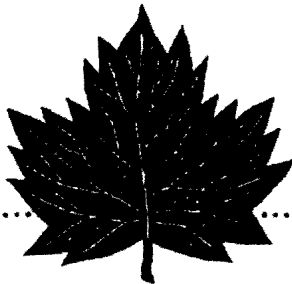


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norad/conad

HISTORICAL SUMMARY

(UNCLASSIFIED)

*Declassified
Version
of*

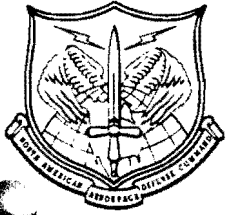
JULY-DECEMBER 1959

Classified ~~X~~ By: Multiple ~~X~~ Sources
Review ~~X~~ 1 May 1999

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NORTH AMERICAN AEROSPACE DEFENSE COMMAND

DEC 14 2006

MEMORANDUM FOR HQ NORAD/USNORTHCOM/HO

FROM: HQ NORAD/J3

SUBJECT: Declassification Review of Histories

1. The NORAD/CONAD histories for the periods specified in your 30 October 2006 memo have been reviewed and are now declassified except for the following sections below. The justification for retaining the classification follows each description.

a. NORAD/CONAD Historical Summary, July—December 1958, page 65. Document still has information based on today's concepts tactics and objectives.

b. NORAD/CONAD Historical Summary, July—December 1958, pages 110-111. Document describes readiness conditions that are still valid today.

c. NORAD/CONAD Historical Summary, January—June 1959, pages 67-71. Document describes some current rules of engagement.

d. NORAD/CONAD Historical Summary, January—June 1959, pages 73 and 74. Document describes some current tactics and rules of engagement.

e. NORAD/CONAD Historical Summary, July—December 1959, pages 55-58. Document describes some current capabilities and procedures.

f. NORAD/CONAD Historical Summary, July—December 1959, pages 59-61. Document describes current rules of engagement.

g. NORAD/CONAD Historical Summary, January—June 1960, pages 37-39. Document describes readiness conditions that are still valid today.

h. NORAD/CONAD Historical Summary, January—June 1961, pages 23-26. Document describes some current tactics and rules of engagement and also could reveal information that would impact the application of state of the art technology.

i. NORAD/CONAD Historical Summary, January—June 1961, page 37. Document describes information that would impact the application of state of the art technology.

j. NORAD/CONAD Historical Summary, January—June 1962, pages 35 and 36. Document describes information that would seriously and demonstrably impair relations between the United States and a foreign government.

k. NORAD/CONAD Historical Summary, July—December 1962, pages 47 and 48. Document describes current tactics.

l. NORAD/CONAD Historical Summary, July—December 1963, pages 59 and 60. N/J3 does not have the authority to declassify these pages. Recommend deferring to NSA for resolution.

m. NORAD/CONAD Historical Summary, July—December 1963, pages 63-65. Document describes current capabilities and tactics.

n. NORAD/CONAD Historical Summary, January—June 1964, pages 57-



58. Document describes capabilities, limitations and deficiencies of warning systems.

o. CONAD Command History, 1968, pages 111 and 112. Document describes current limitations, tactics, and capabilities.

p. CONAD Command History, 1968, page 117. Document reveals current vulnerabilities of systems or projects relating to the national security.

q. CONAD Command History, 1968, pages 171-173. N/J3 doesn't have the technical expertise to evaluate the classification of Chapter VII, Communications. Please refer to N-NC/J6.

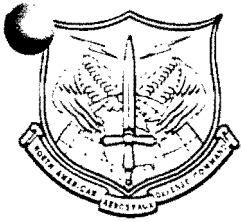
2. The POC for this review is Mr. Michael Allen, 4-3607.



BRETT D. CAIRNS
Major-General, CF
Director of Operations

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**NORTH AMERICAN AEROSPACE DEFENSE COMMAND
AND
UNITED STATES NORTHERN COMMAND**



30 October 2006

MEMORANDUM FOR HQ NORAD/J3

FROM: HQ NORAD-USNORTHCOM/HO

SUBJECT: Declassification Review of Histories

1. HO requires the attached documents to be reviewed by 30 November 2006. Executive Order (E.O.) 12958, "Classified National Security Information," as amended by E.O. 13292 requires a review of classified documentation more than 25 years old. The attached documents have undergone prior declassification review, however, the E.O. requires that the still classified sections be reviewed again by the end of this calendar year, to prevent them from being automatically declassified.
2. The NORAD-USNORTHCOM History Office (HO) maintains NORAD, Continental Air Defense (CONAD), and Air/Aerospace Defense Command (ADCOM) histories, studies, and other documentation that fall into this category. In order to comply with the Executive Order, HO will forward these documents on a systematic basis to functional experts within the NORAD staff to complete this review.
3. During the review process, if any of the material within the documentation still requires protection, please mark those portions (e.g., words, phrases, sentences, paragraphs, pages) with red brackets([]). Justification must be rendered for any material that is determined to be exempt from the 25-year declassification process per E.O. 12958, as amended (E.O. 13292) Section 3.3 (b) -- An agency head may exempt from automatic declassification ... the release of which could be expected to:

-b(1) reveal the identify of a confidential human source, or a human intelligence source, or reveal information about the application of an intelligence source or method;

-b(2) reveal information that would assist in the development or use of weapons of mass destruction;

-b(3) reveal information that would impair U.S. cryptologic systems or activities;

-b(4) reveal information that would impair the application of state of the art technology within a U.S. weapon system;

-b(5) reveal actual U.S. military war plans that remain in effect;

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-b(6) reveal information, including foreign government information, that would seriously and demonstrably impair relations between the United States and a foreign government, or seriously and demonstrably undermine ongoing diplomatic activities of the United States;

-b(7) reveal information that would clearly and demonstrably impair the current ability of United States Government officials to protect the President, Vice President, and other protectees for whom protection services, in the interest of the national security, are authorized;

-b(8) reveal information that would seriously and demonstrably impair current national security emergency preparedness plans or reveal current vulnerabilities of systems, installations, infrastructures, or projects relating to the national security; or

-b(9) violate a statute, treaty, or international agreement.

4. Once the declassification review is complete, please prepare a memorandum for the director's / vice director's signature, i.e., the directorate's Original Classification Authority (OCA), which states:

- a. The CONAD/ADC/ADCOM/NORAD/USSPACECOM (as appropriate) history(ies) for the period(s) have been reviewed and are now declassified; or
- b. The CONAD/ADC/ADCOM/NORAD/USSPACECOM (as appropriate) history(ies) for the period(s) have been reviewed and are now declassified except for the following sections: _____. The justification for retaining the classification is (per paragraph 3).

5. Request the NJ3 staff review the attached documents per Executive Order 12958 and the instructions in paragraphs 2 and 3 above. HQ NORAD/HO POC is Patricia Goude at 4-5999. Please complete the review by 30 November 2006.



THOMAS FULLER
Command Historian

Attachments:

- a. NORAD/CONAD Historical Summary Jul 58 to Dec 58
Pages: 57-59, 64-66, 68, 69, 76, 89 (CONFIDENTIAL); 110, 111 (SECRET) *pp 65 remains (C); pp 110 & 111 remain (S); pp. 57-59, 64, 66, 68, 69, 76 & 89 (u)*
- b. NORAD/CONAD Historical Summary Jan 59 to June 59 - *all pages remain (C)*
Pages: 67-71, 73, 74 (CONFIDENTIAL)
- c. NORAD/CONAD Historical Summary Jul 59 to Dec 59
Pages: 55-65 (CONFIDENTIAL) *pp 55-59 (55-56 (C), 57-58 (S)) pp 60-65 remain (C) pp 62-65 (u)*
- d. NORAD/CONAD Historical Summary Jan 60 to Jun 60
Pages: 37-39 (CONFIDENTIAL) *pp 37-39 remain (C)*
- e. NORAD/CONAD Historical Summary Jul 60 to Dec 60
Pages: 45-50 (CONFIDENTIAL) *pp. 45-50 (u)*

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- f. NORAD/CONAD Historical Summary Jan 61 to June 61
Pages: 20, 22-26, 28-32, 37-39 (CONFIDENTIAL) *pp 23-26 remain (c)
p 37 remains (c) pp. 20, 22, 28-32
38, 39 (u)*
- g. NORAD/CONAD Historical Summary Jul 61 to Dec 61
Pages: 17, 18 (CONFIDENTIAL) *pp. 17 & 18 (u)*
- h. NORAD/CONAD Historical Summary Jan 62 to Jun 62
Pages: 35, 36 (CONFIDENTIAL) *pp. 35 & 36 remain (c)*
- i. NORAD/CONAD Historical Summary Jul-Dec 62 / Apr 63
Pages: 47, 48 (CONFIDENTIAL) *pp. 47 & 48 remain (c)*
- j. NORAD/CONAD Historical Summary Jul 63 to Dec 63
Pages: 59, 60, 63-65 (SECRET) *pp. 59 & 60 - refer to NSA
pp. 63-65 remain (s)*
- k. NORAD/CONAD Historical Summary Jan 64 to Jun 64
Pages: 57, 58 (SECRET) *pp. 57 & 58 remain (c)*
- l. NORAD/CONAD Historical Summary Jan 68 to Dec 68
Pages: 6-10, 43, 44, 67-70, 81-88, 93-96, 98-122, 147-154, 159-162, 171-174
(CONFIDENTIAL/SECRET) *pp 6-10, 43, 44, 67-70, 81-88, 93-96, 98-110, 113-116, 118-122
147-154, 159-162, 174 (u)
pp. 111 & 112 remain (s), 117 remains (s)
pp. 171-173 refer to N-NC/56*

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NORTH AMERICAN AEROSPACE DEFENSE COMMAND

SEP 21 2006

MEMORANDUM FOR HQ NORAD/USNORTHCOM/HO

FROM: HQ NORAD J3

SUBJECT: Declassification Review of Histories

1. The CONAD/ADC/ADCOM/NORAD/USSPACECOM histories requested in your 19 May 06 memorandum have been reviewed and are now declassified except for the following sections (justification for retaining classification follows each description).

a. NORAD Historical Summary, Jan-Jun 1958, p. 56. N/J3 does not have the technical expertise to evaluate the classification level of the described communications architectures. Please refer this to N/NC J6 for evaluation.

b. NORAD/ADCOM Historical Summary, Jul-Dec 1959, p. 58. Document still contains information classified in CONPLAN 3310.

c. CONAD Command History, 1970, p. 78. Information classified per Ballistic Missile Early Warning System (BMEWS) Security Classification Guide (SCG).

d. CONAD Command History, 1971, p. 115. Information classified per BMEWS SCG.

e. History of Space Command/ADCOM/ADC, Jan-Dec 1982, pp. 25, 34. Document contains information still classified per the Defense Support Program SCG, and the BMEWS SCG.

f. History of Space Command/ADCOM, Jan-Dec 1984, p. 131. Please refer to N/NC J52 for declassification instructions.

g. History of Space Command/ADCOM, Jan-Dec 1984, p. 146. Information still indicates a potential vulnerability to National Defense.

h. History of NOARD, Jan-Dec 1986, p. 61. Document contains information classified in NI 10-4.

i. History of NORAD, 1990-91, p. 11. Source of the document is the National Defence Headquarters, Ottawa. Please refer to NDHQ for declassification instructions.

j. History of NORAD, 1990-91, p. 20, 29. Document contains information classified in CONPLAN 3310.

k. History of NORAD, 1990-91, p. 36. Please refer to SJTFHQ-N for declassification instructions.

l. History of NORAD, 1 Jan-31 Dec 1992, p. 69. Information still indicates a vulnerability and capabilities of adversary weapons systems.

m. History of NORAD, 1993-94, p. 97. Information classified per FPS 117 SCG and FPS 124 SCG.



2. N/J3 POC for this review is Lt Col Reilly, 4-3410.



BRETT D. CAIRNS
Major-General, CF
Director of Operations

SECRET (U)

**NORTH AMERICAN AEROSPACE DEFENSE COMMAND
AND
UNITED STATES NORTHERN COMMAND**



19 May 2006

MEMORANDUM FOR HQ NORAD/J3

FROM: HQ NORAD/USNORTHCOM/HO

SUBJECT: Declassification Review of Histories

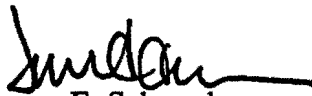
1. Executive Order 12958 requires a review of classified documentation more than 25 years old. The materials attached have been reviewed during previous declassification reviews, but still retain a security classification. The following documents have been identified as potential enclosures for a NORAD historical supplement currently being prepared by the NORAD/USNORTHCOM History Office.
2. During the review process, if any material within still requires protection, please mark those portions (e.g., words, phrases, sentences, paragraphs, pages) with red brackets ([]). Along with this, please provide justification for retaining the security classification for these portions.
3. Once the declassification review is completed, please prepare a memorandum for the director's / vice director's signature which states:
 - a. The CONAD/ADC/ADCOM/NORAD/USSPACECOM (as appropriate) history(ies) for the period(s) have been reviewed and are now declassified; or
 - b. The CONAD/ADC/ADCOM/NORAD/USSPACECOM (as appropriate) history(ies) for the period(s) have been reviewed and are now declassified except for the following sections: _____. The justification for retaining the classification is: _____.
4. Request the NJ3 staff review the following documents per Executive Order 12958 and the instructions in paragraphs 2 and 3 above. Please complete the review by 30 September 2006.
 - a. CONAD Historical Summary, Jul 1956-Jun 1957, p. 80.
 - b. CONAD and NORAD Historical Summary, Jul-Dec 1957, p. 128. *Remainder of planning reviewed except p. 128*
 - c. NORAD Historical Summary, Jan-Jun 1958, pp. 45-46, 48-49, 56, and 58. *except p. 56*
 - d. NORAD and CONAD Historical Summary, Jul-Dec 1958, pp. 81 and 85.
 - e. NORAD and CONAD Historical Summary, Jan-Jun 1959, p. 72.

SECRET (U)

~~SECRET~~ (U)

Part of
page remains classified

- f. NORAD and CONAD Historical Summary, Jul-Dec 1959, p. 58.
 - g. NORAD and CONAD Historical Summary, Jan-Jun 1961, p. 49.
 - h. NORAD and CONAD Historical Summary, Jul-Dec 1961, p. 32.
 - i. CONAD Command History, 1968, pp. 5 and 97.
 - j. CONAD Command History, pp. 78, 97, and 114.
 - k. CONAD Command History, pp. 115, 126, 131, and 137.
 - l. CONAD Command History, p. 106.
 - m. History of ADCOM, 1 Jul-31 Dec 1975, pp. 55-56.
 - n. History of ADCOM/ADC, 1 Jan-31 Dec 1979-80, p. 58.
 - o. History of Space Command/ADCOM/ADC, Jan-Dec 1982, pp. 25 and 34.
 - p. History of Space Command/ADCOM, Jan-Dec 1983, pp. 94-96, 100, and 128.
 - q. History of Space Command/ADCOM, Jan-Dec 1984, pp. 131, 139-140, 146, 158, and 179.
 - r. History of U.S. Space Command/ADC/AFSPACE, 1 Jan-31 Dec 1985, pp. 21 and 178.
 - s. History of NORAD, Jan-Dec 1986, pp. 25, 61-65, and 68.
 - t. History of NORAD, Jan-Dec 1987, pp. 26-28, 100, 103-104, and 107.
 - u. History of NORAD, Jan-Dec 1988, pp. 85, 106, 108-110, and 113.
 - v. History of NORAD, Jan-Dec 1989, pp. 232, 234-237, and 240.
 - w. History of NORAD, 1990-1991, pp. 11, 14-15, 17, 20, 22-23, 29, 36, 49, 91, and 126.
 - x. History of NORAD, 1 Jan-31 Dec 1992, pp. 43, 69, and 96.
 - y. History of NORAD, 1993-1994, pp. 107 and 163.
 - z. History of NORAD, 1995, p. 97.
5. HQ NORAD/HO/POC is the undersigned, Mr. Jerry Schroeder, 4-3385/5999.


Jerome E. Schroeder
Deputy Command Historian

THIS MEMORANDUM IS UNCLASSIFIED WHEN ATTACHMENTS ARE WITHDRAWN.

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NORTH AMERICAN AEROSPACE DEFENSE COMMAND

03 AUG 1991

MEMORANDUM FOR HQ NORAD/USSPACECOM/HO

FROM: HQ NORAD/J3

SUBJECT: Declassification Review of Histories

1. The CONAD histories for the January – June 1959 and July – December 1959 periods have been reviewed and are now declassified except for the following sections:

January – June

Pages 67 –71, reason – similar to current rules of engagement

Pages 72,73,74, reason – issues concerning nuclear capabilities/procedures

July – December

Pages 55 – 57, reason – issues concerning nuclear capabilities/procedures

Pages 57 – 58, reason – DEFCONs are still classified at the SECRET level

Pages 59 – 61, reason – similar to current rules of engagement

Page 62, reason – similar to current procedures

2. If you have any questions, please contact my POC, Maj Bob Sneath, 4-5471.

DAVID W. BARTRAM
Major-General, CF
Director of Operations

FOR THE COMMON DEFENCE

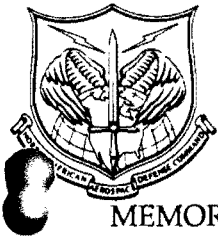


POUR LA DEFENSE COMMUNE

~~CONFIDENTIAL~~

NORTH AMERICAN AEROSPACE DEFENSE COMMAND

RELEASEABLE TO CANADA-U.S.



MEMORANDUM FOR HQ NORAD/J3

25 June 1998

FROM: HQ NORAD/USSPACECOM/HO

SUBJECT: Declassification Review of Histories

1. Executive Order 12958 requires a review of classified documentation more than 25 years old. The NORAD/USSPACECOM History Office (HO) maintains NORAD and Continental Air Defense Command histories, studies, and other documentation that falls into this category. In order to comply with the Executive Order, HO will forward these documents on a systematic basis to functional experts within the NORAD staff to complete this review.
2. During the review process, if any of the material within the documentation still requires protection, please mark those portions (e.g. words, phrases, sentences, paragraphs, pages) with red brackets ([]). Along with this, please provide the justification for retaining the security classification for these portions.
3. Once the declassification review is completed, please prepare a memorandum for the director's/vice director's signature which states:
 - a. The CONAD/ADC/ADCOM (as appropriate) history(ies) for the period(s) have been reviewed and are now declassified; or
 - b. The CONAD/ADC/ADCOM (as appropriate) history(ies) for the period(s) have been reviewed and are now declassified except for the following sections: . The justification for retaining the classification is
4. Request the NJ3 staff review the following documents per Executive Order 12958 and the instructions in paragraphs 2 and 3 above. Please complete the review by 6 August 1998.
 - a. NORAD/CONAD, Historical Summary, January-June 1959
 - b. NORAD/CONAD, Historical Summary, July-December 1959
5. HQ NORAD/HO POC is the undersigned to Mr. Schroeder, 4-5999/3385.


JEROME E. SCHROEDER
Assistant Historian

THIS MEMORANDUM IS UNCLASSIFIED WHEN ATCHS 1 & 2 ARE WITHDRAWN

RELEASEABLE TO CANADA-U.S.

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FOR THE COMMON DEFENCE

POUR LA DEFENSE COMMUNE



**NORTH AMERICAN AIR DEFENSE COMMAND and
CONTINENTAL AIR DEFENSE COMMAND**

HISTORICAL SUMMARY

JULY-DECEMBER 1959

Directorate of Command History
Office of Information Services
Headquarters NORAD/CONAD

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~~SECRET~~

SECURITY NOTICE

CLASSIFICATION

This document is classified SECRET in accordance with paragraph 30b (2), AFR 205-1, and Canadian Air Publication 425. It will be transported, stored, safeguarded, and accounted for as directed by AFR 205-1, AR 380-5, OPNAV Instruction 5510.1A, CAP 425, CAC 255-1, and CBCN 5101.

