1. This letter supplements a letter, same subject, dated 31 December 1960. In accordance with instructions from AFR (mor), the development plans for IMR, NMOS and NIMOS will be presented at the Director of General Research and Engineering at 1600 in Room 101, 12 February 1960. The operational plans and user relationships for IMR, NMOS and NIMOS will be reviewed by the Director of General Research and Engineering and presented to the three services at the same time and place on 17 February 1960. Prior to these presentations, the development plans, operational plans and user responsibilities will be reviewed and approved by the Air Force Ballistic Missile Committee on 10 February 1960. They will be reviewed for recommendations to the Air Force Ballistic Missile Committee by appropriate panels and groups of the Weapons Board on 1 February 1960 and by the Weapons Board on 3 February 1960.

2. DDRD has responsibility for all staff actions pursuant to the preparation and presentation of the development plans and will advise the AFR of participation and representation required. In addition, DDRD will also schedule the Air Staff reviews listed in paragraph 1.

3. DDRD is assigned the responsibility for all staff actions pursuant to the preparation and presentation of the operational plans and user relationships. Briefings on these subjects will be made immediately following presentation of the development plans at all Air Force reviews listed in paragraph 1. DDRD/AF3 will ascertain that user relationships with unified and specified commands set forth in subject plans meet the criteria established in these joint planning documents. Review of user relationships will be conducted at pertinent reviews by DDRD. DDRD is responsible for advising the AFR and AFRP as to the degree of participation or representation required from them during these reviews.

4. Separate logistics plans in accordance with AFR 5-7 are not required at this present time. DDRD will take appropriate action to advise the AFR and to invite one qualified observer to attend the Air Force Ballistic Missile Committee meeting noted in paragraph 1.

5. Attendance at the Air Force Ballistic Missile Committee meetings will
The United States Air Force, in accordance with the Secretary of the AirForce... (Signed)

R. M. Montgomery
Major General, US Air Force
Assistant Vice Chief of Staff

1900 JAN 28 71 19

AFDAP AFDNC APODC AFXPD AF001 AFOG/F W HODGES
JOHN L. MARTIN, JR.
Colonel, USAF
Deputy Assistant for Advanced Technology, DCS/Development

forwarded herewith are the Department of the Army and Department of the Navy requirements for development of surveillance satellite systems referenced in Amendment No. 16 to NASA Order No. 9-50, dated 3 December 1979.

JOHN L. MARTIN, JR.
Colonel, USAF
Deputy Assistant for Advanced Technology, DCS/Development

1. Army Rpt 1712(A) 1
2. Army Rpt 1712(A) 2
3. Army Rpt 1712(A) e
4. Navy Rpt ID-0991
5. Navy Rpt ID-09902

AFDAT
Maj Floyd

AFDAT Coord Cy
AFDAT OIC of Sig
MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

SUBJECT: Army and Navy Requirements for Development of Surveillance Satellite Systems

By Amendment No. 16 to ARPA Order No. 9-60, dated December 3, 1959, responsibility for development work on the SAMOS Project was transferred from the Advanced Research Projects Agency to the Department of the Air Force. As indicated in that Amendment, the Department of the Army and the Department of the Navy documented requirements were to be forwarded under separate cover. Accordingly, they are attached herewith.

As indicated in the transfer directive, further development work on the SAMOS System undertaken by the Air Force should be responsive to the reconnaissance requirements of all three Military Departments. The attached documents thus should serve as a basis for such direct liaison between the Department of the Air Force and the Departments of the Army and Navy as is necessary to ensure that the interests of all will be adequately served.

FOR THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

A. W. Betts
Brig. General, USA
Director

5 Attachments
Army Space Rqm. 1712 (A) c, 5/7/59
Army Space Rqm. 1712 (A) d, 5/7/59
Army Space Rqm. 1712 (A) e, 5/7/59
Ltr fr CNO, Ser 00199P07, 5/18/59 w/encl
Ltr fr CNO, Ser 00177P07, 5/18/59 w/encl

cc: (w/o attachments)
The Joint Staff
Secretary of the Army
Secretary of the Navy

58-59-4432-A1
MEMORANDUM FOR THE SECRETARY OF THE AIR FORCE

SUBJECT: Army and Navy Requirements for Development of Surveillance Satellite Systems

By Amendment No. 16 to ARPA Order No. 9-60, dated December 3, 1959, responsibility for development work on the SAMOS Project was transferred from the Advanced Research Projects Agency to the Department of the Air Force. As indicated in that Amendment, the Department of the Army and the Department of the Navy documented requirements were to be forwarded under separate cover. Accordingly, they are attached herewith.

