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# NORAD/CONAD

# HISTORICAL SUMMARY

(Unclassified)



JULY— DECEMBER 1964



CONFIDENTIAL



[redacted]

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# NORTH AMERICAN AIR DEFENSE COMMAND AND CONTINENTAL AIR DEFENSE COMMAND

# HISTORICAL SUMMARY

JULY—DECEMBER 1964

31 MARCH 1965

DIRECTORATE OF COMMAND HISTORY

COMMAND PUBLIC AFFAIRS OFFICE

HEADQUARTERS NORAD/CONAD

~~CONFIDENTIAL~~

(This page is Unclassified)

## DISTRIBUTION

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|---|---|
| Chief of Defence Staff | 8 |
| CINCLANT | 1 |
| CINCPAC | 1 |
| CINCSAC | 1 |
| CINCSTRIKE | 1 |
| CONARC | 1 |
| RCAF ADC | 3 |
| ARADCOM | 3 |
| NAVFORCONAD | 2 |
| USAF ADC | 1 |
| NORAD Regions (except NNR) | 3 each |
| NNR | 4 |
| NORAD Sectors | 1 each |
| Hq NORAD | 40 |
| TOTAL | 104 |

**REDISTRIBUTED BY HQ NORAD**

| | |
|---|---|
| NHCR | 1 |
| NAPA | 1 |
| NINT | 1 |
| NNPA | 1 |
| NOPS | 1 |
| NOOP | 1 |
| NOEV | 1 |
| NOCC | 1 |
| NOOA | 1 |
| NLOG | 1 |
| NPAP | 1 |
| NPPA | 1 |
| NPPP | 1 |
| NPMO | 1 |
| NPSD | 1 |
| NELC | 1 |
| NGAM | 1 |
| NGPM | 1 |
| NNCH | 22* |

* Includes 12 copies for the JCS sent by separate submission. Distribution to the Services will be made by the JCS.

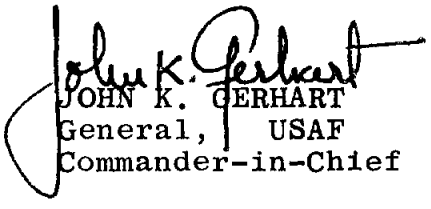
# FOREWORD

This historical summary is one of a series of semiannual reports on the North American Air Defense Command and the Continental Air Defense Command. These summaries bring together in a single document the background and progress of key activities of NORAD/CONAD. The purpose of these reports is two-fold:

First, they provide commanders and staffs a continuing reference and orientation guide to NORAD/CONAD activities.

Secondly, they preserve for all time the record of NORAD/CONAD activities.

31 March 1965



JOHN K. GERHART
General, USAF
Commander-in-Chief



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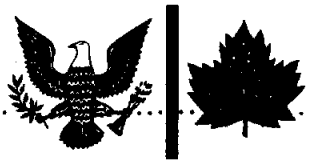





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# MAPS AND CHARTS





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# SUMMARY OF THE FORCES
# (AS OF 1 JANUARY 1965)

~~(S)~~ MISSILE FORCE

Regular

8 BOMARC B Squadrons
243 Missiles Assigned

97 Hercules Fire Units

8 Hawk Fire Units

Army National Guard

46 Hercules Fire Units

~~(S)~~ INTERCEPTOR FORCE

Regular

42 Fighter Interceptor Squadrons
870 Aircraft Assigned

| Squadrons: | 15 | 9 | 2 | 13 | 3 |
|---|---|---|---|---|---|
| | F-101 | F-102 | F-104 | F-106 | CF-101 |

Augmentation

NORAD Category I Augmentation Force:

21 Squadrons from ADC/ANG
468 Aircraft Assigned

NORAD Category II Augmentation Force:
(Regular)

USN/USMC - F-4B, F-3B, F-8A, F-8D, F-6A, F-11A, and F9J aircraft as available

TAC - F-105 and F-100C aircraft as available, D-Day through D+30

TAC - F-4C/D/E, F-100/D/F, F-104C/D, F-105B/D/F aircraft as available, D-Day through D+5

USAF ADC - 164 aircraft

RCAF ADC - CF-101 aircraft as available

~~(S)~~ SURVEILLANCE AND CONTROL

Surveillance

183 Prime Radar Sites
96 Gap Filler Radars
Distant Early Warning Line:
- Land Based Segment - 6 main, 23 auxiliary stations
- Aleutian Segment - 1 main, 5 auxiliary stations
- Greenland Segment - 4 auxiliary stations

Mid-Canada Line: 3 section control and 39 doppler detection stations
Picket Ships: 11 stations authorized, 10 manned
ALRI Stations: 4 off the East Coast
AEW&C Stations: 5 off the West Coast on 30% random rotating basis; 1 off Key West on full time basis
Pacific Barrier (under operational control of CINCPAC): 4 aircraft stations
G-I-UK Barrier (under operational control of CINCLANT): 2 aircraft stations and 2 Iceland-based radars
3 Ballistic Missile Early Warning Stations
1 Space Detection and Tracking System
1 Bomb Alarm System
1 Nuclear Detonation Detection and Reporting System - (NUDETS) Phase I

1 Interim Chemical and Biological Warning System

Control

1 Combat Operations Center
1 Primary and 1 Secondary ALCOP
7 NORAD Region Combat Centers (4 SAGE, 2 Remoted from Sector DC, and 1 Manual)
1 NORAD Region without Combat Center: 32d NORAD Region
18 Sector Direction Centers: 16 SAGE and 2 Manual
1 Sector without Direction Center: Hudson Bay
30 NORAD Control Centers
2 CONAD Control Centers
Army Weapons Control Equipment
- 6 Missile Masters
- 18 BIRDIE
- 2 FSQ-34
- 1 TSQ-38
- 3 Manual

~~(S)~~ MANPOWER

Authorized

| | |
|---|---|
| NORAD and Components | - 154,209 |
| National Guard and Reserve | - 28,794 |
| TOTAL | - 183,003 |

| | |
|---|---|
| NORAD Headquarters | 762 |

# CHAPTER I
# ORGANIZATION AND MANNING

## PLANNING FOR REGION/SECTOR REORGANIZATION

### BACKGROUND

~~(S)~~ Since 1962, NORAD and ADC had been examining the expected phase-out of SAGE direction centers and combat centers and the reorganization necessary when the cuts were made. In October 1963, USAF submitted a PCP for Improved BUIC to the Secretary of Defense that proposed phase-out of SAGE facilities by FY 1968 along with implementation of Improved BUIC (see Chapter II). The Secretary of Defense, on 27 November 1963, deferred Improved BUIC but also directed deletion of four SAGE direction centers during FY 1966 and two SAGE combat centers during FY 1968.

~~(S)~~ In March 1964, USAF directed ADC to submit a plan for phasing out four DC's in FY 1966. The main points of the ADC plan (18 June 1964), were these. The Los Angeles, Reno, Chicago, and New York Sectors would be phased out by the fourth quarter of FY 1966. Along with the sector cuts, ADC's CONUS structure would be reorganized under three numbered air forces (thus deleting two combat centers -- at Truax and McChord). Air force headquarters would be established at Hamilton AFB (4th), Richards-Gebaur AFB (10th), and Stewart AFB (1st). The Reno computer was to be kept to drive the Hamilton AFB combat center display. ADC also proposed to add backup facilities for the three remaining combat centers by using the computers at three of the deleted sectors as ALCOP's.

~~(S)~~ NORAD concurred with the sectors selected and the combat center phase out, but did not agree

with keeping the phased-out direction centers' computers as region ALCOP's. NORAD also said it wanted the Oklahoma City Sector to be tied to the Montgomery Sector to form a Southern Region.

(S) USAF informed ADC in July that this plan could not be approved because it did not meet the mandatory budget and manpower cuts. USAF also did not agree with keeping three of the DC computers for region backup.

## THE ADC REVISED PLAN

(S) In the revised ADC reorganization plan, 1 September 1964, ADC proposed to eliminate the same four sectors as in the first plan (Reno, Los Angeles, Chicago, and New York) in the fourth quarter of FY 1966. But retention of the computers at Los Angeles, Chicago, and New York for region backup and the computer at Reno for driving the Hamilton AFB region display was dropped. ADC proposed to provide for Hamilton by installing a BUIC II computer (AN/GSA-51) and using Portland as a backup. The remaining ADC sectors were to be redesignated as numbered air divisions. The currently-existing numbered air divisions were to be reconfigured at the same time as the sector cuts into four numbered air forces (4th at Hamilton AFB, 10th at Richards-Gebaur AFB, 1st at Stewart AFB, and 14th at Gunter AFB, Ala.).

(S) USAF had not approved the ADC plan by the end of the year, however, and work continued on further refinements. USAF had indicated that the ADC plan would be supported to the maximum extent possible when revised to meet the new OSD force structure (see BUIC II section, Chapter II).

## NORAD REORGANIZATION PLANNING

(S) Coincident with the ADC reorganization, NORAD regions and sectors had to be realigned.

NORAD had concurred with the revised ADC plan on 18 September 1964. Some preliminary planning, therefore, of the general outline of the NORAD reorganization was begun. In line with the proposed ADC changes, NORAD would discontinue its 25th (McChord AFB) and 30th (Truax AFB) Regions and the New York, Chicago, Reno, and Los Angeles Sectors. According to current planning, NORAD would redesignate its remaining sectors as divisions, as ADC proposed to do, in order to maintain a parallel structure. NORAD also would give the divisions a numerical designation, discontinue the city names for sectors as no longer applicable, and change all of its regions to a geographical designation. Following the reorganization, according to the tentative planning, there would be 15 divisions and six regions in the NORAD structure (Alaskan, Northern, Eastern, Western, Central, and Southern Regions).

## NORAD/CONAD MANPOWER REQUIREMENTS

### JOINT MANPOWER PROGRAM - FY 1966

~~(S)~~ As required by the JCS, NORAD submitted, on 22 December 1964, the Joint Manpower Program, outlining its overall manpower requirements for FY 1966. In all, 397 additional spaces would be required for NORAD responsibilities in command and control, intelligence, and nuclear, biological and chemical defense. NORAD pointed out that the requirements stemmed from or were associated with DOD-directed programs. Of the total of 397, sixteen spaces would be made available from within the NORAD staff and 36 were RCAF spaces, leaving a balance of 345 U.S. spaces. Also, some 100 spaces might possibly be returned to the JCS from the NORAD region and sector reorganization being considered (see above). The RCAF spaces were to be requested by NORAD from Canadian Forces Headquarters.

~~(S)~~ Most of the requirements were for NORAD Headquarters, broken down as follows.* For the Group III facility, NORAD stated that 111 spaces would be required. The Group I COC currently had 99 spaces authorized. Under the present concept of operations, NORAD said, Group I would remain operational until Group III reached an operational state at least equal to Group I. Therefore, both the Group I and Group III facilities would operate concurrently for a short period of time. At any rate, 12 additional spaces would be required. For the Space Defense Center, a total of 103 spaces were required, of which nine were currently available, leaving a requirement for 94 additional spaces. The Intelligence Data Handling System required 120 spaces (see below). Forty-one spaces were currently available, leaving a requirement for 79 additional spaces. Five additional spaces were required for the Current Intelligence and Indications Center. To handle NORAD's increased responsibilities in the development, acquisition and operation of the command and control systems, 24 additional spaces and one space up-grading were required. And finally, for the Directorate of Computer Program Control (see below), 74 spaces were required, of which six were available, leaving a requirement for 68 additional spaces. In all, 282 additional spaces were required for NORAD Headquarters.

~~(S)~~ In addition, the NORAD ALCOP at North Bay, Ontario, would require 79 spaces (35 Canadian and 44 U.S.), and nuclear, biological and chemical warning and reporting systems required 36 U.S. Army spaces for region and sector headquarters.

## COMPUTER PROGRAM CONTROL REQUIREMENTS

(U) A Secretary of Defense memorandum, dated

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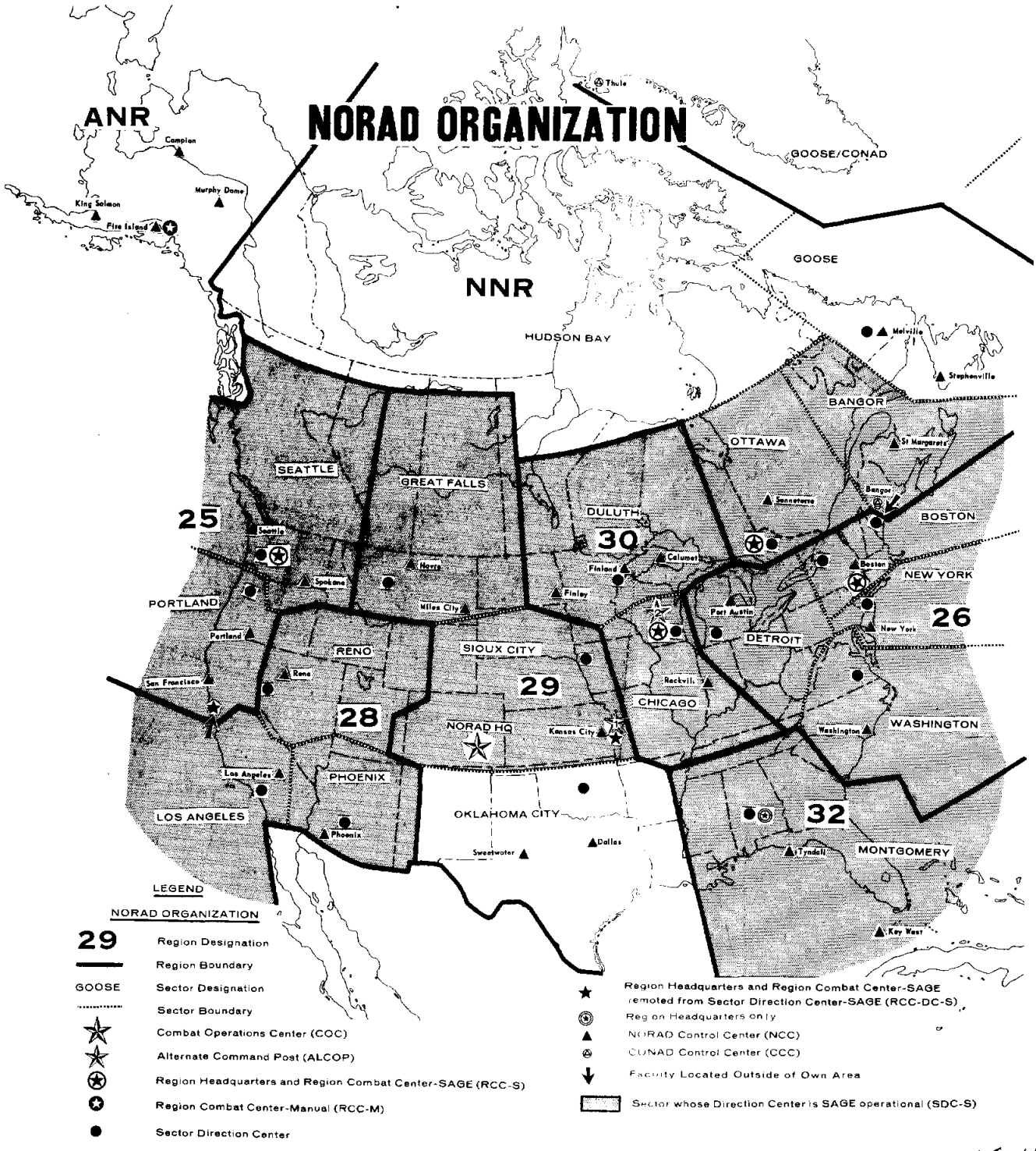
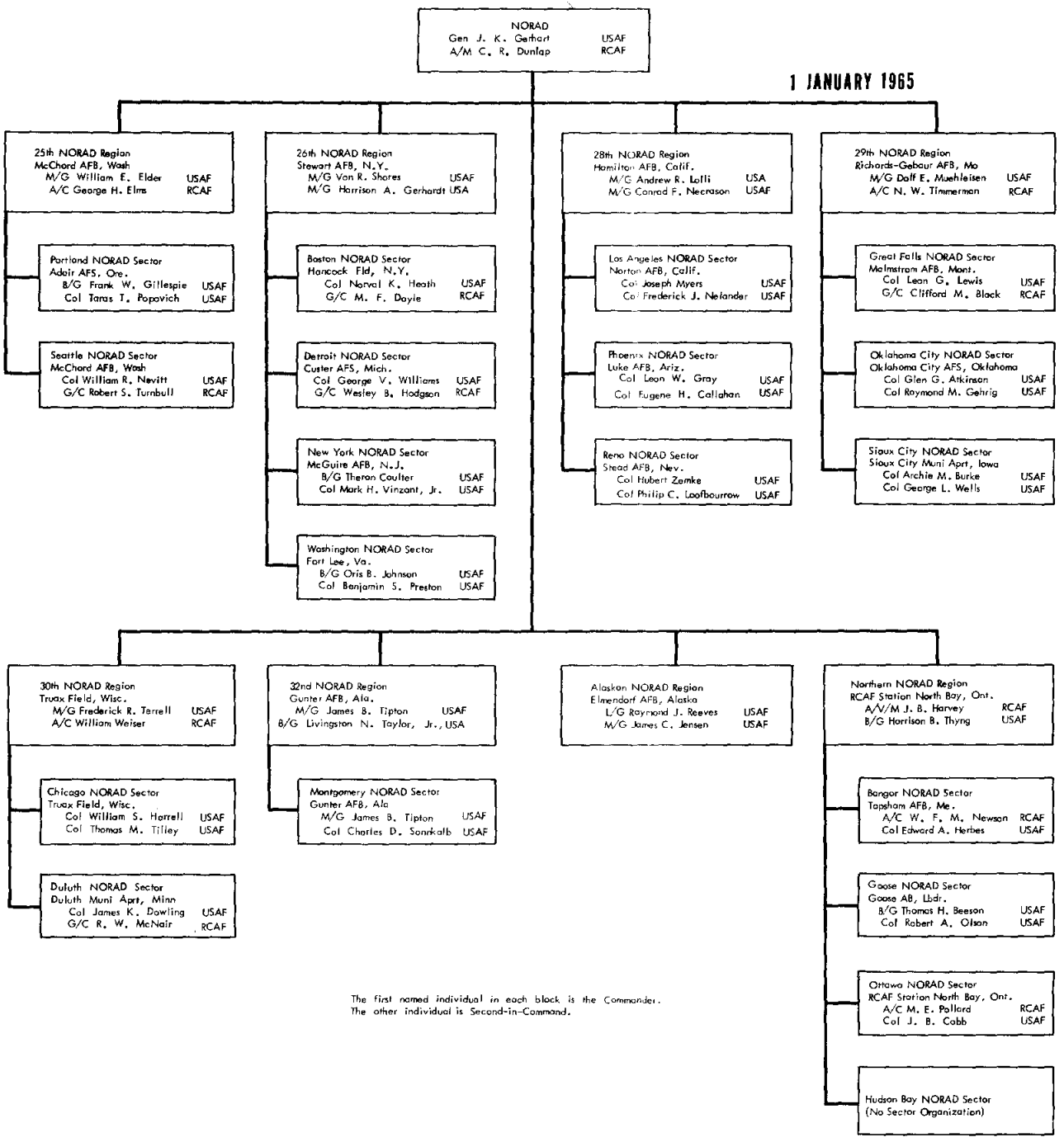
* (U) See also Chapter II.




1 JAN 65

# NORAD COMMANDERS




The first named individual in each block is the Commander.
The other individual is Second-in-Command.





(This page is UNCLASSIFIED)

24 September 1964 (Command and Control Facilities for the North American Air Defense Command), approved NORAD control of computer programming (see Chapter II). In response, effective 1 September 1964, the Directorate of Computer Program Control was established as an agency of and reporting directly to the NORAD/CONAD Chief of Staff. It was set up initially with six spaces provided from currently authorized NORAD Headquarters resources.

(U) At the end of November, NORAD asked the JCS to authorize 15 additional spaces (ten civilian and five military) as soon as possible. A priority request, detailing the over-all requirement for spaces, was submitted on 9 December. In all, NORAD requested 68 additional spaces, which, with the six currently authorized, would bring the total for the directorate to 74 spaces. Fifteen of the spaces were an immediate requirement, the others were requested for the first and second quarters of FY 1966.

(U) On 21 January 1965, the JCS approved the immediately-required 15 spaces.