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* This page is marked SECRET in accordance with paragraph 45b (1), AFR 205-1. However, its actual classification is UNCLASSIFIED.

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PREFACE

UNCLASSIFIED

This historical summary is one of a series of semi-annual reports on the North American Air Defense Command and the Continental Air Defense Command. Its purpose is two-fold. First, it provides a ready reference to NORAD and CONAD activities by bringing together in a single document the key data found in several hundred documents. Secondly, it records for all time the activities of NORAD and CONAD during the period of the report.

Of overwhelming significance to air defense were the reductions being made in nearly all elements of the current and future system. This history, which is concerned with the last six months of 1959, covers the reductions programmed or considered during this period. Included are discussions of the reduction, deletion, or deferral, as the case may be, of the following: SAGE super combat center program, NORAD hardened COC, the AN/GPA-73 for Alaska, frequency diversity and gap filler radars in the CONUS, Alaskan gap filler radars, new airborne early warning and control aircraft, the Navy's blimp squadron, DEW line radar improvements, sea barrier picket ships, BMEWS tracking radars, Air Force interceptor squadrons, the F-108 interceptor, the Navy's interceptor squadron on regular air defense duty, and Bomarc squadrons.

In subsequent histories, there will be covered the general scope of these and other changes, the impact on the air defense system, and the revision of NORAD/CONAD plans and concepts as necessitated by the reductions, all of which developed more fully in 1960. The requirement to cover only a six month period and to issue the history on a certain date prevented coverage of these matters in this edition.

The source materials from which this history was written are on file in the historical office and are available for use by all authorized persons. For security reasons, a list of the documents is not included with this history.

Colorado Springs, Colorado
1 May 1960

L. H. BUSS
Director of Command
History

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APPENDIX

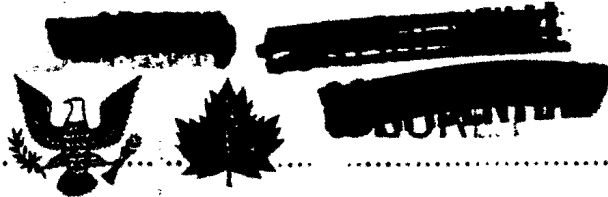
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CHAPTER 1

Organization

NORAD/CONAD HEADQUARTERS REORGANIZATION

The Joint Chiefs of Staff approved the CONAD-submitted plan for reorganization of Headquarters CONAD/NORAD on 23 June 1959, with certain changes* These changes included a reduction in the number of additional personnel requested. The reorganization plan had asked for an increase of 521 to bring the total to 966. The JCS authorized an increase of fifty per cent over the authorized strength of the combined NORAD/CONAD Headquarters of 445 (which included 35 Canadians). This meant an increase of 223 to bring the total to 668.

An Ad Hoc committee, formed to put the reorganization plan into effect, presented a phased implementation program to the Commander-in-Chief, NORAD/CONAD, General E. E. Partridge, at mid-July. He approved the plan and set 3 August as the date for implementation of the reorganization.

This was one of the last official acts of General Partridge who retired at the end of July. Implementation of the reorganization plan was backed by General Laurence S. Kuter, who assumed command of NORAD/CONAD on 1 August 1959. General Kuter had advised in a letter to General Partridge in June that the staff need not delay any reorganization actions on the premise that his views might differ from those of General Partridge.

The new staff structure was established as of 3

* See NORAD/CONAD Historical Summary, January-June 1959, pp 3-7, for this plan and the JCS-directed changes.

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August 1959 by separate general orders for NORAD and CONAD. The staff structures established for NORAD and CONAD were identical except for the position of deputy commander-in-chief on the NORAD staff.

The assignment of additional personnel to the NORAD/CONAD staff to bring it up to the total allowed by the JCS was planned for three phases over a 90-day period. On 23 July, ADC, ARADCOM, and NAVFORCONAD were sent copies of the personnel assignment plan. Each was told to arrange for the provision of the manpower authorizations and assignment of personnel accordingly.

SAGE REGION REORGANIZATION

Background. Since mid-1958, the NORAD/CONAD subordinate unit organizational structure had been undergoing extensive changes. These included the discontinuance of geographically-designated regions, discontinuance of divisions, establishment of numerically-designated regions, and realignment of region and sector boundaries. The purpose of these changes was to reorganize the structure as required for transition from the manual control system to the semi-automatic ground environment (SAGE) system.

This reorganization was being made in phases in accordance with the activation of SAGE units. From the purely manual system organization of mid-1958, the organization was to go to nine-region structure by 1 July 1960 (which would include one region in Canada and one region in Alaska) and to an eleven-region structure by 1 July 1964 (which would also include one region in Canada and one region in Alaska).

The Air Force Air Defense Command organizational structure was undergoing a similar reorganization which would bring first a seven-division structure in the U. S. and later a nine-division structure in the U. S. The U. S. Army Air Defense Command planned to establish a seven-region structure in the U. S.

NORAD originally established in 1958 a total of 23

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divisions and five regions. Seven of these divisions and two of these regions were outside of the continental U. S. In addition to the 18 NORAD divisions and three regions in the U. S. at mid-1958, there was an equal number of CONAD divisions and regions.

The reorganization actions taken prior to 1 July 1959 reduced the number of NORAD/CONAD divisions to eleven in the U. S. USAF ADC divisions had also been cut to eleven. Four of these had been redesignated as SAGE divisions (25th, 28th, 30th, and 32d). To accommodate these changes, both NORAD/CONAD and ADC boundaries had been adjusted as required toward the SAGE configuration and division headquarters moved to their SAGE locations.

By 1 July 1959, NORAD/CONAD had also established six sectors in accordance with the phasing into operation of SAGE direction centers within each sector. These sectors were the New York Sector, McGuire AFB, New Jersey; Boston Sector, Stewart AFB, New York; Syracuse Sector, Hancock Field, New York; Washington Sector, Fort Lee, Virginia; Bangor Sector, Topsham AFS, Maine; and Detroit Sector, Cosper AFS, Michigan. The SAGE direction centers had become operational in all but the Detroit Sector by 1 July.

NORAD/CONAD Organizational Changes and Status to 15 January 1960. On 1 August 1959, NORAD/CONAD took the first action to redesignate divisions as regions. Effective this date, the Eastern NORAD/CONAD Region was discontinued.* On the same date, the 25th, 30th, and

* For details of changes prior to 1 July 1959, see NORAD/CONAD Historical Summary, Jul-Dec 1958, pp 14-19; Jan-Jun 1959, pp 12-17.

** Actually, the operational phase-out date of Eastern was 1 July 1959. On this date, for example, the operational responsibilities for the Atlantic Seaward Element were transferred to the 28th NORAD/CONAD Division. Because of these changes, the Navy disestablished its NAVFOR Eastern CONAD Region on 1 August 1959 (inactivation and close-out of all records was accomplished by 15 August 1959) and four naval billings were transferred to the 28th. The additional month between the operational phase-out on 1 July and the effective date of discontinuance of the Eastern Region was for clearing up administrative matters.

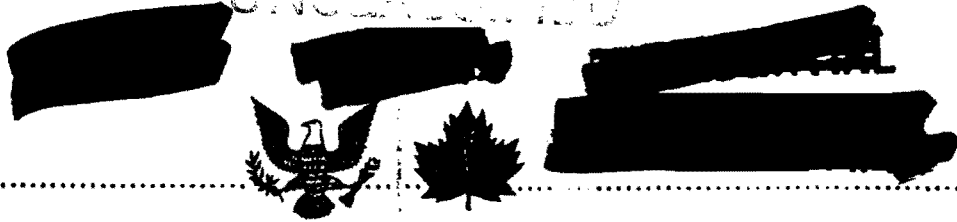


Table 1

BOX SCORE
U. S. REGION/DIVISION REORGANIZATION

STATUS AS OF	NORAD/CONAD - U. S.			ADC - U. S.		
1 July 1958	16 Divs.	3 Rgns.	16 Man. Divs.	3 Def. For.	0 SAGE Divs.	
	9th 31st Eastern 20th 32d Central 25th 33d Western 26th 34th 27th 35th 28th 37th 29th 58th 30th 85th		9th 31st Eastern 20th 32d Central 25th 33d Western 26th 34th 27th 35th 28th 37th 29th 58th 30th 85th			
1 July 1959	11 Divs.	3 Rgns.	7 Man. Divs.	3 Def. For.	4 SAGE Divs.	
	20th 30th Eastern 25th 31st Central 26th 32d Western 27th 33d 28th 34th 29th (Discontinued: 9th, 35th, 37th, 58th, and 85th)		20th 31st Eastern 27th 33d Central 28th 34th Western 29th (Inactivated: 9th, 35th, 85th, 58th, and 37th)		25th 26th 30th 32d	
15 Jan 1960	2 Divs.	6 Rgns.	1 Man. Div.	1 Def. For.	6 SAGE Divs.	
	25th 26th 28th 29th (Discont.: 30th 20th, 27th, 32d 31st, & 33d 34th) Western (Discont: Eastern & Central)		28th (Inact.: 20th, 27th, 31st. & 34th)	Western (Inact.: Eastern & Central)	25th 26th 29th 30th 32d 33d	





32d NORAD/CONAD Divisions were designated regions. These new regions assumed responsibility for the Eastern Region area and reported directly to NORAD/CONAD Headquarters. ADC did not inactivate its Eastern Air Defense Force until 1 January 1960. But EADF began its official phase-out on 1 July 1959.

The Central NORAD/CONAD Region was discontinued on 1 January 1960 and its area was divided between two divisions, the 29th and 33rd, both of which were redesignated regions on this date. The 33rd, which had been at Oklahoma City AFS, was established at Richards-Gebaur AFB, Missouri. The remaining divisions that had been in the Central area were discontinued, the 20th and 34th on 1 January, the 31st on 15 January. SAGE was not operational in either the 29th or 33rd Regions at this time.

USAF ADC inactivated its Central Air Defense Force and 20th and 34th Air Divisions (Defense) on 1 January, its 31st Air Division (Defense) on 15 January. Also, on 1 January, ADC divided the Central territory between the 29th and 33rd Divisions, which were established as SAGE divisions. The 33rd Air Division (SAGE) was activated at Richards-Gebaur AFB, and ADC's old 33rd Air Division (Defense) was redesignated the Oklahoma City Air Defense Sector (Manual).

Earlier, on 1 October 1959, the 27th NORAD/CONAD Division at Norton AFB, California, was redesignated the Los Angeles NORAD/CONAD Sector (Manual) in keeping with action by ADC. The latter redesignated its 27th Air Division (Defense) as the Los Angeles Air Defense Sector (Manual) on this date.

However, CONAD provided that the authorities and responsibilities held by the 27th NORAD/CONAD Division commander were to continue to be held by the commander of the Los Angeles NORAD/CONAD Sector (Manual). This delegation of authority and responsibility was to remain in effect only until 1 July 1960 when the 28th NORAD/CONAD Division was to be redesignated a region and assume control of the Los Angeles area.

Including the Los Angeles Sector, NORAD/CONAD had





established eight more sectors by 1 January 1960 to bring the total to 14. The seven sectors not previously listed were as follows:

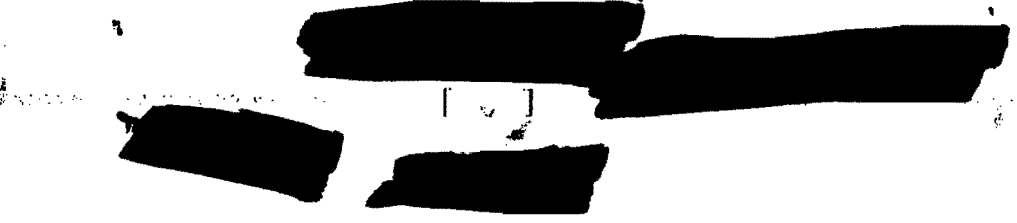
<u>NORAD/CONAD SECTOR</u>	<u>DATE</u>	<u>HEADQUARTERS LOCATION</u>
Chicago	1 Oct 59	Iruax Fld, Wisc.
Montgomery	11 Oct 59	Gunter AFB, Ala.
Duluth	15 Nov 59	Duluth Muni Aprt. Minn.
Grand Forks	15 Dec 59	Grand Forks AFB, N. D.
Kansas City (Manual)	1 Jan 60	Richards-Gebaur AFB, Mo.
Oklahoma City (Manual)	1 Jan 60	Oklahoma City AFS, Okla.
Albuquerque (Manual)	1 Jan 60	Kirtland AFB, N. M.

The SAGE direction centers in the Chicago, Duluth, and Grand Forks Sectors had become operational by the end of the year to bring the total SAGE DC's operational to nine by 1 January 1960. The SAGE DC at Gunter AFB, Alabama, Montgomery Sector, being used for EOMARC testing, was scheduled for operation in March 1960. The three manual sectors, Kansas City, Oklahoma City, and Albuquerque, were to operate the manual combat centers at Richards-Gebaur, Oklahoma City, and Kirtland respectively.

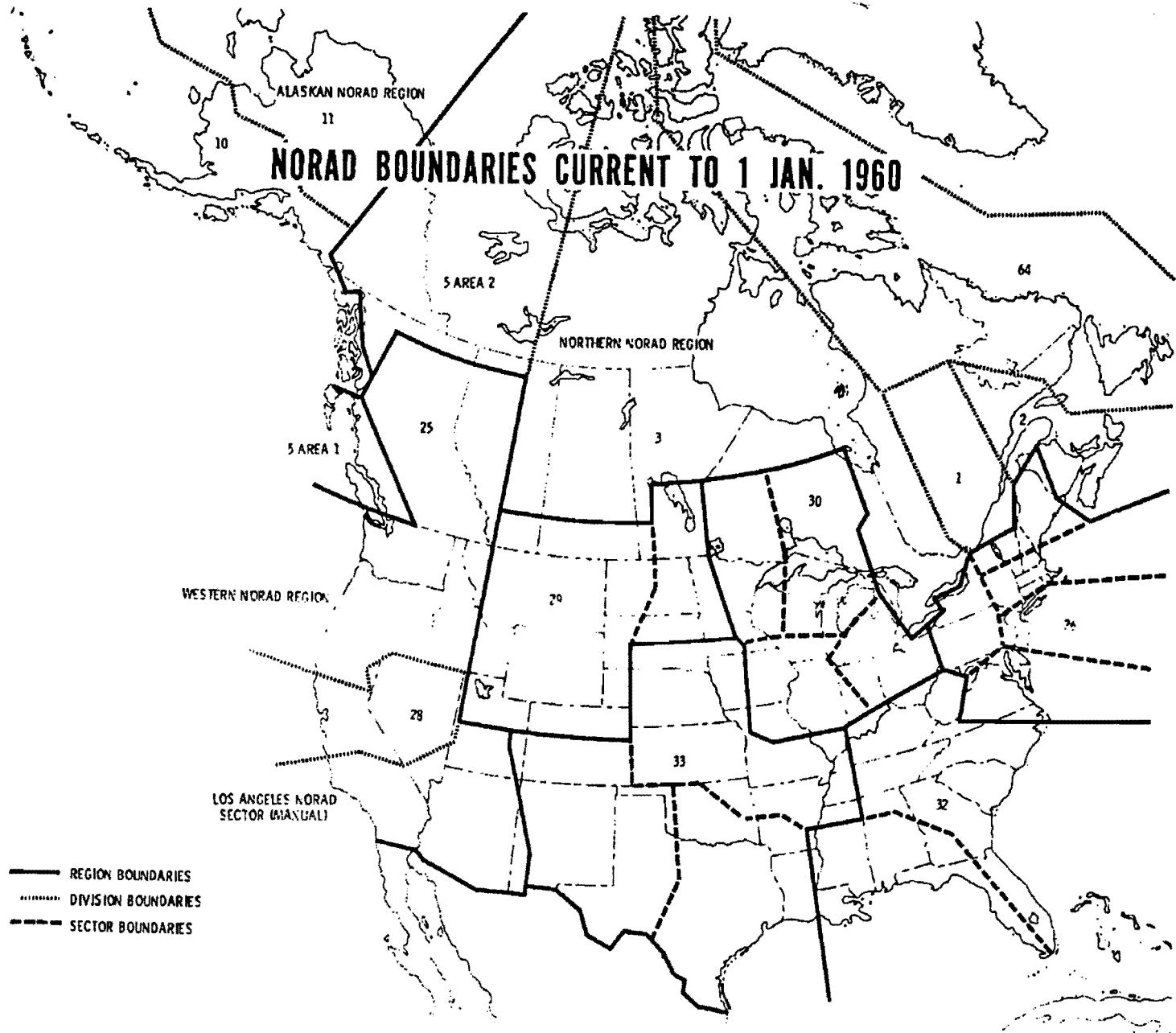
In September 1959, the second SAGE combat center, at the 30th Region, Trux Field, Wash. D.C., became operational. The other operational combat center was the 25th Region located at Syracuse, New York, which became operational on 1 January 1960.

According to planning at the end of 1959, the Western Region was to be discontinued as a NORAD/CONAD on 1 July 1960 and its area taken over by the 25th and 28th Divisions which would be redesignated regions on this date. This would bring the organization to a seven-region structure in the U. S. USAF ADC planned to deactivate its Western Air Defense Force on 1 July, which would give it a seven-division structure.

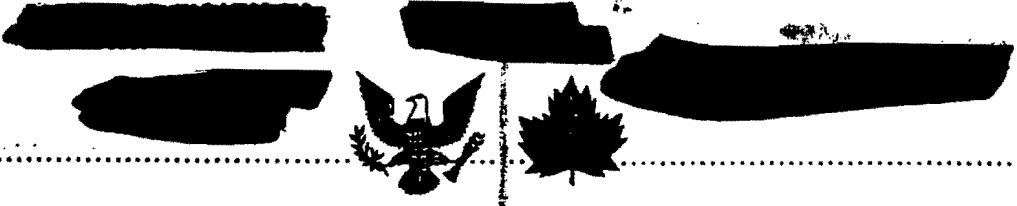
The Army Air Defense Command revised NORAD in October 1959 that it planned to establish two new regions, the 3rd at Malmstrom AFB and the 7th at M. Ford AFB, and to realign its boundaries so as to have a seven-region structure by 1 July 1960. The ARADCOM organization consisted of five regions, as of 1 January 1960.



NORAD BOUNDARIES CURRENT TO 1 JAN. 1960



[4]



This was to be an interim organization, with most boundaries aligned with NORAD/CONAD region boundaries and certain ARADCOM region headquarters collocated with NORAD/CONAD region headquarters. The 1 July organization would have two areas where NORAD/CONAD and ARADCOM region boundaries differed. There would not be common boundaries between the 1st and 2nd ARADCOM Regions and the 26th and 32nd NORAD Regions or between the 3rd and 4th ARADCOM Regions and the 29th and 33rd NORAD Regions. However, ARADCOM said that the variations in boundaries would be eliminated as soon as practicable to effect a complete alignment with NORAD boundaries. In addition, complete collocation of ARADCOM region headquarters with NORAD region headquarters was to be effected as soon as facilities were available at the final locations of the NORAD region headquarters.