As indicated in the transfer directive, further development work on the SAMOS System undertaken by the Air Force should be responsive to the reconnaissance requirements of all three Military Departments. The attached documents thus should serve as a basis for such direct liaison between the Department of the Air Force and the Departments of the Army and Navy as is necessary to ensure that the interests of all will be adequately served.

FOR THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING

Signed - A. W. Betts

A. W. Betts
Brig. General, USA
Director

5 Attachments
Army Space Rqm. 1712 (A) c, 5/7/59
Army Space Rqm. 1712 (A) d, 5/7/59
Army Space Rqm. 1712 (A) e, 5/7/59
Ltr fr CNO, Ser 00199P07, 5/18/59 w/encl
Ltr fr CNO, Ser 00117P07, 5/18/59 w/encl

cc: (w/o attachments)
The Joint Staff
Secretary of the Army
Secretary of the Navy
5. Ground equipment must be capable of:
   a. Processing the required data.
   b. Providing for rapid data processing.
   c. Storing information in such a form that it can be accessed or furnished in a timely manner by type, i.e., locations, etc.

   (4) Distributing information to possessors.

b. (5) Nature of Systems

   a. This system is required now.

   b. This is necessary for providing a management base concerning the U.S.S.R. that is now provided. An analysis of such needs to be included in the report and proper management posture in industrial and military fields.
COMBAT SURVEILLANCE SATELLITE SYSTEM

1. (A) General
   a. There is an Army requirement for a Combat Surveillance Satellite System to provide operational commanders at field Army level with "real time" information of their immediate areas.
   b. The Combat Surveillance Satellite System will perform the following functions:
      (1) Combat surveillance.
      (2) Target acquisition and location.
      (3) Area damage assessment.
   c. The Combat Surveillance Satellite System will consist of:
      (1) The necessary space vehicles and sensors to permit day and night, all-weather coverage.
      (2) The necessary mobile ground equipment to allow:
         (a) Receipt, interpretation, and dissemination of information from the satellite.
         (b) Orders to be transmitted from the ground to the satellite.

2. (B) Background for Requirement
   a. The broad mission of Army forces in war is to bring to bear sufficient power at the decisive point and time to render an enemy's military capability ineffective. Inherent in this mission is the requirement for combat intelligence systems which will permit commanders and staffs at all echelons to:
      (1) Arrive at timely decisions in conducting current operations.
(2) Select targets for effective use of available weapons.

(3) Conduct post-fire damage assessment.

(4) Assist in the preparation of plans and estimates for future operations.

(5) Avoid surprise.

b. The current information collection capability of the Army is limited in two principal respects:

(1) Depth of penetration into enemy territory.

(2) Obscured vision during night or bad weather.

c. Use of aircraft to secure intelligence information will become increasingly more unreliable as air defense systems are improved.

d. Current intelligence systems severely limit the Army's ability to obtain tactical information prior to the outbreak of hostilities.

e. The employment of sensory equipment on space vehicles provides a logical augmentation and extension of current and projected information-collecting sub-systems within the framework of the combat intelligence system. Their use will be coordinated with other sensory sub-systems.

3. (S) Operational Concept

a. Orbits for combat surveillance satellites should permit repeated observations of pre-selected areas of the earth's surface up to 1,000 nautical miles wide by 1,500 nautical miles long. The altitude of the satellite orbit above this selected area should be as low as possible consistent with acceptable satellite life. Consideration should be given to using an elliptical orbit whose perigee is over the area of primary interest in order to achieve maximum satellite life with minimum degradation of sensor performance.
b. Sufficient satellites should be employed to provide surveillance of the designated area at least once each eight hours with a resolution of at least 15 meters initially with \( \frac{200}{100} \) meters desired by 1970.

c. Sensors are required which will give information day or night, under all weather conditions. Initially it may be necessary to have two sets of sensors - one that gives extremely good data during daylight and good weather, and a back-up set of sensors that provides data during night and bad weather conditions.

d. Pictorial type presentation of sensor data will be acceptable initially. The ultimate objective is the incorporation of devices designed to sense the unique characteristics or "signatures" of intelligence targets.

e. Mobile ground equipment, located in the area of the field Army, is required to:

   (1) Interrogate and receive information from the satellite during each pass over the area of interest.

   (2) Catalog and store information received.

   (3) Furnish to an operator, on command, information by type, for example:

      (a) Changes in missile launcher locations since last pass.

      (b) Complete missile launcher locations detected.

      (c) Troop movements.

      (d) Changes in troop locations & since last pass.