## IDHS REQUIREMENTS

~~(C)~~ In January 1964, NORAD submitted requirements to the JCS for 71 manpower spaces for the Intelligence Data Handling System. At that time, the JCS deferred action pending receipt of the CMC Task Force Study Report. In September 1964, NORAD requested processing of the 71 spaces, pointing out that the IDHS computer had been approved for lease and installation. A more detailed submission was sent on 5 October showing the organization of a proposed IDHS Management Directorate. To a current authorization of 41 spaces, NORAD wanted to add 71 to bring the total to 112. In the meantime, effective 14 September, the IDHS Management Division was reestablished as the Directorate of Intelligence Computer Applications.

(U) The JCS asked for a listing of the 29 most essential spaces of the 71 requested. NORAD provided these on 29 October. The over-all IDHS requirements were submitted again on 22 December as they were being submitted in the annual Joint Manpower Program and as informally requested by the JCS. Eight additional spaces were requested to bring the required additions to 79 for a total of 120 spaces. On 11 January 1965, the JCS approved the 29 spaces indicated as the most essential and urgently required.

## STATEMENT OF NORAD FUNCTIONS

~~(C)~~ NORAD asked the JCS and the Chief of Defence Staff (Canada) on 3 November 1964 for approval of an unclassified statement of NORAD functions as suggested by NORAD. Since issuance of NORAD's Terms of Reference in June 1958, NORAD responsibilities had expanded to include defense against missile attack and operational control of SPADATS. NORAD said it had frequent need for a definitive statement for quoting in various NORAD publications. Both the JCS and CDS approved the statement. It was the view of the JCS that the statement should not be used in regard to the official NORAD mission, for NORAD's mission could be established only as a result of governmental agreement.

(U) A policy memorandum was published on 5 January 1965 with the approved statement of current NORAD functions:

> The functional responsibilities of CINCNORAD are to defend the Continental United States, Canada, and Alaska against air and missile attack; obtain and provide warning of attack by aircraft, missile and/or space vehicles through detection and tracking systems and associated warning nets assigned to the operational control of CINCNORAD; and support other United States and Canadian commands as may be specified.

# CHAPTER II
# COMMAND AND CONTROL SYSTEMS

## SYSTEMS IN GENERAL

### PROVISION FOR INCREASED AUTHORITY

(U) Background. In a memorandum of 26 October 1963, the Office of the Secretary of Defense provided for ensuring that unified and specified commanders could achieve adequate influence over the development, acquisition and operation of their command and control systems. This provision for increased authority was spelled out in eight assignments to the unified and specified commanders. Included was authority to establish operational requirements, participate in planning and design, review system documentation prior to contract negotiation, identify those elements that should be under the commander's direct command and control, establish certain regulatory procedures, and attach the command's views to program change proposals.

(U) Certain instructions for carrying out the OSD memorandum were issued by the JCS on 21 December 1963. General guidance for carrying out each of the eight assignments was given. However, detailed guidance from JCS and DOD was still being developed. This guidance was to be in the nature of a definition of the degree of influence to be exercised by unified and specified commanders with regard to command and control systems.

(U) NORAD/CONAD Implementation. In implementing the directive, one important task was to identify those parts of the command and control system that the commander considered should be directly and immediately responsive to his command and control. The JCS instructions also asked for a description of the command and control system. These

subjects were provided by NORAD in a two-part document on 6 February 1964.

(U) A staff memorandum on handling of command and control system program change proposals was issued on 1 July 1964 by DCS/Programs. The latter was established as the staff agency responsible for the review, control and processing of PCP's.

(U) The policies and procedures for CONAD participation in the development and acquisition of command and control systems were laid down by CONAD in Policy Memorandum No. 1, 18 December 1964. It was noted in this memorandum that general guidance only could be provided because the wide range of elements in the command and control systems did not permit a precise statement of the degree of participation desired. Included in the guidance was the following:

> All the decisions inherent to stating requirements, defining a system, and developing, producing and acquiring an element or system require a definite series of steps, all documented. The key to insuring adequate influence on development and acquisition of command and control systems lies in timely participation in the actions leading to preparation and review of the required documents. CONAD will influence these steps to the desired degree by providing qualified personnel to participate in the process leading to the formal documentation, by assisting in the preparation of the documents themselves, and by reviewing finalized documents and commenting thereon as appropriate to the Secretary of the Military Department concerned.

(U) The added responsibilities resulting from the increased authority provided by the OSD directive raised the workload on the headquarters.

To adequately handle the increased responsibilities, on 21 October 1964, NORAD submitted to the JCS a request for additional manpower authorizations. NORAD said that within certain staff agencies, it had been possible to assimilate the increased workload by realigning functions and current resources. But a requirement existed in other staff agencies for a total of 24 additional spaces (20 Air Force, 3 Army, and 1 Navy)* and the upgrading of one Air Force space from colonel to brigadier general. The latter was requested for the position of Director of Systems Development, DCS/Plans. The increased responsibilities resulting from the OSD memorandum had greatly raised the level and extent of responsibilities of this position.

(U) These manpower requirements were also listed in the Joint Manpower Program submitted to the JCS on 22 December (see Chapter I).

## NORAD HARDENED COMBAT OPERATIONS CENTER

### NORAD CHEYENNE MOUNTAIN COMPLEX STUDY

~~(S)~~ Background. In late 1963, the Assistant Secretary of Defense (Director of Defense Research and Engineering) expressed concern to CINCNORAD over the complexity of the evolving NORAD Cheyenne Mountain Complex (NCMC). There seemed to be an excessive number of computers planned and requirements were overlapping. The Assistant Secretary felt that adequate centralized planning and overall management was lacking and recommended a thorough study. On 10 December 1963, the Secretary of

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* (U) By staff agency, the additional space requirements were: J-3 (DCS/Operations) 11, J-5 (DCS/Plans) seven, and J-6 (DCS/Communications and Electronics) six.

Defense directed CINCNORAD to study in depth the requirements, technical design, operational plans, and acquisition management of the COC complex of systems in Cheyenne Mountain. A task force was assembled by NORAD to make the study which was completed and sent to the JCS on 18 March 1964. CINCNORAD stated his concurrence in the report of the study and asked that it be forwarded to the Secretary of Defense.

~~(S)~~ The six-volume NCMC Study Report included in its recommendations the following:

1. Implementation of Operational Level 1 (covered in the report) in the hardened facility -- the initial operational capability to be at least equal to that of the soft facility.... The system to achieve initial operation not later than 1 January 1966.

2. The equipment at IOC.

3. Establishment of a separate Battle Staff organization for operation of the hardened COC.

4. Consolidation of space functions in a Space Defense Center subordinate to the Director of the COC.

5. Establishment of a Cheyenne Mountain Complex Management Office by the Air Force. The latter to designate the manager, NORAD the deputy manager.

~~(C)~~ The CMCMO, which was to get responsibility for the over-all management of acquisition, installation and integration of the NCMC, was set up in May at Hanscom Field. USAF advised in June that the JCS and DOD had approved the CMCMO and the following month, the office was moved to Colorado Springs.

~~(C)~~ Secretary of Defense Approval and Guidance. Decisions on the NCMC Task Force Study Report were provided by a memorandum from the Secretary of Defense dated 24 September 1964. This memorandum approved, in effect, the NCMC Study Report. Specificially, this paper approved the Space Defense Center as proposed by NORAD, stated the computer and equipment configuration and functional objectives authorized for the NORAD COC, established 1 January 1966 as the target date for turning over the COC to CINCNORAD/CINCONAD and 30 June 1966 as the target date for changeover from Ent AFB facilities to the Cheyenne Mountain facilities, authorized centralized computer program control by NORAD, and provided authority for the already-established CMCMO.

COC OPERATIONAL DATES

~~(S)~~ In accordance with the dates in this memo, NORAD notified the Secretary of Defense that it had established 1 January 1966 as the "Initial Operational Capability (IOC)" date for the new COC, with "Full Operational Capability (FOC)" to follow not later than 30 June 1966. The Secretary of Defense memo had also stated that NORAD/CONAD should arrange for staffing, operating and maintaining the Space Defense Center so that full capability could be achieved by 1 January 1966. NORAD interpreted this to mean Space Defense Center IOC/FOC dates of 1 January 1966 and not later than 30 June 1966 and asked if this was correct.

~~(S)~~ OSD replied on 17 December that the dates of 1 January 1966 and 30 June 1966 for IOC/FOC for the COC and Space Defense Center were considered responsive to the Secretary's memo.

~~(S)~~ NORAD also established a target date for attaining operational capability in Group III equal to that existing in Group I for transfer of operations to the NCMC. The target date for equal operational capability (EOC) was 1 April 1966 (see page 19).

SPACE DEFENSE CENTER

~~(S)~~ The Secretary of Defense said he desired to indicate that CINCNORAD/CINCONAD was responsible for the functional performance, the operational management, and the technical support arrangements of the Space Defense Center (SDC) in the NORAD Cheyenne Mountain Complex.* Accordingly, CINCNORAD/CINCONAD was to proceed with arrangements for staffing, operating and maintaining the SDC to achieve full capability by 1 January 1966 (see above).

~~(S)~~ In accordance with the Secretary's guidance, NORAD/CONAD issued a regulation on 26 October 1964 (20-2), establishing the functions and organization of the SDC. As provided in the Secretary's memo, the regulation stated that:

> The NORAD/CONAD COC Space Defense Center will provide the information basic to CINCNORAD/CINCONAD decisions in space operations. Supporting systems, operated by the military departments, and cooperative agencies and sensors, will provide to the NORAD/CONAD Space Defense Center data upon which the catalog of man-made orbiting objects is based, status of sensors, and status of weapons and weapons systems. Functions which will be performed by the NORAD/CONAD COC Space Defense Center include identification and cataloging of satellite population, computation and dissemination of space information as authorized or directed by proper authority, provision of data upon which defensive

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* (U) See NORAD/CONAD Historical Summary for January-June 1964, pp. 15-20, for full background discussion of the Space Defense Center.

action is based, and direct command and control of satellite defense systems.

(S) The regulation prescribed the organization of the SDC, stating that the SDC Command Post, as an integral part of the NORAD/CONAD COC, was directly responsive to CINCNORAD/CINCONAD through the COC Command Post. Three major divisions were to be set up that would report to the SDC Command Post: Sensor Control Division, Weapons Control Division, and Analysis and Classification Division. In addition, the regulation laid down the basic principles for operation of the SDC and the functions of NORAD/CONAD and USAF ADC.*

(S) On 4 December 1964, NORAD sent to the JCS a requirement for SDC manpower. NORAD said that a total of 103 spaces was required to man the SDC, of which nine spaces were available. This left a requirement for 94 more spaces for which NORAD asked that expeditious action be taken because of the time needed to acquire and train personnel to meet the target date of 1 January 1966. The manpower requirement was also included in the Joint Manpower Program - FY 1966, submitted on 22 December 1964 (see Chapter I).

(S) To establish the detailed actions to implement the SDC, NORAD/CONAD issued a Space Defense Center Implementation Plan (391N-65 and 391C-65), dated 1 January 1965. The plan provided for transition from the present operation of the NORAD

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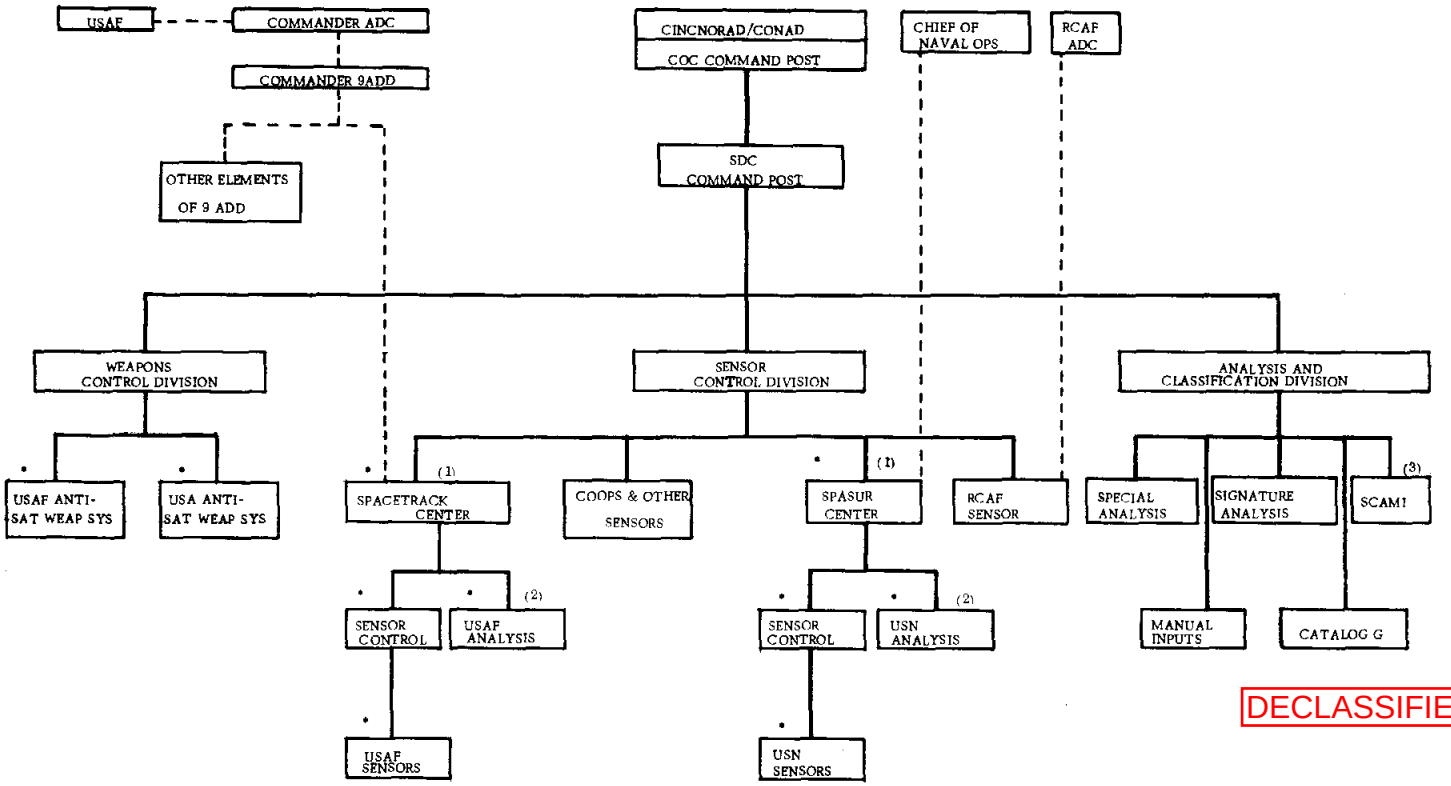
* (S) USAF ADC was to support NORAD/CONAD requirements and technically operate the SPADAT center computer and communications systems. It was noted that ADC could operate a SPACETRACK center in Cheyenne Mountain in support of unilateral USAF requirements, quality control of USAF component element inputs, USAF R&D efforts, and other USAF command responsibilities for the SPACETRACK system.

NORAD/CONAD COC

SPACE DEFENSE CENTER

ORGANIZATION




OPERATIONAL CONTROL

COMMAND, ADMINISTRATION & LOGISTICS

• COMPONENT MANNED

(1) Sensor Control thru Component (direct in emerg)

(2) Component Analysis Function for Quality Control & In-Service Use

(3) Satellite Classification & Mission Identification

SPADATS Center in Group I to an initial operation of the Space Defense Center in Group I and the orderly movement of the SDC to the Group III facility. SDC implementation involved three basic phases:

1. Establishment of the SDC in the Group I facility as soon as practicable in order to gain operational experience prior to transfer to the NCMC.

2. Transfer of the SDC from Group I to the Group III facility. This phase-over will require adjustments to SDC functions to accommodate changes in computer programs and configurations.

3. Establishment of an equal operational capability (EOC) in Group III. The target date for EOC of the NORAD COC, including the SDC, is 1 April 1966.

COMPUTER PROGRAM CONTROL

~~(C)~~ The Secretary of Defense memo providing decisions on the NCMC Task Force Study Report approved, as part of the management structure, control of computer programming. The memo stated that it was necessary that NORAD have the capability to specify and control the contents of computer programs associated with the NORAD command and control systems. A capability was to be established to control system characteristics. The memo suggested that this computer programming control capability be unified and responsible to one agency rather than be fragmented throughout the staff.

(U) In response, on 1 September 1964, the Directorate of Computer Program Control was set

up under the NORAD/CONAD Chief of Staff, with six spaces from current resources. NORAD asked for 68 more spaces to bring the total to 74. Fifteen of the 68 spaces were an immediate requirement and were approved by the JCS on 21 January 1965 (see Chapter I).

NCMC IMPLEMENTATION PLAN

~~(S)~~ NORAD issued a detailed implementation plan (390N-65), dated 15 January 1965, for the Cheyenne Mountain Complex. The required actions listed in the plan included the following:

1. Equipment Installation. Phasing of operations from Group I to the Group III facility is keyed to the availability of hardware and the completion of Category 2 testing. The CMCMO plans to discontinue testing in the Group II facility approximately 1 June 1965. During June 1965, the CMCMO will move the 425L computer, consoles and related hardware from Group II and install them in the Group III facility. The complete 425L internal system should be installed, checked out, and ready to resume testing in the Group III facility by 1 July 1965.

2. Transfer of COC Function to Group III. The CMCMO will complete its test requirements and turn over a completed facility with all systems performing in accordance with specifications on or about 1 January 1966. From 1 January 1966 forward, NORAD will operate the system contained in the NCMC through a shake-down period, the length of which will be determined by CINCNORAD on the basis of performance

of personnel and equipment. When CINCNORAD, based on advice of the Director, COC, declares Group III has attained equal operational capability (EOC) to that existing in Group I, operations will transfer to the NCMC. The target date for EOC is 1 April 1966. DOD guidance has directed that the Group I facility will be closed not later than 1 July 1966.

3. Personnel Training. Trained operator personnel for the system involving the air-breathing threat will be available in sufficient numbers to permit transfer of operational control from Group I to Group III as early as 1 February 1966, if directed by CINCNORAD. Procurement and training of personnel for command and control functions of the COC involves two general categories: technical maintenance personnel and operators.

4. Establish an SDC. J-3 (DCS/Operations) will establish, as a part of the NORAD Group III COC, an SDC which should have an operational capability equal to that of Group I by 1 April 1966.

~~(C)~~ The total end manpower requirements (4th quarter FY 1966) to implement and man NORAD functional areas in the NCMC were 351 spaces (336 military and 15 civilian).* The NORAD-manned positions included all those involving operational control, threat assessment and/or tactical decisions, with the exception of the "Missile Warning

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* (U) Manpower requirements submissions during the six months, July-December 1964, are covered in Chapter I.

Division Group III COC," which was to be manned by USAF ADC as a part of Spacetrack, 1st Aerospace Division. The NORAD positions were divided into three major elements:

| | | |
|---|---|---|
| Group III COC (minus SDC) | - | 111 |
| Intel. Acty. under J-2 | | |
| CIIC | - | 17 |
| IDHS | - | 120 |
| Space Defense Center | - | 103 |
| Total | - | 351 |

~~(S)~~ Of the 336 military personnel required, 124 could be provided from NORAD resources. This left 212 spaces to be requisitioned from the U.S. services and the RCAF. Of the 15 civilian spaces required, four were available. In the annual NORAD Joint Manpower Program - FY 1966, sent to the JCS on 22 December 1964, it was stated that 214 spaces for the Group III facility, including the SDC, would be required (111 for Group III and 103 for the SDC). The JMP also stated a requirement for 120 spaces for the IDHS and five spaces for the CIIC.

~~(C)~~ The COC was to be organized and operated under a separate battle staff organization. The COC at Ent AFB operated under the DCS/Operations with a limited staff assigned to the Director of the COC. During exercises or increased alert, the current COC staff was augmented by personnel from NORAD J-staff elements. Under this concept, the deputy chiefs of staff played a prominent role by advising the commander-in-chief on problems within their jurisdiction. After transition to the separate battle organization was complete, the new COC was to operate with a full-time battle staff headed by a major general as director who was to report directly to the commander-in-chief. The deputies were to function, within the COC, only

in an advisory capacity as required by the commander-in-chief.