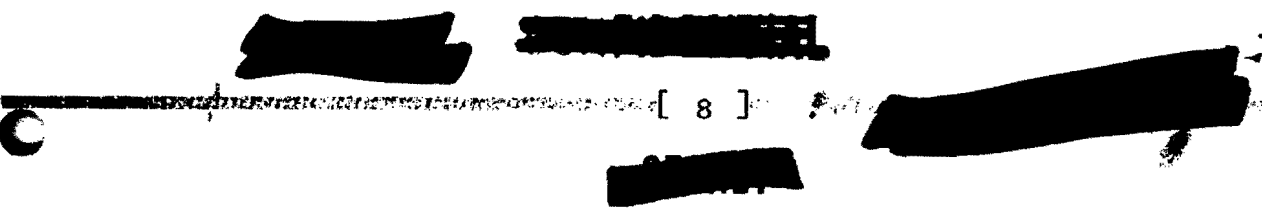
NORAD concurred with the ARADCOM plan on 20 November 1959, noting that while complete boundary agreement was desirable, ARADCOM's problems in realignment were appreciated.

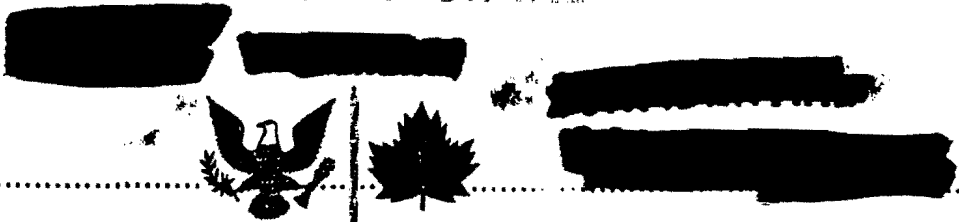
INTEGRATION OF 25th AND 5th DIVISIONS

Background. In November 1958, Western Region forwarded a proposal of the 5th and 25th NORAD Divisions to shift operational control of certain USAF-manned radar units in Canada from the 5th to the 25th. RCAF ADC/NNR concurred on 13 December 1958 and NORAD approved the plan and directed implementation on 16 January 1959.

Northern and Western Regions then recommended that the 5th NORAD Division and the 25th NORAD Division be integrated. They proposed that the 5th be disbanded and its area of responsibility and control of forces be transferred to the 25th. NORAD concurred.

This change was planned in phases. The first step was for the 25th to assume operational control of the four USAF-manned radars, using existing circuitry. This was taken on 2 March 1959. The second step was for the 5th to be phased out and the 25th to assume operational control of the RCAF air defense forces.





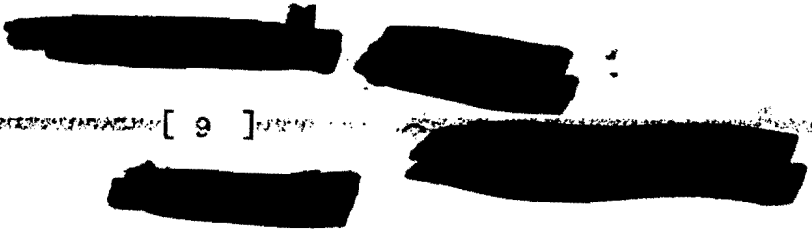
Phase-out of the 5th NORAD Division. In February 1959 and in amendments in May and July. NORAD submitted requirements to the COSC for joint manning of the 25th NORAD Division. RCAF positions on the staff of the 25th included the deputy commander position. On 17 August 1959, NORAD was informed by the Executive Agent for the COSC that the Canadian Cabinet Defense Committee had approved, in principle, the Canadian participation in the region and sector headquarters located in the U. S. (see below for additional details). It was further stated that Canada was endeavoring to man the 25th Division in accordance with NORAD submissions in May and July.

On 22 October 1959, NORAD proposed to the Canadian Executive Agent that the date for assumption of operational control of the 5th area by the 25th be set to coincide with the operational date of the Seattle Sector -- 1 March 1960. The expense of assuming control under the manual system was not warranted.

NORAD also submitted a new manning proposal for RCAF positions on the 25th staff. A total of 28 positions were listed. Of these, 17 spaces were for the combat center. NORAD asked that personnel be transferred for duty in January 1960. Shortly thereafter, this list was reduced by one officer.

The Executive Agent replied on 2 November that the 1 March 1960 date was satisfactory. The Chief of the Air Staff also stated that NORAD's manning requirements were being studied. On 7 December, the Chief of the Air Staff advised that the required 16 individuals had been selected for duty in the combat center at the 25th and that 15 of them would be sent to the SAGE Training Course at Richards-Gebaur in January. The other individual was already on duty at the 25th and would not need to attend the school.

On 4 December, NORAD requested RCAF Headquarters and USAF ADC to take the necessary provisioning action to provide the communications required for assumption of operational control by the 25th. The date for assumption of operational control was delayed, however.



[REDACTED] UNCLASSIFIED [REDACTED]



The Chief of the Air Staff asked that it be postponed until 15 May 1960 when the 25th NORAD Division SAGE combat center became operational. By that date, the RCAF would have the required personnel in place at the 25th. NORAD agreed and on 19 February advised all parties of this postponement.

MAKING OF THE HEADQUARTERS OF NORTHERN NORAD REGION AND CANADIAN/U. S. BORDER REGIONS

Organization of NNR Headquarters. By General Order 6, dated 5 August 1958, NORAD established the Northern NORAD Region, effective 10 June 1958 (the date of the NORAD Terms of Reference), with headquarters at RCAF Station, St. Hubert.* NORAD designated the commander of the RCAF ADC as commander of the NNR and advised him by message that the staff of the RCAF ADC would have to be used for NORAD work until separate manning was approved.

Manning proposals were then submitted to the JCS and COSC for the NNR Headquarters. On 24 December 1958, the JCS concurred in NORAD's need for the U. S. manpower spaces. The Army and Air Force were asked to provide the personnel. A total of 18 spaces were authorized, 14 officers and two enlisted men. Thirteen of the officers and the two enlisted men were to be provided by the Air Force. The U. S. personnel began to arrive on 15 May 1959 and were assigned to the NNR staff, but in a liaison status only pending Canadian approval. All spaces were filled with the exception of two, the deputy commander and deputy for plans positions, both of which called for Air Force brigadier generals.

On 17 August 1959, NORAD was advised of Canadian Cabinet Defence Committee approval, in principle, of U. S. participation in the NNR Headquarters and the 35th Region Headquarters (as NNR was later to be redesignated).

* GO 3 was rescinded by GO 11, 1 September 1958, but NNR's establishment effective 10 June 1958 was not changed.

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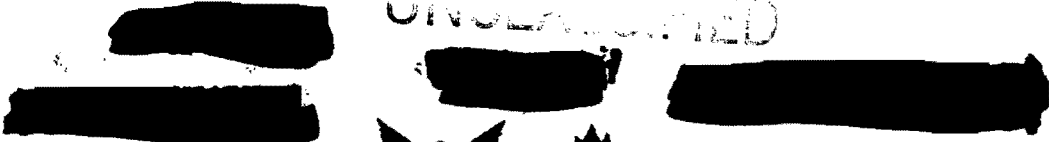
On 30 September 1959, RCAF Headquarters advised of Canadian approval of the formation of NNR Headquarters and the manning by U. S. and Canadian personnel in accordance with NORAD's requirements, with one exception. The RCAF requested that the deputy for plans position be changed from a brigadier general to a colonel because the NNR was to be redesignated the 35th Region and the position then would call for a colonel. The RCAF asked for the date that NORAD would organize the headquarters.

NORAD replied that effective 0001 hours, 1 November 1959, the NNR Headquarters would be organized. The commander of the RCAF ADC was to continue as the commander of the NNR and, as such, was to assume command of NNR Headquarters on its formation. USAF ADC and ARADCOM were directed to change the status of the U. S. personnel from a liaison capacity to a fully assigned status. USAF ADC was also asked to assign the brigadier general that had been withheld and a colonel in place of the other brigadier general that had not been assigned.

NORAD General Order 31, dated 2 November 1959, designated and organized NNR Headquarters effective 1 November.

Establishment of NORAD Divisions in Canada. On 2 November 1959, RCAF ADC advised that 1, 2, and 3 Sectors and 6 Air Division were to be designated 1st, 2nd, 3rd, and 6th NORAD Divisions, respectively, in accordance with NORAD GO 11, 1 September 1958. This general order established these divisions effective 1 September 1958.

Revision of RCAF ADC/CONAD Agreement. Back on 1 September 1953, the U. S. Northeast Command, a JCS unified command, was disestablished and CINCONAD took over responsibility for air defense of the Northeast Area (Greenland and western coastal area of Canada). The RCAF had always had operational control of U. S. air defense forces in Canada. This had been formally agreed to initially by the Commander Northeast Command and the AOC RCAF ADC in April 1953. This agreement and subsequent renewals provided that the AOC RCAF ADC would exercise operational control through CINCNE.



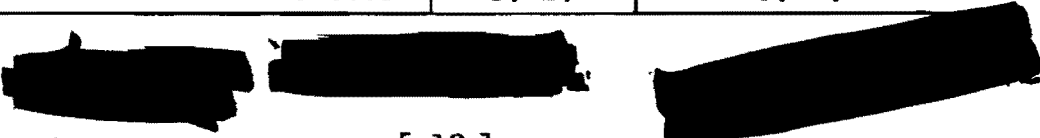
After CONAD took over, a new agreement was signed, dated 1 January 1957, by CINCONAD and the ADC RCAF ADC. It provided that the latter would exercise operational control over all U. S. air defense forces in Canada through CINCONAD's subordinate commander in the area.

On 27 October 1959, NNR suggested that this agreement be rescinded as being redundant because of the formation of NNR Headquarters and also because it had been superseded by other NORAD regulations and orders. NORAD replied that it agreed and that effective 1 November 1959, the agreement would be rescinded.

Manning of Other Canadian/U. S. Border Regions.
 On 25 February 1959, NORAD submitted to the Canadian Chiefs of Staff Committee its proposed U. S./Canadian manpower requirements and the commander and deputy commander positions for border regions and sectors. NORAD listed five regions and eleven sectors in this submission. NORAD stated in its letter to the executive agent that the manpower requirements did not represent a formalized headquarters position, but were provided as a basis for study and recommendation by the COSC.

For commanders and deputy commanders of these jointly manned organizations, NORAD proposed the following:

Unit	Commander	Deputy Commander
25th Region	U. S.	Canada
Seattle Sector	U. S.	Canada
Spokane Sector	U. S.	U. S.
29th Region	U. S.	U. S.
Grand Forks Sector	U. S.	U. S.
Great Falls Sector	U. S.	U. S.
Minot Sector	U. S.	U. S.
30th Region	U. S.	Canada
Detroit Sector	U. S.	U. S.
Duluth Sector	U. S.	U. S.
Sault Ste Marie Sector	U. S.	U. S.





Unit	Commander	Deputy Commander
35th Region Ottawa Sector Bangor Sector*	Canada Canada	U. S. Canada
26th Region Bangor Sector* Syracuse	U. S. U. S. U. S.	U. S. Canada Canada

* NORAD stated that when the Bangor Sector boundary adjustment under the SCC plan was made, it was proposed to install a Canadian as Commander of the Bangor Sector with a U. S. deputy.

On 21 May 1959, NORAD advised the COSC that the proposals previously submitted were firm, at least until the reorganization and boundary alignment required by the super combat center plan. NORAD said that there would be some delay in final implementation of the complete organization and manning of all of its subordinate organizations. But there was a pressing need for Canadian representation at some units. For this reason, NORAD asked that, as an interim arrangement, Canadian liaison officers be authorized for certain organizations, which were listed by NORAD.

As noted previously, on 17 August 1959, NORAD was advised that the Canadian Cabinet Defence Committee had approved, in principle, the Canadian participation in the border region and sector headquarters as outlined by NORAD. However, three additional deputy commander positions were requested. The executive agent letter stated that this committee felt that Canadian interests would be better served if the deputy commander position at the 29th Region Headquarters and at the Detroit and Grand Forks Sector Headquarters were Canadian officers. It was also stated that complete manning requirements were being prepared and that in the meantime, arrangements were being made to provide RCAF officers in a liaison status to the positions asked in NORAD's 21 May letter.

[REDACTED]



NORAD informed the COSC and the JCS on 23 October 1959 that it concurred with the proposal for Canadian deputy commanders for the 29th Region and Grand Forks Sector Headquarters. NORAD said that although the Canadian force contribution in these areas was modest, the Canadian territory involved was large. But NORAD said that it did not agree with the proposal for a Canadian deputy commander at the Detroit Sector Headquarters. The air defense forces involved would be all U. S., NORAD pointed out, as would about four-fifths of the territory. Canadian interests would be served, NORAD felt, by providing for Canadian representation on the Detroit Sector staff (nine officers and twenty enlisted men) to include a group captain in the operations and planning staff.

NORAD requested approval of the commander/deputy commander alignment as outlined on 25 February with the two additional deputy commander positions and for approval of the ten-region SCC boundary plan. Under this plan, what was currently the 30th NORAD Region would become, with shifts in boundaries, the 31st NORAD Region.

The JCS agreed with the revised apportionment of Canadian and U. S. officers for commander and deputy commander positions. On 12 November 1959, NORAD was informed that the Canadian Chiefs of Staff concurred with the revised NORAD alignment.

In the meantime, the RCAF began providing officers in a liaison capacity to certain region and sector headquarters as requested by NORAD on 21 May 1959. On 30 September 1959, NORAD was advised that transfer instructions had been issued for eleven RCAF officers with an effective date of 21 November 1959. They were slated for the 26th and 30th Region Headquarters, and the Syracuse, Bangor, Detroit, Duluth, and Grand Forks Sector Headquarters. On 29 December, NORAD advised these organizations that the Canadian liaison officers were to be under the full authoritative control of the commander of the unit and that they were to be placed in the operational staff positions that they would occupy when the organizations were organized and manned.

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On 17 February 1960, NORAD wrote to the RCAF, reaffirming the RCAF manning requirements. NORAD said that since its earlier correspondence, there had been a number of minor changes as a result of exchanges of correspondence between the two headquarters. The manning tables provided for RCAF confirmation or comment, which were dated 26 January 1960, showed a total of 334 RCAF personnel required for NORAD regions and sectors under the eight-region organization and 385 under the ten-region structure. This was for manning of four regions and ten sectors and did not include the 35th Region or Ottawa Sector.

ORGANIZATION OF NORAD/CONAD REGION HEADQUARTERS

Background. When the Continental Air Defense Command was established on 1 September 1954, it was superimposed on the existing USAF ADC structure. Each ADC headquarters from command down through division level was additionally designated a joint headquarters (e.g., Joint Eastern Air Defense Force and 32nd Joint Air Division (Defense)). The commanders of the defense forces and divisions were designated as commanders of the joint defense forces and joint divisions as an additional duty. Thus, in reality, CONAD was no more than an additional designation for USAF ADC.

New terms of reference in September 1956 provided authority for CINCONAD to establish a separate headquarters. He was also authorized to establish such subordinate joint organizations as he deemed necessary to accomplish his mission. CONAD had no approved subordinate unit manning, however, and could not organize and man separate units. However, on 15 January 1957, CONAD disestablished all of its joint defense forces and its joint divisions and replaced them with CONAD regions and CONAD divisions.

Region was considered to be a more appropriate term as the traditional designation given to the subdivision of an air defense territory. Also use of the term region distinguished CONAD units from ADC units, giving the former a little more identity. The ADC

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commanders were designated as commanders of the CONAD units. CONAD directed these individuals to have separate staffs, but they could appoint only provisional staffs for the CONAD units. And there were no requirements established for the size or organization of these provisional staffs.

The first proposed manning requirements for CONAD regions and divisions were submitted to the JCS on 7 June 1957. The size of the staffs proposed varied, but an average of about 128 people were proposed for each region headquarters and 115 for each division headquarters.

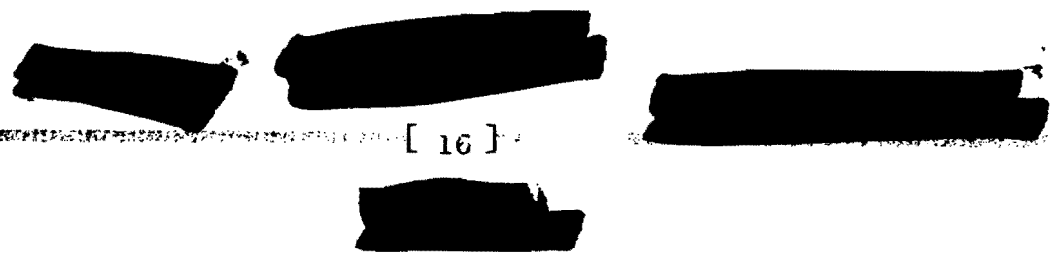
Before any action could be taken by the JCS, NORAD asked for a postponement of the decision. NORAD said it was going to change boundaries which would affect manning requirements.

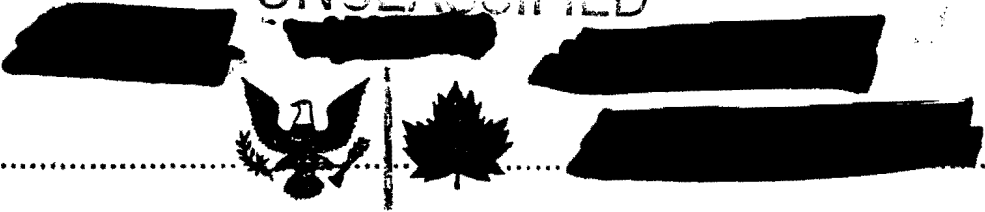
On 10 June 1958, CONAD received new terms of reference and terms were provided for NORAD. Both sets of terms provided that CINCONAD/NORAD was authorized to establish such subordinate joint organizations as he deemed necessary to carry out his assigned mission.

Nothing more was done on drawing up manning and organization requirements for NORAD/CONAD units. For one thing, the SAGE-transition-reorganization was underway, which was eliminating NORAD divisions. Secondly, reorganization of NORAD/CONAD Headquarters took precedence. A reorganization group established in July 1958 to develop a command headquarters and subordinate headquarters organization decided that doing both at once was too much. The decision was made to concentrate on the command headquarters first.

Region Organization Plan. Thus, after the NORAD/CONAD headquarters reorganization was completed, a plan for the organization of the region headquarters was prepared. It was sent to the component commands for comment in December and was finalized and submitted to the JCS on 8 February 1960.

NORAD's proposal was applicable to all regions





except the Northern Region and the Alaskan Region. The former was handled separately, as discussed above, and the organization of the latter was to be left to the wishes of the Commander-in-Chief Alaskan Command*. The sector organization was not covered on the assumption that the concepts and principles approved for the region would be applicable to the sector. NORAD proposed that the date for implementation of its plan be 1 July 1960 when the seven-region structure (within the continental U. S.) was achieved.

The concept under which the NORAD/CONAD region organization was developed provided for both the NORAD and the CONAD authorities and responsibilities, a concept that was adopted in organizing NORAD/CONAD Headquarters. The Commander-in-Chief, NORAD, a U. S. national, was also the Commander-in-Chief of the unified command, CONAD. He had the dual responsibility of exercising operational control over Canadian and U. S. air defense forces and of exercising operational command over U. S. air defense forces assigned to CONAD. A single, integrated NORAD/CONAD staff at the command level was established in which resided the combined functions.

At the region level, one individual, a U. S. national, was to be designated as the subordinate NORAD and CONAD commander and he was to have an integrated NORAD/CONAD staff. This would permit the exercise of the dual operational control and operational command responsibilities.

* NORAD adopted the term region as the organizational element immediately subordinate to NORAD Headquarters and the term sector as the major subdivision of the region. In keeping with this policy, NORAD suggested to CINCAL that the 10th and 11th NORAD Divisions in Alaska be redesignated as the Anchorage and Fairbanks NORAD Sectors. CINCAL agreed and requested that 15 May 1960 be the date for this redesignation.





However, the development of the subordinate headquarters organization was based on the premise that it should be primarily operational in nature. This consideration plus the fact that personnel were in critically short supply made it necessary that manning be aimed primarily toward the accomplishment of NORAD operational control functions. U. S. personnel assigned to the NORAD staff were to accomplish such essential CONAD functions as required.