      (e) Area damage assessment by location.

      (f) Depot locations.
(4) Merge data listed in subparagraph (3) above into an automatic data processing system for display to all interested agencies.

(5) Issue commands to the satellite for minor orbit and attitude corrections.

f. The system should be able to detect and track surface-to-surface missiles for the purpose of launch site location and impact zone prediction and warning.

4. (S) Degree of Urgency

This system should be operational during FY 1963.
1. (a) Signal

There is an Army requirement for a Signal Intelligence and Countermeasures Satellite System to:

a. Monitor for signal traffic analysis many transmissions originating from stations on earth, in space, or on the sea.

b. Locate through direction finding many transmitter stations on earth, in space, or on the sea.

c. Monitor RF electromagnetic emissions to provide information from which the efficiency of our communications and electronic security can be determined.

2. (b) Requirement for Development

Regarded CONTINENTAL 7 May 1950

[Redacted]

SECRET
countermeasures effort can be greatly increased by locating our
equipments in space.

b. Mobile satellite-borne electronic systems may be quite
vulnerable to jamming or other countermeasures particularly if we can
place a countermeasures satellite in orbit near the hostile satellite.

c. Effective monitoring of friendly transmissions to evaluate
the effectiveness of our own security can be more efficiently
accomplished if the monitoring equipment is placed in special orbit.

3. (3) Operational Concept

a. The Signal Intelligence and Countermeasures Satellite
System will consist of a number of space satellites and include the
necessary earth "read-out", data reduction and control stations.

b. The satellite vehicle(s) should provide continuous, or
near continuous, intercept coverage of designated sections of the earth
and of space. Initially two or three satellites spaced in a circular
300 to 400 mile orbit will provide the desired coverage. Later for
intercept questions a single satellite in a 24 hour orbit will possibly

(1) correct the objects about the center of gravity,
and the position the projectiles exist, and to relocate itself in a
favorable position for scanning.

(2) Intercepts signals or search over the radio frequency
spectrum from 2 megacycles to 30,000 megacycles. The receiver must be
capable of being remotely programmed for wide band operations for
electronic search missions and the narrow band operations for specific
intercept missions or else two separate receiver must be provided.

(3) Transmitt data to earth stations and receive and
implement modifications to the intercept program or satellite position.
The transmitted data will be in a form facilitating data reduction.
SECRET

(4) Record and store data for retransmission to earth “read-out” stations.

(5) Respond to pulse, amplitude and/or frequency modulation signals.

a. The earth “read-out” stations will contain the necessary equipment to control, interrogate and receive data from the signal intelligence and anti-satellite satellites. These stations are responsible for data reduction, analysis and dissemination.

b. Primary target sources for the communications and electronic intelligence system will be:

(1) Those emissions from tactical military satellites from division through army group, and the strategic emitters of military directorate and minihastid.

(2) Those emissions from enemy satellites and other space craft.
4. Statement of Reasons
The Signal Intelligence and Command reconnaisance Satellite
System should be operational as soon as possible and no later than the
final quarter of calendar year 2015.
From: Chief of Naval Operations
To: Distribution List
Subj: Navy Research and Development Plan, Operational Requirement
No. IO-09501 (Electronic Reconnaissance Satellites) (U)

Ref: (a) DODV Instruction 3000.8 of 29 Apr 1958
    (b) DOD Directive No. 5105.15 of 17 Mar 1959 with
        enclosure thereto
    (c) Dir ARPA memoranda to Service Secretaries of 30 Jul 1958,
        26 Aug 1958 and 3 Mar 1959

Enclosure (1) Operational Requirement No. IO-09501

1. The responsibilities of the "action", "lead", or "supporting" Bureaus
   as defined in reference (a) are somewhat modified in the research and
   development programs for space systems. Reference (b) directs that the
   responsibility for certain research fields, including earth satellites,
   is exclusively assigned to the Director of the Advanced Research Projects
   Agency (ARPA). The Director of ARPA has, by memoranda (ref (c)),
   authorized the Military Departments to proceed independently in space
   research within certain monetary limitations.

2. The production and operation of specific equipment in space
   technology for naval applications remain in the province of the Navy
   Department. ARPA sponsored research projects will be transferred to
   the using services after the successful completion of an experimental
   demonstration of feasibility. At this change-over point ARPA
   responsibility ends and, for programs of naval interest, the cognizant
   bureaus should be prepared to undertake normal development functions.

3. Enclosure (1) has been forwarded to the Secretary of Defense for
   consideration by the Director of ARPA in planning his research and
   development program.