## NORAD HARDENED MANUAL ALCOP

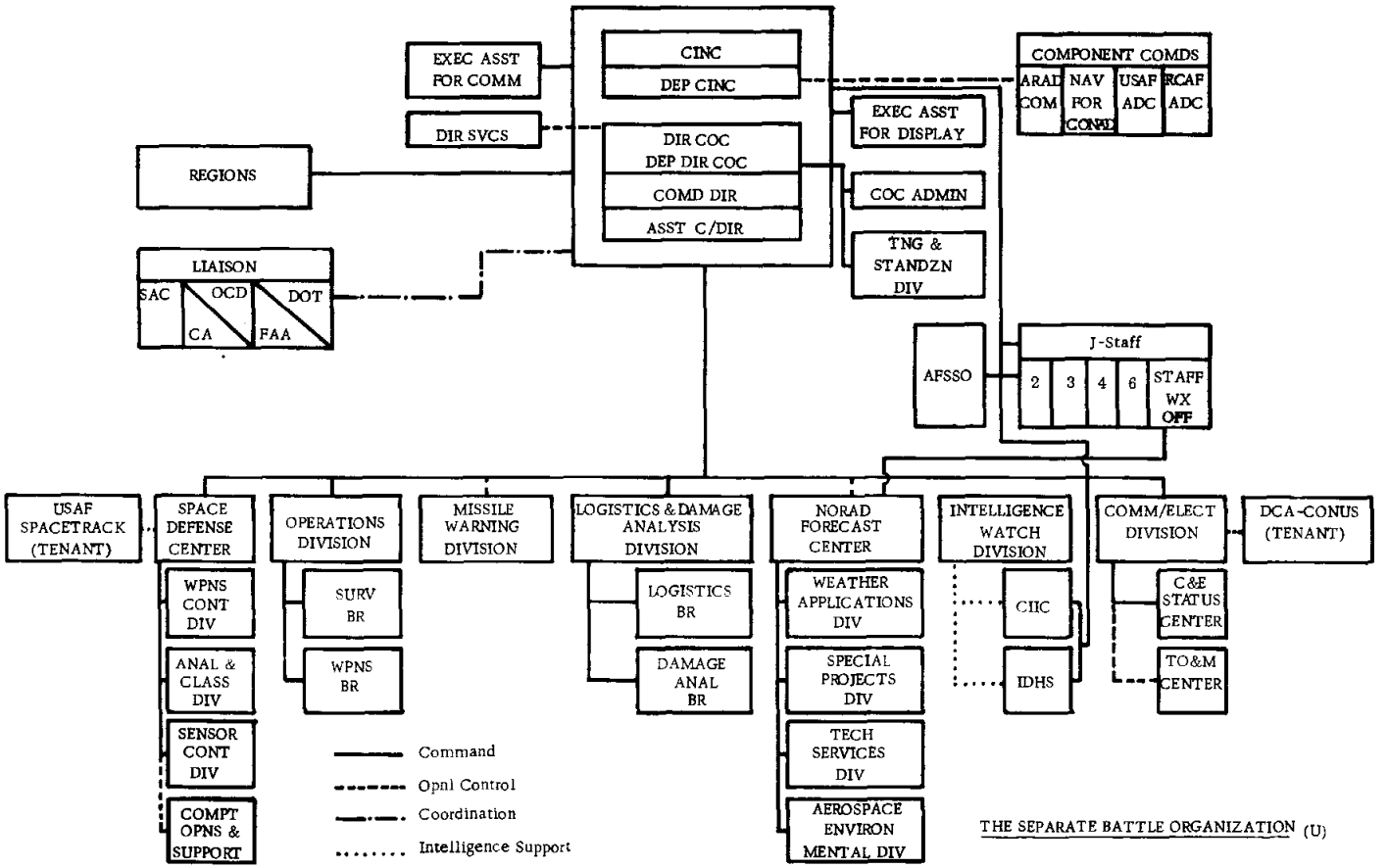
### BACKGROUND

~~(S)~~ In October 1960, the JCS directed all unified and specified commands to have alternate command elements in hardened, dispersed, or mobile facilities. Because the NORAD alternate command post at Richards-Gebaur AFB did not meet the standards, USAF suggested moving it to the hardened center at North Bay, Ontario. NORAD agreed and asked, because of the need to relocate as soon as possible, that the ALCOP be set up at first in a manual mode. The JCS approved the manual ALCOP at North Bay on 3 May 1963. On 10 December 1963, the RCAF advised that the cabinet had approved installation of a manual ALCOP on the understanding that it could be done within the terms of the governmental agreement for NORAD.

~~(S)~~ Development studies were at first for a separate combat center and ALCOP at North Bay. But too many personnel and too much space was required, so in August 1963, NORAD asked that a study be made of the feasibility of merging the functions of the two. The resulting study, made by ESD/MITRE, proposed an integrated design and was concurred in by NORAD. ESD then developed a PSPP which was sent to AFSC and USAF in June 1964.

### STATUS

~~(S)~~ On 6 July 1964, NORAD submitted a telecommunications requirement for the manual ALCOP to the JCS. Later, NORAD added two requirements. In August 1964, NORAD asked that automatic secure voice communications capability be added, and in September, NORAD requested addition of a manual activation capability for the automatic attack warning system.




THE SEPARATE BATTLE ORGANIZATION (U)

(S) The telecommunications requirements, including the additions, were approved by the JCS on 21 October 1964. Canadian Force Headquarters had stated on 11 August that the RCAF approved the design for the ALCOP as contained in the PSPP with certain exceptions. It was also stated that the RCAF was ready to negotiate implementation and cost sharing with the USAF Central Coordinating Committee - Canada upon receipt of USAF design approval. By the end of the year, the PSPP and the telecommunications requirements had been reviewed by the DCA and were being forwarded to the JCS and the Secretary of Defense for approval. It was expected that the Secretary of Defense would decide by the third quarter of FY 1965.

## BACKUP INTERCEPT CONTROL SYSTEMS

### BACKGROUND

(S) As an outgrowth of a June 1961 directive from the Secretary of Defense aimed at providing more system survivability, a SAGE backup system, termed BUIC (Backup Intercept Control), was approved for implementation in two phases. Phase I, which was completed, provided manual control using NCC's, NGCI's, and surveillance stations. The Phase II program prior to approval of BUIC III (see below), was to provide semi-automatic control at 34 NCC's, each of which was to have the AN/GSA-51 computer. The first BUIC II NCC, Z-10, North Truro, Massachusetts, was scheduled to become operational on 1 September 1965.

(S) In the meantime, to provide a more survivable system in place of the primary system, SAGE, NORAD had proposed a transportable system called TRACE. But the report of an Air Force study made at the direction of the Secretary of Defense, Continental Air Defense Study, 10 May 1963, recommended a fixed Improved BUIC system. The Air Force submitted a PCP for Improved BUIC, but the Secretary of Defense deferred the program without prejudice pending resolution of the DOD/FAA radar

environment and the air defense posture. The Secretary of Defense asked the Air Force to continue studies on the system. USAF then asked ADC to make a comprehensive study with NORAD and AFSC. The results of the latter were given to USAF in June 1964.

~~(S)~~ Recommended was a system called PAGE (Primary Automated Ground Environment). Various alternatives or options, an all PAGE system or various SAGE/PAGE mixes, were provided. Option I was recommended by NORAD and USAF ADC. Under Option I, all SAGE would be replaced. Thirty-nine PAGE groups would be installed, 35 in NCC's in 12 PAGE sectors and four in PAGE region combat centers.

## PAGE/BUIC III PROPOSALS

~~(S)~~ USAF prepared a draft PCP for PAGE conforming generally to Option III of the ADC-NORAD PAGE Study. Option III was designed specifically for further reconfiguration to include the FAA National Airspace System and consisted of 33 PAGE facilities (29 PAGE NCC's in ten sectors and four PAGE region combat centers). The draft PCP also included the phase-out of two SAGE combat centers and four direction centers in FY 1966 and further phase-out of SAGE CC's and DC's as the PAGE system was installed. It also proposed the replacement of the AN/FST-2 with a solid state radar video data processor (common digitizer, AN/FYQ-40, Transmitting Set, Coordinate Data) at selected sites in the common DOD/FAA system.

~~(S)~~ ADC was asked to send its comments with NORAD coordination. ADC replied on 22 August that it and NORAD desired PAGE Option I as previously recommended. But, ADC continued, since Option III was an incremental step toward Option I, neither had any objection to Option III as an interim step. After USAF submitted the PCP to the JCS, the latter asked for CONAD's comments on it. CONAD said about the same thing that was said in the ADC message to USAF.

(S) The JCS concurred in the PCP on 22 September and sent it on to DOD. The Assistant Secretary of Defense (DDR&E) asked the Air Force to compare some alternative configurations of BUIC II and SAGE with the PAGE system. He suggested three alternate systems. Of interest is number two because it was later approved. This called for a system of ten to 12 SAGE DC's and 19 NCC's equipped with BUIC III (a new designation). BUIC III would use the BUIC II computer but would be improved to receive inputs from ten radars and would have ten to 12 consoles among other things. BUIC II provided inputs from five of ten radars and had six consoles. SAGE would remain as the primary system with BUIC III as an improved back-up.

(S) Implementation was to be in stages. An interim system of 14 of the planned 34 BUIC II computers would be installed. The assets from the balance of the BUIC II computer contract would be used to modify to a BUIC III capability for a total of 10 BUIC III centers. Then the 14 BUIC II centers would be phased out to provide equipment for the last nine BUIC III centers.

(S) In the briefing to the DDR&E, comparing the alternatives, ADC said that the Alternate II system could be acceptable with certain additions. Alternate II was approved with the additions proposed by ADC.

## BUIC III

(S) On 2 December 1964, the Secretary of Defense approved the SAGE/BUIC III plan as outlined for Alternate II above. There would be an interim deployment of 14 BUIC II's in FY 1966-1967 and a phase-in of 19 BUIC III's in FY 1968-1969, replacing the BUIC II's. Twelve SAGE DC's would be kept. The DOD paper said that the SAGE/BUIC III program, with roughly the same effectiveness and operational characteristics as PAGE, could be implemented with much less investment cost.

~~(S)~~ The DOD guidance also provided for keeping the Reno DC as a BUIC III to drive the Hamilton (28th/Western Region) CC. The force structure provided a phase out of two SAGE CC's and four SAGE DC's (for radar reductions see Chapter IV). Funds were authorized for the AN/FYQ-40, referred to as the common digitizer, which were to replace the FST-2's at FAA/DOD joint use radar sites. The Air Force was to prepare a PCP for the SAGE/BUIC III program for submission to DOD by 15 March 1965.

~~(S)~~ At year's end, representatives of NORAD, ADC, and ESD were working on a SAGE/BUIC III definition study and phasing schedules. At this time, installation of the first BUIC III was set to begin in April 1967 at Z-50, Saratoga Springs, New York, with operation set for the following December.

## CHANGES IN ARMY WEAPONS CONTROL EQUIPMENT

### PHASE OUT OF MISSILE MASTERS AND OTHER CHANGES

~~(S)~~ Background. In its control system, ARADCOM had at the end of 1963, ten Missile Masters (AN/FSG-1), 18 BIRDIE systems (AN/GSG-5 or 6), and one AN/TSQ-38 at Key West and one GSG-3 at Homestead. The NORAD Objectives Plan issued in June 1963, 1965-1974, stated an objective to replace the Missile Masters and BIRDIE with approximately 26 improved fire coordination systems, the AN/TSQ-51, between FY 1966 and FY 1968. The latter equipment would be more economical to operate, require fewer personnel, provide increased operational capabilities, and could be deployed to more survivable locations.

~~(S)~~ In December 1963, DOD approved replacement of Missile Masters in FY 1966 with ten AN/TSQ-51's. Also, DA approved procurement of seven Remote Radar Integration Stations to support the TSQ-51.

~~(S)~~ In the meantime, however, there began an early phase-out of Missile Masters because of DA-directed cuts to provide spaces for higher-priority

projects. In September 1963, ARADCOM phased out two Missile Masters and replaced them with BIRDIE's from other defenses (Loring AFB and Fairchild AFB), leaving the latter to operate manually.

~~(S)~~ Status. Two more Missile Masters were cut by combining defenses. The Missile Master in the Philadelphia defense was phased out on 15 October 1964. The Philadelphia defense was combined with the New York defense under the Missile Master at Highlands, New Jersey. In December, the Boston-Providence/Hartford-Bridgeport defenses were combined into a New England Defense Area and placed under the control of a BIRDIE at Coventry, Rhode Island. The Missile Master at Boston was phased out at the end of the year.

~~(S)~~ There were also other changes. The Chicago and Milwaukee defenses were combined and the BIRDIE (GSG-5) from Milwaukee was moved to the Miami-Homestead defense where it became operational on 28 September. The BIRDIE 5 replaced the GSG-3 at Homestead.

## THE AN/TSQ-51 FIRE COORDINATION SYSTEM

~~(S)~~ As stated above, the NADOP issued in 1963 had proposed replacement of Missile Master and BIRDIE with 26 AN/TSQ-51's. DOD had approved replacement of Missile Master with ten of these systems. NORAD changed its requirement in its next NADOP, 1966-1975, 1 October 1964. In this document, NORAD proposed to replace the six remaining Missile Masters and four of the BIRDIE systems with the ten TSQ-51's by FY 1967. The first TSQ-51 was required in FY 1966. NORAD also wanted to replace the one TSQ-38 in the ARADCOM system (Key West) with one of the BIRDIE's when it became available.

~~(S)~~ The Hughes Aircraft Company was awarded a contract for the TSQ-51 in June 1964 for the production of ten systems to be delivered by December 1966. The first system was to be used for tests starting about December 1965. NORAD published

an operational employment concept for the TSQ-51 on 20 July 1964. In this document, NORAD listed deployment priority. Chicago was first, Seattle or the NORAD COC was last.*

## REQUIREMENT FOR AN AIRBORNE WARNING AND CONTROL SYSTEM

~~(S)~~ The report of the Air Force study, Continental Air Defense Study, 10 May 1963, recommended a system to replace SAGE of Improved BUIC and Airborne Warning and Control. NORAD had stated a requirement in its 1963 NADOP, 1965-1974, for deployment of advanced airborne radar on ten stations in a manner similar to the IMI by FY 1969.

~~(S)~~ In NADOP 1966-1975, 1 October 1964, NORAD proposed an AWACS of one squadron by end FY 1969 and four squadrons by end FY 1971.** NORAD also sent a Qualitative Requirement for an AWACS (NQR 3-64), 16 November 1964, to the JCS in support of

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* (U) Pending a decision on redeployment of Nike Hercules units. For further information, see NORAD/CONAD Historical Summary, Jan-Jun 1964, pp. 67-70.

** ~~(S)~~ The AWAC system, as stated in the NADOP, would provide a survivable, highly mobile command and control capability that could exploit the full performance potential of current and improved manned interceptors and be complimentary to the coastal over-the-horizon backscatter radar in wartime. The AWAC platform would be an airborne self-contained long-range surveillance and weapon control unit containing radar and other sensors, automatic data processing, displays, communications and secure identification. The aircraft would have a command and control capability to be exercised autonomously or within and in support of the ground-based weapon control system.

the objectives in the NADOP. The requirements stated by NORAD included that the sensor be capable of detecting and tracking a one square meter target from sea level to 100,000 feet at speeds up to Mach 4 and at ranges of up to 400 nm. NORAD noted that its NQR supported the concept of and was generally compatible with a USAF Specific Operational Requirement on AWACS (206) with the exception of the sensor detection range. NORAD asked for a 400 nm range. The USAF SOR specified a 200 nm range.

~~(S)~~ On 18 December, the JCS responded to the NORAD NQR with a request for a comparison of the military worth of the 400 mile detection range specified in the NORAD requirement with the 200 mile range in the USAF SOR.

# CHAPTER III
# COMMUNICATIONS

## AUTOVON

### NORAD REQUIREMENTS AND BACKGROUND

~~(S)~~ In 1960, NORAD, ADC, and commercial communications companies developed a concept for an automatic switching network. Requirements were submitted to the JCS for a first phase, nine switching centers to serve NORAD regions, which was approved in July 1961. Requirements for a second phase to expand and extend the service with 18 more centers were submitted by NORAD in January 1963. Another part of the switching requirement was to provide communications for the BUIC II system. USAF ADC submitted requirements in September 1962 for some 70 centers which included the nine phase one and 18 phase two centers, or 43 additional.

~~(S)~~ In the meantime, the Defense Communications Agency (DCA) had developed a plan for a world-wide Automatic Voice Network (AUTOVON) as part of the Defense Communications System. The latter was being set up as the single long-haul system for all elements of the DOD. In May 1963, OSD approved the combining of the four Army SCAN centers with five NORAD/ADC centers to establish the first part of the CONUS AUTOVON.* Also in May, OSD approved the BUIC communications requirement to be implemented as an Air Force-operated element of the DCS through expansion of AUTOVON. In August 1963, the JCS validated the NORAD phase two, 18-center requirement, for inclusion in AUTOVON.

~~(C)~~ Integration of the SCAN-NORAD/ADC centers

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* (U) SCAN is Switched Circuit Automatic Network.

to form the initial CONUS AUTOVON was on a phased basis with two centers integrated first and then tested. The first integration was made on 1 November 1963 and a test held in December 1963 of the Hillsboro, Missouri, and Monrovia, Maryland, switches. Combining of the SCAN-NORAD/ADC networks was completed on 20 April 1964 into the initial CONUS AUTOVON.

## STATUS

~~(S)~~ By the end of 1964, the DCA AUTOVON program was for 66 switching centers in the CONUS, all of which were to be operating by FY 1970. Ten centers of the 66 were operating (the nine SCAN-NORAD/ADC centers and one added at Faulkner, Maryland, to meet requirements in the Washington, D.C., area). All of these switching centers were to ultimately use electronic solid state switches (ESS's). Five more ESS's and nine interim switches (number five cross-bar switches) were to become operational in FY 1966. The NORAD/ADC requirement, originally for 70 centers, was to be met within the 66 center DCA program. This was because the original NORAD/ADC BUIC II requirement had been reduced. Also, the BUIC III program would have a lesser number of NCC's (see Chapter II). The reconfiguration of the NORAD organization, being planned for FY 1966 (see Chapter I), would also change the NORAD requirements.

## AUTOVON IN CANADA

(U) To explore expansion of AUTOVON to Canada to meet NORAD air defense requirements, a joint Canadian-U.S. AUTOVON Coordinating Panel was set up at mid-1964. At the initial meeting, a requirement for 11 switching centers in Canada for air defense communications was determined. At subsequent meetings, plans were completed for connecting Canadian air defense facilities to the Canadian switching centers and to associated U.S. switching centers and air defense facilities. In January 1965,

the requirement for Canadian centers was reduced to ten. Canadian commercial carriers were to provide costing data so that contracting action could be taken by Canadian Forces Headquarters early in 1965. It was expected that the Canadian system would be operating in CY 1967.

(U) The JCS asked for NORAD's comments on expansion of AUTOVON in Canada to satisfy other military and governmental requirements (other than air defense). NORAD agreed that mutual advantages would accrue from such expansion. NORAD said also that the Joint Coordinating Panel also recognized the advantages of such expansion. The expansion would be outside the scope of current USAF and Canadian Forces air defense agreements, so a new governmental agreement would be necessary. NORAD suggested that the JCS organize a joint U.S.-Canadian working group to work on plans for an expanded AUTOVON to serve as a basis for an international agreement.

## OVERSEAS AUTOVON

~~(S)~~ In October 1964, DCA provided NORAD with a list of overseas AUTOVON subscribers and network configuration with a request for approval of NORAD requirements. This list did not include NORAD requirements because NORAD had never been asked to provide any. On 24 November, NORAD submitted its requirements to the JCS. NORAD asked for access through Overseas AUTOVON with a flash precedence capability to CINCEUR, CINCPAC, Diyarbekir, Oslo, Fylingdales, Trinidad, Sand Island, Johnson Island, and Kwajalein Island.

(U) The JCS informed NORAD in December that the requirements were approved for planning. The final levels of precedence, the JCS said, would be validated for all unified and specified commands on a consolidated basis.

## SATELLITE COMMUNICATIONS

### BACKGROUND

~~(S)~~ In an interim statement of objectives for survivable communications, sent to the JCS in November 1962, NORAD included a requirement for satellite communications. This was further expanded upon in the NORAD Communications Planning Guide, July 1963.

~~(S)~~ On 24 February 1964, the JCS asked the unified commands to submit their requirements for satellite communications. Tests of the synchronous satellite communications vehicle, SYNCOM II, had proven very successful. CONAD's near-term requirements, provided on 27 February, included circuits from the NORAD COC and the two ALCOP's to Diyarbekir, Turkey; Trinidad; the three BMEWS sites; NCMC alternates; SHAPE, CINCPAC; and for Projects 437 and 505. Additional requirements were to be submitted, if found, after a detailed study.