Distribution among the Services of officer spaces and key staff positions was made on the basis of the composition of the forces within the region and the character of the operations. For example, in regions where SAGE was operational or being developed, it was considered appropriate that Air Force personnel predominate in the key positions until the system was completed or the personnel of other Services became proficient in the SAGE system. NORAD stressed that organizational and personnel adjustments might be required as the result of operational experience and changes in force deployments.

Currently, on the basis of force contributions, the Army was given command of two regions: the 28th, Hamilton AFB, California; and the 33rd, Richards-Gebaur AFB, Missouri. The other five regions were placed under Air Force commanders.

Because of the severe shortage of general officers, NORAD worked out a complicated, dual-role, manpower-saving arrangement for the region command positions. The arrangement was, however, designed to give NORAD the effectiveness and control it needed. Currently, the men designated as commanders of its regions were assigned to the Air Force ADC units as commanders of the ADC units and served as region commanders as a secondary duty.

NORAD proposed to reverse this arrangement. The NORAD/CONAD region commander was to be assigned to the NORAD/CONAD unit and serve as commander of the region as a primary duty. He could, however, be additionally designated as commander of his service component at the appropriate region. Under this dual-capacity arrangement,





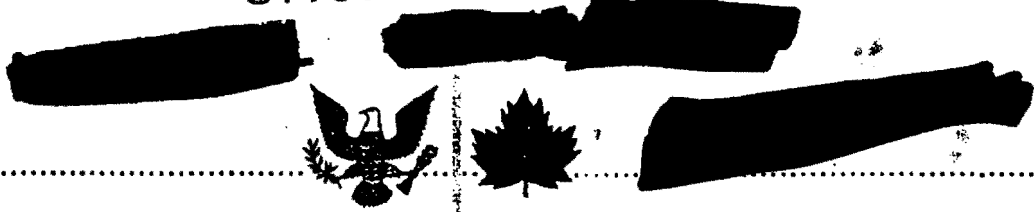
he was to be operationally responsible to CINCNORAD and in his capacity as component commander he would exercise the normal command authority over the component forces and activities. On a dual-capacity commander, concurrent effectiveness reports were to be submitted. CINCNORAD would report directly to the appropriate service on the individual's performance as region commander as his primary duty. The Commander of ADC or ARADCOM would report to the service on the individual's performance of his additional duty as region-level component commander.

The above plan was proposed to be reversed for the deputy region commander who would be from a different service than the region commander. The deputy commander would always serve in a dual capacity, as the assigned commander of his service component as a primary duty and as the designated deputy region commander as an additional duty.

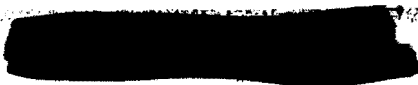
To illustrate, the 28th NORAD/CONAD Region commander would be, under this plan, an Army general officer. He could also be designated as the commander of the 6th ARADCOM Region as an additional duty. The 28th Air Division (SAGE) commander, an Air Force general officer, would be designated as deputy commander of the 28th NORAD/CONAD Region as an additional duty.

For those three regional headquarters where a Canadian was to be the deputy commander (the 25th, 29th, and 30th Regions), the Canadian deputy was to be known as the NORAD Vice Commander. He was to be over the dual-capacity deputy commander mentioned above. When the Canadian vice commander assumed command of the NORAD region during the absence of the NORAD/CONAD commander, command of the CONAD region was to pass to the senior U. S. officer present and eligible for CONAD command.

The staff structure of the region was to consist of a deputy for operations, and directorates of operations and systems training, intelligence, and plans and requirements. In addition, there was to be an office of information and an administrative element.



The total manpower requirement for the seven region headquarters was set at 479: 284 officers, 117 enlisted men, and 78 civilians. The strength of each region varied according to the needs of the particular region. The proposed manpower requirements ranged from 55 for the 32nd Region to 84 for the 25th Region.





CHAPTER 2

Control Facilities

CANCELLATION OF THE SAGE SUPER COMBAT CENTER

The SCC Plan. In 1958, USAF ADC proposed improving the SAGE system by employing a new, transistorized computer at certain locations in hardened facilities. NORAD approved an ADC operational employment plan on 20 December 1958, and on 5 February 1959, Air Force Headquarters advised ADC that it approved the concept of employing the computer in a hardened configuration.

The operational employment plan, as revised on 19 June 1959, provided that there would be ten super combat centers (SCC's), one for each of ten divisions (NORAD regions), which included one in Canada. Each was to employ the new computer, AN/FSQ-32*. One additional AN/FSQ-32 computer was planned for a direction center at the Albuquerque SAGE Sector. Five of the SCC's were to perform a dual function. i.e., in addition to operating as an SCC, they were to operate as a direction center (27th, 30th, 32nd, 33rd, and 35th).

Each division/region was to encompass two to four sectors. In all there were to be 27 sectors. Of these, 21 were to be equipped with an AN/FSQ-7 computer in a "soft" structure. Five of the sectors were to be controlled by the direction center portion of the SCC. And one sector, Albuquerque, as noted, was to have an AN/FSQ-32.

The operational employment plan provided that each of the ten SCC structures was to be hardened to a minimum of 200 pounds per square inch overload.

* Termed AN/FSQ-7A prior to January 1960.





A Department of Defense-prepared Continental Air Defense Program (see Chapter Four), dated 19 June 1959, the same date as this operational employment plan, reduced the number of hardened sites to six in the U. S. and one in Canada. It provided that consideration would be given to establishing three other SCC's in a soft configuration in the southcentral and central areas of the U. S.

Both of NORAD's Objective Plans, issued in 1958 and 1959, stated a requirement for this new computer in hardened facilities. The NADOP 1961-1965 carried a requirement for ten hardened SCC's by FY 1964 as the functional centers of ten NORAD regions.

Cancellation of the SCC's. In a message to NORAD on 9 December 1959, Headquarters USAF advised that because of budget limitations for FY 1961, the SCC's at the 27th (Denver) and the 33rd (San Antonio) Divisions, and the direction center at Albuquerque would have to be deferred. But the remaining SCC's were approved by the Air Force and were in the Air Force program. However, USAF also stated that the Office of the Secretary of Defense had placed a hold order on all SCC equipment pending evaluation.

Then on 21 December 1959, NORAD learned from personnel from the office of the Director of Defense Research and Engineering, who visited NORAD Headquarters, that a stop order had been placed on production of the AN/FSQ-32 and that a decision was pending in OSD to eliminate the entire SCC program. In messages to the JCS and COSC by NORAD following this 21 December conference, support was urged for the NORAD/USAF/Canadian program of seven hardened SCC sites in the U. S. and one in Canada. This was felt to be the minimum position, both messages stated, and should be supported "since these super combat centers are the key to maintaining centralized control of the air defense forces and to accomplishing force commitment to relatively large geographical areas during time of war..."

* An OSD evaluation of the SCC resulted in a recommendation in January 1960 for cancellation of the SCC program. On 18 March 1960, the JCS advised NORAD that they had approved cancellation of the SCC program for the U. S. This cancellation and its results will be covered in subsequent histories.

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CANCELLATION OF THE AN/GPA-73 FOR ALASKA

Background. The Alaskan Command Air Defense Requirements Plan, 1957-1966, submitted in March 1957, stated a requirement for Air Force BADGE (Base Air Defense Ground Environment) equipment for Alaska. On 19 August 1958, USAF advised the Alaskan Air Command that the Office of the Secretary of Defense had approved the AN/GPA-73 system for Alaska.

AAC then prepared an operational employment plan for its system, which was approved by USAF on 22 December 1958. AAC planned to employ the AN/GPA-73 components to form what it called an Alaskan Semi-automatic Defense System (ALSADS) in four subsectors: Fire Island, King Salmon, Murphy Dome, and Campion. AAC set January 1961 as the target date for implementation of the complete ALSADS.

Cancellation of the AN/GPA-73. Almost immediately the program slipped. In June 1959, USAF advised the Alaskan Command that equipment was being diverted to USAFE which would delay realization of the full capability as outlined in the ALSADS plan. Then on 15 July, USAF advised that there would be a further delay because of an OSD restriction on the procurement of the AN/GPA-73. The best estimate for completion of the ALSADS, USAF stated, was the third or fourth quarter of FY 1962.

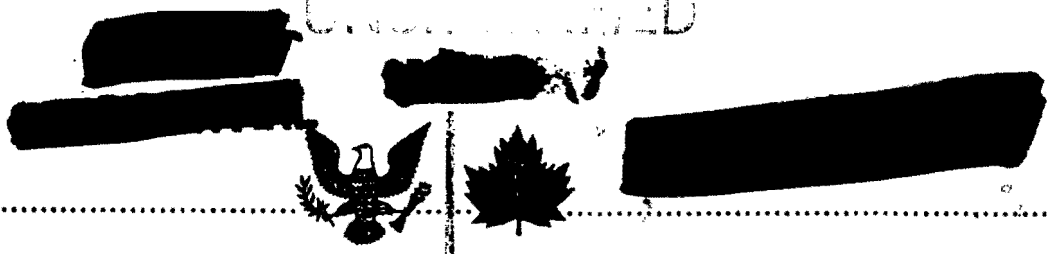
Finally, on 26 January 1960, USAF informed AAC that because of severe budget limitations, substantial reductions were necessary. This included cancellation of the AN/GPA-73 for Alaska. AAC replied that it still had a requirement for a modern environment system in Alaska, but in recognition of the severe limitations in the USAF budget for FY 1961, it reluctantly accepted cancellation of the AN/GPA-73.

AAC stated that in order to up-date its manual system, it had asked for Iconorama equipment at one COC and four direction centers. The relative cost was AN/GPA-73, approximately \$70 million; Iconorama, approximately \$3.1 million.

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On 18 February 1960, the JCS asked NORAD for its comments on the cancellation. NORAD replied that in view of the guidance provided by the JCS, it understood the necessity for the deletion and concurred. In a letter to USAF in March, NORAD backed AAC's request for Iconorama.

NORAD MODE III OPERATIONS

Background. When SAGE was adopted by the Air Force and plans made for its operation, consideration was naturally given to how operations could be conducted if a SAGE direction center was put out of commission or saturated. An Air Force ADC SAGE operations plan annex, issued in December 1955, provided for emergency back-up, listing various conditions and methods of emergency operations. By this time, the term "mode" was also being used to describe normal and degraded conditions of operations under SAGE. For example, an informal ADC paper on SAGE weapons employment prepared in August 1955 made an early effort to describe modes of employment for each individual weapons system.

The mode concept was developed further and issued in a CONAD operations plan for employment of anti-aircraft weapons in the SAGE era in March 1956. Operations under Modes I (normal) through IV (autonomous) were described. Further refinement was made in a CONAD/component command conference in August 1956 which produced a proposed plan for employment of anti-aircraft weapons in the SAGE era. The mode concept was also contained in a CONAD plan for integration of SAGE and the Army's AN/FSG-1, Missile Master, submitted to the JCS in September 1956.

The concept continued to be refined and standardized and was included as the concept of operations under SAGE in NORAD's Operations Plan 1-58 (Air Defense of the North American Continent), dated 1 August 1958. NORAD Manual 55-1, Combat Surveillance and Tactical Action Reporting Procedures, September 1959, defined four modes of operation under various conditions of weapons control from full, centralized SAGE DC control to autonomous, local control by weapons systems or units.





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This manual described Mode I as the normal, primary operating condition under which a SAGE DC had full responsibility over and control of its sector* Mode II described a condition wherein a SAGE DC became inoperative and adjacent SAGE DC's took over its responsibilities.

Mode III condition would prevail when two adjacent SAGE DC's became inoperative or any other situation developed that prevented Mode I or II operation. According to NORAD Manual 55-1, in this mode, responsibility for conducting the air battle would be exercised by the NORAD division commander through the designated NORAD commander at the master direction center/NORAD control center. Mode III required, in other words, a manual back-up to SAGE. Mode IV provided for autonomous operation by any air defense system or unit when it lost all contact with the SAGE DC or NCC under whose control it had been operating.

USAF ADC's Objection to Mode III On 22 May 1959, the ADC Commander, Lieutenant General Joseph H. Atkinson, wrote to General Partridge, asking that the Mode III concept be dropped. General Atkinson said that he was convinced that the Mode III concept was no longer valid and that to continue to expend effort on an emergency manual back-up would result in degradation of the primary SAGE system.

General Atkinson's letter was backed up by a study in which it was argued that the Mode III concept was not valid as shown by SAGE operational experience. In the 26th Air Division (SAGE), it had been found that the SAGE system had double the capacity of the manual system it replaced and that by April 1960, when a new computer program was operational, the capacity to perform air defense functions would be tripled. This made

* Modes were never used to describe operations under the Super Combat Center. The term "option" was selected to describe methods of conducting air defense operations in the SCC era. Six options were described.

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the possibility of saturation very remote, it was declared. As for vulnerability, it was pointed out in the study that many of the Mode III facilities (NCC's, MDC's) were near metropolitan centers which made them as vulnerable as the SAGE DC's. Furthermore, in the era of supersonic speeds and precision control, the most effective, integrated system possible was necessary to profitably employ the weapons. To plan to revert to manual operations, which actually would be only a partial system under Mode III, for effective employment was being very optimistic, the study said.

Secondly, ADC contended that the solid state computer in its hardened configuration would eliminate the requirement for any type of Mode III operation. The requirement for Mode III would be only an interim measure prior to SCC operation. And the primary purpose of Mode II was a back-up to SAGE.

Finally, the ADC study said that ADC did not have the resources to support a Mode III back-up and that if it did provide the resources the SAGE system would be degraded. ADC said it could not provide the manning, communications, and training necessary for Mode III unless they were diverted from SAGE.

General Partridge replied on 2 July 1959 that the NORAD requirement for a non-SAGE back-up method of exercising operational control of all weapons was valid until the SCC system was operational and could not be withdrawn. However, General Partridge said that because of ADC's problem in supporting Mode III, NORAD would work out a means of reducing the current "across-the-board" requirement. NORAD would consider target areas on a priority basis and establish requirements for Mode III operations by location. Finally, he said that there would be no general requirement for special equipment to provide a non-SAGE back-up control capability in the SCC time period.

NORAD Mode III Plan. A compromise requirement was worked out, which included deletion of the requirement for control of BOMARC in Mode III operations, and sent to ADC and ARADCOM on 31 July 1959. NORAD stated that





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as "a matter of policy, it has been determined that the NORAD requirement for a Mode III capability in the soft SAGE time period is firm." But because of the shortage of resources, a decision had been made to provide a Mode III capability by target areas on a priority basis. Four categories of Mode III operations were set up applicable to the soft SAGE area fully implemented.

Category I was to be established in nine defense areas. NORAD established, for the purpose of Mode III operations, that eight of the ten collocated Missile Master/ADDC sites (NCC's) were defending critical target areas. These NCC's were located in the Los Angeles, Seattle, Chicago, Detroit, Boston, Washington-Baltimore, New York, and Buffalo areas. NORAD added San Francisco, at which there was no NCC, but at which, NORAD said, one would be established. ARADCOM would furnish the personnel currently programmed to be used in the NCC during Modes I and II. ADC would furnish personnel to perform the functions of detection, identification, and commitment of Air Force weapons, with the exception of BOMARC. ADC was to man six of the NCC's (New York, Washington, Boston, Buffalo, Detroit, and Chicago) on a continuous basis (called Category Ia sites); the other three on a one-shift basis (called Category Ib sites).

At each of these nine NCC's, there would be an AN/GPA-37 to provide Mode III capability to control manned interceptors. In addition, NORAD required an AN/GPA-67 at each of these NCC's so as to provide a capability for control of Time Division Data Link-equipped interceptors when the sector converted to TDDL. NORAD had expressed its initial requirement on 1 May 1959 for the AN/GPA-67 at all ten collocated Missile Master/ADDC sites. NORAD restated its requirement in September 1959 for the nine NCC's listed under Category I.

Category II of Mode III operations included only two NCC's, the two remaining collocated Missile Master/ADDC sites: Pittsburgh and Philadelphia. NORAD determined that it was unnecessary to have control facilities and personnel at these NCC's, for their areas could be combined with the areas of nearby NCC's having

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operational control capability. Pittsburgh was to be under the operational control of the NCC at Buffalo, Philadelphia under the operational control of the NCC at New York. ARADCOM was to furnish the personnel programmed to be used in the NCC during Modes I and II; ADC was to furnish the personnel to perform detection and identification only on a one-shift basis. In keeping with this withdrawal of a requirement for control capability at Pittsburgh and Philadelphia, the requirement for AN/GPA-37's and AN/GPA-67's at these NCC's was deleted.

These eleven NCC's were the only ones in the soft SAGE area to which ADC would have to furnish personnel. Their areas covered the Northeast, a portion of the northern Mid-west in the Chicago-Detroit area, the Northwest, and California. This left large areas not covered. It was decided to leave interceptors, in Mode III operations, to operate autonomously in the areas not covered. But in those areas where Nike was to be employed a further provision had to be made. Nike could not operate autonomously as could interceptors; Nike had to be provided at least a limited identification and control capability. These areas were designated Category III.

The latter was defined as an area of point target dimensions under the control of an NCC with limited identification and control facilities. Ten defense areas were assigned to this category: Loring AFB, Fairchild AFB, Ellsworth AFB, Minneapolis, Malmstrom AFB, Glasgow AFB, Minot AFB, Mt. Home AFB, Davis-Monthan AFB, and Offutt AFB. The NCC's were to be manned by ARADCOM personnel only. If the ADA complex was located at a SAC base, the control facility was to be able to provide identification of and protection for SAC bombers in addition to its other capabilities.

The last category, IV, was defined as an area other than the first three where all weapons were to operate on an autonomous basis.

In a briefing to General Kuter on 1 September 1959, ADC reiterated the problems that it would face in trying to support Mode III and SAGE and its contention that

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Mode III facilities were unnecessary. General Kuter replied on 4 September that the NORAD requirement for a Mode III capability had to remain firm. He said that NORAD was committed to both the U. S. and Canada to provide the highest degree of authoritative, centralized commitment and control of weapons that was possible to get with available resources. Elimination of the Mode III requirement would act to deny NORAD the ability to centralize control of weapons in critical defense areas whenever and if ever SAGE became inoperative. General Kuter said that, to his mind, the reliability of SAGE and the pros and cons regarding vulnerability of facilities was not particularly germane to the basic problem. To say or infer, he concluded, that weapons would not be used when SAGE was inoperative was not only "unpalatable but unacceptable."

General Kuter directed ADC to submit a proposal for supporting the Mode III requirement as outlined on 31 July 1959. He said that consideration should be given to designing the system on a minimum rather than a maximum capability basis; an identification capability had to be provided; degradation to a degree was acceptable on a calculated risk basis since this was the third and last method of coordinated operation; and although it was desirable to provide such control for all weapons in the local areas, availability of resources might act to eliminate certain weapons from consideration.

ADC submitted a proposal for support of Mode III operations on 19 November 1959. ADC stated that the resources to support Mode III were not available and no funding action had been taken in advance of NORAD's approval of the plan. Upon approval, it would be sent to USAF Headquarters for assistance in getting the personnel, equipment, and funding.

ADC also asked that NORAD drop its requirement for the AN/GPA-67 equipment at the nine NCC's in Category I. ADC said that this equipment would be procured solely as a Mode III requirement with no purpose after the SCC implementation.

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NORAD advised ADC that it approved the plan on 21 January 1960. NORAD reaffirmed its requirement for AN/GPA-67. ADC had submitted a communications-electronics implementation plan, dated 20 October 1959, for this equipment to Headquarters USAF. NORAD heard informally early in 1960 that USAF was in the process of disapproving ADC's CEIP because of lack of funds.