4. Enclosure (1) is forwarded to the Chief of Naval Research as
   principal action addressee and to other addressees for information or
   such action as their interest or responsibility in support of this
   Operational Requirement may indicate. A request will be made to the
   Secretary of the Navy for designating the Office of Naval Research as
   Lead Bureau for this Operational Requirement.

5. The Chief of Naval Research is requested to review the Research
   and Development program now in progress in ARPA and advise the Chief of
   Naval Operations of the adequacy of this effort in support of Naval
   requirements.

[Signature]

R. B. HICKEY
By designee

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(See page 2)
**DISTRIBUTION (Continued)**

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SECRET
1. OPERATIONAL CONCEPT

Current systems of collecting electronic intelligence are peripheral in nature and do not cover many vital areas inside the Soviet Bloc. A relatively simple satellite carrying equipments for intercepting radar and other electronic emissions would provide vital information over interior areas of great military significance at an early date. Since more versatile but more complex systems appear feasible during the next five years early development is an essential element of this concept.

2. OPERATIONAL REQUIREMENT

Develop a satellite system capable of detecting, locating, and processing deliberate and inadvertent electronic transmissions under all weather conditions, emanating from interior and infrequently covered regions controlled by foreign nations in order to provide strategic warning, installation inventory, and installation location in advance of other known systems.

a. Functions required to be performed

(1) All foreign nations are known to use controlled electronic radiations for a wide variety of purposes, e.g., detection, communications, vehicle control, and navigation. The major potential enemies of the United States are on a par with the United States and its Allies in their ability to develop, produce, and use systems for these purposes. The ability of U.S. Intelligence Agencies, to intercept and exploit such radiations is presently limited in both depths and completeness of coverage. It is believed that many of the foreign electronic sites and development facilities are located beyond intercept coverage now provided. There is a requirement to fill this gap in order to learn of technological advanced, provide strategic warning, and assist mission planning. The satellite appears to be one of the most logical systems which can be developed to accomplish this function in a short time period.

(2) This system should provide material and techniques for placing a satellite in orbit, establish the tracking ephemeris, a rapid and automatic means of intercepting and collecting electronic transmissions, and relaying selected data to the Navy (including ship and aircraft) and national intercept stations when commanded. Data processing should be capable of being accomplished through existing processing facilities in an interim system.

b. Threat

(1) The known ability of a potential enemy to initiate a limited or all-out war against the free world is a continuing threat. This threat steadily increases as it becomes outwardly apparent that an enemy's capabilities for conducting war are increasing. To effectively counter this threat, detailed intelligence concerning level of enemy electronic activity, type of electronic emissions, and general location of electronic equipments is required. The electronic reconnaissance system needed to provide this information shall consist of a number of components which, when used together, provide a completely comprehensive all-weather system.

ENCLOSURE (1) to CNO
Ser 00199791 78 MAY 1969
c. Performance and limitations.

(1) Minimum features acceptable mid-1959, are as follows:

(a) Lifetime of at least 4 to 6 months.

(b) Coverage by a single vehicle of "S" or "X" band, with controlled interrogation.

(c) Payload of approximately 50 pounds.

(d) Orbit and trajectory obtainable with THOR or similar boosters using existing facilities.

(e) Utilize existing telemetering, control, and intercept stations.

Additional features desired will be stated in development characteristics.

(2) It is desired, when the payload is capable of being increased sufficiently and the state-of-the-art permits, to cover in one satellite multiple electronic emissions bands. Specific operational performance requirements will be stated in Development Characteristics.

d. Features of desired development work

(1) Data collection and control systems and equipments envisaged will be primarily for shore-based ELINT activities for an interim system. Substantial requirements exist, however, for receipt of electronic intercept data from satellite directly by mobile platforms (ships and airborne vehicles) and rapid processing on board.

(2) Maximum security should be provided to prevent furnishing intelligence to the enemy and should have minimum susceptibility to countermeasures.

(3) Reliability shall be a paramount feature of the system.

(4) Employ modular techniques whenever feasible.

(5) System should automatically intercept, collect, record, and relay to control and processing sites, data on electronic emissions.

(a) Frequency

(b) Pulse repetition rate

(c) Pulse width and modulation

(d) Antenna scan rate, pattern and beam structures

(c) Polarization

(f) Location of emission.

(6) Any shipboard equipment required should be designed for all Naval environments.

(7) The system should be designed so as to use all or any existing sites and electronic reconnaissance equipment whenever desired.