~~(S)~~ The plan for SYNCOM III, which was launched on 19 August 1964, submitted by DCA to the JCS, included the requirement for Project 437 but left out Project 505 because of insufficient ground terminals. However, the Secretary of Defense deleted the 437 requirement because of an approved cable installation and more urgent requirements in southeast Asia.

### STATUS

~~(S)~~ The Secretary of Defense authorized an interim near synchronous orbit military communications satellite system for research and development and limited communications for the 1966-1967 time period. Sixteen to 24 vehicles were to be launched within 18 months of 1 August 1964. This system would have only 11 ground stations available for the whole system of which five were already committed. A final system was also being

planned, scheduled to be operational within three years.

~~(S)~~ The JCS asked NORAD to provide by 1 December 1964, its requirements in the interim system, the Initial Defense Communications Satellite Program (IDCSP) and for the Advanced Defense Communications Satellite Program (ADCSP). Because of the short response time, NORAD sent its requirements in the IDCSP by message on 1 December and its overall requirements on 4 December.

~~(S)~~ In the IDCSP, NORAD requested channels to Projects 437 and 505 and the Diyarbekir, Turkey, site. In ADCSP, NORAD asked for 110 channels which included channels to the national authorities, Canada, SPADATS sites, other unified and specified commands, ALCOP's, etc.

~~(S)~~ The JCS advised that the NORAD requirements for the IDCSP would be validated first and any requirement that could not be satisfied because of the limited capacity of this system would be considered for follow-on systems. The JCS was recommending approval to DOD of the 505 site and Diyarbekir; the 437 requirement was to be considered with the requirements in the ADCSP.

## SURVIVABLE LOW FREQUENCY/VERY LOW FREQUENCY COMMUNICATIONS SYSTEM

### BACKGROUND

~~(S)~~ NORAD had initially stated a requirement to the JCS for low frequency communications in May 1962. A USAF SOR for low frequency communications, revised in early 1963, did not meet all of NORAD's needs. In July 1963, NORAD sent its overall requirements for LF communications to the JCS. NORAD asked for 21 transmit/receive stations and 30 receive-only stations. Early in 1964, NORAD was advised that the JCS would consolidate all requirements and send them to the DCA which was to design a plan for a world-wide system to serve all users.

CURRENT PLANNING

~~(S)~~ The plan for DCA to prepare a LF/VLF world-wide system plan for all users was cancelled and on 18 August 1964, the JCS advised all services to prepare plans for their service and for the unified and specified commands they supported. In line with this, the JCS validated the NORAD requirements and forwarded them to USAF for inclusion in its overall plan. In addition, there were to be stations required as part of the JCS Minimum Essential Emergency Communications Net (MEECN). In August also, the JCS outlined the plan for the MEECN which would include receive-only stations for all unified and specified commanders and component commands.

~~(S)~~ On 19 November, NORAD revised its requirements for LF/VLF facilities submitted in July 1963. NORAD added four T/R facilities to the July 1963 requirements (two of which were for Projects 437 and 505 as requested by CONAD the previous July to make a total of 25) and reduced receive-only stations by seven to a total of 26, three of which were R/O stations for the MEECN at the COC and ALCOPs.

~~(S)~~ However, project officers in JCS and USAF informally advised that they had learned from DDR&E that the NORAD requirements were considered excessive because of the cost of T/R stations and other means of communications available. NORAD reviewed its needs for possible cuts in view of the increased survivability gained with AUTOVON/AUTODIN, commercial communications, advent of satellite communications and the cost of LF/VLF communications. It was decided that redundant stations at the COC and ALCOPs, SPADATS sites, and regions could be deleted, lowering the T/R stations from 25 to ten. The deleted T/R stations at regions (6) were replaced by R/O stations, raising the total NORAD requirement for these stations to 32 (29 plus three for the MEECN).

~~(S)~~ However, following system design meetings

with ESD and ADC, NORAD again reviewed its requirements. NORAD found that it could replace T/R stations with R/O stations at four sites, thus lowering its T/R requirements to six stations and raising its R/O stations to 36. MEECN requirements remained the same.

## SECURE VOICE COMMUNICATIONS NETWORK

### BACKGROUND

~~(S)~~ NORAD submitted to the JCS in March 1963, a five-year plan for secure voice communications. NORAD proposed to replace the system in use, KY-9, which it considered unsatisfactory, with the HY-2/KG-13 long-distance secure voice equipment and the KY-3 shorthaul equipment. NORAD stated a requirement for 40 KY-3 sets and 42 HY-2/KG-13 equipment. The component commands were to program HY-2/KG-13 equipment for their commands.

~~(S)~~ NORAD was advised in mid-1963 that DCA was developing a world-wide automatic secure voice network for all users and NORAD's requirements were being included in the DCA plan. The following October, NORAD found that in the DCA plan, switching would be done from Cheyenne Mountain for ADC and ARADCOM, so additional equipment was requested. NORAD increased its requirements to 45 HY-2/KG-13 sets and 77 KY-3 equipment.

### STATUS

~~(S)~~ The Secretary of Defense stated that approval of the world-wide Automatic Secure Voice Communications (AUTOSEVOCOM) Switching Plan would depend on the results of a test of the VOCOM. This test, using three prototype USAF 493L VOCOM switches (installed at NORAD Headquarters, EUCOM, and JCS), was scheduled for completion at the end of June 1965. In July 1964, DCA submitted a plan for use of these switches in an interim system upon completion of the testing. Plans for the NORAD switch

were to provide two circuits each to the NMCC, ALCOM, SAC, PACOM, and one circuit to NORAD regions, 15 KY-3 local subscribers, and 20 local secure telephones in the COC. The DCA plan was not yet approved at year's end.

## AIR FORCE RESERVE RECOVERY TROPO SYSTEM

### BACKGROUND

(C) In November 1962, NORAD sent its general requirements to the JCS in the proposed USAF reserve recovery tropo system. The system was to provide mobile voice tropospheric scatter stations in non-target areas, 30 to 40 miles from each station served, operated by Air Force Reserve and National Guard personnel. The JCS validated the NORAD requirements and instructed USAF to include them in the over-all plan. NORAD then, in June 1963, furnished the Air Force Communications Service with its specific requirements. A prototype system was approved by OSD of 25 stations to be installed by 1 July 1965. DOD approval of the final system was to depend on the results of tests of the prototype system.

### SYSTEM CANCELLATION

(C) In September, USAF advised that on 13 August, the Secretary of Defense cancelled the system and that no reclama action was planned. The reasons for the cancellation were the high cost of the system and the fact that commercial companies had or had planned for enough mobile equipment to restore vital military communications during an emergency.

## NORAD AUTOMATIC ATTACK WARNING SYSTEM

BACKGROUND

~~(C)~~ In 1961, NORAD asked ADC to study the feasibility of an automatic attack warning system that could be triggered automatically by the DEW Line, BMEWS, NUDETS and other sensors to give instant warning to all NORAD combat units. ADC turned the problem over to AT&T. A plan from the latter was approved in principle by NORAD in 1962. In May 1962, NORAD submitted a telecommunications requirement for an AAWS to the JCS. The latter validated the requirement and sent it on to DCA. Secretary of Defense approval of a DCA system plan was given in June 1963, but implementation approval was held up until the following December. AT&T was given the contract in April 1964 and the scheduled operational date was 1 September 1964.

~~(C)~~ NORAD published an Operational Employment Concept (3-64) in June 1964, stating that the AAWS alert warning would constitute CINCNORAD's declaration of an attack warning. All survival actions were to be taken upon receipt as prescribed in NORADM 55-5 except flushing of nuclear-armed aircraft. The latter would not be flushed until the AAWS alert signal was authenticated in accordance with JCS-established standards for precautionary launches of nuclear weapons.

OPERATION

~~(S)~~ Testing of the system began on 19 August and with all going well the system became operational as scheduled on 1 September. Neither Alaskan NORAD Region nor Northern NORAD Region were included in the system at the time. Installation and checkout of equipment in Alaska and at Thule, Goose and Harmon was set for September. While circuits from the latter three bases went into service, difficulties with the Alaskan system delayed operation. No equipment was yet installed at Canadian bases. On 9 September, NORAD requested that the JCS amend the telecommunications requirement

for the manual phase NORAD ALCOP at North Bay to include a manual activation capability and circuits to each NORAD region. Tieing in of the Goose and Harmon circuits and circuits to other Canadian bases was being discussed under CADIN cost sharing.

~~(C)~~ In the meantime, all regions were notified by NORAD that effective 1 September the NAAWS system was in operation. Full instructions and procedures to be taken on receipt of an actual alert warning signal and for testing the system were also provided and clarified further in subsequent messages.

MALFUNCTION AND REMOVAL FROM OPERATIONS

~~(S)~~ The NAAWS had numerous malfunctions, such as false light indications, causing more and more concern as September wore on. Finally, on 29 September, all organizations were notified that effective 1 October the NAAWS was being removed from operational use. Missile attack warning would be passed to all regions by the NORAD COC by the voice alert network. ADC, together with the AT&T, was given the responsibility of checking out and modifying the system to meet NORAD's operational standards. By early January, AT&T said that modifications and engineering changes had been completed and initial testing could begin shortly. However, the system was closely examined at NORAD Headquarters and it was determined that it was still not acceptable. The entire system was being studied by NORAD/ADC with the American Telephone Company.

# CHAPTER IV
# MANNED BOMBER DETECTION SYSTEMS

## RADAR REDUCTIONS

### NAVY DEW LINE SEA BARRIERS AND CONTIGUOUS COVERAGE

~~(S)~~ Background. The Navy provided radar-equipped picket ships for patrol off both coasts of the U.S. to extend contiguous radar coverage out to sea, and airborne early warning aircraft to extend the DEW Line seaward to Midway and to the UK. As of 1 January 1965, there were ten manned picket ship stations (with 16 AGR's), five off each coast. There was one additional station established off the East Coast, but it was vacant. Four Navy EC-121C aircraft were on Pacific Barrier patrol at all times. Two aircraft stations in the G-I-UK Barrier were manned by Navy EC-121P aircraft.

~~(S)~~ Originally, the Atlantic and Pacific DEW Line barriers were manned by both Navy planes and ships. At mid-1959, the Navy had four ships and four aircraft on Atlantic barrier stations and five ships and an average of 4.5 aircraft on Pacific barrier stations. This was about the high point. Manning declined after this time. In April 1960, the ships on the barrier stations were withdrawn, over NORAD's objection, from early warning as a primary mission. A few ships remained with the latter as a secondary mission, but air rescue as their primary mission.

~~(S)~~ Later in 1960, the CNO proposed to discontinue the Pacific extension entirely because of shortage FY 1962 funds. This time, NORAD successfully defended the need for the barrier and it stayed in operation. After the Greenland-Iceland-United Kingdom (G-I-UK) Line had replaced the former Atlantic barrier (Argentia to the Azores) in mid-1961, the AEW stations were cut from four to two.

~~(S)~~ In early 1964, the Navy again proposed to phase out its force in the DEW Line extensions and also in the contiguous coverage. The JCS asked for CONAD's comments. CONAD replied, to no avail, that detailed studies had shown that the loss of these systems would seriously weaken its capability to defend against the manned bomber threat.

~~(S)~~ Phase Out Begins. On 19 December 1964, NORAD learned that the Secretary of Defense had directed the Navy to phase out its seaward extensions of the DEW Line and the contiguous barriers. Phase-down was to start in FY 1965 and be completed in FY 1966. It was estimated that this would release about 9,000 men for other jobs. The CNO explained that, due to budgetary, personnel, and other implications, the phase-out required the following schedule:

(1) Pacific Ocean:

(a) Inactivate the contiguous barrier (five picket ship stations) in FY 1/1966.

(b) Gradual reduction of the seaward extension of the DEW Line (four AEW stations) with flight operations ending by 1 May 1965.

(2) Atlantic Ocean:

(a) Reduce the contiguous barrier to three picket ship stations (of six stations, only five were manned) in FY 3/1965; complete inactivation in FY 1/1966.

(b) Reduce the G-I-UK barrier (two AEW stations) to one station on 1 July 1965 with flight operations ending by 1 September 1965.

~~(S)~~ On 28 December, CONAD protested to the JCS. CONAD repeated the effect that the phase outs would have as shown in earlier studies on defense against the manned bomber. CONAD asked the JCS to try to delay the phase outs until replacements, such as over-the-horizon (OTH) radar and the airborne warning and control system, were available. Loss of the current systems, CONAD said, would make it incapable of preventing a near simultaneous missile and bomber attack, drastically cut warning time to SAC of the imminence of a bomber attack, deny early warning data on which air defense commanders could base initial tactical decisions, and prevent the destruction of air-to-surface missile-carrying bombers before missile launch. Also, CONAD reminded the JCS that the loss of the picket ship in the Florida Straits would have a serious impact in that area.

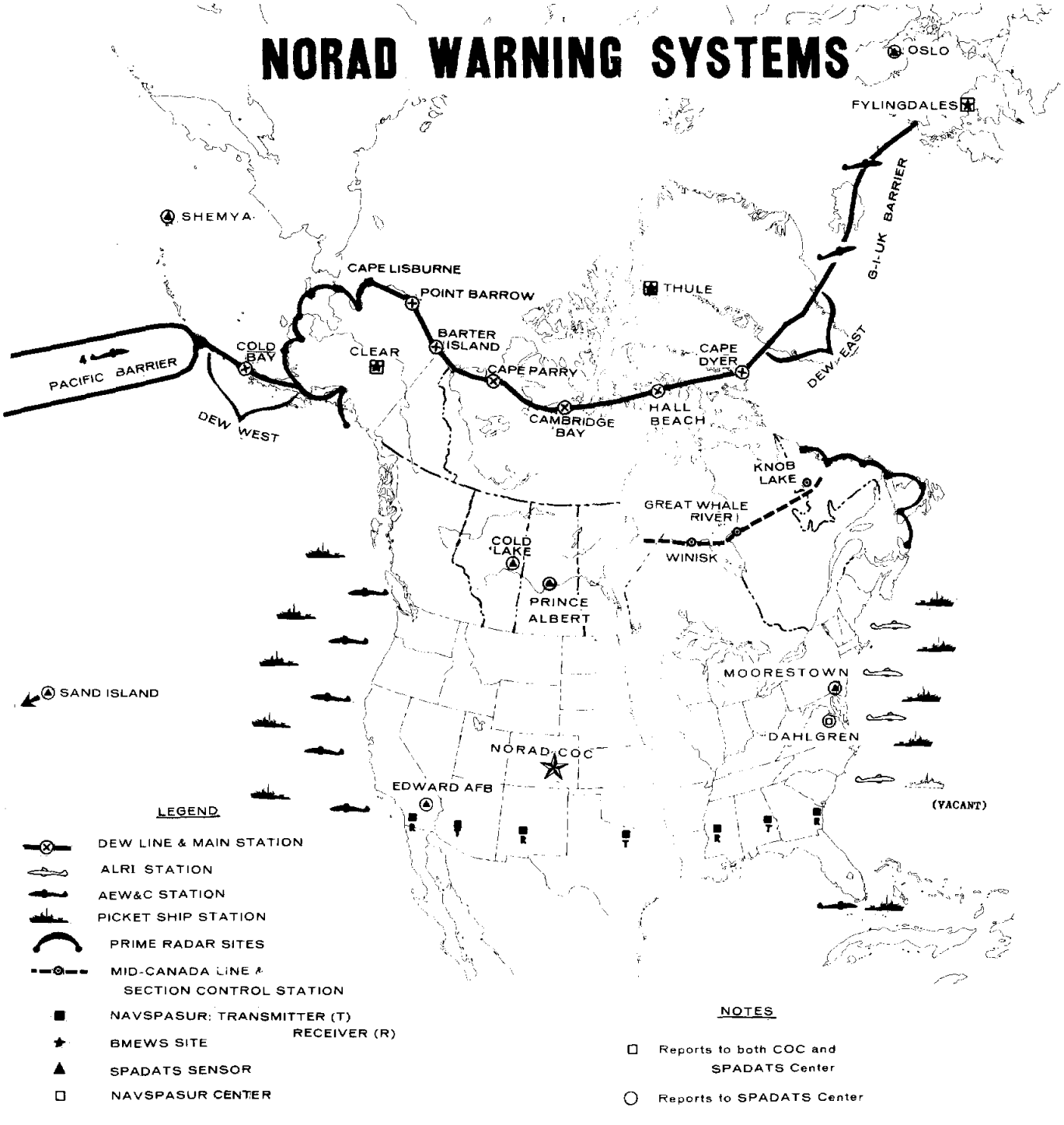
~~(S)~~ In January 1965, NORAD learned that the above information had been given to the Secretary of Defense before his decision and that only new and compelling information would provide a basis for reconsideration. NORAD said it had no new facts. At year's end, NORAD was planning to study ways to minimize the impact of the deletions.

~~(S)~~ The phase down began in January with reduction of flight operations on the Pacific Barrier to two aircraft and elimination of three picket ship stations from the East Coast (two manned and one unmanned).

## PHASE OUT OF 16 PRIME RADAR SITES

~~(S)~~ Prime Site Retention Study. Prompted by indications that radar cuts would be made, NORAD formed an Environment Working Group in October 1963. The objectives of this group were to prepare a priority list of radars for determining future improvements or cuts, to find a solution for a high quality radar system with less operating and maintenance costs, and to re-evaluate ground environment requirements.

# NORAD WARNING SYSTEMS



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~~(S)~~ The Working Group had prepared by early February 1964, a criteria for choosing land based prime radar sites to be kept in the combat zone. This zone was defined as "Southern Canada, Continental U.S. and the ocean areas bordering the land mass." Because the criteria specified that radars would be selected from the ADC, RCAF, and FAA radar inventory, it would provide a commonly understood and accepted basis for configuring the radar system. The criteria outlined requirements for radar, passive detection, and radio coverage. It said that only a minimum number of radars would be picked to meet the coverage criteria. It also specified that no more conventional military radars would be bought although existing and programmed radars could be modified and/or relocated.

~~(S)~~ Although this criteria was not approved by NORAD until 6 March 1964, USAF ADC had been using the draft criteria to prepare a "hard core" list of radar sites. USAF had asked ADC to list the sites needed through 1970 to meet military requirements for survivability and ECCM, for joint-use FAA/ADC needs, and for approved and proposed programs. USAF also asked for a list of sites not chosen for retention to aid in future planning.

~~(S)~~ ADC prepared a list of radars that could serve both FAA and ADC for possible netting into an integrated national surveillance system. On 6 March, NORAD concurred with ADC's hard core list of 116 CONUS sites (changed later to 115 -- 99 ADC/ 16 FAA) and 30 Canadian radars (changed later to 29). This list also identified 16 ADC radars as excess.* Before asking RCAF to concur with the Canadian sites, NORAD wanted to determine coverage requirements for search, height, and gap filler radars.

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* ~~(S)~~ These revised prime site figures were reflected as a line item requirement in NADOP 66-75, 1 October 1964.

~~(S)~~ On 9 March 1964, ADC and NORAD briefed the USAF Air Defense Panel which approved in principle both the criteria and the CONUS hard core list. However, FAA representatives, at an informal meeting with NORAD and ADC officials, said they would have to determine FAA radar requirements before they could concur with the hard core list.

~~(S)~~ DOD Approval of Phase Outs. As noted above, NORAD and ADC had tentatively chosen 16 ADC radar sites that were not needed to satisfy the NORAD radar criteria. However, some of these sites were listed as "conditionally required" to be kept to meet ARADCOM air defense requirements and/or until certain FAA radars were integrated into the air defense system. At mid-1964, USAF was preparing a program change proposal (PAGE/NAS PCP 64-107) for the ground environment system. On 17 August, USAF asked for a NORAD/ADC position on proposed radar phase downs in the draft PCP. This PCP listed 10 prime radars for phase down in FY's 1965 and 1966 and six more for phase down in FY 1967. The PCP stated that these latter sites, except Z-74 which was planned for transfer to FAA, would be closed if substitute FAA radars were tied into the air defense surveillance system. The NORAD/ADC position was sent to USAF on 22 August: "ADC and NORAD agree with the radar phase downs ... but only with positive assurance that contingency requirements are met prior to phase outs."

~~(S)~~ In September, USAF sent the PCP to the JCS. The JCS then asked for CONAD comments on it. On 17 September, CONAD reiterated the NORAD/ADC position.