BATTERY INTEGRATION AND RADAR DISPLAY EQUIPMENT (BIRDIE)

Background. In September 1954, CONAD submitted a plan to the JCS for integration of SAGE and Missile Master and for the collocation of Missile Master and Air Force Air Defense Direction Centers (ADDC's) at ten sites. The Secretary of Defense concurred in the basic concepts of the plan and directed the Army to withhold procurement of Missile Masters beyond those for the ten collocated sites, pending CONAD's determination of requirements. He required that CONAD determine the requirement for additional Missile Masters or modified Missile Masters for small AA weapon complexes.

CONAD asked the Army component command to study the requirement for fire direction systems for the non-Missile Master defenses. ADC was asked, in February 1957, to prepare a requirement for a means of controlling BOMARC under Mode III operations. On 22 May 1957, CONAD advised the JCS that no additional Missile Masters would be required beyond the ten already programmed. However, some type of fire direction system would be required for non-M/M defenses.

In February 1958, NORAD asked ADC and ARADCOM to jointly explore the feasibility of combining the requirements for a SAGE back-up (Mode III) control of BOMARC and an AA fire direction system into one device. ADC recommended the AN/GPA-73, but CINCNORAD expressed dissatisfaction with it because of its impact on the SAGE system. ARADCOM recommended a family-type system: Hughes Aircraft Company equipment for small defenses and Martin Company equipment (Missile Master Junior, AN/GSG-4) for larger defenses where Mode III control of weapons



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was required. About this time, NORAD concurred on the super combat center program. As a result, NORAD told ARADCOM on 22 December 1958 and the JCS on 26 January 1959 that if timely and complete implementation of the solid state computer proposal was made, a system for Mode III operations would not be needed. But SAGE would not extend throughout all areas, so some additional weapon direction and control device would be required. The Martin Company Missile Master Jr. appeared to have merit for use in non-SAGE areas, so NORAD recommended that a single prototype be developed for test and evaluation.

In the meantime, ADC recommended a device for integrating Nike weapons into SAGE, the SABRE (SAGE and Battery Routing Equipment), which was an unmanned switchboard for routing SAGE messages and battery status data. NORAD concurred in the development of prototype SABRE equipment and the testing of this equipment.

Because of the welter of proposals and requirements, the JCS asked NORAD, in May 1959, for clarification. NORAD was asked also to submit its requirements for specific equipment to integrate Army-provided weapons with SAGE. NORAD replied on 19 June that its studies had indicated that those areas not provided with Missile Master would require a piece of equipment somewhere between Missile Master Jr. and SABRE. But whether one of these pieces of equipment or some other equipment was the best for the requirement had not yet been determined. MITRE, USASADEA, and NORAD's SAGE/Missile Master Integration Test Group were studying the equipment and the requirement.

The following month, OSD queried NORAD on the requirement for a prototype Missile Master Jr., in view of the Secretary's Continental Air Defense Program. The OSD stated that the Army was procuring it for installation in the San Francisco area. NORAD replied that the CADP did not change the requirement for integrating equipment for the San Francisco area. But NORAD was re-examining the San Francisco requirement for all other non-Missile Master defense complexes, 29 in all. There was a requirement for equipment of the general nature


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of the Missile Master Jr. for all areas including San Francisco. NORAD said that it had not yet determined the specific equipment that would be required for the 29 complexes and therefore it asked that the Army FY 1960 funds, which had been slated for the prototype Missile Master Jr., be held in abeyance.

Following this, on 3 August, NORAD wrote to ADC and ARADCOM, laying down in detail its specific requirements for ADA/SAGE integrating equipment. The components were asked to provide data on equipment that would satisfy these NORAD requirements. On the basis of the data provided (such as availability, cost, etc.), NORAD then made its selection of equipment.

Requirement for BIRDIE. On 22 September 1959, NORAD submitted to the JCS a requirement for specific equipment for all non-Missile Master air defense artillery complexes, now set at a total of 28 (reduced from 29 by combining Offutt and Lincoln). In explaining its requirement, NORAD said that the equipment would be needed in both the "soft" SAGE era and the super SAGE system era. It was not the purpose of the equipment to provide a complex backup facility for SAGE operations, NORAD said. But a backup capability to employ ADA weapons in non-Missile Master areas was achievable with very little extra cost. And the provision of operational flexibility for degraded operations was required during the unhardened SAGE era and possibly thereafter.

To meet its requirement, NORAD said that it had selected equipment recommended by ARADCOM. The ARADCOM recommendation was for Martin Company switching and synchronizing gear that could be provided to all 28 ADA complexes for about the cost of one Missile Master Jr. NORAD proposed that it be provided to 13 small defenses in a simplified form, at the other 15 defenses, which were larger (four or more fire units), with greater capability.

Funds for this equipment, which had originally been requested for a prototype Missile Master Jr., were being held in abeyance by the Army, NORAD noted. NORAD said it no longer had a requirement for either the single Missile Master Jr. or the SABRE equipment.

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On 31 December 1959, the Secretary of Defense concurred on the requirement. Program approval was given to the Department of the Army and FY 1960 funds were released by the Department of Defense to the Army. On 8 January 1960, USAF advised ADC that because of this decision the requirement for SABRE no longer existed.

BIRDIE Operational Employment Plan. On 30 January 1960, NORAD issued an operational employment plan for this equipment which was designated Battery Integration and Radar Display Equipment (BIRDIE). The BIRDIE AN/GSG-5 was to be placed at the 15 large defenses, the BIRDIE AN/GSG-6 at the 13 small, two-fire unit defenses.

As described in the operational employment plan, the AN/GSG-5 was capable of collecting, processing, storing, and disseminating data in such a manner as to coordinate a maximum of 16 Nike fire units. It had facilities for storing SAGE or locally-generated data on up to 32 tracks, for certain computations, and for manual rate-aided tracking. The AN/GSG-6 could collect, process, and disseminate data in such a manner as to coordinate two Nike fire units. It had no storage or computing capability and only manual tracking was possible.

The concept of operations for the manual and soft SAGE eras, stated that in the SAGE area, the primary purpose of BIRDIE equipment was to integrate the ADA units with SAGE to provide data interchange between fire units and to enable the ADA defense commander to monitor the air battle. If SAGE control was interrupted, BIRDIE equipment would continue to permit fire unit interchange of data and provide a means for electronically directing and monitoring fire unit actions. In a manual area, the BIRDIE equipment would ensure more effective control of ADA units by affording electronic direction to fire units, monitoring of fire unit actions, and interchange of data between fire units.

BIRDIE deployment in the ADA complexes was to be based on the availability of existing radar and the time phasing with other air defense elements. Twelve systems were to be located at Air Force AC&W or radar squadron.

(SAGE) sites. The remaining systems, with the exception of San Francisco (a new NCC site), were to be located at Nike fire unit or battalion headquarters of the ADA complex*. All of the systems would use the input of the radar, either Air Force or Army, associated with the BIRDIE location.

On 8 March 1960, NORAD asked ARADCOM to assume responsibility for implementation of the BIRDIE program with the assistance of ADC and NORAD, following the guidelines established in the NORAD operational employment plan. NORAD stated that the two components were to be responsible for the coordination and liaison required between their respective service agencies and senior and subordinate commands. NORAD said that it planned to actively monitor the program from its inception.

NORAD CONTROL CENTERS

Initial NCC Capability for Collocated Missile Master/ADDC Sites. CONAD proposed back in September 1956 that Missile Masters and the Air Force's AN/GPA-37 be collocated in ten areas**. The Secretary of Defense concurred on 30 October 1956. These ten areas were: New York, Niagara-Buffalo, Detroit, Philadelphia, Chicago, Washington-Baltimore, Boston, Pittsburgh, Seattle, and Los Angeles (see page 41 for the NCC locations). NORAD selected Air Force radar (AN/FPS-7 or FPS-20) for six of the sites. Federal Aviation Agency radar (ARSR-1A) for four of the sites (Boston, Pittsburgh, Seattle, and Los Angeles).

The original estimate of operational dates for

* It was planned that the San Francisco NCC, under Mode III operations, would control interceptors through use of the AN/GPA-37/67 equipment and Nike weapons through the use of the BIRDIE equipment.

** The detailed background from early 1956 can be obtained in preceding NORAD/CONAD historical summaries.



these ten NCC's, furnished to NORAD by USAF in January 1958, ranged from May 1960 for the first site to April 1961 for the last. NORAD contended that these dates were much too late and aimed at getting all ten operating by the end of calendar year 1960

In the ensuing months, as implementation progressed, NORAD was successful in getting the dates advanced. As scheduled by the end of 1959, all ten were to achieve initial NCC capability during 1960*. The first site at which initial NCC capability was to be reached was at Seattle, Ft. Lawton (RP-1), scheduled for 29 February 1960.

Initial NCC capability at two of the sites, Pittsburgh and Philadelphia, did not mean the same as at the other eight. NORAD deleted the requirement for control of manned interceptors from these two NCC's as a result of its Mode III operations plan issued on 31 July 1959 (see section above, Mode III Operations). Therefore, the Air Force equipment (AN/GPA-37/67) to perform this function was no longer required at these two locations. In a message to Army, Air Force, and component commands in September, NORAD stated that although Air Force control equipment was not required, the Air Force radars were still required. And the Air Force still was responsible for detection, identification, and broadcast

* The Air Force portion of the Los Angeles NCC was later postponed, see page 38. Initial NCC (Missile Master/AN/GPA-37) capability was defined as that capability which exists when the NCC can control both missiles and manned interceptors in a Mode III situation. This was the first phase. Beyond this, SAGE/Missile Master capability (Phase II) would be reached when the SAGE system was connected to the Missile Master via digital data communications and the SAGE computer was programmed to send appropriate track and identification data to the Missile Master. Finally, under Phase III, there would be SAGE/Missile Master/ATABE capability.



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warning to friendly aircraft at these two NCC's, so equipment and personnel for these functions were still required.

In order for operations to begin at two of the NCC's in 1960, temporary radars were going to be used. These two were the Philadelphia and Chicago NCC's. The delay in both cases in installing the permanent Air Force AN/FPS-20 radars scheduled was the result of problems encountered by the Air Force in meeting its obligations.

The problem at Philadelphia was caused by a delay in Congressional approval for funds for the Air Force portion. This was to be a split site. The NCC was to go to an Army installation at Pedricktown, New Jersey, the AN/FPS-20 radar at Gibbsboro, New Jersey, and the data remoted. The Air Force was held up for over a year in getting Congressional approval for funds for real estate and radar at Gibbsboro, however. While the other nine sites were approved in 1958, Congress did not authorize funds for Gibbsboro until December 1959. The Army Missile Master installation was going in as scheduled at its Pedricktown site and an operational radar, able to provide inputs to the Missile Master, was required by 1 April 1960 for equipment testing and acceptance.

ARADCOM protested the delay when it first arose in 1958 and recommended to Army that if the Air Force could not get the funds, the Army install an AN/FPS-33 as an interim measure. This was the Army radar that ARADCOM originally intended to use with its Missile Masters. NORAD had decided not to use these radars and to use Air Force and FAA radars instead. NORAD expressed its concern over the delay to both the Air Force and the JCS and urged action to get the funding.

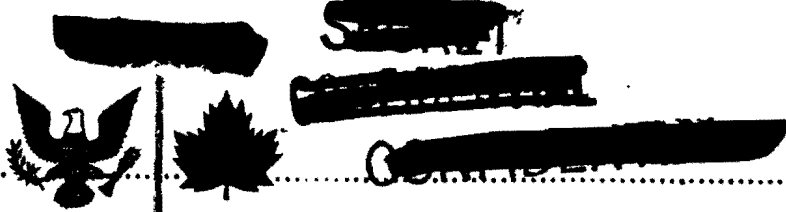
On top of this problem, in August 1959, NORAD learned that the Air Force AN/FPS-20 for the Chicago NCC (Arlington Heights) would be delayed a year, from February 1960 to February 1961. The reason was that Air Force delayed in providing MCP line item authorization for the construction of radar towers. At

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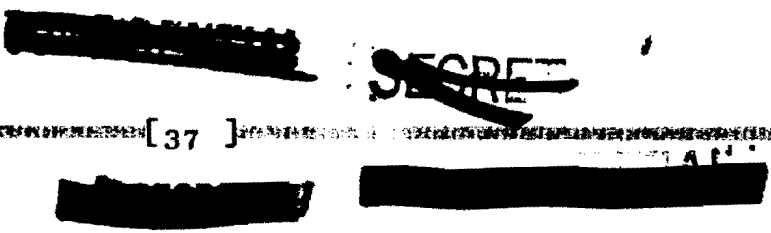
Arlington, as at Pedricktown, the Army Missile Master was going in on schedule. An operational radar was required by 1 February 1960 for equipment testing and acceptance.

ARADCOM vigorously protested the delays at both NCC's to NORAD and to Department of the Army, stating that the Missile Master program had already been delayed by the necessity for collocation and that further delay was unthinkable. NORAD also protested to Air Force and to the JCS. The Air Force Chief of Staff replied in September 1959 that the delay at Philadelphia was caused by Congressional refusal to authorize funds and that the requirement to provide exceptionally high tower foundations for the towers at Chicago had caused funding, design, and construction problems. But funds were available for the Chicago site, he said, and construction would be started in early 1960 and every effort made to complete it as soon as possible.

In the meantime, NORAD directed ADC to provide a temporary search radar and height finder at Pedricktown and at Arlington Heights for use by the Army during Missile Master installation and testing. Arrangements were made by ADC and USAF for the Tactical Air Command to loan for a year an AN/MPS-11 for Arlington Heights and an AN/MPS-11 search radar and an AN/MPS-14 height finder for Pedricktown.

The AN/MPS-11 for Arlington was scheduled to be able to furnish inputs to the Missile Master by 26 March 1960. The permanent radar for Arlington, the AN/FPS-20, was scheduled to be installed and operational in January 1961. At Pedricktown, an AN/GPS-3 search radar was substituted for the AN/MPS-11. The search radar and the AN/MPS-14 height finder were scheduled to be able to provide inputs to the Missile Master by 1 April 1960. The permanent radar was scheduled to be installed and operational in April 1961.

Initial NCC capability at Arlington, with the temporary radar, was scheduled for September 1960; at Pedricktown for December 1960.



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Los Angeles NCC. As scheduled at the end of 1959, the Los Angeles NCC at RP-39, San Pedro Hill, was to become operational in October 1960. It was planned that concurrently ADC's P-39 on San Clemente Island would be phased out and the personnel moved to RP-39.

However, the commander of Western NORAD Region, Major General John D. Stevenson, wrote to General Kuter on 11 January 1960, objecting to this phase-out of P-39 at the scheduled time. He recommended that instead P-39 not be phased out until the Los Angeles SAGE Sector became operational on 1 April 1961. He pointed out that for only a few months from October to April would the NCC/MDC be in operation. Then when SAGE was activated, the facility would revert to the Mode III operations (see Mode III section, this chapter). It was not economically or operationally profitable to move as many as 100 people for this short period.

General Kuter replied on 5 February that he accepted this recommendation for delaying the phase-out. Activation of the Army portion of the NCC was to proceed as previously scheduled.

Collocation of AADCP's with ADDC's. Work toward collocating non-Missile Master Army Air Defense Command Posts (AADCP's) with associated ADDC's began in 1957. The first such collocation was achieved at Geiger Field, Washington, in 1958. On 15 May 1958, operation of the first NCC began at this site. Collocation was agreed upon at three other locations by ADC and ARADCOM in 1958 and approved by NORAD, and implementation was underway. These were at Dallas, Kansas City, and St. Louis.

During 1959, studies and surveys of other sites continued. On 1 July 1959, NORAD issued a statement of policy on the collocation of AADCP's and ADDC's as follows:

- a. That the operational functions of the AADCP's and ADDC's be collocated in those areas where at least two years operational benefits could be derived prior to SAGE.

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b. That AADCP's and ADDC's not be collocated in those areas where less than two years operational benefits will be derived prior to SAGE.

NORAD provided a list of 20 defenses which it recommended for collocation under this policy. Included in this list were the three city defenses mentioned above. Shortly after this letter was issued, the JCS deleted seven of the other sites.

On 22 July 1959, ARADCOM submitted collocation plans for the 13 defenses. Two types of collocation were recommended. At eight ADDC's where the defenses were sufficiently close to the appropriate ADDC for the Army commander to be physically present at the ADDC when necessary, operations personnel and in some cases the complete battalion were to be permanently stationed. Three of these were the above city defenses (Dallas, Kansas City, and St. Louis). This was called Type I collocation. At the other five ADDC's, only an Army deputy commander of field grade, with necessary operating personnel, was to be permanently stationed. This was termed Type II collocation.

NORAD approved this collocation plan on 3 August 1959. Thirteen ARADCOM defenses were involved, but two, Kansas City and Schilling AFB, were to be combined at the Kansas City control center, located at Olathe AFS, Kansas. Thus, there were to be 12 control centers in this group. Implementation moved ahead and as of February 1960 operations were set to begin at all but two of these control centers by the end of 1960. The two exceptions were Malmstrom and Minot.

Summary of NCC/CCC Status. As planned at the end of 1959, there were to be a total of 24 NORAD/CONAD control centers in the CONUS. Making up this total were the ten Missile Master/ADDC control centers and the twelve others discussed above. In addition, there was an operating control center at Geiger Field, Washington, and a new control center was planned for San Francisco. Early in 1960, NORAD/CONAD issued general orders establishing the twenty control centers that were scheduled



at this time to become operational in 1960. This took care of all control centers except at Malmstrom, Minot, and San Francisco. The Geiger NCC/CCC had been established by NORAD/CONAD effective 1 September 1958.

The control centers established and the dates of their establishment and operational dates as of February 1960 were as shown on the following page.

NORAD HARDENED COMBAT OPERATIONS CENTER

A decision was made by the JCS on 18 March 1959 to locate a new NORAD COC within Cheyenne Mountain, south of Colorado Springs. The previous month, the JCS had charged the Air Force with responsibility for carrying out the COC project in collaboration with NORAD. USAF then directed its Air Research and Development Command to assume management responsibility for the NORAD COC. ARDC, in collaboration with NORAD, was to examine the projected NORAD Command Control System and to determine COC requirements. A report was then to be prepared and submitted to the JCS for approval for implementation.

USAF directed ARDC to develop COC requirements within the parameters approved by higher authority. Included in these parameters was a requirement for hardening which provided that the structure was to be located under 800 to 1,000 feet of cover in granite, giving protection in excess of 200 p.s.i. Entrances, however, were to be limited to hardening for an over-pressure of 200 p.s.i. only. Neither NORAD nor ARDC concurred with this degree of hardness.

The ARDC report, submitted on 19 May 1959, which was concurred in by NORAD, recommended additional hardening. ARDC also urged that USAF give it authority to start source selection board proceedings to select a systems contractor as soon as possible.

