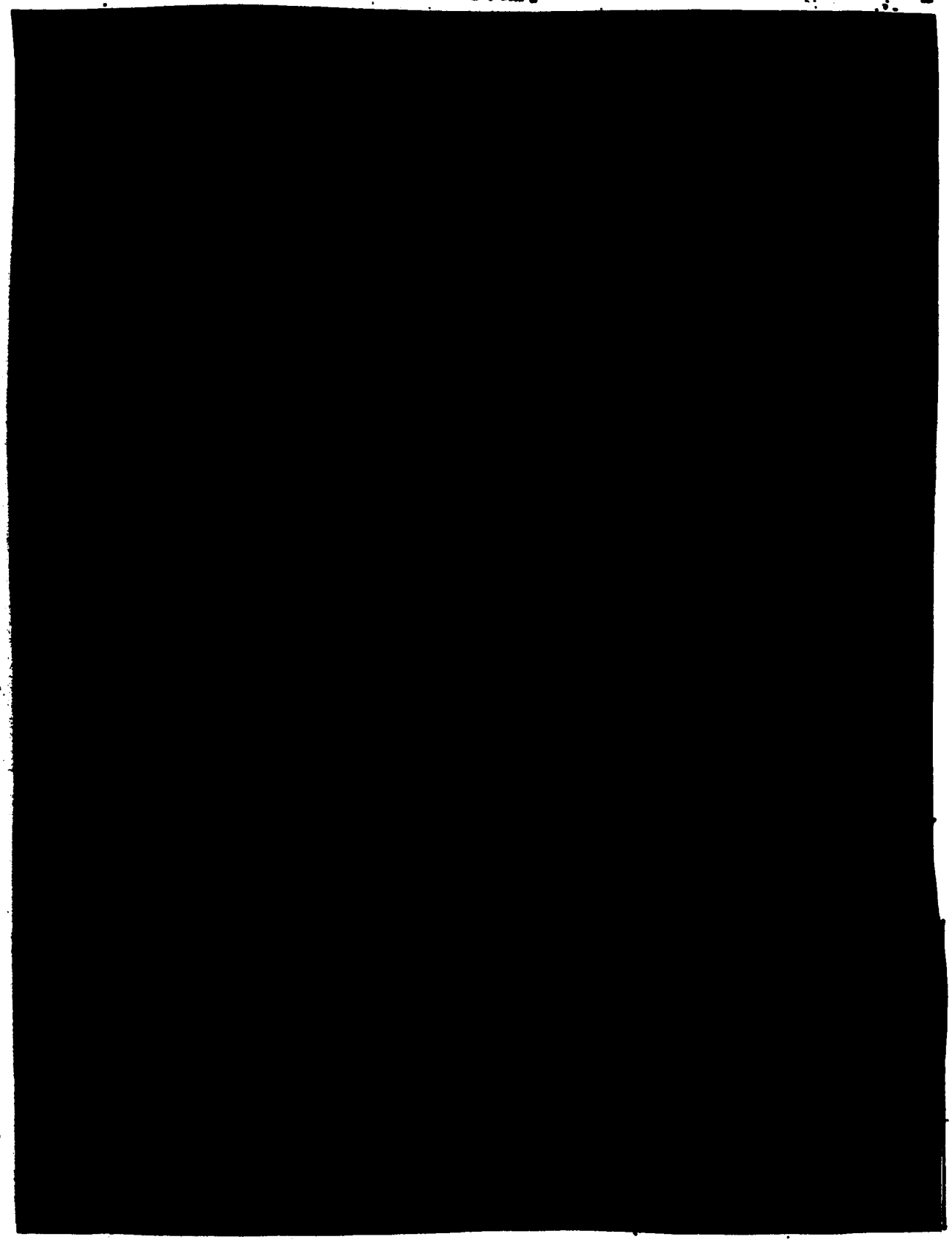
3. NASA Press Kit
   "LANDSAT D"

4. NASA Press Kit
   "NOAA-E"

5. Report for Mr. Michael Bayer, Associate Deputy Secretary of Commerce
   10 Nov 82
   "Report of the Ad Hoc Government Interagency Panels on Civil Operational Remote Sensing Commercialization"
   Chaired by: Major General Earl Peck and Mrs. Kathleen Charles

6. NASA Book
   August 1980
   "GOES D, E, F Data Book"

[redacted]