~~(S)~~ Although PAGE was turned down,* DOD approved the deletion of the 16 prime radars, 32 height finder radars (two per prime site), and nine

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* (U) See Chapter Two.

gap filler radars.* At the same time, DOD directed USAF to submit a new PCP (for SAGE/BUIC III) by 15 March 1965. USAF was to submit a detailed radar phase down plan, prepared in cooperation with NORAD, that satisfied NORAD plans for support of Army Air Defense units within NORAD and for Canadian manning support of selected NORAD installations.

~~(S)~~ On 20 November, USAF directed ADC to phase out the sites as follows:

FY 1965**

| | |
|---|---|
| Z-13 | Brunswick AFS, Maine |
| Z-24 | Cutbank AFS, Montana |
| Z-55 | Manassas AFS, Virginia |
| Z-67 | Custer AFS, Michigan |
| Z-150 | Cottonwood AFS, Idaho |
| Z-177 | Dickinson AFS, North Dakota |

FY 1966

| | |
|---|---|
| Z-9 | Highlands AFS, New Jersey |
| Z-38 | Mill Valley AFS, California |
| Z-53 | Rockville AFS, Indiana |
| Z-57 | Naselle AFS, Washington |

FY 1967

| | |
|---|---|
| Z-15 | Lompoc AFS, California |
| Z-43 | Guthrie AFS, West Virginia |
| Z-74 | Madera AFS, California |
| Z-98 | Miles City AFS, Montana |

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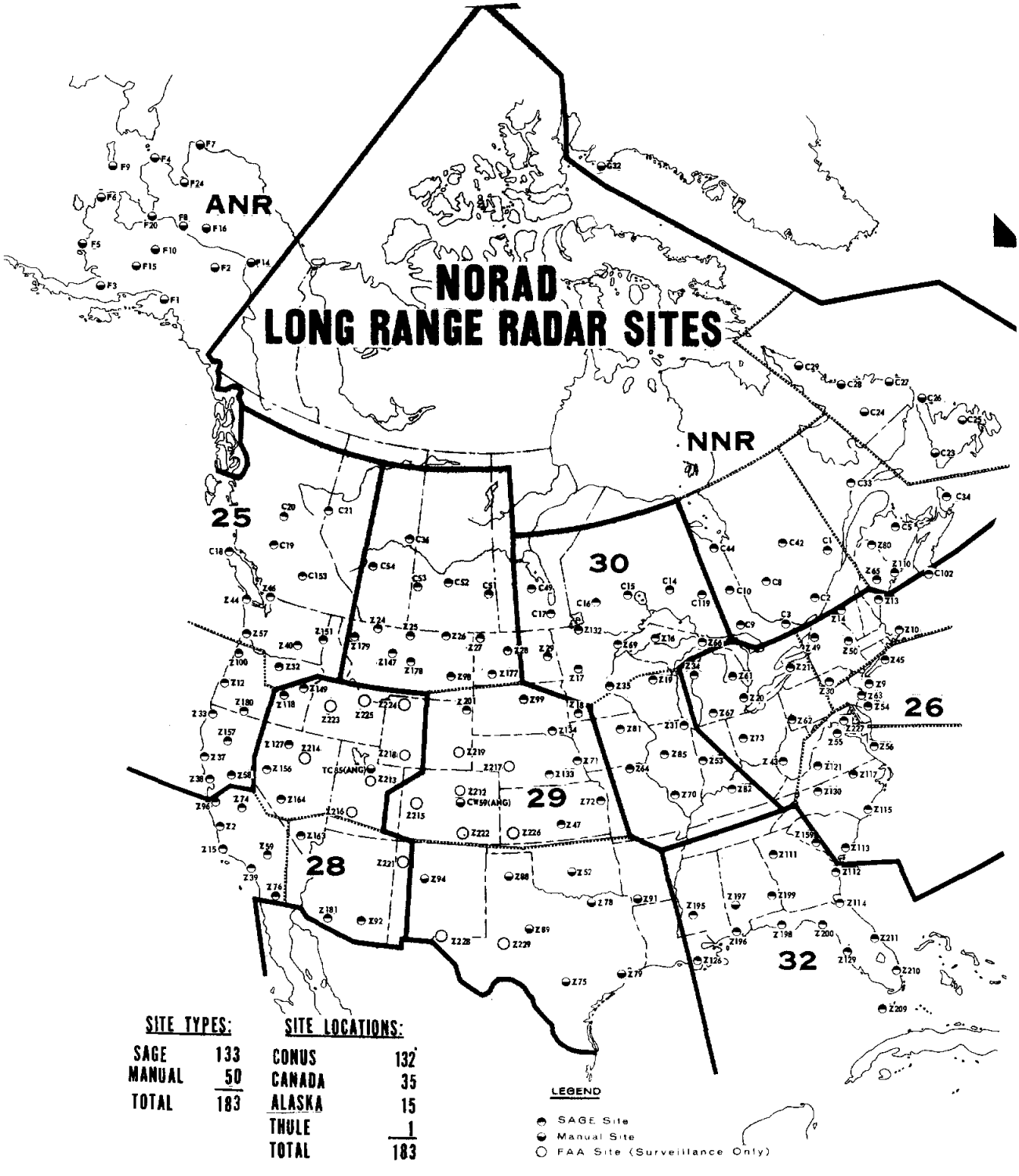
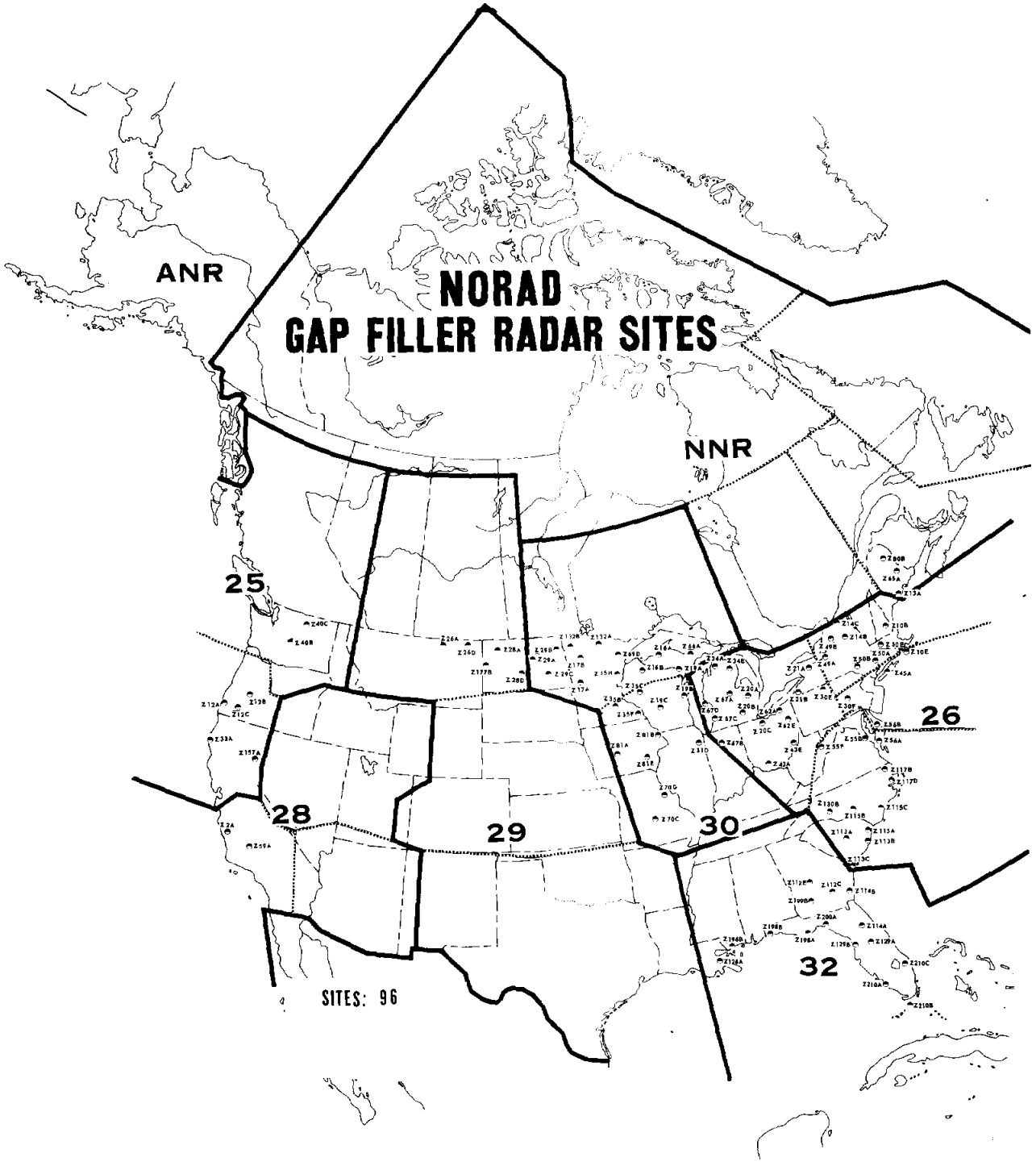
* ~~(S)~~ Ten gap fillers were tied to five of these prime sites, however: one to Z-13, two to Z-55, four to Z-67, one to Z-177, and two to Z-43.

** (U) Site Z-150 ceased operation on 15 December 1964. The other sites, scheduled to be closed in FY 1965, were to cease operations on 1 March 1965.





Z-127 Winnemucca AFS, Nevada
Z-149 Baker AFS, Oregon

~~(S)~~ It was estimated this would save yearly about 2,140 military and 160 civilian manpower spaces and a total of about $13.8 million.

~~(S)~~ ADC/NORAD Recommendations on Height Finder and Gap Filler Deletions. With NORAD concurrence, on 10 December 1964, ADC sent recommendations to USAF on the phase out of the 32 height finder and the nine gap filler radars. ADC said that joint NORAD/ADC studies were being made to develop "firm NORAD objectives and requirements for combating the air breathing threat and studying the equipment requirements for the proposed joint FAA/DOD surveillance system." It was expected that some of these height finders might be required at FAA sites for an effective air defense control capability. So ADC recommended that the height finders be put in storage under its control until future requirements were decided. It also recommended that gap fillers be retied to other prime sites.

(U) In January 1965, USAF approved ADC's recommendations. The height finders were to be kept temporarily under caretaker status on the phased-out sites; however, this action was not to prevent disposing of the radar sites as programmed. The gap fillers, tied to those sites set for closing in FY 1965,* were to be retied and redesignated as follows:

| Site | New Designation | Retied To |
|---|---|---|
| Z-13A | Z-65B | Z-65 Charleston AFS, Me. |
| Z-67A | Z-20G | Z-20 Selfridge AFB, Mich. |
| Z-67B | Z-73J | Z-73 Bellefontaine AFS, O. |

* (U) Site Z-43, which had the two remaining gap fillers, was not slated to close until FY 1967.

| Site | New Designation | Retied To |
|---|---|---|
| Z-67C | Z-34G | Z-34 Empire AFS, Mich. |
| Z-67D | Z-34H | Z-34 Empire AFS, Mich. |
| Z-177B | Z-28E | Z-28 Minot AFS, N.D. |

Retie of two gap fillers, Z-55B and F, was being held up for further study.

~~(C)~~ The above gap fillers, except for Z-177B, were needed to support air defense around critical targets in the northeastern U.S. However, NORAD and ADC were to choose nine gap filler sites from less critical areas for phase out to meet the DOD-directed cuts. It was expected that a list would be sent to USAF in early 1965.

## CANADIAN CHECKERBOARD PLAN FOR RADAR OPERATION

### BACKGROUND

~~(S)~~ In October 1963, RCAF ADC recommended to NORAD that Canadian radars be operated part time on a staggered-shift schedule (hence, the term "checkerboard"). RCAF ADC had made a study of Canadian air defense requirements for 1963-1968 to find ways to handle its tasks with less manpower and cost. One conclusion was that it was unnecessary in peacetime to keep all air defense facilities on a 24-hour schedule.

~~(S)~~ While NORAD was studying this proposal, pressure from higher authority to cut personnel and operating costs caused RCAF ADC to begin testing checkerboard operation at two sites. This testing, in the Ottawa NORAD Sector, was to see if the plan was technically feasible and to get data on savings. Results showed that these sites could go back to full operation within 90 minutes after recall. It was also possible that about 1,100 personnel could be cut with radars running efficiently on a part-time schedule.

~~(S)~~ In April 1964, RCAF ADC asked NORAD if checkerboard testing could be expanded to the whole Ottawa Sector. On 15 May, NORAD agreed to a full sector test (nicknamed Cree Dance). NORAD said that the main purpose of the test was to determine the capability of the NORAD system under this form of operation. However, NORAD stipulated that the sector had to be able to resume normal, around-the-clock operations within 90 minutes. Also, the test was to stop at once if there was an increase in the DEFCON.

RESULTS AND RECOMMENDATIONS

~~(S)~~ Testing began on 15 June 1964. Except for two sites, C-1 and C-8, that remained on full time, the other six Ottawa Sector sites operated on a schedule of 32 hours on and 64 hours off. Sector-wide testing, originally to end 15 August 1964, was extended to 12 September to get added information. After this ended, four sites went back to full operation and comparative data on personnel use was collected for two more weeks. Two sites, C-3 and C-10, continued the checkerboard operation until 31 December to assess the effects of turning equipment off and on.

~~(S)~~ After the Ottawa Sector Commander had analyzed the data from Cree Dance, he recommended to RCAF ADC, with NNR's endorsement, that the checkerboard plan should "not be adopted due to its detrimental effect on the peacetime posture of this sector and its possible effect on the wartime posture of the sector." However, he urged adoption of single-shift maintenance at RCAF radar sites for manpower savings.

~~(S)~~ On 28 December, RCAF ADC recommended to Canada's Chief of Defence Staff that the checkerboard plan not be implemented at this time. But RCAF ADC pointed out that on the basis of intelligence estimates of the manned bomber threat it believed the checkerboard plan was still workable.

It recommended that the plan be kept for possible use if the air defense system had to be cut further. RCAF ADC said it would test single-shift maintenance at several radar squadrons to see if it could save manpower.

~~(S)~~ NORAD was asked to do nothing until the Chief of the Defence Staff responded to ADC's recommendations.

## PASSIVE DETECTION FOR NON-SAGE/BUIC AREAS

### BACKGROUND

~~(S)~~ In 1963, NORAD had considered giving its manually-operated areas (non-SAGE/BUIC) a passive detection capability.* This would enable the Alaskan NORAD Region, Goose Sector, and Oklahoma City Sector to detect, track, and control weapons against aircraft in an ECM environment. These areas lacked frequency diversity radars and were particularly vulnerable to ECM. In September 1963, NORAD evaluated an RCAF ADC manual PD system (Azimuth Time Recorder) and was impressed with it.

~~(S)~~ Seeing the need for such a system, in January 1964, NORAD asked USAF, USAF ADC, RCAF ADC, ANR, NNR, and 29NR for comments on the proposal. All, except USAF which did not reply, favored it. However, the development of a PD requirement was held up for the radar coverage criteria and for the effect that new proposed systems -- such as AWACS, IMI, PAGE -- would have on ground surveillance requirements.

~~(S)~~ NORAD drafted an NQR in late 1964 for passive detection in the manual areas. Included were ANR, Goose Sector, and Oklahoma City Sector. The current NADOP (1966-1975), 1 October 1964, indicated

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* ~~(S)~~ By mid-June 1964, a semi-automated PD system, TCU/ASTRA, was installed in all 16 SAGE sectors.

that ANR's ground environment and control facilities would remain at about the current level and that the AWACS and IMI would not affect Goose Sector until FY 1969-1970. PAGE would have automated the Oklahoma City Sector, but DOD disapproved PAGE.

~~(S)~~ In early 1965, the proposed PD qualitative requirement was being coordinated with the component commands and ANR.

# CHAPTER V
# BALLISTIC MISSILE AND SPACE WEAPONS DETECTION SYSTEMS

## SEA LAUNCHED BALLISTIC MISSILE DETECTION

### BACKGROUND

~~(S)~~ In early 1962, NORAD had sent the JCS a qualitative requirement for an automatic off-shore missile attack warning system. NORAD was concerned that it could not detect short to intermediate range missiles (ballistic or cruise types) launched from submarines. NORAD said it knew of research on modifying certain prime radars along the coasts that would provide a detection capability. But NORAD said this would give only minimum warning and coverage would have to be supplemented at an earlier part of the trajectory than provided by line-of-sight radar. The additionally-needed coverage, NORAD said, could be provided by a system being developed by the Navy -- MADRE* OTH radar.

~~(S)~~ In March 1963, NORAD recommended either one of two warning systems that could provide the earliest capability with the least technical risk: the FPS-24/26 system or the FPS-35 with the back-to-back 60-foot tracker system. Either system required modifications to certain SAGE FD radars for greater sensitivity and longer range. NORAD felt that these modifications would provide only an interim capability, however.

~~(S)~~ In September 1963, the Secretary of Defense approved a program for modifying SAGE radars,

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* (U) Magnetic Drum Receiving Equipment.

but it was deferred in April 1964 for evaluation of other techniques. DOD decided to re-study other methods because SAGE modifications would cost more than had been expected and OTH radar was expected to be available about the same time as the SAGE program. The JCS directed the Air Force and Navy to make independent evaluations of OTH radar for use in off-shore missile launch detection and aircraft surveillance. These studies were then to be sent to DDR&E for evaluation of the OTH radar versus a line-of-sight system.

~~(S)~~ This examination of OTH radar was in line with a recommendation that NORAD had made to the JCS in March 1964. NORAD said it supported the SAGE FD modification program for warning of short range SLBM's. However, to get a system for warning of a long range SLBM, NORAD said more research was needed on satellite-based infra-red sensors and OTH radar. NORAD again called attention to MADRE OTH radar. NORAD pointed out its greater capability over line-of-sight radar, its promise of relatively low costs, and the possibility of using it to replace the Atlantic and Pacific Barriers. NORAD also asked to have a prototype OTH radar installed and tested at a site in the CONUS.

USAF RECOMMENDATIONS

~~(S)~~ NORAD took part in the USAF study completed in July. The study indicated that the SAGE FD modifications were too sophisticated and expensive for the current threat. Also, they were inadequate for both the cruise missile and the future threat. The study concluded that serious consideration should be given to getting an OTH prototype. But an inexpensive modification to line-of-sight radars should be obtained to meet the current threat.

~~(S)~~ In July, USAF asked for NORAD comments on the study. NORAD concurred with the main conclusions and recommended that funds for an austere interim system be limited to the minimum needed to

insure warning for SAC. For the longer-range threat, NORAD recommended approval of a CONUS backscatter OTH prototype with concurrent planning for a complete OTH system.

~~(S)~~ On 11 August, NORAD explained its position to the JCS on getting an early SLBM detection and warning capability. NORAD said that its position on SAGE FD modifications had changed, but it still wanted an interim capability, based on modification or use of current surveillance systems. NORAD said that:

> As a result of the USAF study and the passage of time the NORAD position has been altered to the extent that it will now accept an interim capability other than that provided by the previously proposed full FD modification program, if such a capability will adequately deal with the current and near term threat.

Also, NORAD said again that an operational prototype OTH system should be deployed.*

~~(S)~~ In September, USAF recommendations were sent to the JCS for forwarding to DDR&E. They were to:

> 1. Proceed immediately with an austere line-of-sight radar program. AFSC would prepare the detailed design in coordination with the users.
>
> 2. Begin a design phase for an OTH radar prototype to be sited at a suitable operational location. The

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* ~~(S)~~ NADOP 66-75 stated a requirement for a CONUS two-site backscatter system covering East and West coasts to provide longer range SLBM/MRBM warning by FY 1969.

sophistication of this prototype would be determined by the requirement for an early operational capability in aircraft surveillance.

However, the JCS did not forward the recommendation on OTH (2 above) to DDR&E. NORAD learned informally that it was not sent because the Navy evaluation of OTH had not yet been considered.

DDR&E APPROVAL

~~(S)~~ On 5 November, the Deputy Director of DR&E, Dr. Eugene G. Fubini, approved the interim line-of-sight system concept and said that a maximum of $20.2 million was available for development. He also provided the following guidance: a maximum of four sites could be moved and consideration should be given to using seaward SAGE radars, the FPS-49 Spacetrack radar at Moorestown, N.J., and the FPS-85 phased-array radar at Eglin AFB, Fla. (almost totally destroyed by fire on 5 January 1965).

~~(S)~~ In mid-November, NORAD, AFSC, and 416L SPO representatives met to discuss a system configuration proposed by ESD/MITRE. Because ESD/MITRE believed that OTH would not be available for SLBM warning until about 1970, they proposed a three-phased program -- a minimum system, an improved system, and a long range system -- using FD radars.