(8) This system should not only furnish, at an early date, the desired intelligence data, but also valuable information for design and development of future collecting, relaying, recording, and processing equipment.
Weight and mass limitations

(1) Cognizance must be taken of weight and size limitations imposed by maximum payload which existing combinations of rocketry can place in orbit.

f. Special environmental limitations

(1) It will be necessary to obtain necessary frequency clearances for the data link portion of the system as set forth in OPNAV Instruction 02410.8.

g. General information

(1) In all material developments, the Chief of Naval Operations considers timely availability and suitability of first importance. Considerations of cost, critical materials, and manpower are of almost equal importance. The performance figures given in this requirement are goals, except where specifically noted as minimums. During the course of planning for this development, it may be found that in meeting these goals a large and complex or costly article will result; whereas it may be found possible to develop a much simpler and therefore more readily available, reliable, and suitable equipment short of the ultimate specific, but which nevertheless will constitute a considerable advance over presently available equipment. Determination and notification of such alternatives should be considered an essential part of the preparation of the Technical Development Plan. In submission of the Technical Development Plan, the developing agency shall inform the Chief of Naval Operations or Commandant of the Marine Corps, as appropriate, of the results, with respect to the factors enumerated above, in order that consideration may be given to making an appropriate modification of this Operational Requirement.

3. SUPPORTING DATA AND RECOMMENDATIONS:

a. ELCON 9.4/5, SECRET, 19 June '56 - U.S. ELINT Objectives and General Intelligence Requirements.

b. USID ELINT Committee memo SIB 0014 of 24 Feb 59 - Project TATTLETALE Objectives.

c. U. S. Specific ELINT Collection Requirements (SpeCor) of 1 July 1957.

d. NRL Report '58-2193 of 17 Dec 1958 - Project TATTLETALE.

4. PRESENT EQUIPMENT AFFECTED:

None at this time.

5. TRAINING AND PERSONNEL CONSIDERATIONS:

The developing agency shall give the utmost consideration to training and personnel requirements peculiar to this system during research and development.

6. MATERIAL UNDER DEVELOPMENT

a. Project VANGUARD (NASA).

b. NRL Electronic Research Program.
7. RESEARCH CONSIDERATIONS:

a. Existing technology and know-how permit satisfying the basic requirements without any additional basic research. Components required for this operational requirement have already been developed and used in other systems. Component improvement will require applied research and development.

b. The Air Force and Army have a similar requirement. Close liaison and exchange of information must be maintained with the Air Force and Army.

c. Additional research is required to increase the payload which now can be placed in orbit and to improve other system components and to adapt receiver equipment to shipboard use.

d. Research and development work in achieving this requirement is subject to the provisions of DOD Directive No. 3200.5 of 19 May 1958 and enclosures thereto which in part states that the Director, ARPA will have exclusive authority in this field. Also applicable are three memorandums from the Director, ARPA to the Service Secretaries dated 20 July 1958, 26 August 1958 and 3 March 1959 which authorize the Military Departments to enter into contracts for exploratory studies and feasibility investigations in ARPA project area within certain monetary limitations.

8. INTERIM READINESS:

Existing methods, equipment, and technology will meet the demands of interim situations falling within this requirement.

9. DATE COMPLETION OF DEVELOPMENT IS REQUIRED:

a. An interim "S" or "X" Band Satellite BLINT system is required by mid-calendar 1959 or as soon thereafter as possible.

b. Dates for completion of specific systems following the interim system will be specified in the Development Characteristics or other directives.

10. PLANNING OBJECTIVE AND IMPORTANCE CLASSIFICATION:

a. Directly supports Planning Objective - IO.

b. Indirectly supports Planning Objective - AS, AD, AO, SC, CA, & SW.

c. Lead Bureau - ONR.

d. Supporting Bureaus - NUSD, NUSMF, NUSEV, BUARK.

e. Priority - Class 1-B.

APPROVED:

[Signature]

SECRET
SECRET

From: Chief of Naval Operations
To: Distribution List

Subj: Navy Research and Development Plan, Operational Requirement No. IO-09502 (Reconnaissance/Surveillance Satellite System) (U)

Ref: (a) OPNAV Instruction 3900.8 of 29 Apr 1958
    (b) DOD Directive No. 5105.15 of 17 Mar 1959 with enclosures thereto
    (c) Dir ARPA memoranda to Service Secretaries of 30 Jul 1958, 26 Aug 1958, and 3 Mar 1959

Enclosure (1) Operational Requirement No. IO-09502

1. The responsibilities of the "action", "lead", or "supporting" Bureaus as defined in Reference (a) are somewhat modified in the research and development programs for space systems. Reference (b) directs that the responsibility for certain research fields, including earth satellites, is exclusively assigned to the Director of the Advanced Research Projects Agency (ARPA). The Director of ARPA has, by memoranda (ref (c)), authorized the Military Departments to proceed independently in space research within certain monetary limitations.