On 10 July 1959, USAF asked NORAD whether it wanted to get additional hardening which would delay the project and increase the cost or go ahead as currently planned and scheduled. CINCNORAD replied that while he

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SUMMARY OF NCC/CCC STATUS

Table 2

NCC/CCC and Location	ADA Complex	Category or Type of Collocation	Effective Date of Establishment	Control Center Operational Date
Seattle, Ft. Lawton, Wash.	Seattle	Cat. Ib *	1 January 1960	February 1960
New York City, Highlands AFS, N.J.	New York	Cat. Ia	1 January 1960	July 1960
Boston, Ft. Heath, Mass.	Boston	Cat. Ia	1 March 1960	August 1960
Detroit, Selfridge AFB, Mich.	Detroit	Cat. Ia	1 March 1960	July 1960
Niagara-Buffalo, Lockport AFS, N. Y.	Niagara-Buffalo	Cat. Ia	1 March 1960	July 1960
Chicago, Arlington Hts, Ill.	Chicago	Cat. Ia	1 March 1960	September 1960
Wash., D. C., Ft. Meade, Md.	Wash-Balt	Cat. Ia	1 March 1960	November 1960
Los Angeles, San Pedro Hill, Cal.	Los Angeles	Cat. Ib	1 April 1960	April 1961
Pittsburgh, Oakdale, Penn.	Pittsburgh	Cat. II	1 May 1960	November 1960
Philadelphia, Gibbsboro, N. J.	Philadelphia	Cat. II	1 June 1960	December 1960
St. Louis, Belleville, Ill.	St. Louis	Type 1 **	1 January 1960	May 1960
Kansas City, Olathe AFS, Kans.	Kansas City/Schilling	Type 1	1 January 1960	April 1960
Dallas, Duncanville AFS, Tex.	Dallas	Type 1	1 January 1960	May 1960
Omaha, Omaha AFS, Neb.	Offutt AFB	Type 1	1 February 1960	December 1960
Roswell, Walker AFB, N. M.	Walker AFB	Type 1	1 February 1960	August 1960
Sweetwater, Sweetwater AFS, Tex.	Dyess AFB	Type 1	1 February 1960	July 1960
San Antonio, Lackland AFB, Tex.	Bergstrom AFB	Type 2	1 February 1960	July 1960
Aiken, Aiken AFS, S. C.	Robins AFB	Type 2	1 February 1960	July 1960
Jacksonville, Jacksonville NAS	Turner AFB	Type 2	1 February 1960	July 1960
Alexandria, England AFB, La.	Barksdale AFB	Type 2	1 February 1960	July 1960
Geiger, Geiger AFB, Wash.	Fairchild AFB	Type 1	1 September 1958	May 1958
San Francisco (undetermined)	San Francisco	Cat. Ib	not estab.	January 1961
Malmstrom, Malmstrom AFB, Mont.	Malmstrom AFB	Type 1	not estab.	
Minot, Minot AFB, N. D.	Minot AFB	Type 1	not estab.	

* See Mode III Operations, pages 27-29, for categories.
 ** See pages 39-40 for types.

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agreed with the soundness of the ARDC recommendation for maximum cover, he was mindful of the urgency of getting the earliest BOD. Therefore, he recommended the portal locations and the general configuration, as proposed by the Parsons, Brinkerhoff feasibility study, with the structure at the greatest depth attainable with currently approved funds.

On 17 July 1959, USAF authorized ARDC to select a systems contractor for the COC and award a contract. The contract was to be carried out in two phases. The first phase to be a study phase to extend the ARDC study, which would have to be presented to the JCS for approval. This study was to cover communications; coordination, integration, and technical compatibility of the electrical subsystems involved, including SAGE, BMEWS, MIDAS, and Nike Zeus; and the technical parameters, characteristics and quantities of equipment to meet these requirements. Emphasis was to be on the near NORAD requirements, rather than on future requirements, such as satellite defense, but appropriate consideration was to be given the latter. Phase II was to be an implementing phase, started after JCS approval.

But the systems contractor was not selected. And on 24 November 1959, USAF directed ARDC to defer all action on the 425L (COC) system for an indefinite period. The system was under review, USAF stated, at Air Force Headquarters and might be reinstated in whole or in part as a study contract at a future date.

There were two factors involved. One was a review of the requirement for all underground structures; the other was a review of all of the 400 L-series projects to determine such matters as duplication.

INTERIM BMEWS DISPLAY FACILITY

Background. The Thule, Greenland, BMEWS site (Site 1) was scheduled to reach initial operational capability in September 1960; the Clear, Alaska, site (Site 2) a year later. A BMEWS display facility was planned for the new COC, but to use this initial BMEWS

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capability, an interim display facility was required at the current COC.

When the decision was first made by NORAD on what to accept in an interim facility, the hardened COC planning date was January 1962. Because of this early date, NORAD accepted an austere construction with a minimum of equipment. After a number of studies, NORAD concluded that the best solution was to add an annex to the current COC building at Ent AFB to house the interim facility. The technical installation was proposed to be a simplex threat evaluation system with readout consoles. However, NORAD asked that there be floor space for a duplex system and a satellite prediction computer.

On 18 March 1959, USAF told the BMEWS Project Office to proceed with the interim facility in all respects as NORAD required, except for provision of floor space for a computer. USAF directed that there be an annex constructed at the NORAD COC.

All action toward this plan was stopped, however. First, it became necessary to reconsider the requirements for the display facility because of a decision to defer tracking radars for BMEWS Sites 1 and 2 (Thule and Clear). On 7 July 1959, USAF advised NORAD that because of this decision it was necessary to reexamine NORAD's requirements. USAF stated that it was the DOD position that a great amount of money for the interim facility should not be spent.

The Interim Facility. On 17 July 1959, USAF directed the BMEWS Project Office to prepare an engineering proposal for an interim BMEWS display facility. It was preferably to be at Ent AFB and it was not to require any additional construction. Also, ARDC was directed to evaluate the possibility of using the Penske, Federick and Miller Company Iconorama display equipment.

* See BMEWS section, Chapter Four.

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The BMEWS Project Office prepared a paper on possible configurations for an interim facility, dated 3 August 1959. Approval for implementation of one of the configurations in this paper ("B"), using the Fenske, Federick and Miller equipment, was given by the Office of the Director of Research and Engineering on 14 September. The Air Force was directed by this office to prepare a descriptive specification for this configuration.

This descriptive specification, prepared by the BMEWS Project Office, was submitted to the Air Force on 8 October 1959. The project office's recommendation was to install within the current COC the Iconorama display equipment and to have Radio Corporation of America provide data display processing equipment and other electronic hardware needed to complete the interim facility.

The paper described the BMEWS installation as a facility that would be fully implemented with equipment, services, and personnel to meet the minimum reliability, performance and operational requirements of the using agencies between September 1960 and the operational date of the hardened COC. During this time, the facility would receive input information from Sites 1 and 2 only. Growth potential, however, would be considered for accepting inputs from Site 3 (British Isles) and other warning systems. The data processing equipment would perform the functions of final ballistic missile mass raid alarm decision, preparation and transfer of required data for transmission to SAC, display of significant BMEWS outputs, and the permanent recording of significant ZI input and output data.

The display of impact points was to be superimposed on the Iconorama display programmed for the current COC air breathing threat display board. Launch points were to be displayed on a separate screen using Iconorama equipment. Equipment status was to be displayed on a tote board mounted adjacent to the air breathing threat display.

On 14 October 1959, USAF approved the descriptive

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specification prepared by the BMEWS Project Office and authorized hardware implementation. USAF stated that no new construction was authorized other than interior modification of the current COC building at Ent. The costs were not to substantially exceed \$1.9 million in incremental costs over those already expended. A need for Site 3 integration was to be considered, but expenditures for such integration were to be kept to a minimum.

Following this, on 16 October 1959, the BMEWS Project Office requested RCA to take all necessary action to effect the installation of the display facility so as to meet an initial operational capability date of September 1960. RCA was to provide the necessary electronic equipment for a simplex data processor, Iconorama projection display, tote boards and other required equipment, and install it in the existing COC. RCA was also to design and prepare SAC output equipment, the details for which were to be furnished by the project office as soon as the SAC requirements were finalized.

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CHAPTER 3

Operational Requirements & Procedures

CONELRAD AND SCATER

Canada - U. S. CONELRAD. In April 1959, representatives of Canada and NORAD met in Colorado Springs to develop a common NORAD policy on CONELRAD (Control of Electromagnetic Radiations). The conferees agreed that CONELRAD was a requirement. But they could not agree on the portion of the frequency spectrum that should be controlled.

The conferees decided that the subject should be studied further by a scientific group similar to the Canada-United States Scientific Advisory Team. Subsequently, NORAD, with Canadian concurrence, contracted for a technical study of the CONELRAD problem by the Planning Research Corporation of Los Angeles, California.

PRC's preliminary study was dated 28 October 1959. Its findings were summarized as follows. There was no requirement for control to deny the enemy initial navigation aid or mid-course guidance. An enemy would be interested in using radiations only for terminal guidance and for reconnaissance. And this interest was not limited to any particular part of the frequency spectrum.

The problem of mutual interference was large. Any decision to control had to be based not only on denying aid and comfort to the enemy, but also on what effect this control would have on U. S. - Canadian aid and comfort. If control was proposed, techniques other than shutdown should be sought. Existing plans would not provide a capability for communications with the civilian population of adequate coverage or reliability.

By December 1959, NORAD had forwarded the study to RCAF, USAF, NNR, ADC, and the JCS for review.

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Canada - U. S. SCATER. At the same April conference discussed above, the representatives of both countries agreed that a NORAD plan was needed for security control of air traffic (SCATER). The differences between the plans of the two countries were minor. To develop a workable NORAD SCATER plan, it was decided that a group consisting of representatives from NORAD, RCAF, USAF, Federal Aviation Agency, Department of Transport, and other appropriate agencies, would be organized.

A NORAD SCATER working group was formed and met at Headquarters NORAD on 17 and 18 November 1959. The differences between the two plans were quickly resolved. Canadian representatives stated that they had no objections to including the control of aeronautical navigation aids (a CONELRAD requirement in Canada) in their plans for SCATER. The RCAF also agreed that authority for implementation of SCATER should come from CINCNORAD.

After further study, the group concluded that a single NORAD plan would, of necessity, be so detailed that it would be difficult to obtain the necessary signatures to make it valid. Thus, it was decided that a general plan would be written outlining the requirements for control of air traffic and aeronautical navigation aids during an air defense emergency. The plan would be circulated to FAA, DOT, RCAF, and other interested agencies for staff action before submitting it to the JCS and COSC for publication approval. Based on the general plan, FAA and the Department of Defense in the U. S. and DOT and the Department of National Defence in Canada would draw up the detailed plans, procedures, and regulations pertaining to control.

U. S. - Mexico CONELRAD Program. Since 1955, there had been an agreement between the U. S. and Mexico on the control of electromagnetic radiations in time of war or emergency. The Mexican Government participated to a limited degree in CONELRAD tests in 1955, but since that time Mexico's interest in the program had waned. The most recent example of this lack of interest occurred in the 17 April 1959 CONELRAD test. During the test, Mexican stations could be heard throughout Southern California broadcasting on regular frequencies and.

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power while the U. S. stations in the area were operating under CONELRAD rules.

In July 1959, USAF told NORAD that the State Department was considering reopening discussions with Mexico on the CONELRAD program. NORAD was asked to provide information on its current and future requirements for a joint U. S. - Mexican CONELRAD program, to comment on the desirability of a combined Canadian-Mexican-U. S. program, and to provide any information on appropriate matters that should be taken up with Mexico.

In August 1959, NORAD replied that because the effectiveness of the CONELRAD program in the southwestern part of the U. S. was dependent upon the shutting down of Mexican radio facilities, there was a definite requirement for some form of joint Mexican - U. S. program. If CONELRAD negotiations were reopened, NORAD continued, it was recommended that the Mexican stations along the border be considered for inclusion in the existing "sequential cluster" system of operations.

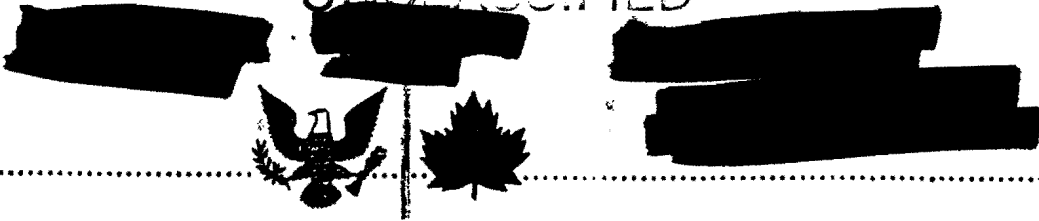
As to a Canadian-Mexican-U. S. CONELRAD program, NORAD had its doubts. NORAD did stress that any program or plan conceived with Mexico would have to be compatible with the Canada - U. S. program.

U. S. CONELRAD Alerting Procedures. One matter that had received considerable attention from NORAD was the development of a new CONELRAD alerting system. The existing system was considered inadequate because, for one thing, it was subject to false alarms. This was demonstrated rather conclusively on 5 November 1959 when the 30th Air Division, in trying to make a weekly line check, declared a CONELRAD alert. Another weakness of the system was that it did not provide a written record. Radio managers were particularly anxious about this. They wanted proof that CONELRAD directions had been passed to them because of the possible litigation (i.e., breach of contract with sponsors, inciting the public to panic, etc.) that could arise because stations were shut down erroneously.

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Several systems had been under consideration, but all were rejected for one reason or another. One of the latest plans under consideration was for use of Associated Press and United Press International teletype wire service facilities to pass the alert. NORAD could be connected to these facilities by a teletype loop into Chicago, the central point of the AP/UPI news service.

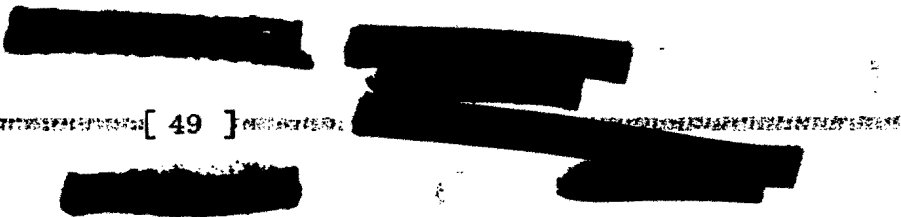
This system seemed to have every advantage over the current system and no disadvantages. It would cover 95 to 99 per cent of all U. S. radio stations (including TV and FM). The alert could be disseminated to the lowest levels in three minutes, whereas the existing system required some 20 minutes. Also, a written record would be available. The estimated cost was \$2,500 annually against the cost of the current system of \$115,000. And the system would be operational 24-hours-a-day. Lastly, the system was compatible with NORAD's desire to initiate the alert from NORAD Headquarters and make it effective NORAD-wide without regard to geographical or tactical boundaries.

USAF had the matter under consideration in December. It recommended to NORAD that no change be made in the current system until technical and operational feasibility studies could be conducted.

CONTROL OF LONG-RANGE AIR NAVIGATION AIDS

On 13 May 1958, CONAD laid down guidance on control of Long-Range Air Navigation (LORAN) aids during SCATER. This provided that LORAN facilities were to be treated as critical navigation aids and would be controlled at all times during an Air Defense Emergency when SCATER had been implemented. However, CONAD authorized Western CONAD Region to arrange with appropriate Coast Guard authorities for intermittent operation of LORAN to provide navigational assistance to AEW&Con aircraft. In September 1959, NORAD reaffirmed the CONAD policy and stated that this policy was also NORAD's.

By this date, it had been found that technical



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operating difficulties made use of the intermittent operations concept impractical. The use of a security coding device (LORAN-A) for operations was suggested as an alternate course of action. However, when NORAD investigated the use of LORAN-A devices further, it learned that the use of these devices had been dropped at JCS direction.

During September also, NORAD met with representatives of the Navy and Coast Guard to discuss LORAN operations. It was determined that only two possible courses of action were available. These were: (1) LORAN could be shut down completely during an air defense emergency, or (2) the equipment could be operated intermittently on a pre-scheduled basis. NORAD did not want to use either method.

On 13 November, NORAD advised the JCS of the problem and of the courses of action open. NORAD recommended that LORAN facilities be considered the same as other navigation aids and that they be turned off upon implementation of SCATER. The equipment would not be turned on unless specifically directed by the NORAD region commander in whose area the facilities were located.

The JCS concurred in NORAD's recommended course of action in January 1960.

ATTACK WARNING SYSTEMS

Canadian Attack Warning System. Until 1 September 1959, civil defense matters in Canada were the responsibility of the Department of National Health and Welfare. Included among these responsibilities was establishment and operation of a civil defense warning system.

To meet this responsibility, the following warning system had been established. At RCAF ADC Headquarters, St Hubert, Canada, a Warning Control Office was set up in the combat operations center and manned part-time by a Senior Warning Control Officer. He was provided with a direct, full-time, private-wire voice circuit to the government switchboard in Ottawa. In addition to the


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private circuit, an attack warning network, consisting of voice circuits on a call-up basis, was connected to ten Provincial Civil Defence Coordinators and 11 Civil Defence Coordinators at Zone and Target areas.

After warning information was passed from the COC at St Hubert to the Coordinators, various communications media were used to convey warnings to the public. In general, there were announcements from the Canadian Broadcasting Company and private broadcasting stations. These were supplemented by civil defense mobile broadcasting stations. In addition, forestry, provincial police, public utilities, and amateur radio networks were used.

As noted above, this network had developed under the Department of National Health and Welfare. On 1 September 1959, responsibility for this network and other civil defense matters was taken over by the Minister of National Defence. The latter delegated responsibility for the warning system to the Canadian Army.

Meanwhile, in February 1959, NORAD asked Canada if it wanted space in the new COC for a civil defense officer. NORAD's proposal was placed before Canadian Army officials for study.

In September 1959, Canadian Army representatives briefed NORAD on a new warning system plan. This called for use of space in the present NORAD COC for a staff of eleven. The Army officials stated that the current warning control facility at St Hubert would continue to function as the primary warning center until Army personnel could be transferred to Colorado Springs. This, they hoped, could be accomplished by 1 November 1959.

After that time, the St Hubert center would function as a regional warning center for Eastern Canada (when the 35th Air Division became operational, the center would be moved to North Bay). The Army proposed that a western region warning center be established at the 25th NORAD Region at McChord AFB, Washington, by 1 February 1960. A National Warning Center would be set



up in Ottawa with primary warning information coming from the Canadian officials to be placed at NORAD. Following this conference, a formal proposal, containing essentially the above plan, was sent to NORAD.

NORAD replied that the COC could furnish the attack warning information desired. However, various events made it essential to find a more economical method of providing such information. NORAD pointed out that facilities at Ent were already saturated as a result of the NORAD reorganization. And construction of the new COC was being delayed by DOD. This had forced NORAD to program additional construction for the current COC. NORAD asked Canada to re-examine its request for use of NORAD facilities in relation to these facts.

U. S. National Warning System. The U. S. National Warning System (NAWAS), operated by the Office of Civil and Defense Mobilization, was the Federal portion of the U. S. Attack-Warning System. OCDM had maintained a National Warning Center in the NORAD COC and three Regional Warning Centers at Eastern, Central and Western NORAD regions prior to 1 July 1959. Each of the centers was manned around-the-clock by OCDM Attack Warning Officers.

On 1 July 1959, concurrent with the discontinuance of Eastern NORAD Region, the warning center was moved from Stewart AFB, New York, to Syracuse, New York, and redesignated the OCDM 26th Warning Center. On this same date, warning centers were also established at the 30th NORAD Region at Madison, Wisconsin, and the 32nd NORAD Region at Marietta, Georgia.

NUCLEAR DETONATION REPORTING SYSTEM

CINCNOAD Assumes Responsibility. At JCS direction, CONAD was assigned the responsibility for the establishment of a nuclear detonation and fall-out reporting system. In carrying out this assignment, an interim collection system had been established consisting primarily of observation reporting by installations and units under its jurisdiction. Establishment of a



permanent system awaited development of an adequate remote-reading, indirect bomb detonation detection system.

In April 1959, CONAD asked the JCS to realign some of the existing directives so as to abolish some of its obligations and to bring others into line with current operational techniques. CONAD pointed out that there were conflicting directives in use. One assigned CONAD overall responsibility for establishing and operating a nuclear detonation and fallout reporting system; the other made CONAD responsible only for the reporting of nuclear detonations. USAF's Weather Service was assigned the task of fallout reporting. In requesting the realignment, CONAD stated that it did not want responsibility for fallout reporting.