~~(S)~~ ESD then recommended to AFSC that modifications to FD radars get first priority of SPO effort, and the FPS-49 and FPS-85 receive second and third priority, respectively. Approval was given for a minimum system using FD radars. A work statement and system requirements were being prepared at year's end. It was expected that requests for bids would be released to contractors in March 1965.

## DOD SPACE DETECTION, SURVEILLANCE, TRACKING, AND DATA PROCESSING STUDY

### OSD AD HOC STUDY GROUP

(U) In a memorandum of 22 July 1964, the Deputy Secretary of Defense, Mr. Cyrus Vance, directed that a study be made of all current and programmed DOD space detection, surveillance, tracking, and data processing equipment. He wanted an ad hoc study group to determine the ability of these systems to:

1. Maintain space catalogs.

2. Support approved weapon systems.

3. Maintain a technical and organizational posture to support future national operations.

The group would then recommend ways to reduce, consolidate, and allocate resources, and organize these systems so they would operate as a coordinated program. The study was to be finished in time to influence FY 1966 apportionment decisions.

(U) Mr. Vance named Mr. Daniel J. Fink, ODDR&E, to form the ad hoc group and act as its chairman (the group was variously known as the DATOS Study Group and the Fink Committee). Representatives from ODDR&E, OSD (Comptroller, Manpower, and Installations and Logistics), JCS, DCA, and DIA were to take part.

### SPADATS REQUIREMENTS

(U) On 1 September, the JCS asked NORAD to give the committee a description of SPADATS equipment and operation and the latest requirements for improving

SPADATS.* NORAD gave this information on 17 September and also appeared before the group in October and November.

~~(S)~~ To fulfill another study group request, NORAD updated its April 1961 requirement document for an improved SPADATS. The JCS wanted to include this new document in their report to the study group. In mid-November, NORAD held a conference of all users of SPADATS data to get their requirements. These were included with an advance copy of the revised qualitative requirement, sent to the JCS on 7 January 1965. NQR 2-65 (see below) was published on 18 January.

~~(S)~~ NORAD told the JCS that most of the user requirements were currently being met and were a normal product of SPADATS. However, there was one major exception. NORAD said this was the need to furnish space threat and situation warning before the first pass of a foreign spacecraft over all unified or specified command areas. NORAD added that the implications of this requirement were particularly far-reaching in terms of surveillance coverage.

## SPACE DETECTION AND TRACKING SYSTEM

NQR 2-65

~~(S)~~ NADOP 66-75, 1 October 1964, gave an analysis of the shortcomings in the SPADAT System. The system could not detect space objects on their first revolution, and detection could vary from a few minutes to several hours after launch. This meant that it could take up to 36 hours to make an accurate

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* (U) In April 1961, CONAD had submitted to the JCS present and future requirements of all SPADATS users in the document, "Requirements for Space Detection and Tracking System - Improved (SPADATS-IMP)."

orbit determination. Besides being inadequate for support of space defense weapons, SPADATS could not determine missions of space objects and was limited in its ability to detect de-orbiting objects.

~~(S)~~ To correct these limitations, NADOP recommended deployment of a launch-detection system by the end of FY 1967 for surveillance of the Sino-Soviet land area. It also recommended sensors to detect, track, and determine the mission of all satellites during the first revolution and to provide observations on lunar and deep space vehicles. Also, it said improvements should be started so the system could adequately support defensive weapons systems.

~~(S)~~ As noted previously, on 7 January 1965, NORAD sent to the JCS a revised SPADATS qualitative requirement (NQR 2-65). This NQR replaced the previous (April 1961) document and supported NADOP recommendations on SPADATS.* The qualitative requirements for the system included the ability to detect and track all space objects and to determine the mission of all spacecraft before completion of the first circuit or before the first pass over a unified or specified command's area of responsibility, whichever came first. The detailed requirements included:

1. Altitude Coverage:

a. For engagement of hostile spacecraft by future weapon systems:

By 1966 - 2,600 NM (nautical miles)

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* (U) For additional information on the 1961 document, see NORAD/CONAD Historical Summary, Jan-Jun 1961, Chapter Two.

1966-1970 - 20,000 NM
Post 1970 - Greater than 20,000 NM

b. For tracking data on highly elliptical and near-circular orbits, tracking coverage to the maximum altitude within the state-of-the-art of ground, air, and space-based sensor technology.

2. Target Size: Based on the predicted Soviet capability to reduce the apparent radar cross section of a space object, the required detection capability was:

Present - $1M^2$ (one square meter)
1966-1970 - $.1M^2$
Post 1970 - $.001M^2$

3. Detection Probability:

| | By 1966 | 1966-1970 | Post 1970 |
|---|---|---|---|
| Orbital inclination | $0^o$ to near polar orbit | All | All |
| Prior to completion of 1st circuit | .90 | .95 | .95 |
| Prior to 1st pass over U&S Command areas | .95* | .99 | .999 |

4. Catalog Accuracy: Based on time of arrival at a calculated point in the orbit plane, was:

Present ± 15 Seconds

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* ~~(S)~~ Over North American Continent only.

1966-1970 ± 3 Seconds
Post 1970 ± 1 Second

5. Weapons Support: Support weapon systems and other special projects with 3 sigma (.99 probability) accuracies on the order of ± 1 NM along track and of ± .5 NM cross track and radially, through post 1970.

6. Reaction Time: For determining orbital elements of selected spacecraft for weapons employment was:

By 1967 - 4 hours
1967-1970 - Less than 4 hours
Post 1970 - Minimum required for weapons support

7. Space Population: The system must cope with a space object population of 5,000 by 1970; the system must have a growth potential making it capable of handling up to 10,000 space objects.

TRINIDAD SITE

~~(S)~~ NORAD had tried since 1962 to get full-time operational control of the Trinidad FPS-44 tracking radar. It wanted the radar because its near-equatorial location enabled it to track all earth satellites. At the time, it was supplying data to SPADATS on a part-time basis. In February 1963, the JCS said NORAD would get operational control when Trinidad was transferred from the USAF Missile Test Center (later the AF Eastern Test Range) to ADC. OSD held up the transfer, however.

~~(S)~~ In January 1964, ADC urged USAF to modify the radar and sanction its transfer. USAF replied that the current arrangements would have to continue until the FPS-85 radar at Eglin AFB, Fla., became

operational. The reason was a shortage of funds for Spacetrack and a recommendation from the State Department that no changes be made to the Trinidad facility.

~~(S)~~ On 20 July, NORAD told ADC that it had originally asked for control of the site in its present configuration and had made control a condition for deactivating the Laredo radar facility.* NORAD asked ADC to comment, reaffirming NORAD's position. ADC replied on 3 August that it considered this inappropriate because of objections cited by USAF. However, ADC said it was working to improve the existing arrangements. This included getting AFETR's approval to put in a computer and a high-speed printer for better data output to SPADATS, and setting up an ADC National Range Office at AFETR for recognition of ADC requirements and set up better operating procedures. Also, ADC said it was starting studies to identify continuing requirements for Trinidad.

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* (U) The Laredo sensor was deactivated on 15 July 1964. For additional information, see NORAD/CONAD Historical Summary, Jan-Jun 1964, p. 54.

# CHAPTER VI
# NUCLEAR DETONATION DETECTION AND C/B REPORTING SYSTEMS

## NUCLEAR DETONATION DETECTION AND REPORTING SYSTEM (NUDETS 477L)

### NUDETS PHASE I

~~(S)~~ The first phase of the NUDET System became operational on 1 July 1964. Phase I provided data for alarm, attack and damage assessment, and fallout warning on nuclear detonations in the Washington, D. C. area. This initial phase was to satisfy the requirements of the National Military Command System. It consisted of a regional data processing center at Benton AFS, Pa., and sensors located at Benton, Thomas, W. Va., Manassas, Va., and Hermanville, Md.*

~~(S)~~ Normal operation was to be interrupted by additional testing. Testing results were to be sent to DOD to help determine requirements for Phase II. This second phase, for satisfying a NORAD requirement for a nation-wide system, was under study (see below).

~~(S)~~ Phase I operation was hindered by lack of an operations concept. Several users told ADC that detailed information was needed on the objectives, limitations, and practical capabilities of this system. SAC said it was turning its equipment off

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* ~~(S)~~ The radar site at Manassas (Z-55) was slated to close in March 1965. ADC asked that this closure not include that portion of the site required by NUDETS. USAF approved but said that it was making a study of the costs associated with retaining the sensor at Manassas as compared to relocating it to an active installation.

until it got enough information to establish an operational concept. At a meeting in late October 1964, ADC gave system users a draft concept for comment. ADC planned to consolidate the comments and submit an operational concept to the JCS for approval.

~~(S)~~ In November, ADC asked NORAD to evaluate the system. NORAD replied on 8 December that its equipment had not been tested yet. NORAD said that the Mission Display Unit (MDU) had not been operational for a total of 100 days since 1 July. In one instance, the MDU had been out 82 days because of lack of parts. NORAD told ADC that when the system displayed greater dependability, it would hold user tests in conjunction with NORAD Region Evaluation Exercises.

PHASE II

~~(S)~~ NUDETS Phase II was to be a nation-wide system that NORAD wanted operational by the end of FY 1969. At the end of CY 1964, however, Phase II requirements were still being evaluated. In 1963, the Secretary of Defense had directed a restudy of the nation-wide NUDETS requirement. MITRE was to find a way to relax height-of-burst and yield accuracies for all targets and reduce ground-zero criteria on enough targets to permit use of longer-range sensing techniques. It was expected that a report on this study would be made in January 1965.

~~(S)~~ The DOD position on the NUDET System was that no more funds would be authorized until data from Phase I testing was available and MITRE's study of Phase II was completed.

## CHEMICAL AND BIOLOGICAL RAPID WARNING SYSTEM

BACKGROUND

~~(S)~~ NORAD's requirement for an automatic biological and chemical rapid warning system was approved by the JCS in 1961. Later, it was expanded by the JCS from a system for NORAD into an overall continental system.* The Army was to provide the system. After reviewing the Army's plan for developing it, DDR&E directed in July 1962 that a complete system study be made to further define and clarify the project.

~~(S)~~ This study was divided into two phases. The first phase, completed in July 1963, developed the basic concepts of the system, the scope of the follow-on study, and a plan for doing the second study.

~~(C)~~ General Electric began the second study on 3 September 1963. Midway in this study, NORAD learned it was being based on a requirement that would provide tactical warning at the local level -- "point" coverage -- and so was not responsive to NORAD's requirements. On 6 March 1964, NORAD told the Army that the JCS had expanded the NORAD requirement. Its primary requirement was detecting and reporting CB attacks to make national strategic and tactical decisions. NORAD said this required area coverage rather than point coverage. NORAD recommended that GE's contract be revised to include study of the area coverage requirement. This would give a broader basis for comparing and choosing the best approach.

## ARMY MATERIEL COMMAND RECOMMENDATIONS

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* ~~(S)~~ The JCS had realized that an automatic system was a long way off and, therefore, told the Army to set up an interim system until an automatic system was ready. This interim system became operational on 1 July 1964 and was based on observations of trained personnel using available detection equipment and reporting observations to CINCNORAD for evaluation.

~~(S)~~ NORAD's recommendation was not included in the study but was considered by the Army Materiel Command (AMC) in its evaluation of GE's final report. On 1 October, AMC sent its conclusions and recommendations to NORAD for comment. AMC had concluded that CB sensors were not developed enough (biological sensors, particularly) to have a complete system responsive to NORAD's requirements. And it said that current guidance was too limited for analysis of a totally responsive system. Although the system had started as an exclusive requirement for NORAD, AMC said that civilian needs would have to be considered now. Therefore, AMC recommended suspending the program until:

1. Suitable advances were made in sensor development.

2. Guidance was developed which clearly establishes the system mission, the nature and degree of the CB threat, and the organizational and operational environment in which the system must be designed to function.

3. A complete evaluation was made of the over-all CONUS CB warning problem.

~~(C)~~ On 22 October, NORAD told the Army that it generally concurred with the analysis and evaluation of the study. NORAD repeated its interpretation of the system's mission as stated on 6 March 1964. Under this interpretation, NORAD said the requirement for a rapid CB warning system was unchanged.

# CHAPTER VII
# WEAPONS

## STATUS SUMMARY

~~(S)~~ The NORAD regular interceptor force decreased by one squadron, from 43 to 42 squadrons, during the last six months of CY 1964 because of the inactivation of one F-101 squadron (15th FIS, Davis-Monthan AFB). The total number of aircraft dropped from 885 to 870. ANG (Category I Augmentation Force) squadrons remained at 21, but the number of aircraft went from 480 to 468. The ANG continued to increase the number of aircraft on high alert. By the end of this period, ten squadrons had three aircraft on 5/15 minute status and eleven had two aircraft on this status.

~~(S)~~ The number of BOMARC missiles in the eight squadrons dropped one, from 244 to 243, because of the evaluation firing of one missile by the 447th SAM Squadron at La Macaza. The transfer of 48 Regular Army Hercules fire units to the Army National Guard continued with ten more transferred this six months. This brought the total transferred to 46, leaving 97 in the RA units. The transfer was scheduled for completion during the first half of CY 1965. There remained eight Hawk fire units in the RA, with 288 missiles and 48 launchers.

## INTERCEPTOR FORCE

### PLANNED FORCE REDUCTION

~~(S)~~ In December 1964, OSD ordered interceptor force cuts that would lower the number of interceptor squadrons available to NORAD from 39 to 20 by FY 1970. Eight F-102 squadrons were to be inactivated in the CONUS during FY 1966-1967, the inactivation of the F-102 squadron at Thule was to be

moved up to the end of FY 1965, and one F-104 and nine F-101 squadrons were tentatively set for phasing out in FY 1968-1969.

~~(S)~~ The seven aircraft of the Thule squadron were to be dispersed throughout the remaining regular squadrons. The F-102 aircraft from the other eight regular squadrons were to be used to convert eight of the nine F-89 ANG squadrons to F-102's. The ninth ANG F-89-equipped squadron was to get F-102's that were being phased out of PACAF early in FY 1966.

~~(S)~~ The detailed plan for the inactivation of the F-102 squadrons in FY 1966-1967 was as follows:

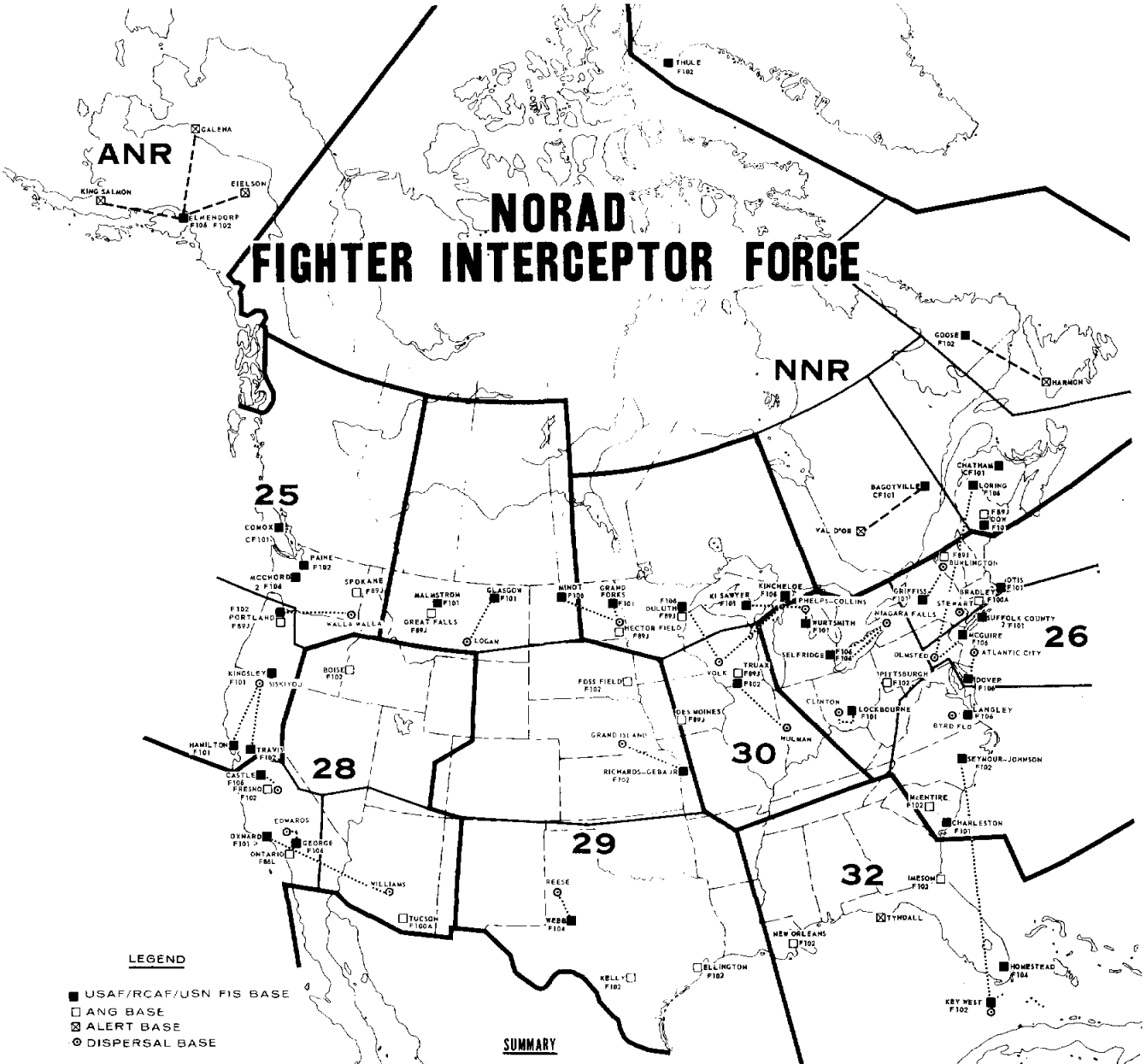
FY 1966

| Inactivate | | Aircraft To |
|---|---|---|
| 482nd FIS, Seymour-Johnson AFB | - | Burlington ANG |
| 325th FIS, Truax Field | - | Traux ANG |
| 460th FIS, Portland IAP | - | Portland ANG |
| 82nd FIS, Travis AFB | - | Fargo ANG |

FY 1967

| Inactivate | | Aircraft To |
|---|---|---|
| 326th FIS, Richards-Gebaur AFB | - | Duluth ANG |
| 64th FIS, Paine Field | - | Great Falls ANG |
| 59th FIS, Goose AB | - | Dow ANG |
| 317th FIS, Elmendorf (AAC) | - | Des Moines ANG |

~~(S)~~ A comparison of the number of squadrons and interceptors available to NORAD on 1 January 1965 with the FY 1970 level shows the overall reduction:




## SUMMARY

### REGULAR FIGHTER INTERCEPTOR FORCE

| | | |
|---|---|---|
| 3 | CF-101 | SQDNS |
| 15 | F-101 | SQDNS |
| 9 | F-102 | SQDNS |
| 2 | F-104 | SQDNS |
| 13 | F-106 | SQDNS |
| TOTAL 42 | | SQDNS |

### ANG FIGHTER INTERCEPTOR FORCE

| | | |
|---|---|---|
| 1 | F-86L | SQDNS |
| 9 | F-89J | SQDNS |
| 2 | F-100A | SQDNS |
| 9 | F-102 | SQDNS |
| TOTAL 21 | | SQDNS |

| | REGULAR FORCE | | ANG | |
|---|---|---|---|---|
| | Sqns | A/C | Sqns | A/C |
| 1 Jan 1965 | 39 | 822 | 21 | 468 |
| FY 1970 | 20 | 330 | 21 | 378 |

~~(S)~~ NORAD also had three RCAF CF-101 Squadrons in Canada with a total of 48 aircraft. The future of these squadrons was not settled as of 1 January 1965.

## INACTIVATION OF THE 15TH FIS

~~(S)~~ In a memo to the Secretary of the Air Force on 14 August 1964, OSD ordered the inactivation of the 15th FIS on 24 December 1964.* NORAD was informed by CSAF on 25 August. The JCS was asked at once by NORAD to have the matter reconsidered. ADC supported this request. But on 12 November, the JCS advised that the inactivation would go ahead as scheduled. ADC asked NORAD to remove the 15th from air defense alert. NORAD concurred and the squadron was disbanded on 24 December 1964. This brought the USAF total to 39 squadrons on 1 January 1965 as shown above.