2. The production and operation of specific equipments in space technology for naval applications remain in the province of the Navy Department. ARPA sponsored research projects will be transferred to the using service after the successful completion of an experimental demonstration of feasibility. At this change-over point ARPA responsibility ends and, for programs of naval interest, the cognizant Bureau should be prepared to undertake normal development functions.

3. Enclosure (1) has been forwarded to the Secretary of Defense for consideration by the Director of ARPA in planning his research and development program.

4. Enclosure (1) is forwarded to the Chief of the Bureau of Aeronautics as principal action addressee and to other addressees for information or such action as their interest or responsibility in support of this Operational Requirement may indicate. A request will be made to the Secretary of the Navy for designating the Bureau of Aeronautics as Lead Bureau for this Operational Requirement.

5. The Chief of the Bureau of Aeronautics is requested to review the Research and Development program now in progress in ARPA and advise the Chief of Naval Operations of the adequacy of this effort in support of naval requirements.

K. A. Masterson

DISTRIBUTION
(See page 2)

SECRET
1. OPERATIONAL CONCEPT:

a. The Long Range Objectives of the Navy indicate that the missions and tasks of the naval striking forces will be directed towards the deterrence of and the conduct of limited war and of general war. The successful employment of these forces will require continuous and instantaneous reconnaissance and surveillance of ocean/sea areas, land areas of naval interest, and enemy operating bases to obtain early knowledge of the enemy intent, and extent and type of war he is preparing to fight, and the inventory and disposition of the enemy naval forces. Reconnaissance and surveillance operations, in the event of war, will provide intelligence necessary to naval commanders for early warning, strategic warning, tactical warning, deployment control, force inventory, installation inventory, and target damage assessment.

b. A method of obtaining this information during this time period is by a manned or unmanned satellite reconnaissance/surveillance system.

c. The objectives of this satellite system during this period are to constantly and instantaneously obtain reconnaissance and surveillance data not obtainable by other systems, or to supplement data obtainable by other systems and relay it directly to surface ships, submarines, aircraft, and shore stations or store the data and relay it when commanded. These receiving stations must be equipped with rapid read-out systems to permit both tactical and strategic use of the information.

2. OPERATIONAL REQUIREMENT:

The technical feasibility of establishing unmanned or manned satellites in predetermined orbits about the earth with long lifetimes opens up the possibility of establishing a system which can provide reconnaissance and surveillance information in future years which is either not obtainable by other known systems, nor can be obtained in advance of other known systems. The concept of naval operations establishes an operational requirement for research and development of satellite reconnaissance/surveillance systems and equipments to support, both limited and general war during the period 1965-1975.

d. Functions required to be performed:

(1) In the advent of hostilities it is assumed that the enemy capabilities will be approximately the same as our own. It must be assumed that operations will involve forces about whose disposition, strength, movements, and build-up little is known. This information, as well as details of land targets of naval interest, is required to prevent destruction of our forces by surprise attack; to provide early warning; tactical warning, and strategic warning; to maintain up-to-the minute surveillance of actual combat; to provide target damage assessment; and to provide commanders with vital information on which to base tactical and strategic decisions.
SECRET

From: Chief of Naval Operations.
To: Distribution List.

Subj: "Navy Research and Development Plan, Operational Requirement No. IO-09503 (Reconnaissance/Surveillance Satellite System)" (U)

Ref: (a) OPNAV Instruction 3900.3 of 30 Apr 1958
(b) DOD Directive No. 5105.15 of 17 Mar 1959 with enclosures thereto
(c) Dir ARPA memoranda to Service Secretaries of 30 Jul 1958, 26 Aug 1958 and 3 Mar 1959

Enc: (1) Operational Requirement No. IO-09503

1. The responsibilities of the "action", "lead", or "supporting" Bureaus as defined in reference (a) are somewhat modified in the research and development programs for space systems. Reference (b) directs that the responsibility for certain research fields, including earth satellites, is exclusively assigned to the Director of the Advanced Research Projects Agency (ARPA). The Director of ARPA has, by memoranda (ref (c)), authorized the military departments to proceed independently in space research within certain monetary limitations.

2. The production and operation of specific equipments in space technology for naval applications remain in the province of the navy Department. ARPA sponsored research projects will be transferred to the using service after the successful completion of an experimental demonstration of feasibility. At this change-over point ARPA responsibility ends and, for programs of naval interest, the cognizant Bureau should be prepared to undertake normal development functions.