OSD 3.3(b)(1)
NGA 3.3(b)(1)

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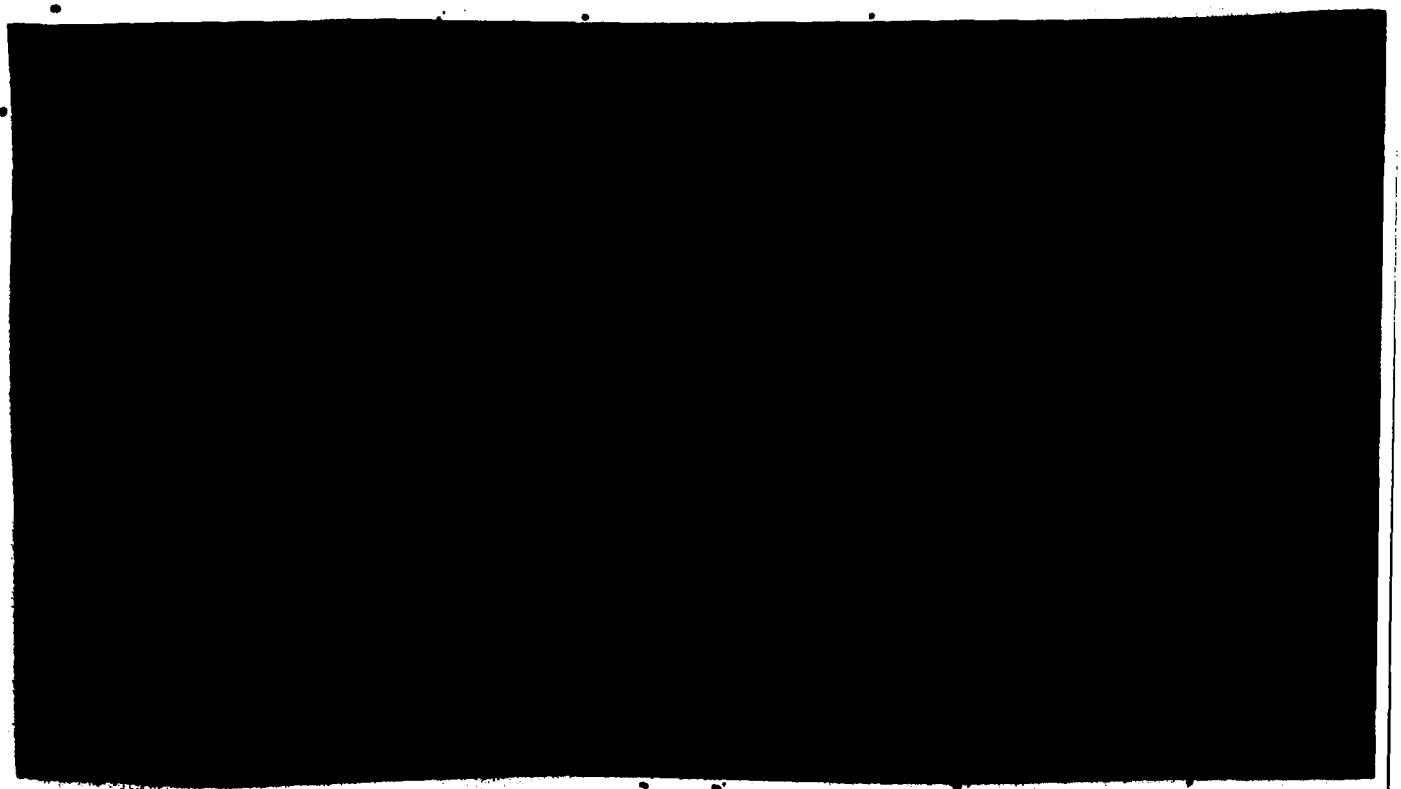

OSD 3.3(b)(1)
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NINETY-EIGHTH CONGRESS

Congress of the United States

House of Representatives

LEGISLATION AND NATIONAL SECURITY SUBCOMMITTEE
OF THE
COMMITTEE ON GOVERNMENT OPERATIONS
RAYBURN HOUSE OFFICE BUILDING, ROOM B-373
WASHINGTON, D.C. 20515

March 11, 1983

Honorable Caspar W. Weinberger
Secretary of Defense
Department of Defense
Washington, D.C. 20301

Dear Mr. Secretary:

I recently learned of the Administration's proposal to sell our Government's civil remote sensing satellite systems known as LANDSAT and METSAT. This proposal is of considerable concern to me for many reasons, including its potential impact on our security.