## INCREASE IN ANG ALERT

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* ~~(S)~~ The 15th FIS was one of two USAF F-101 squadrons that had been programmed to inactivate, according to NADOP 65-74, in the 1964-1965 time period to make F-101 aircraft available to increase the UE of the five Canadian CF-101 squadrons from 12 to 18. However, in the first half of 1964, the RCAF disbanded two CF-101 squadrons and used the aircraft to increase the UE of two of the remaining three squadrons from 12 to 18. Therefore, when the 15th inactivated, its aircraft were used to meet the attrition of the remaining USAF F-101 squadrons.

~~(S)~~ The ANG alert requirement had been set by ADC OPLAN 10-61, ANG Alert Plan. This required, as agreed by USAF ADC and the National Guard Bureau, that Category I ANG squadrons keep two aircraft on five-minute and two aircraft on one-hour alert status. In January 1964, ADC began revising its plan and suggested that the ANG peacetime alert requirements be included in NORADR/CONADR 55-3.* NORAD replied that this could be done only if the Category I ANG squadrons with a nuclear capability on targeted bases met a minimum requirement of four aircraft on 5/15 minute status.

~~(S)~~ On 23 June 1964, the National Guard Bureau advised that it would increase its alert status to meet NORAD's requirement. The National Guard could not reach this level at once but would build up to it as resources permitted. The fourth quarter of FY 1966 was the target date for all ANG squadrons to have four aircraft on a 5/15 minute status.

~~(S)~~ By 10 August 1964, all nine F-89 squadrons and one F-102 squadron had three aircraft on 5/15 minute status. The remaining eleven squadrons had two aircraft on the high state. There had been no more changes by the end of 1964.

## IMPROVED INTERCEPTOR FOR ALASKA

~~(S)~~ Background. In 1962, the JCS had concurred with CINCAL in the validity of a requirement to replace his F-102's with an improved interceptor. But FY 1963 funding had not been provided. In March 1963, Soviet aircraft flew over an area of the Alaskan Region and the inadequacy of the F-102 was clearly demonstrated. The F-4C was considered the

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* ~~(S)~~ NORADR/CONADR 55-3 established weapons alert requirements, except for peacetime (prior to mobilization) ANG aircraft alert.

best replacement, but it would not be available to solve the immediate problem. For temporary assistance, eight F-106's from ADC were added to the F-102 force in July 1963 until a final solution could be worked out. This temporary deployment plan was called White Shoes.

~~(S)~~ A USAF study group that had been examining the problem since mid-1963 concluded in June 1964 that an F-102/F-4C combination would best serve the air defense mission in Alaska. The JCS directed that White Shoes be continued until the first quarter of FY 1966, when the F-106's would be replaced by a rotational TAC F-4C squadron of 18 aircraft. The F-102 squadron was to be cut from 44 to 26 aircraft at the same time.

~~(S)~~ Status. NORAD advised ANR on 14 July 1964 that recent force guidance from the Secretary of Defense proposed that all F-102's be taken out of the regular force by FY 1966. In the same message, ANR was asked to comment on the interceptor forces needed for its peacetime and general war mission if the OSD proposal was implemented. ANR replied that it would need 28 F-4C aircraft to fulfill its air defense mission. ANR also said that if the JCS assigned a secondary mission to the F-4C unit of training with ALCOM ground forces, more planes than the 28 needed for air defense would be required.

~~(S)~~ In December 1964, USAF asked ADC for a coordinated ADC/CONAD position on air defense forces for Alaska. CINCONAD backed ANR's requirements to ADC as stated above and added that the feasibility of providing the F-4C with a nuclear capability should be examined. CINCONAD also asked that ADC prepare contingency plans for deployment to Alaska of one interceptor squadron until the F-4C was nuclear capable in the air defense role.

~~(S)~~ Meanwhile, in December, OSD ordered interceptor force cuts that made the F-102 squadron in Alaska the last of the regular force F-102 squadrons

to inactivate (in the fourth quarter of FY 1967).*

~~(S)~~ The ending of White Shoes was planned for the same time as the arrival of the F-4C squadron on 4 August 1965. In January 1965, ANR asked NORAD to try to change the termination date of White Shoes to 1 September 1965. This would provide an overlap for changeover routine including area familiarization for the F-4C squadron. ANR felt this would prevent an unacceptable degradation of its effectiveness during the transition period. NORAD concurred and on 3 February sent ANR's request to ADC for its comments and recommendations.

## IMPROVED MANNED INTERCEPTOR

~~(S)~~ One of the most urgent and long sought requirements of NORAD was for an improved manned interceptor.** NORAD's current objectives plan (NADOP 1966-1975, 1 October 1964) stated an objective to have two CONUS squadrons equipped with an IMI in FY 1968, 11 in FY 1969, and 12 by FY 1970. A requirement was also stated to equip three Canadian squadrons with the IMI by FY 1970, for a total of 15 squadrons.

~~(S)~~ On 8 December 1964, CINCNORAD advised the JCS that NORAD favored the F-12A to fill the IMI requirement and recommended that the JCS back the USAF request for FY 1966 funds to start producing

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* ~~(S)~~ See "Planned Force Reduction," p. 68.

** (U) See Historical Reference Paper No. 6, "NORAD's Quest for Nike Zeus and a Long-Range Interceptor," 1 July 1962, which traces developments since 1953.

the F-12 interceptor for continental air defense.* NORAD had also sent the JCS a Qualitative Requirement for an IMI, dated 4 December 1964.

## INTERCEPTOR DISPERSAL

### BACKGROUND

~~(S)~~ The NORAD ADNAC 300N-64 stated that interceptors would be deployed to predesignated dispersal bases to enhance their survivability and/or as a tactical deployment to initiate early attacks against a hostile air-breathing threat. A dispersal base was a recovery or turnaround airfield, other than the home base, that was predesignated for the operation of dispersed interceptors. The operational capability of a dispersal base was defined as one of four phases; Phase I, II, III (modified), and III. Phase I was a "turnaround only" capability progressing to Phase III that provided permanent dispersal facilities for an eight-sortie nuclear capability for six aircraft on high alert.

~~(S)~~ USAF ADC OPLAN 20-64, dated 1 January 1964, provided ADC's dispersal orders. The plan listed 30 dispersal bases, 21 in CONUS and nine in Canada. There were no agreements between Canada and the U.S. for implementation of the dispersal plan in Canada.

### STATUS

~~(S)~~ On 2 July 1964, USAF advised ADC that as a result of the OSD tentative force guidance memo

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* (U) In February 1964, President Johnson announced that the U.S. had developed an advanced experimental jet aircraft, the A-11, which had been tested in sustained flight at more than three times the speed of sound and at altitudes in excess of 70,000 feet. On 30 September 1964, the A-11 was unveiled to the public and redesignated the YF-12A.

of 21 May 1964, only 17 of the 21 permanent CONUS dispersal bases were approved for construction of dispersal facilities in the FY 1964 MCP. Thirty-one million of the $39 million appropriated by Congress was released for construction of the line items needed for the tentative force in the OSD tentative force guidance memorandum issued in May. Because of changes required in design and contract at most of the bases, a slip of several months was anticipated in the construction completion dates. By the end of 1964, construction had begun on 16 bases in the CONUS and completion to Phase III capability was expected by September 1965.

~~(S)~~ In the meantime, during the latter part of 1964, the dispersal requirement was further appraised by USAF and ADC. In December, when the Secretary of Defense announced the planned interceptor force reduction, ADC sent USAF a proposed dispersal alignment for the period FY 1966 through 1969. ADC also stated that under its future 20-squadron force, a minimum of 18 CONUS and two Canadian dispersal bases were required for "one squadron/one Dispersed Operating Base (DOB)," dispersal. On 7 January 1965, USAF approved 17 CONUS bases plus three Canadian bases for future negotiation with Canada. NORAD was satisfied except it felt that two more Canadian bases should be negotiated for in eastern Canada in place of two of the CONUS bases approved that NORAD felt were in probable target areas. NORAD asked the JCS on 20 January 1965 to help reopen Canadian dispersal base negotiations at the earliest practical time.

~~(S)~~ As of 1 January 1965, there were two Phase I DOB's, 12 Phase II DOB's and five Phase III (m) DOB's. Some of these bases were temporary and others were slated by USAF to be activated. The plan called for one Phase II and sixteen permanent Phase III DOB's in CONUS by September 1965. The Canadian bases were still to be negotiated.

TRANSPORTATION FOR DISPERSAL

~~(S)~~ NORAD was concerned about the limited airlift support for the interceptor dispersal program. ADC had nine C-54's and 27 C-123's assigned. TAC could also make 154 C-119's available from four Reserve Wings. These resources were not considered adequate by NORAD.

~~(S)~~ In July, NORAD asked the JCS to consider substituting MATS or other regular Air Force airlift units stationed on or near ADC bases for the reserve units for dispersal airlift. The JCS replied on 7 October 1964, asking NORAD to submit a detailed plan that took into account the phasing of airlift requirements under various DEFCON's, the need to cut requirements to a minimum, the prepositioning of equipment at DOB's, and alternate means of transportation.

~~(S)~~ Preliminary studies showed, however, that NORAD requirements for dispersal airlift might be diminishing. This was because the permanent Phase III DOB's were planned to be adequately stocked by September 1965 and a study was underway on use of surface transportation in lieu of airlift for dispersal of additional stocks. NORAD advised JCS on 28 January 1965 that it was studying airlift with ADC. When the study was completed, a plan would be submitted as asked by the JCS.

## MISSILE FORCE

### BOMARC COMBAT EVALUATION LAUNCH PROGRAM

~~(S)~~ There had been a requirement for test/training launches of BOMARC, CIM-10B, during their introduction to the NORAD inventory. Most of the first testing had been finished by 30 June 1963. Yet to be done was part of the last phase called the Category III Test Program. There was also a requirement for a follow-on launch program.

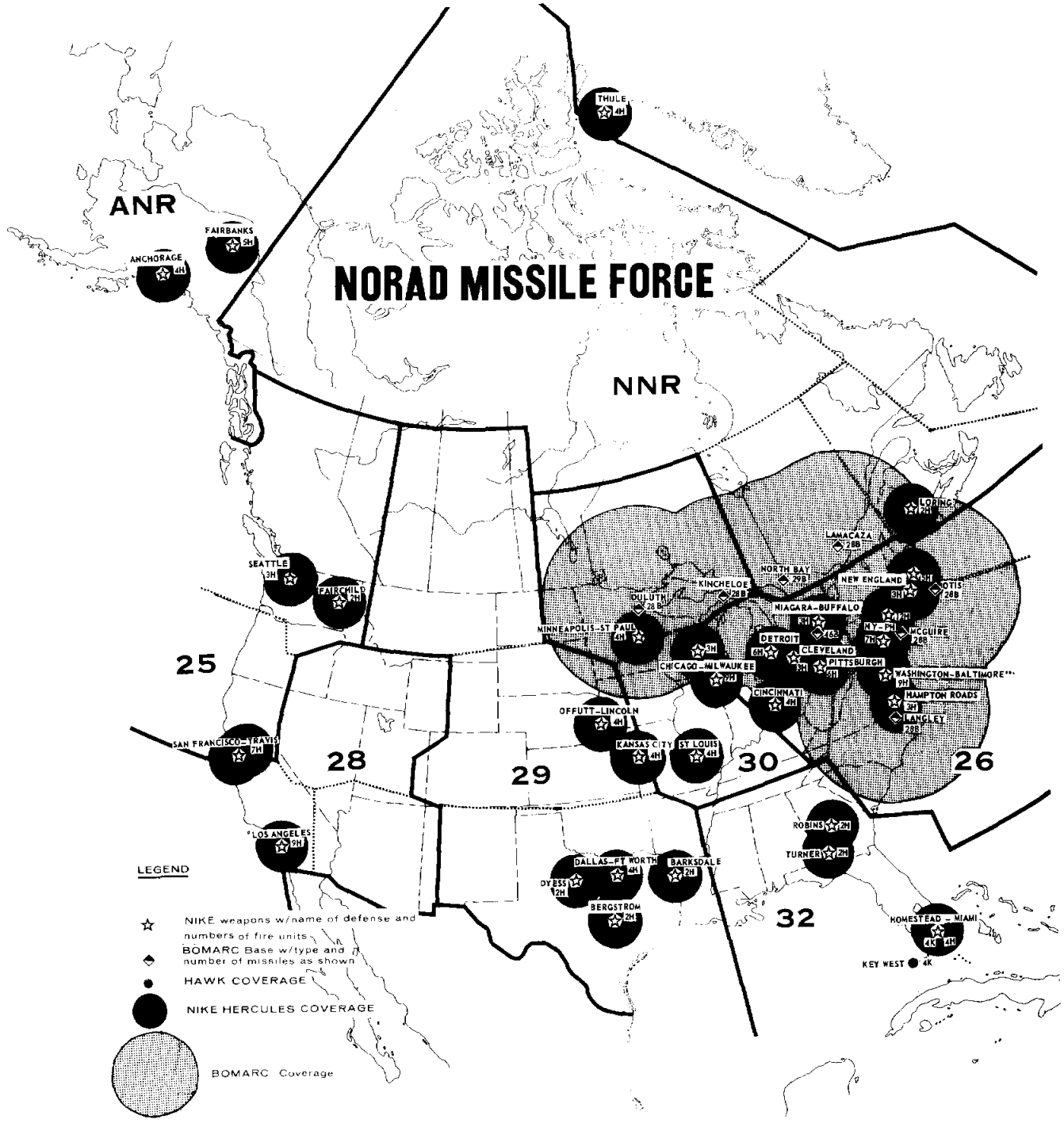
~~(S)~~ On 30 June 1963, there were 252 BOMARC, CIM-10B, missiles including 58 in Canada in the NORAD

force. There were six U.S. squadrons with 188 launchers and two Canadian squadrons with 56 launchers. To complete the Category III Test Program and go ahead with a follow-on test/training launch program, a schedule of launches was required. In October 1963, USAF ADC set up a schedule through FY 1968 for the six U.S. squadrons. At the same time, the RCAF was asked to take part in the program. The schedule provided for six more launches (two had been launched since 30 June) to make a total of eight for FY 1964. For the period FY 1965 to FY 1968, each of the U.S. squadrons was to launch one missile annually. Provision was made to include the Canadian squadrons in this schedule if the RCAF decided to take part.

~~(S)~~ The authority for the Category III Test Program and the follow-on launch program covered firing of only those missiles over a ratio of one missile to one launcher for both the U.S. and Canadian squadrons. USAF therefore submitted a BOMARC Program Change Proposal (PCP) covering a Combat Evaluation Launch (CEL) Program so it could go on with the test/training launches. The CEL Program was considered vital by ADC, for it was the only means to evaluate system capabilities and tactics and for shelf-life testing of an otherwise static weapon system.

~~(S)~~ The Secretary of Defense approved the PCP on 16 June 1964. It set the force structure for missiles on launchers at the end of FY 1964 at 186, to be cut by six annually to 138 in FY 1972. Of the six squadrons in ADC, five had 28 missiles/launchers and one had 46 missiles and 48 launchers. All missiles to be used in the CEL Program through FY 1967 were to come from the larger squadron, reducing its UE to the same as the other five squadrons. There were no missiles launched from the U.S. squadrons during the last half of 1964. The launches were held up awaiting telemeter conversion kits from the Ogden Air Material Area.

~~(S)~~ The two Canadian squadrons would be able to take part in the FY 1965 program using the surplus


NORAD MISSILE FORCE
ANR
NNR
THULE 4H
FAIRBANKS 6H
ANCHORAGE 4H
SEATTLE 3H
FAIRCHILD 7H
SAN FRANCISCO–TRAVIS 7H
*LOS ANGELES 9H
LORING 2H
LAMACAZA 28B
NORTH BAY 29B
KINCHELOE 28B
DULUTH 28B
NEW ENGLAND 8H
OTIS 28B
NIAGARA–BUFFALO 6H
MINNEAPOLIS–ST PAUL 4H
DETROIT 6H
CLEVELAND 3H
NY–PH 7H
MCGUIRE 28B
PITTSBURGH 4H
CHICAGO–MILWAUKEE 7H
WASHINGTON–BALTIMORE*** 9H
HAMPTON ROADS 3H
LANGLEY 28B
CINCINNATI 4H
OFFUTT–LINCOLN 4H
KANSAS CITY 4H
ST LOUIS 4H
ROBINS 2H
TURNER 2H
DALLAS–FT WORTH 4H
BARKSDALE 2H
DYESS 2H
BERGSTROM 2H
HOMESTEAD–MIAMI 4K 4H
KEY WEST 4K
25
28
29
30
26
32
LEGEND
NIKE weapons w/name of defense and numbers of fire units
BOMARC Base w/type and number of missiles as shown
HAWK COVERAGE
NIKE HERCULES COVERAGE
BOMARC Coverage

missile each had. One squadron launched its surplus missile in November 1964 and the other planned a launch for March 1965. Discussions were still underway between USAF and RCAF in January 1965 on the details of Canadian participation in the CEL Program after FY 1965.

~~(S)~~ The CEL Program, with Canadian participation, would therefore reduce the total number of BOMARC, CIM-10B's, in the NORAD inventory at a rate of eight missiles a year.

BOMARC ALERT STATUS

~~(S)~~ On 27 October 1964, ADC advised NORAD that two BOMARC, CIM-10B, missiles were being removed from alert status on 2 November at each of the six U.S. and two Canadian squadrons and that they would not be returned until June 1965. This was necessary, ADC said, to provide an added source of critical parts for depot reconditioning and re-installation in missiles. The pipe line of such items would not support the peak "time change" needs in the last half of FY 1965. If the controlled reduction was not taken, a greater number of missiles would have to be removed from alert during the last half of FY 1965. This controlled reduction would result in a 6.6 per cent cut in the total BOMARC force for about seven months

# CHAPTER VIII
# PROCEDURES AND TRAINING

## IDENTIFICATION AND AIR TRAFFIC CONTROL

### MARK XII IFF/AIMS PROGRAM

~~(S)~~ Background. For electronic identification, NORAD used certain operational proecdures in conjunction with the Mark X IFF/SIF equipment. However, this equipment had proven to be inadequate in full-scale exercises. Security of the identification codes could not be maintained and in any air battle there was the risk of destroying friendly aircraft. A more secure system was needed to increase NORAD's ability to provide safe passage to the SAC Emergency War Order aircraft and to identify other essential traffic during hostilities.

~~(S)~~ NORAD had asked the JCS for implementation of a new crypto-secure system, the Mark XII IFF. Tests of the system showed it to be highly reliable. In April 1963, the JCS said they approved the requirement and had given the Secretary of Defense their views. The Secretary had already indicated his appreciation of the need in a draft memorandum to the President.* The JCS felt that funds would be included in the Five Year Force Structure and Finance program beginning in FY 1964.

~~(S)~~ The JCS priority schedule called for all units in North America to be equipped in the 1965-1968 period. First priority was to be given to

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* (U) For actual quotation see NORAD/CONAD Historical Summary, Jan-Jun 1963, p. 75.

the NORAD ground environment and the SAC Emergency War Order Force. Accordingly, the JCS directed the services to prepare PCP's for acquisition of the system for FY's 1964 through 1969. In August 1963, the JCS published a proposed priority schedule for system implementation which was generally in line with NORAD recommendations.

~~(S)~~ Late in 1963, the JCS advised NORAD that acquisition of Mark XII was to be put in the AIMS PSPP and asked that NORAD submit its requirements in this program.* NORAD complied with an initial outline of its requirements. Meanwhile, the JCS had named USAF as executive agent for the AIMS program.

~~(S)~~ USAF asked AFSC to submit the AIMS program PSPP by 30 March 1964. This was done in two parcels. The ATCRBS was sent in March and the MK XII in May 1964. However, prior to 30 March 1964, the Secretary of Defense deferred Mark XII procurement funds until 1966. In April, NORAD re-emphasized the problem of safe passage for SAC EWO traffic and urged implementation of Mark XII as set out in the JCS priority schedule of August 1963.

~~(S)~~ Current Developments. Early in October 1964, CINCNORAD and CINCSAC again asserted to JCS the pressing need for the MK XII IFF. The JCS urged the Secretary of Defense to authorize implementation of the MK XII program in FY 1966. The Secretary agreed and said that austere funding could be expected in FY 1966. Revised PCP's, outlining the program through 1970, were asked for by 1 November 1964.

~~(S)~~ On 4 November 1964, USAF submitted PCP 64-157 for ATCRBS and PCP 64-158 for MK XII. FY 1966 funding

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* ~~(C)~~ AIMS program was the grouping of the military actions relating to A: - ATCRBS (FAA's Air Traffic Control Radar Beacon System); I: - IFF/SIF Mark X; M: - Mark XII IFF, S: - System, into one PSPP.

was approved by DOD on 9 December 1964.