3. Enclosure (1) has been forwarded to the Secretary of Defense for consideration by the Director of ARPA in planning his research and development program.

4. Enclosure (1) is forwarded to the Chief of the Bureau of Aeronautics as principal action addressee and to other addressees for information or such action as their interest or responsibility in support of this Operational Requirement may indicate. A request will be made to the Secretary of the Navy for designating the Bureau of Aeronautics as lead Bureau for this Operational Requirement.

5. The Chief of the Bureau of Aeronautics is requested to review the Research and Development program now in progress in ARPA and advise the Chief of Naval Operations of the adequacy of this effort in support of naval requirements.

K. J. Masterson
By DR S

DISTRIBUTION (See page 2)

DS 59-4432

SECRET
1. OPERATIONAL CONCEPT:

   a. The Long Range Objectives of the Navy indicate that the missions and tasks of the naval striking forces will be directed towards the deterrence of and the conduct of limited war and of general war. The successful employment of these forces will require continuous and instantaneous reconnaissance and surveillance of ocean/sea areas, land areas of naval interest, and enemy operating bases to obtain early knowledge of the enemy intent, and extent and type of war he is preparing to fight, and the inventory and disposition of the enemy naval forces. Reconnaissance and surveillance operations, in the event of war, will provide intelligence necessary to naval commanders for early warning, strategic warning, tactical warning, deployment control, force inventory, installation inventory, and target damage assessment.

   b. A method of obtaining this information during this time period is by a manned or unmanned satellite reconnaissance/surveillance system.

   c. The objectives of this satellite system during this period are to constantly and instantaneously obtain reconnaissance and surveillance data not obtainable by other systems, or to supplement data obtainable by other systems and relay it directly to surface ships, submarines, aircraft, and shore stations or store the data and relay it when commanded. These receiving stations must be equipped with rapid read-out systems to permit both tactical and strategic use of the information.

2. OPERATIONAL REQUIREMENT:

   The technical feasibility of establishing unmanned or manned satellites in predetermined orbits about the earth with long lifetimes opens up the possibility of establishing a system which can provide reconnaissance and surveillance information in future years which is either not obtainable by other known systems, nor can be obtained in advance of other known systems. The concept of naval operations establishes an operational requirement for research and development of satellite reconnaissance/surveillance systems and equipments to support, both limited and general war during the period 1965-1975.

   a. Functions required to be performed:

      (1) In the event of hostilities it is assumed that the enemy capabilities will be approximately the same as our own. It must be assumed that operations will involve forces about whose disposition, strength, movements, and build-up little is known. This information, as well as details of land targets of naval interest, is required to prevent destruction of our forces by surprise attack; to provide early warning; tactical warning; and strategic warning; to maintain up-to-the minute surveillance of actual combat; to provide target damage assessment; and to provide commanders with vital information on which to base tactical and strategic decisions.

      (2) This system should be ultimately capable of placing unmanned or manned satellites in orbit which are capable by both passive and active means, under all weather conditions, of maintaining a continuous and up-to-date minute surveillance of ocean and sea targets, air targets, and land targets of naval interest. This information must be capable of being...
b. Threat:

(1) The known ability of a potential enemy to initiate a war against this country is a continuing threat. The threat steadily increases as it becomes outwardly apparent that an enemy's capabilities for conducting war are increasing. To effectively counter this threat, detailed intelligence concerning his war making plans and potential are required. The reconnaissance/surveillance systems needed to provide this information shall consist of a number of components which, when used together, provide a completely comprehensive, day and night, operable in all-weather, system.

c. Performance and limitations:

(1) Operational performance requirements will be prescribed in the Development Characteristics.

d. Features of desired development work:

(1) System should be capable of day and night operations under all weather conditions.

(2) Ultimate system should be capable of integrating any or all methods of active or passive sensor techniques:

(a) Visual/Optical
(b) Radar
(c) Infra-red
(d) Electronic Intercept
(e) Acoustics
(f) Sonics
(g) Nuclear Sniffers
(h) Other

(3) Sensor systems must be developed which will provide for the detection, location, and identification of sea, land, and air targets of naval interest.

(4) Maximum security should be provided to prevent furnishing intelligence to the enemy and the system should have minimum susceptibility to countermeasures.

(5) Reliability shall be a paramount feature of the system.

(6) Employ modular techniques whenever feasible.

(7) System should be capable of rapid readout, comparison of returns from different sensors and interpretation on shipboard.