I would appreciate your providing the Subcommittee information on all uses of data obtained from these satellites by your Department and on its importance to national security, an account of other sources from which this data might be obtained, the current cost of this data to the Department, and the estimated cost of procuring this information following implementation of the Administration's proposal. In addition, I would appreciate receiving the Department's view of the proposal and any underlying documentation to support its position. Moreover, if your support of this proposal was conditioned upon the inclusion in a possible contract of certain stipulations which would bind the purchaser, I would appreciate receiving a copy of those stated conditions.

Finally, I would appreciate receiving information on the ability of DOD to become the primary provider of weather data for civilian use should future exigency cause disruption in receipt of such data.

Because of the extreme importance of the issues involved, I would appreciate receiving this information as soon as practicable.

Meanwhile, with every good wish to you, I am

Sincerely,

JACK BROOKS
Chairman

32342

~~SECRET~~

OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

RESEARCH AND ENGINEERING

COVERING BRIEF

TO: UNDER SECRETARY OF DEFENSE FOR RESEARCH & ENGINEERING

FROM: DEPUTY UNDER SECRETARY OF DEFENSE (C3I) DCT 5/27

PROBLEM: To respond to a letter from Congressman Jack Brooks on the commercialization of remote sensing satellites.

DISCUSSION: The enclosed cover memorandum to Secretary Weinberger describes the information Congressman Brooks is seeking. All of the information is contained in the proposed response.

RECOMMENDATION: That you sign the enclosed cover memorandum.

COORDINATION:

(DUSD (S&TNF)	(Date)
RSC	5-20-83
Dir, DARPA	(Date)

OSD Case #32342

DLH

Prep'd by: DLHamilton/rre/SCS/3D158/X-71375/30Mar83
Rewritten: DLHamilton/rre/SCS/3D158/X-71375/21Apr83
Rewritten: DLHamilton/rre/SCS/3D158/X-71375/19May83

~~SECRET~~

~~When the attachments are removed, this memorandum becomes Unclassified~~

OFFICE OF THE UNDER SECRETARY OF DEFENSE
FOR RESEARCH AND ENGINEERING

Date 25 Apr 1983

Memo for DUSD(S&TNF)
Director, DARPA
ASD (Legislative Affairs)
OUSD (Policy) (Gen Peck)
DAMO-C4 (Dept of the Army)
OP-094 (Dept of the Navy)
AF/RDS (Dept of the Air Force)
C^3S (OJCS)

Attached is a response to Congressman Brooks' letter on remote sensing. I would appreciate your coordination no later than Friday, 29 April 1983.

Donald C. Latham

Donald C. Latham
Deputy Under Secretary of Defense
(Communications, Command, Control and Intelligence)

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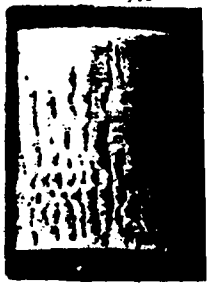

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OFFICE OF THE UNDER SECRETARY OF DEFENSE

WASHINGTON, D.C. 20301

RESEARCH AND ENGINEERING

COVERING BRIEF

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FROM: DEPUTY UNDER SECRETARY OF DEFENSE (C3I)

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COORDINATION: Kenneth M. Malahy Col, USAF — 26 Apr 83
(DUSD (S&TNF)) (Date)

Dir, DARPA — (Date)

DECLASSIFIED IN FULL
Authority: EO 13526
Chief, Records & Declass Div, WHS
Date: JUL 2 9 2016

Office of the Secretary of Defense
Chief, RDD, ESD, WHS
Date: 29 JUL 2016 Authority: EO 13526 5 USC. 552
Declassify: _____ Deny in Full: _____
Declassify in Part: X
Reason: 3.3(b)(1) + 5 USC. §552(b)(6)
MDR: 13 -M- 4756

OSD Case #32342

Prep'd by: DLHamilton/rre/SCS/3D158/X-71375/30Mar83
Rewritten: DLHamilton/rre/SCS/3D158/X-71375/21Apr83

~~SECRET~~

~~When the attachments are removed, this transmittal letter becomes~~