~~(S)~~ ADC advised NORAD on 20 January 1965 that coordination of the AIMS PSPP by participating services and commands was to be completed by 15 February 1965. ADC also asked to meet with NORAD to develop joint comments on the draft PSPP. A meeting on 12 February 1965 resulted in ADC preparing a combined NORAD/ADC submission to USAF.

SCATER/SCATANA PLAN

(U) Background. NORAD had been trying for some time to publish a new directive on SCATER (Security Control of Air Traffic and Electromagnetic Radiations). Publication was held up because the CONELRAD (Control of Electronic Radiation) plan, which directly affected SCATER, was being revised by DOD and FCC.

(U) On 12 January 1963, the JCS directed NORAD to revise its SCATER planning together with FAA and to assume that CONELRAD would be changed to control only accurate navigation aids. Thus, NORAD's requirements in the SCATER plan were for control of accurate navigation aids only (i.e., VOR, VORTAC, TACAN, LORAN, and SHORAN). In line with this, NORAD proposed to change the title from SCATER to SCATANA (Security Control of Air Traffic and Air Navigation Aids). In September 1963, a draft of a revised SCATER plan was prepared by NORAD/FAA. The revision would be known as the SCATANA Plan.

(U) Development. In October 1963, NORAD sent its proposed SCATANA requirements document to the JCS and the COSC. The JCS approved it in November as a basis for further development of the SCATANA plan. Approval was expected from COSC in early 1964.

(U) A conference was held in Washington in March 1964 between FAA, FCC and NORAD where the September 1963 proposed SCATANA plan was revised. NORAD then sent copies of this draft to the U.S. services, the RCAF, USCG, and unified and specified commands for

comment and concurrence.

(U) In May 1964, the RCAF advised that it and DOT (Canadian Department of Transport) were preparing a Canadian SCATANA plan. NORAD would be advised when it was finished and a U.S./Canadian meeting could be arranged. At the same time, RCAF advised that the COSC had approved the "NORAD Requirements for SCATANA" document as requested by NORAD in October 1963.

(U) On 28-29 July 1964, FAA, FCC and NORAD met to prepare a final draft SCATANA plan based on all comments received on the 12 March 1964 draft. Also arrangements were made to meet with Canadian authorities on 29-30 September 1964, to review Canadian and U.S. plans to assure that they were as compatible as possible. Meanwhile, the FCC had asked NORAD to provide the military justification for the control requirements specified in the draft plan, on which FCC could base the need for changes in its regulations. NORAD provided the justification to FCC in early October.

(U) At the meeting on 29-30 September 1964, the Canadian and United States SCATANA Working Groups reviewed the two national draft plans and found them compatible. On 12 October 1964, NORAD sent the final draft SCATANA plan to FAA and FCC for final review before submission to the JCS. The FAA replied on 29 December 1964 with tentative concurrence except for certain changes designed to clarify FAA responsibilities. NORAD put these changes in the final draft and on 29 January 1965 sent the DOD/FAA draft SCATANA plan to JCS for final approval and promulgation. Meanwhile, the Canadian draft plan was progressing in a parallel manner in Canada and both plans were expected to be put in force by mid-1965.

POSITIVE TARGET CONTROL (PTC) PROGRAM

(U) Background. For training, NORAD needed a

system of positive identification and control of target (faker) aircraft in an exercise environment. For realism, it was necessary to present only primary radar returns from faker aircraft to the active operations personnel. But there was also a flight safety requirement to maintain positive and continuous tracking of faker aircraft by both NORAD faker monitor personnel and the FAA Air Route Traffic Control Center (ARTCC) concerned. The question to be answered was on the use and display of MK X IFF/SIF equipment.

(U) The procedure in general use required the faker aircraft to place its IFF transponder in the standby position during the part of the flight it was simulating an attacking hostile aircraft.* This procedure was not satisfactory for several reasons, however. It was difficult, and sometimes impossible, for the faker monitor personnel to continuously track the faker due to weather or ECM conditions. If contact was lost, the target had to be declared unsafe and any intercepts in progress had to be stopped with loss of valuable training.

(U) Also, FAA had to keep positive control of all air traffic operating under instrument flight rules in its area of responsibility. Before there was extensive radar coverage by FAA, this control was by air-to-ground voice position reports and use of the IFF transponder was of no consequence. When FAA got the radars, it set up an area of positive control for all aircraft and the use of IFF equipment in faker aircraft came under FAA regulation. The procedure of the faker plane placing its IFF transponder in standby position as the mission required became unacceptable to FAA unless prior arrangements had been made. FAA's requirements were

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* (U) In this position the IFF equipment was ready for instant use but presented no return to the ground environment.



detailed in Federal Aviation Regulation (FAR) 91.97. The proposal for and development of a PTC system was an attempt by NORAD to satisfy both its requirements and FAA regulations by selected use of the MK X IFF/SIF equipment.

(U) Development. Following discussion with NORAD, on 3 September 1963, FAA authorized faker aircraft, in exercises directed by NORAD regions or higher authority, to operate IFF transponders in the standby position providing;

1. use of standby position was limited to that portion of the faker flight between the point where the strike phase begins and the ground target;

2. flight was made in an approved altitude reservation;

3. efforts be continued to devise a system to permit faker aircraft to operate in compliance with FAR 91.97.

(U) Prior to October 1963, NORAD/ADC were evaluating Positive Target Control Systems in the 26th NR and the Great Falls ADS. However, technical problems with the equipment were holding up testing. Further tests were decided to be of little value to NORAD until these problems could be solved. ADC electronic specialists said that given a reasonable amount of time, these problems could be solved. It was agreed that a definite plan, considering these problems, should be made to hasten determination of the validity of these systems. Therefore, on 14 October 1963, NORAD asked that ADC, with help from NORAD, prepare a time-phased, overall evaluation and test plan using the following guidelines:

1. Phase I. Resolve internal technical problems to insure compliance with the following criteria: (to be completed by 1 January 1964).

a. insure optimum safe training for SAC target and NORAD interceptor forces.

b. provide for attacking target forces at all altitudes day and night.

c. allow safe use of tactics and techniques established in existing tactical doctrine, including ECM.

d. provide for training in both SAGE and BUIC modes of operation.

e. not detract from the active air defense capability of the NORAD system.

f. target identification and tracking should be centralized at the operational level where the interceptors are controlled, and also provide:

(1) for the positive identification and monitoring of all air traffic.

(2) the ability to monitor and override tactical actions in the interests of safety.

(3) the capability to locate the position of all IFF/SIF and nonsquawking air traffic at the Faker monitor positions.*

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* (U) Nonsquawking describes aircraft carrying IFF/SIF equipment but selected to standby, and aircraft not equipped with IFF/SIF equipment.

(4) denial to active operations' personnel of SIF/IFF on target aircraft, but provide display of all other SIF/IFF and nonsquawking targets.

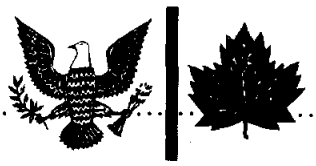
g. have no negative effect on FAA air traffic control.

2. Phase II. Upon resolution of technical equipment problems, proceed by testing the system using small-scale exercises and missions. Only simulated interceptors were to be used in this Phase, and it was to be completed by 1 March 1964.

3. Phase III. This phase would be the same as Phase II using live interceptors if Phase II tests proved satisfactory, and be completed by 1 May 1964.

4. Phase IV. Test the reliability of the system in an intense ECM environment with target aircraft using approved SAC evasive tactics. Live interceptors would not be used in this phase until the PTC System was certified as reliable by the testing team. This phase was scheduled for completion by 1 July 1964.

(U) After finishing the four test phases and acceptance by NORAD, SAC and ADC, the PTC system would be used to insure positive control and tracking during all NORAD exercises. NORAD also asked ADC for monthly progress reports. ADC replied on 18 October that a test plan was being drafted reflecting the phasing NORAD had requested. It was anticipated that the target date of 1 July 1964 for completion of the tests could be realized. ADC began Phase I in November. On 12 December 1963, ADC advised NORAD that ADC Test Project 64-3 had



been published. This provided testing in three phases to be finished by 1 July 1964.

(U) On 21 January 1964, NORAD, ADC, JOTF, and FAA representatives met at NORAD Headquarters. The purpose was to acquaint everyone with the PTC system, determine requirements for additional waiver authorization to FAR 91.97, and find ways of satisfying both military and FAA requirements for operation of MK X IFF/SIF. After this meeting, NORAD asked FAA to expand the 3 September 1963 waiver to FAR 91.97 to cover deviations in the use of IFF/SIF in carrying out the test program. On 8 April 1964, FAA advised NORAD that the original waiver was extended to 1 October 1964, but that it could not be extended further. NORAD could, however, ask for one-time waivers from the applicable ARTCC as required for specific tests. The current overall air traffic situation would affect the decision on each request.

(U) Meanwhile, ADC Test Project 64-3 was progressing as scheduled. There were two Phase III tests, both during SNOWTIME exercises on 1 May and 5 June 1964.* Based on the results, ADC recommended on 6 July 1964 that "the program (PTC) be frozen in its present design and placed in production in order to achieve an operational program date of 1 January 1965." ADC added that this would not prevent future modifications as needed. NORAD concurred on 14 July 1964. But it said that before implementing the program there would have to be a NORAD/ADC/FAA meeting to develop procedures for use of the program that would be acceptable to everyone.

(U) In August 1964, NORAD invited ADC and FAA to a meeting on 9-10 September 1964. FAA was also asked to extend the current waivers to FAR 91.97

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* (U) SNOWTIME was a major SAC/NORAD exercise where the SAC target force employed extensive ECM and evasive tactics.

to 1 January 1965, the expected operational date for the PTC System. Discussions at this meeting and later correspondence between NORAD and FAA resulted, in December, in an agreement between the two to be effective 1 April 1965.

(U) A general look at the terms of the agreement showed that FAA would amend FAR 91.97, permitting target aircraft to use two selected MK X IFF/SIF codes in normal day-to-day training and training exercises. These codes were to be used on that part of the faker mission between the point where the strike phase began and the target, and would make it possible for NORAD target monitor and the FAA ARTCC personnel to maintain positive radar tracking of the flight. These two IFF/SIF codes, however, would be denied to the NORAD active operations personnel who would only have primary radar returns. The majority of NORAD/ADC air defense exercise target aircraft operations would be covered under this part of the agreement.

(U) For exercises designed for testing and/or evaluation with large target forces, NORAD required the use of up to 14 more selected IFF/SIF codes. The agreement required that NORAD ask for separate waivers to FAR 91.97 from the appropriate ARTCC for each exercise of this kind. However, with the waiver granted, NORAD operations could be conducted satisfactorily.

(U) A waiver would also have to be asked for when exercises were held in manual air defense areas and when BUIC I procedures were implemented in SAGE areas. In the latter case, the waiver request would be to operate the IFF/SIF transponder in standby position using the same procedures as were used prior to PTC planning. NORAD did not expect a large amount of exercise target traffic in the two cases where waivers would be required. FAA also asked NORAD to hold the number of exercises requiring deviation to FAR 91.97 to an absolute minimum. Finally, FAA further extended the current waiver to 31 March 1965. On 1 April 1965, it would be replaced by the Positive

Target Control System.

(U) NORAD recommended that the PTC System remain under review by both FAA and NORAD for any revision thought desirable or necessary because of mutual technological advances in radars, ancillary equipment and data processing computers. This would insure that necessary changes could be put into the system to meet FAA traffic control objectives and NORAD system operational and training requirements.

## ECCM TRAINING PROGRAM

### WORLD WIDE ECM/ECCM PROGRAM FOR AIR DEFENSE TRAINING

~~(S)~~ During the last half of 1964, NORAD continued its efforts to provide realistic ECCM training for its forces. NORAD's requirements had been included in an ADC letter to USAF in April 1964 on ECM/ECCM training capabilities and requirements for FY 1965-1971. USAF had received similar reports from TAC, PACAF, AAC and USAFE. These were used as a basis for a USAF study and survey to provide a recommended "World Wide ECM/ECCM Program for Air Defense Training." In November 1964, USAF called representatives of NORAD, SAC, ADC, TAC, and USAFE for a briefing on the progress of the world wide study working group. Two studies going on that were pertinent to NORAD/ADC operations were a world wide survey of USAF ECM/ECCM equipment for re-allocation on a requirement priority basis, and a USAF study on getting an effective ECM simulator/evaluator trainer. It was also recommended that the study working group be formed into a permanent Electronic Warfare (EW) organization.

~~(S)~~ On 16 November 1964, NORAD told USAF that it strongly backed continuance of the World Wide ECM/ECCM Working Group as a permanent EW organization. NORAD also recommended that the organization: (1) be chartered to coordinate efforts of all agencies concerned with implementation of EW programs;

(2) be comprised of a principal and alternate representatives from the commands which would be permanent members of the group; (3) meet quarterly; (4) have a chairman named by USAF; and (5) have representation from the Army and Navy.

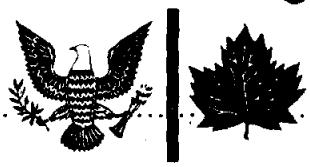
CURRENT ADC PROGRAM

~~(S)~~ Meanwhile, USAF told ADC that a contract had been awarded to Hughes Aircraft Company on 23 July 1964 for 533 ECM jamming pods. ADC would receive 155 pods starting in August 1965. These pods were to be hung on current training aircraft to give air-to-air or air-to-ground ECCM training.

~~(S)~~ ADC had also been trying to increase the UE and improve the effectiveness of its three B-57 Defense System Evaluation Squadrons (DSES). One squadron of 14 aircraft at Biggs AFB, Texas, was entirely committed to the tracking and ECM requirements of the U.S. Army Air Defense Center (USAADC) at Fort Bliss. There were two other DSES's, one at Stewart AFB, New York, with 21 aircraft and one at Hill AFB, Utah, with 20 aircraft. By the end of 1964, ADC had gotten nine more B-57's from storage that would be assigned to the Stewart and Hill squadrons on completion of a high altitude and ECM equipment modification program. USAF had advised that 24 more B-57's could be expected. Eleven were to come from the TAC ANG in late 1965 and 13 from PACAF in mid-1966. The actual ECM/ECCM equipment that the B-57's were to be finally fitted with was still being studied by USAF.

ECM SIMULATOR/EVALUATOR SYSTEM

~~(S)~~ NORAD was also concerned about USAF's plans for an ECM simulator trainer. The only equipment NORAD had was the Active Countermeasures Trainer (ACTER). This was originally designed for the manual radar system and was not suited for the automated (SAGE/BUIC) radar environment. ARADCOM had



been working on a simulator system for some time and NORAD felt that any system sought by USAF should be compatible with the ARADCOM effort. NORAD also wanted the simulator system to be usable in evaluation as well as training. In January 1965, NORAD met with ARADCOM and ADC to agree on a realistic position concerning the simulator system. This meeting provided the basis for a NORAD Qualitative Requirement for an ECM Simulator/Evaluator system. Work was in progress on the NQR early in 1965. When completed, it was to be sent to ADC for inclusion in ADC's submission to USAF. The SAC EB-47 ECM force, that had been providing most of NORAD's ECCM training in exercises, was scheduled to phase out by FY 1966. So NORAD felt that strong emphasis had to be placed on getting a suitable ECM simulator/evaluator system as soon as possible to offset cuts programmed for existing ECCM training sources.

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# GLOSSARY





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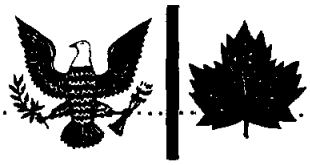

# GLOSSARY OF ABBREVIATIONS

| | |
|---|---|
| AAWS | Automatic Attack Warning System |
| ACTER | Active Countermeasures Trainer |
| ADCSP | Advanced Defense Communications Satellite Program |
| ADS | Air Defense Sector |
| AEW | Airborne Early Warning |
| AFETR | Air Force Eastern Test Range |
| ALCOP | Alternate Command Post |
| AMC | Army Materiel Command |
| ANG | Air National Guard |
| ARADCOM | Army Air Defense Command |
| ARTCC | Air Route Traffic Control Center |
| AUTODIN | Automatic Digital Network |
| AUTOSEVOCOM | Automatic Secure Voice Communications |
| AUTOVON | Automatic Voice Network |
| AWACS | Airborne Warning and Control System |
| BIRDIE | Battery Integration and Radar Display Equipment |
| BMEWS | Ballistic Missile Early Warning System |
| BUIC | Backup Intercept Control |
| CADIN | Continental Air Defense Integration North |
| CB | Chemical-Biological |
| CC | Control Center; also Combat Center |
| CDS | Chief of Defence Staff (Canada) |
| CEL | Combat Evaluation Launch |
| CIIC | Current Intelligence and Indications Center |
| CMC | See NCMC |
| CMCMO | Cheyenne Mountain Complex Management Office |
| CNO | Chief of Naval Operations |
| COC | Combat Operations Center |
| CONUS | Continental United States |
| COSC | Chiefs of Staff Committee (Canada) |

| | |
|---|---|
| DATOS | Detection and Tracking of Satellites |
| DC | Direction Center |
| DCA | Defense Communications Agency |
| DCS/... | Deputy Chief of Staff/... |
| DDR&E | Director Defense Research and Engineering |
| DEW | Distant Early Warning |
| DIA | Defense Intelligence Agency |
| DOB | Dispersed Operating Base |
| DOD | Department of Defense |
| DSES | Defense Systems Evaluation Squadron |
| ECCM | Electronic Counter Counter Measures |
| ECM | Electronic Counter Measures |
| EOC | Equal Operational Capability |
| ESD | Electronic Systems Division |
| ESS | Electronic Solid State Switches |
| EW | Electronic Warfare |
| FAR | Federal Aviation Regulation |
| FD | Frequency Diversity |
| FOC | Full Operational Capability |
| G-I-UK | Greenland-Iceland-United Kingdom |
| IDCSP | Interim Defense Communications Satellite Program |
| IDHS | Intelligence Data Handling System |
| IFF | Identification Friend or Foe |
| IMI | Improved Manned Interceptor |
| IOC | Initial Operational Capability |
| JOTF | Joint Operations Task Force |
| LF/VLF | Low Frequency/Very Low Frequency |
| MADRE | Magnetic Drum Receiving Equipment |
| MDU | Mission Display Unit |
| MEECN | Minimum Essential Emergency Communications Net |
| MITRE | Massachusetts Institute of Technology Research and Engineering (Corporation) |

| | |
|---|---|
| NADOP | NORAD Objectives Plan |
| NAS | National Airspace System |
| NCC | NORAD Control Center |
| NCMC | NORAD Cheyenne Mountain Complex |
| NGCI | NORAD Ground Control Intercept Station |
| NQR | NORAD Qualitative Requirement |
| NUDETS | Nuclear Detonation Detection and Reporting System (477L) |
| ODDR&E | Office of the Director Defense Research and Engineering |
| OSD | Office of the Secretary of Defense |
| OTH | Over-The-Horizon |
| PAGE | Primary Automated Ground Environment |
| PCP | Program Change Proposal |
| PD | Passive Detection |
| PSPP | Proposed System Package Program |
| PTC | Positive Target Control |
| R&D | Research and Development |
| R/O | Receive Only |
| SAGE | Semi-Automatic Ground Environment |
| SAM | Surface-to-Air Missile |
| SCAN | Switched Circuit Automatic Network |
| SCATANA | Security Control of Air Traffic and Air Navigation Aids |
| SCATER | Security Control of Air Traffic and Electromagnetic Radiations |
| SDC | Space Defense Center |
| SHAPE | Supreme Headquarters Allied Powers in Europe |
| SIF | Selective Identification Feature |
| SLBM | Sea Launched Ballistic Missile |
| SOR | Specific Operational Requirement |
| SPADATS | Space Detection and Tracking System |
| SPO | System Program Office; also System Project Office |
| TCU/ASTRA | Threshold Control Unit/Azimuth Strobe Tracking |
| T/R | Transmit/Receive |

| | |
|---|---|
| TRACE | Transportable Automated Control Environment |
| VOCOM | Voice Communications |

# INDEX



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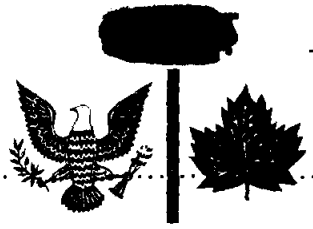

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