(8) System must be compatible in so far as practical with existing shipboard and aircraft equipment. Particular attention to compatibility with equipment under development for other associated systems must govern design criteria.
e. Weight and space limitations:

(1) Cognizance must be taken of weight and size limitations imposed by maximum payload which combinations of rocketry can place in orbit.

(2) Weight and space limitations of ships and aircraft must be borne in mind in the design of equipment for them.

f. Special environmental limitations:

(1) It will be necessary to obtain frequency clearance for active detectors and the relay portions of the system, if new frequencies are utilized.

G. General Information:

(1) In all material developments, the Chief of Naval Operations considers timeliness, availability and suitability of first importance. Considerations of cost, critical materials, and manpower are of almost equal importance. The performance figures given in this requirement are goals except where specifically noted as minimums. During the course of preliminary design or development, it may be found that in meeting these goals, a large and complex or costly article will result; whereas it may be found possible to develop a much simpler and therefore more readily available, reliable, and malleable equipment short of the ultimate specified, but which nevertheless will constitute a considerable advance over presently available equipment. Determination of such alternatives should be considered essential in the preparation of the Technical Development Plan required in response to this Operational Requirement.

3. SUPPORTING DATA AND RECOMMENDATIONS:

a. Past experience has shown that reconnaissance and surveillance, particularly of the photographic variety, has been a superior and accurate means of obtaining necessary intelligence on the enemy forces and installations. Because of the rapid pace at which modern warfare may take place and the possibility of a surprise attack it is essential that reconnaissance and surveillance data of high quality be available to naval commands constantly and quickly in order to immediately interpret and evaluate the military situation.

b. CNO Ser 004P93 of 24 Feb 59 (LR9-59) states the requirement for reconnaissance during the 1969-74 period.

c. CONNAVAILANT Ser 50/01807 of 2 Nov 53 states that existing photographic aircraft are deficient.

d. Joint ltr CONSEXTFFLT Ser 0031/2 and CONSECONDFFLT Ser 0022 of 15 Feb 1958 states that there is a weakness in reconnaissance capability.


4. PRESENT EQUIPMENT AFFECTED:

None at this time.
5. MATERIAL UNDER DEVELOPMENT:


b. Project SENTRY - ARPA.


d. Project VANGUARD - NASA.

e. Project DISCOVERER - ARPA.

f. Doppler and Minitrack Network - NRL & BRL.

g. A-101 RECON System - BUAEER.

h. POLARIS, ATLAS, THOR, JUPITER, TITAN, SCOUT, KOVA CENTAUR booster programs.

i. Project TIROS - ARPA.

j. Navy Tactical Data Systems - BUSNIPS.

k. Project SALAAN - Army.

6. TRAINING AND PERSONNEL CONSIDERATIONS:

The developing agencies concerned shall give the utmost consideration to training and personnel requirements peculiar to the reconnaissance/surveillance satellite system and shall define in the earliest planning stages the unique and unusual personnel talents required. Every effort shall be made during design planning to minimize the additional fleet training requirements.

7. RESEARCH CONSIDERATIONS:

a. Existing technology and know-how permit only partial fulfillment of this requirement. Additional feasibility studies and research and development are required to satisfy this requirement particularly in the field of sensor development, relay systems, and read-out and interpretation systems, satellite vehicles, and satellite power supplies.

b. The Air Force and Army have a similar requirement. Close liaison and exchange of information must be maintained with the Air Force and Army, and duplication of costly parallel projects must be avoided.

c. Research and Development work in achieving this requirement is subject to the provisions of DOD Directive No. 5105.15 of 17 Mar 1959 and enclosures thereto which in part states that the Director, ARPA will have exclusive authority in this field. Also applicable are three memoranda from the Director, ARPA to the Service Secretaries dated 30 July 1958, 26 August 1956 and 3 March 1959 which authorize the Military Departments to enter into contracts for exploratory studies and feasibility investigations in ARPA project area within certain monetary limitations.

8. INTRINSIC READINESS:

a. Existing developments will not satisfy this requirement.

b. An interim capability only partially satisfying this requirement with a single high resolution sensor and a minimum useful life of 6 months is acceptable.

9. DATE COMPLETION OF DEVELOPMENT IS REQUIRED:

a. The need exists for the reconnaissance/surveillance satellite system to be employed immediately. Acceptable completion dates will be indicated upon receipt of a Technical Development Plan for the Lead Bureau.
10. OPERATING OBJECTIVE AND THEATRE:

a. Directly supports Training Objective
b. Directly supports Operations Objective

Lead Bureau - BUASS

Supporting Bureaus - BUORD, BUSLIP, ETOP

Importance Classification - 1-A.

APPROVED

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