On 1 September 1959, the conflicting directives were rescinded. CONAD was relieved of its responsibility for fallout and NUDET reporting and the responsibility for both was given to NORAD. CINCNORAD was assigned overall responsibility for the establishment and operation of a nuclear detonation and radioactive fallout reporting system for all NUDETS, other than test, occurring in or adjacent to the U. S. And subject to Canadian concurrence, his responsibility was to include Canada. NORAD was directed to prepare a plan to carry out this assignment. Since an automatic system was not available, NORAD was required to establish and operate an interim system to accomplish this assignment.

The Interim System Plan. As a first step in carrying out its assignment for operating an interim system, NORAD invited appropriate agencies throughout the U. S. and Canada to an exploratory conference in Colorado Springs. NORAD explained its responsibility and pointed out that until an adequate remote reading indirect bomb detonation system was developed and operational, the interim system established under CONAD had to be continued and expanded.

The conferees agreed that the interim system should be based primarily on individual observations, supplemented by other sources where possible. NORAD's region headquarters would be the primary echelon of command for



collecting, evaluating, and disseminating NUDET information and fallout warnings using existing communications facilities. A Radiological Defense Officer would be designated at each region headquarters to monitor this operation. The basic NUDET source data would be provided primarily by personnel assigned to air defense prime radars, Nike fire units, and USAF air weather stations located throughout the U. S. (including Alaska). Gaps in this coverage would be filled by reports from CONARC radiological centers, Navy installations, the FAA, the U. S. Weather Bureau, and OCDM facilities. The Canadians would participate in the interim system by designating specific agencies to provide NUDET reports, through appropriate channels, to NNR headquarters.

Using the above as guidelines, an operations plan was prepared by NORAD. But as of 31 December 1959, it had not yet been published. The guidance available for NUDET reporting was that contained in NORAD Manual 55-1 (NORAD Combat Surveillance and Tactical Reporting Procedures) dated September 1959.

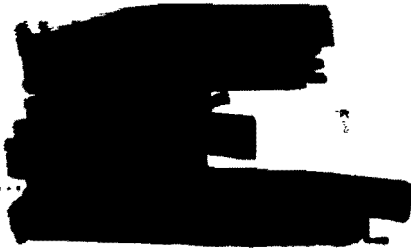
The Automatic System. In June 1959, CONAD had been directed to study a report on an indirect bomb damage assessment system conceived by the Interagency Attack Surveillance Committee*. The committee was charged with finding a means to meet military and civilian needs for information on the location and yield of nuclear detonations. It had recommended setting up a manual system using such devices as bang-meters, sound-ranging sets, and flash-recording sets.

CONAD initially reported that the proposed system did not meet its requirements for a "real time" reporting system. The system might, however, supplement the

* The Interagency Attack Surveillance Committee was formed in 1957 with representatives of the Office of Defense Mobilization and the Federal Civil Defense Administration (later combined to become the Office of Civil and Defense Mobilization) and Department of Defense.



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current NUDET reporting system. Further study confirmed CONAD's initial conclusions -- an automatic system was needed rather than a manual one.

On 29 October, NORAD submitted its criteria for an automatic NUDET system to the JCS. NORAD said the system should provide intelligent, reliable, and timely information for transmission of bomb alarm and detonation information which, when coupled with weather information, would provide radioactive assessment and fallout prediction. It should further provide instantaneous alarm, so that timely operational decision and tactical assessment and evaluation of a situation could be made. The basic information essential to the above was time and height of burst, location, and yield.

In the meantime, representatives of the Thompson, Ramo-Woolridge Company approached NORAD with an automatic system design. NORAD liked it and arranged for a presentation to representatives from JCS, OSD, Canada, SAC, and other interested agencies. After viewing the design, it was decided that an automatic system was feasible. The JCS later told NORAD that OSD was no longer considering implementing the system proposed by the Interagency Attack Surveillance Committee, but would devote all its efforts toward immediate development and implementation of an automatic system.

NORAD was directed to contact interested representatives of industry and have them prepare proposals and concepts for an automatic NUDET system for presentation to the Secretary of Defense, JCS, Canada, and other agencies, in January 1960.



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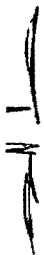
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NORAD system. On 12 January 1960, NORAD forwarded a new 55-3, which proposed the adoption of the readiness conditions of the JCS system, to the COSC for approval.

CURRENT NORADR 55-3	UNIFORM READINESS CONDITION	EXERCISE TERM
Normal Readiness	DEFCON 5	Fade Out
Normal Readiness (Increased Intelligence Watch)	DEFCON 4	Double Take
Increased Readiness Condition 1 Condition 2	DEFCON 3 Alpha Bravo	Round House
Increased Readiness Condition 3 Condition 4	DEFCON 2 Charlie Delta	Fast Pace
Maximum Readiness (Air Def Readiness)	DEFCON 1	Cocked Pistol
Maximum Readiness (Air Def Emergency)	Defense Emergency Air Def Emergency	Hot Box Big Noise

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Governmental Agreement on Increasing Readiness of NORAD Forces. In October 1959, NORAD was informed by General Nathan F. Twining, Chairman of the JCS, that Canada and the U. S. had signed an agreement on increasing the operational readiness of NORAD forces during periods of international tension. The joint agreement became effective on 2 October 1959.

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It would be the responsibility of the COSC and the JCS in consultation with their respective political authorities, to reach agreement for increasing the conditions of readiness of NORAD forces during periods of international tension when factors of overriding political significance were involved. In such circumstances, parallel consultations between the political authorities would be conducted to reach an agreement. And CINCINORAD would be continuously provided with the best information regarding the world situation to assist him in anticipating any requirements for increasing or decreasing operational readiness conditions.

In the event a decision was made to authorize CINCINORAD to order an increase in readiness during joint consultation, agreement would be reached also on the desirability of making a public announcement and the terms of such announcement. The governments also agreed that the JCS and COSC would be informed in advance, whenever possible, or any important training exercise so that each government might be in a position to handle any public comment. Provision was also made that either government might make additional proposals if it considered more detailed arrangements necessary.

RULES OF ENGAGEMENT

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SAC/NORAD AGREEMENTS AND PROCEDURES

SAC/NORAD Agreement on Take-Off Priorities at Joint-Use Bases. On 29 June 1959, General Thomas S. Power, CINCSAC, wrote CINCNORAD that he felt some action should be taken to preclude conflicts in take-offs from bases jointly occupied by SAC/NORAD aircraft. If CINC-NORAD concurred, he continued, the staffs should develop mutually acceptable procedures. CINCNORAD concurred.

Before the two staffs met, each conducted an independent study of the problem. NORAD directed its units operating at joint-use bases to forward the take-off priorities they were using. A study of these procedures revealed that a variety of circumstances existed. Some bases had written agreements, some had verbal agreements, others had no agreements at all. Even the agreements differed. Take-off priorities in some cases favored SAC, others gave priority to NORAD aircraft.

SAC's study of the problem disclosed that during an actual alert situation no conflicts existed during the initial launch of its alert forces. However, there might be possible conflicts during the follow-on phases. This was not considered too serious because of the greater take-off intervals of SAC aircraft in the follow-on force. The study also revealed there would be conflicts involving peacetime scrambles and SAC exercises, but

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these could be overcome by closely coordinating the dates for NORAD and SAC no-notice missions. It was concluded that SAC and NORAD should direct the commanders of tactical units on joint-use bases to develop procedures and establish facilities as required to minimize actual alert and peacetime conflicts.

(u) The SAC recommendations were presented to the NORAD/SAC Coordinating Committee on 16 September, and subsequently became the basis of a joint agreement developed by the joint staffs in a meeting at SAC Headquarters in November 1959. The agreement was signed by General Powers in November and General Kuter in December.

(u) The agreement established two categories for take-off priorities: take-offs under actual alert conditions and take-offs under peacetime conditions. Under both conditions, NORAD aircraft would have taxi and take-off priority when directed to launch on active air defense missions. SAC aircraft would have priority under both conditions at all other times for launch of the alert force and follow-on aircraft. The agreement provided also that SAC and NORAD commanders of the joint-use bases would use the priorities established to set up mutually acceptable taxi and take-off plans.

(u) On 16 December, NORAD forwarded copies of the joint agreement to the regions. They were directed to disseminate the information to the appropriate bases so that local procedures could be developed. NORAD pointed out that there might still be some areas of conflict. Problems that could not be settled at base level were to be submitted to Headquarters NORAD for resolution.

Safe Passage of SAC Emergency War Order Traffic. The procedures for getting SAC EWO traffic safely through the air defense system during an emergency were issued in April 1959 in NORAD Manual 55-4. These procedures required SAC to prepare Altitude Reservation Flight Plans and Aircraft Clearance Forms for contingency, combat, and support flights. A separate form was required for each different route. In addition, there were several options under which each flight could be

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flown. And SAC was required to prepare cards on these and submit them to NORAD.

(u) The process of distribution was both cumbersome and time consuming. After preparation by SAC, one copy of each form came to NORAD Headquarters where the data had to be reprocessed. The data had to be screened and sorted so that each region received the information pertaining to its area of responsibility. Additional copies of the forms had to be made also so each region would get a copy. Once the information reached the regions, another screening, sorting and reproduction process was carried out to get the information to the users in the field. The whole process often took so long that the forms were outdated before they reached the users. Also, the various processing often introduced errors.

(u) In looking for a better method, NORAD and SAC agreed that the procedures could be made much simpler if all the information could be mass produced, incorporated into a single volume, and disseminated from a central agency. Working with the System Development Corporation of Santa Monica, California, a satisfactory procedure was found. SAC agreed to furnish all necessary information to SDC. The latter was to sort the data, in accordance with joint SAC/NORAD instructions, and reproduce it for dissemination to the field in a single volume. The new books were named SAC Strike Route Information Books (SRIB's) and were first issued in September 1959.

(u) Meanwhile, on 20 August 1959, NORAD issued policy guidance on the books to the field. Upon receipt of the books, NORAD directed, use of the previous forms would be discontinued.

(u) In order to use the prepositioned strike route information, the execution hour and option of the EWO flights had to be disseminated from SAC to NORAD and to every echelon of NORAD where the SRIB's were prepositioned. The procedures for passing this information were issued as NORAD Regulation 55-27, dated 11 December 1959.

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(u) Shining Light Tests. In March 1959, SAC and NORAD agreed it might be possible to develop an air-to-air identification system for SAC EWO traffic by using the interceptor AI radar equipment to interrogate the X-band AN/APN-69 radar beacons installed in the SAC bomber/tanker fleet. Also, it was agreed that a test program was needed to evaluate this concept and to determine if Nike units could interrogate and identify beacon signals with the target tracking radars (TTR's). If the TTR's could interrogate, possibly an air-to-ground identification system could also be developed.

(u) By July 1959, a test directive had been agreed upon. The Joint SAC-NORAD test program -- codenamed Shining Light -- was started on 1 September 1959 by SAC, ADC and ARADCOM units at Ellsworth AFB, South Dakota. It was run for sixty days.

(u) To evaluate the air-to-ground concept, nine bomber and tanker test sorties were flown against the Nike TTR's. Additional ground tests were also conducted to develop procedures and techniques for use in the test flights. The joint test report stated that the Nike TTR's were functionally capable of interrogating a modified APN-69 under certain controlled conditions. But there were a number of tactical and equipment limitations. The report stated that development of SOP's to use the APN-69 for interrogation and identification by Nike fire units was not considered warranted at that time because of the limitations.

(u) It was concluded that a study should be made of these limitations to evaluate the desirability of modifying the equipment and to determine if further testing was needed. If the study showed that it was feasible to go ahead, it was recommended that the technical agencies responsible for the equipment find the means to modify it.

(u) [let] In the air-to-air phase of the test, 27 successful F-89J sorties were flown against B-52 and KC-135 aircraft. In addition, the APN-69 equipments were operated in accordance with test SOP's on 191 orientation flights. The test report stated that the Hughes MG-12 AI radar and the APN-69 beacon were capable of providing air-to-air identification and safe passage with certain limitations. It

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was felt that employment of the equipment was desirable and operationally suitable for air-to-air identification purposes.

(u) The report pointed out that there were a number of limitations existing in both the AI radar and the beacon which could be eliminated or reduced by modifying the equipment. It was recommended that before SAC/NORAD-wide implementation of the identification system, draft SOP's be tested in an area of heavy air traffic. It was felt that the limited number of aircraft used for test purposes at Ellsworth might have provided an unrealistic test environment.

(u) SAC/NORAD Bomber/Fighter Affiliation. On 19 December 1959, NORAD and SAC informed their units that, for the interim, no fighter attacks against bomber aircraft would be allowed. The order was issued as a result of a mid-air collision on 17 December between an F-102 and a B-47 engaged in exercise Quick Kick. The restriction was to remain in effect until an accident investigation was completed and all current fighter/bomber intercept procedures were reviewed.

SHAPE/NORAD EXCHANGE OF INFORMATION

(u) By April 1959, Supreme Headquarters Allied Powers Europe (SHAPE) and NORAD had agreed that an exchange of early warning information was desirable. They agreed further that detailed studies would have to be conducted to determine the exact information that should be exchanged and the desired communications and display facilities for use.

(u) NORAD wanted from SHAPE track/raid and states of alert/warning information. It also wanted SHAPE's reaction to the information transmitted, indications of unidentified or hostile flights apparently enroute to North America, and any other intelligence information that might be of value. SHAPE wanted to know the air defense warning and air defense readiness conditions assumed by NORAD along with the reasons for the conditions and the general location of any situation that might be reported.

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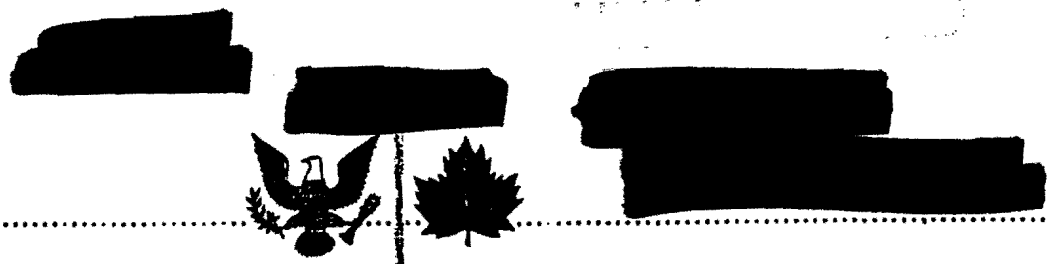
As a result of conferences held at JCS and SHAPE Headquarters, NORAD concluded that establishment of communications between NORAD and SHAPE for the exchange of evaluated early warning information was essential. This requirement could best be fulfilled by establishing for this purpose alone, a full-period, point-to-point voice telephone circuit between the NORAD COC and the SHAPE Operations Center. NORAD representatives had examined the semi-automatic data transmission (Link III) system SHAPE proposed using for its internal communications network. This system, NORAD felt, would provide information in greater detail and quantity than was required. However, a test of the system over Trans-Atlantic circuits to NORAD should be conducted in view of a need for possible use of the system at a later date.

On 28 September 1959, NORAD forwarded the above views to the JCS. NORAD told the JCS that it was willing to cooperate in conducting a test of the Link III system. NORAD pointed out that SHAPE Air Defense Technical Center representatives had indicated that they would prefer to conduct the test in October 1959.

In October, the JCS replied that NORAD's proposals were under study. NORAD continued making arrangements for the test. And in December, NORAD again asked for JCS approval to conduct the test. NORAD said that its participation in the test was a courtesy to SHAPE and did not indicate acceptance of the Link III system for NORAD/SHAPE use. On 8 January 1960, the JCS told NORAD that the test proposals were still being considered, as were NORAD's other proposals.

CINCLANT/NORAD AGREEMENT ON IDENTIFICATION

On 6 November 1959, a memorandum of agreement signed by Commander-in-Chief Atlantic Fleet and CINCNORAD was issued outlining procedures for identifying aircraft of the Atlantic Command operating within the Atlantic and Gulf of Mexico ADIZ's. Provisions of the agreement were to become effective at 0001Z, 1 January 1960.



The agreement was considered necessary for several reasons. NORAD could not afford to expend its air defense alert force efforts in visual identification of friendly "unknowns", nor could it risk having the air defense system saturated with unidentified aircraft. The Navy could not accept the risk of having its aircraft shot down by NORAD forces.

Local arrangements at the operating levels had partially overcome these obstacles in the manual system. But these procedures were not compatible with the SAGE system. The common flight plan correlation method of identification could not be used. The search patterns of the anti-submarine warfare aircraft were considered too complex to reduce to AMIS format. And the operational and training flights from naval air stations and attack carriers could not be reduced to predictable flight plan data required for correlation.



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CHAPTER 4

The Surveillance System

STATUS SUMMARY

On 31 December 1959, the operational land-based portion of NORAD's surveillance system (less the DEW Line and extensions and the Mid-Canada Line) consisted of 184 heavy and 114 gap-filler radars*. Eighteen of the heavy radars were in Alaska. Canada had 34 heavy radars and six gap fillers, and the U. S. had 131 heavy radars and 108 gap-filler radars. The remaining heavy radar was at Thule, Greenland. Augmentation radar was reported available to NORAD in an emergency in four Navy units, two ANG AC&W squadrons, two Air Training Command fighter wings, two Tactical Air Command AC&W squadrons, and one ARDC Test Group.

The DEW Line, less its extensions, consisted of 57 radar stations running from Cape Lisburne, Alaska, to Cape Dyer, Baffin Island. The Aleutian Extension contained an additional six stations. Further south, the Mid-Canada Line had 90 doppler detection and eight section control stations.

In addition to these land-based radars, NORAD forces operated ten picket ship stations (five off each coast), seven AEW&Con stations (three off the East Coast and four off the West Coast), and one airship station and three Texas Towers off the East Coast. These forces were supplemented by nine picket ship stations (four in the Atlantic and five in the Pacific) and eight aircraft stations in sea barriers (four in each barrier) operated by the Navy as extensions to the DEW Line.

* See Appendix 1 for detailed Surveillance Network.

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Robert Annett*



NORAD SURVEILLANCE CRITERIA

On 19 June 1959, the Secretary of Defense provided the JCS with his approved objectives for certain air defense equipment to be employed in defense of the continental U. S. This program provided specific guidance on some air defense equipment, general guidance on other equipment.

The CADP emphasized a perimeter defense. It divided the Continental U. S. into two areas: (1) the east and west coast and the U. S. - Canadian border area and (2) the south-central and central area. The former was to have an "Improved SAGE" environment in support of the BOMARC deployment in that area; the latter area was to have an "Austere SAGE" environment.

This concept on an Improved and Austere SAGE deployment provided the following. The SAGE improvement program was to be carried out along the U. S. - Canadian border and the east and west coasts of the U. S. This program was to include Airborne Long Range Input Stations off the coasts, Frequency Diversity radars at prime sites, and enough gap fillers to provide, as an objective, radar coverage down to an altitude of 500 feet, for a minimum distance of 150 miles forward of the BOMARC launching sites.* SAGE Super Combat Centers in a hard (underground) configuration were to be completed at six sites in the U. S. and at one in Canada. These site locations were to be determined later by appropriate agencies and were to serve the SAGE system along the border and coasts and to support the BOMARC deployment authorized.

In the Austere SAGE area, improvements were to be limited to those required to identify SAC bombers in flight, vector the currently operational family of interceptors, and provide capability for air traffic

* A change to the gap filler coverage to 230 miles forward and 150 miles rearward of the BOMARC sites was approved by DOD and USAF in August 1959.

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control. Gap fillers and FD radars were not to be installed except at sites programmed for experimental or prototype equipment. In this area, consideration was to be given to installing three Super Combat Centers in a soft configuration.

Because of these reductions and changes directed by the CADP, it was necessary to change the program and the planned deployment of certain elements of the ground environment. On 7 October 1959, NORAD provided guidance on this to ADC as follows.

1. The following austere SAGE area is constituted using the sectors as defined on page 7, SAGE Implementation Schedule, 1 July 1959: Denver Air Defense Sector, Sioux City Air Defense Sector, Albuquerque Air Defense Sector, San Antonio Air Defense Sector, Phoenix Air Defense Sector (east of 112°), and Fort Knox Air Defense Sector (west of 89°30').
2. Frequency Diversity radars will be deployed throughout SAGE (less the austere area) to provide triple frequency and coverage overlap at 10,000 feet. No Frequency Diversity radars will be deployed in the austere SAGE area.
3. Gap fillers will be deployed to provide low altitude coverage (500 feet) 230 nautical miles forward and 150 miles to the rear to all BOMARC launch sites, as well as 25 nautical miles from the NIKE HERCULES Ring around Chicago, Detroit, Cleveland, Pittsburgh, Cincinnati, and St. Louis. Criteria for BOMARC coverage is that no lateral gaps exceed 25 nautical miles (normal terrain) at a curve of constant altitude of 300 feet; for NIKE HERCULES that the nominal lateral gap not exceed 5 to 10 miles depending on terrain at a curve of constant altitude of 500 feet. Deployment of gap fillers

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not adding to the above coverage and for which construction is not funded as of the date of this letter will be deleted.

- 4. Directional antennas and high power amplifiers for the ground-to-air transmitter sites will be programmed and deployed only as required to support BOMARC operations.

Using the above criteria, a new radar program was agreed upon by NORAD, USAF, and ADC. However, in January 1960, USAF advised that this program would have to be reassessed because of a limited budget.

CANADIAN RADAR

Comox Radar. In June 1959, NNR asked NORAD's permission to drop the gap filler role at Comox and give the radar a mission of approach control and recovery. NNR said that Comox did not provide low altitude coverage of sufficient quality to warrant continuing this function.

On 7 July, NORAD approved the change. However, NORAD stated that a capability had to be maintained at Comox to provide low altitude coverage.

On 27 November, NNR again requested permission to discontinue the low altitude coverage function. Operations in accordance with NORAD instructions from July through October confirmed what NNR had stated before. The low altitude surveillance contributions of Comox were insufficient to justify its retention even in a limited role as a gap filler. NNR urged NORAD to retain the radar solely as a Radar Approach Control facility and to use the AC&W personnel at other locations.

NORAD approved the change on 2 December 1959.

Addition to CADIN Program. In January 1959, the Governments of the U. S. and Canada agreed in principle

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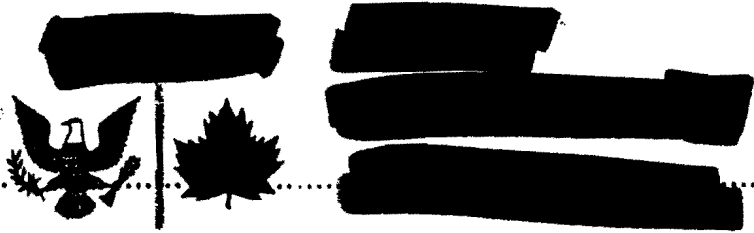
to a cost sharing arrangement for a joint air defense program in Canada. The program (which became known as the Continental Air Defense Integration North (CADIN) program)* was to extend the SAGE system into Canada and to provide two Canadian BOMARC bases. Among other things, the CADIN program was to provide seven heavy radars (two in the North Bay-Ottawa area and five in the Pinetree system), a SAGE SCC/DC in the Ottawa area, and 45 gap fillers (12 in the Ottawa-North Bay area and 33 in the Pinetree system). It was also agreed that 21 existing heavy radars of the Pinetree system would be tied into SAGE making a total of 28 heavy radars for SAGE use.

On 11 March 1959, the Air Defense Systems Integration Division, was directed to prepare, in conjunction with RCAF and other USAF agencies, a master integration schedule for implementing CADIN. ADSID recommended the inclusion of 32 heavy radars (25 existing and the seven programmed) in the CADIN program, or four more heavy radars in addition to the 28 already recommended. Three of the radars -- Beaver Lodge, Moisie, and Sydney -- were in Canada's manual system and merely required modification to be integrated into a SAGE environment. The fourth, Cold Lake, Alberta, was currently being used for training purposes by the Operations Training Unit at Cold Lake.

RCAF indorsed this proposal to USAF and the latter agreed to include these four radars in the CADIN program. Cold Lake was programmed to receive an AN/FPS-20 and an AN/FPS-6A. The radars were to be tied into the Great Falls Air Defense Sector by December 1963. Until the facility was integrated, the radar would be used for OTU training.

* The CADIN program was discussed in NORAD/CONAD Historical Summary, January-June 1959, pp 64-66.

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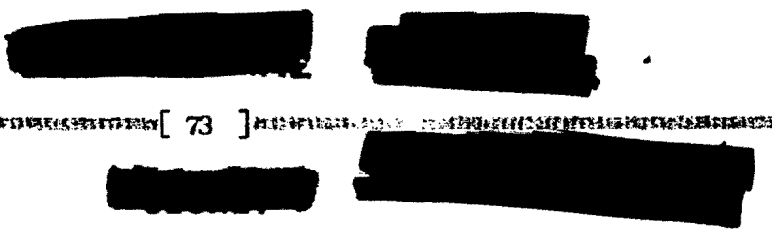
Radar for Queen Charlotte Island Area. On 1 October 1959, NNR proposed to NORAD that a high performance search radar be installed in the Queen Charlotte Islands off Canada's West Coast. The radar was needed to extend detection and surveillance capabilities and to increase weapons control.

The proposal for a radar in these islands was not new. WNR had suggested such in March 1959 to permit close control of interceptors in the area north of Vancouver Island and to provide absolute identification seaward to permit maximum control and employment of BOMARC. At that time, NORAD recommended that plans for the radar be held in abeyance until further studies could be made of interceptor deployment plans for Canada. NORAD pointed out that an AEW&Con station would be manned in the area opposite the island during a condition of Increased Readiness or higher. It also noted that the Seattle ADS had reached the limit of heavy radar inputs and could not use data from the radar.

When NNR reopened the subject in October, it tried to meet all of NORAD's objections. Technological improvements, it said, in computer programming provided a possibility of increasing heavy radar inputs to the Seattle ADS. Further, the AEW&Con station would only partially satisfy surveillance requirements for the radar coverage gap existing between Middleton Island, Alaska (F-22), and Holberg Island on the northern tip of Vancouver Island (C-18).

NNR's recommendations coincided with the development of the NORAD Objective Plan 1961-1965. The plan called for an F-101 squadron for Comox AB, Canada, and a BOMARC squadron for Paine AFB, Washington. To control these squadrons, NORAD also provided for an AN/FPS-28 for the Queen Charlotte Islands.

NORAD replied to NNR that deployment of this radar was based on the premise that off-shore elements would be redeployed northward so that the proposed station would not be sitting off by itself. The requirement for the radar would continue through 1965 and as long as the





Comox fighter deployment existed. However, NORAD cautioned, funding limitations might prevent installation of the radar.

ALASKAN RADAR

Elimination of Gap Fillers. Alaskan Command had programmed two gap fillers to augment its 18 prime radars. One was to be installed at Gulkana, the second at Mulgraves Hill. On 13 October 1959, NORAD was informed that the Mulgraves Hill gap filler had been deleted from USAF's Fiscal Year 1961 program and was not being included in any later program. This announcement was followed in December by a similar one for Gulkana.

On 24 December, ALCOM advised NORAD that an AAC recommendation to delete the Gulkana site from the FY-1961 program had been concurred in. A limited budget was given as the reason.

NIKE HERCULES IMPROVEMENT PROGRAM

The modifications proposed by Department of the Army to improve the basic Nike Hercules system included: (1) a new, long-range, high-powered, L-band acquisition radar (HIPAR); (2) a new Ku-band, range-only radar; (3) improvements to the target tracking radar to give increased capability against small targets; and (4) changes in the operating consoles.

The improvements were to be provided in retrofit improvement kits. These were expected to provide the Hercules system with a capability against high-speed targets of the Rascal and Hound Dog type and to enable the Hercules to work in a heavy ECM environment.

In March 1959, ARADCOM recommended improving 140 batteries. At 97 batteries, it wanted all the improvements. The remaining 43 batteries were proposed to receive partial (less the HIPAR) kits. NORAD forwarded this proposal to the JCS, stating that it did not concur in the specific number of complete kits requested

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or the battery sites to be modified. NORAD said that the requirements for improvement kits should be determined only after a site-by-site study

In May 1959, the JCS directed CINCNORAD to conduct a site-by-site survey, with the assistance of ARADCOM and ADC, of the Hercules units to determine the total number of kits needed and the specific batteries to be improved. NORAD, in turn, directed ARADCOM and ADC to appoint representatives to a study group to participate in the site evaluations starting in July.

On 14 December 1959, NORAD forwarded the study group recommendations to the JCS along with a separate NORAD deployment plan. The difference in the study group plan and the NORAD plan was mainly in numbers of kits. NORAD recommended 38 complete kits, the study group wanted more -- 55. But the study group recommended less partial kits, 89, than did NORAD which recommended 139 (126 for the U. S., 13 for Thule and Alaska). NORAD felt it was more important to provide an ECCM capability to all the batteries rather than HIPAR's. NORAD recommended that the deployment of HIPAR's be completed by 1962.

In the meantime, NORAD had been investigating the possibility of remoting radar data to the Hercules batteries to reduce the number of high-powered radars needed in any one defense area. If remoting was feasible, frequency diversity radars might be used to provide acquisition data to the Hercules target tracking radars (TTR's). And it might be possible to use one HIPAR or FD radar to provide data to several batteries. Finally, if remoting was possible, NORAD thought that it might place HIPAR's in the Austere SAGE area where the proposed FD radars had been eliminated by the DOD Continental Air Defense Program.

ARADCOM, at NORAD's request, asked DA to investigate the remoting of data. DA replied it was not possible to remote accurate enough data from the HIPAR's to the batteries, without auxiliary equipment, whenever the two were more than 500 feet apart. No existing equipment was suitable, DA continued. Even if

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a policy letter to ADC, ARADCOM, and the regions in July 1959 on tying the radars into SAGE using teletype facilities.

Later, NORAD decided that it was supporting a program which it was not certain would work. Twelve of the 20 FPS-36's in the program had to be relocated, requiring an expenditure of approximately \$150,000 per site. Yet no test or operational experience was available to show that the data from the relocated radars could be used at the SAGE DC's. So on 29 October, NORAD asked all parties concerned to hold in abeyance the actions being taken to deploy the FPS-36 as an interim gap filler. NORAD stated that it planned a test to determine if data from the radars could be used in SAGE. The JCS agreed to this action on 5 November.

The test was planned for the Chicago SAGE Sector. Three FPS-36's -- two in Illinois and one in Wisconsin -- were to be tied into the Chicago Sector through the Chicago AADCP by teletype. Test results were not expected to be available until April 1960 at which time a final decision on using the FPS-36's would be made.

USE OF THE AN/FPS-36 RADARS AS
ALTERNATE ACQUISITION RADARS

Another ARADCOM plan involving the use of its FPS-36's was for the installation of these radars at the missile batteries as alternate battery acquisition radars. Numerous tests had shown ARADCOM that the Nike Hercules S-band radar was vulnerable to ECM jamming. To find a means to offset this ECM threat, tests were conducted to determine if the Hercules batteries could be given additional ECCM capability by integrating the L-band FPS-36's as alternate acquisition radars. The tests indicated the integration program was feasible. In addition, an Army Air Defense Board developed an electronic switch which enabled an operator at the battery to select either the S-band or the L-band radars in target acquisition. Accordingly, ARADCOM began planning for the program. ARADCOM assured NORAD that the integration program would not interfere with the interim gap filler program.

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systems, and the change in the threat from bombers to ballistic missiles forced its decision. Any improvement to the existing system would have to be accomplished by modification programs.

Integrating the Contiguous Elements into SAGE. ADC had been aware for some time that a follow-on aircraft might not be procured. Accordingly, it had looked for other ways to improve the AEW&Con fleet and make it compatible with SAGE. In February 1959, it forwarded to NORAD a plan that would accomplish this.

ADC stated that it had already programmed and funded an improved search radar -- the AN/APS-95 -- for the RC-121's. Installation of these radars would permit seaward coverage at all altitudes from the surface to 80,000 feet and off-shore to about 300 miles. To exploit this coverage for added intercept capability, it would be necessary to have the radar data converted and automatically transmitted into the SAGE computer. This would require an airborne data processor and deployment of the aircraft to permit line-of-sight transmission to shore stations and to permit tracking of the AEW&Con aircraft by the shore-based radars.

Equipment modification and new equipment required to implement the proposed concept included the following: removal of a portion of the existing manual reporting equipment aboard the RC-121's, modification of the AN/APS-45 height-finder to improve range characteristics, installation of a data processor, improved navigation equipment, and installation of a time-division data link transmitter. On the ground, a time-division data link receiver would be needed at selected prime radar sites to receive the air-to-ground data. From the radar sites, telephone circuits would carry the data to the SAGE computer.

ADC planned to have the Airborne Radar Platform (ARP), the designation for the modified aircraft, operate at an altitude of 15,000 feet, 130-150 miles off the shoreline of the East and West Coasts of the U. S. Land-based SAGE radars would track the ARP which would automatically report its position, heading, and speed

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along with processed radar data with each scan. The SAGE computer would convert the processed data, along with other information from the SAGE tracking program, to the SAGE coordinate system and display the data to operators in the DC. Track initiation, identification, and weapons commitment would be accomplished at the DC in the usual manner. Height information would be requested by voice from the DC over a UHF link. This data would be provided by the ARP using the same UHF link.

NORAD concurred in the plan in April. USAF approved the plan on 1 May. And on 28 October, USAF approved a Communications Electronics Implementation Plan for the Airborne Long Range Inputs (ALRI) program. On 12 November, a contract was awarded to Burroughs Corporation for both retrofit of the aircraft and installation of the necessary communications and electronics equipment for the ground stations.

As of December 1959, the program provided for five ground and five air stations off each coast. The first station scheduled to become operational on the East Coast would be in the Washington Sector by July 1961. The last station for this coast was to be in the Atlanta SCC/DC area. It would be temporarily tied into the Montgomery Sector in September 1962. On the West Coast, the first station would be in the Portland Sector by September 1961; the last station would be in the Los Angeles Sector by May 1962.

Meanwhile, Lieutenant General Joseph H. Atkinson, ADC's Commander, proposed to CINCNORAD extending seaward coverage even further by using the picket ships. He stated that the total off-shore coverage, available from ALRI and land-based sources, would permit use of the BOMARC B only to approximately 70 per cent of its low-altitude and 50 per cent of its high-altitude range capability. He felt that if picket ships were equipped to make timely automatic SAGE quality inputs, an additional 100 to 200 miles of high-altitude coverage could be obtained.

On 24 September, NORAD asked ADSID to study the



feasibility of using the picket ships to provide Surface Long Range Inputs (SLRI) to SAGE. ADSID reported in December that it had completed a preliminary investigation but there were several areas needing further study. ADSID said that major developmental effort might be required to extend the system using the ships. This could prove extremely costly and should be weighed against the operational advantages to be gained. ADSID pointed out several courses of action for NORAD's consideration and asked how far it should carry the feasibility study.

Withdrawal of the Navy's ZW-1. In the first six months of 1959, Eastern NORAD Region expressed considerable dissatisfaction with the location of the Lighter-Than-Air (LTA) component of its contiguous system. Located at Lakehurst, New Jersey, the squadron -- Airship Airborne Early Warning One (ZW-1) -- manned Station 16 intermittently. This station was located inside the picket barrier and was part of the emergency stations to be manned only upon the declaration of a Maximum Readiness (Air Defense Readiness) condition. It was ENR's contention that the squadron would be more useful if moved to Glymco Naval Air Station, Georgia. From that base, the squadron could man a station just south of the picket line.

NORAD rejected the proposal. Instead, it proposed to the CNO that the AEW squadron be relocated on the West Coast in the San Diego area where the airships could be used to fill a gap existing in offshore coverage from Los Angeles southward.

The CNO turned down the proposed transfer. He stated that until performance characteristics of the new ZPG-3W airships were evaluated, all LTA units would be based at Lakehurst. NORAD concurred in this decision.

In October 1959, NORAD was informed that the CNO proposed to withdraw ZW-1 from its air defense role in Fiscal Year 1961 unless an operational requirement past that period could be substantiated. On 17 November, NORAD concurred in the withdrawal of the squadron as proposed.

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As noted above, ZW-1 was manning Station 16 part-time in the East Coast contiguous system. In November, ZW-1's flying hour allocation was suddenly reduced from 288 hours per month to 76 hours a month. ZW-1 told the 26th NORAD Region that it would be unable to provide coverage of the station.*

The 26th Region protested to NORAD. Until November, the squadron had been able to man Station 16 some 12 days a month. The new flying schedule would allow only four days coverage. NORAD, in turn, protested to the CNO, asking for clarification of the status of the AEW squadron and its capability to man a contiguous station.

Commander-in-Chief Atlantic Fleet, speaking for the CNO, asked for NORAD's concurrence in reducing the flying hour allocation for ZW-1 to 215 hours per month for the remainder of Fiscal Year 1960 because of a shortage of operating funds. COMNAVFORCONAD had written that the squadron was manning an emergency station. This had been interpreted to mean that the station was to be manned only in the event of an air defense emergency. The 215 hours, CINCLANTFLT concluded, would be adequate to provide approximately 100 hours per month on-station training time and to maintain a capability to fulfill NORAD's requirement.

When NORAD asked the 26th Region to comment on the proposal, the region agreed if the reduction would not interfere with ZW-1's plan to have the ZPG-3W airships operationally ready by 1 May 1960. The 1 May date was significant to the region because of its proposal before NORAD to realign the seaward extension elements on that date. Included among the realignment proposals was movement of ZW-1 to Glynco, Georgia, and around-the-clock manning of one station by airships.

* On 1 July 1959, operational control of ZW-1 had passed from ENR to the 26th Region when the former had been disestablished.

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the removal of the picket ships until the AEW aircraft were modernized and increased in numbers.

NORAD had little hopes of stopping the withdrawal, however. It was learned that the CNO's proposal had been made in conference with the Secretary of Defense as a means of offsetting FY-1961 budget limitations and that the Secretary had agreed to the proposal.

DISTANT EARLY WARNING LINE

DEW Operations Plan. In August 1959, NORAD issued a new operations plan for the Distant Early Warning Line (NORAD Operations Plan 3-59). The provisions of the plan were made effective at 0001Z, 1 October 1959. NORAD's plan replaced the USAF-RCAF Operations Plan dated 1 June 1956 for DEW operations.

The NORAD plan had been submitted to the JCS and COSC for approval on 29 January 1959. The plan delegated to the Commanders of Alaskan and Northern NORAD Regions, operational control of those portions of the DEW Line within their areas of responsibility. The plan would not, NORAD said, affect USAF ADC's responsibilities for contract administration, logistic support, and operation of the Cape Lisburne-Cape Dyer system.

On 9 April, the RCAF informed NORAD that the COSC concurred in replacing the existing USAF-RCAF operation plan and in delegating operational control to the Commander NNR. Certain portions of the draft plan needed clarification, however. These grey areas were outlined, and suggested amendments to clarify the plan were forwarded. Once these revisions were made, the RCAF stated, the plan would be acceptable.

The JCS agreed in principle with the COSC in delegating operational control to the NORAD region commanders. They agreed also to issuing the NORAD plan. Lastly, they were generally in agreement with the proposed Canadian amendments. Thus, the plan was revised and issued.



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As of 31 December 1959, there was one major problem area to be resolved. This concerned the definition of operational control as it affected the 4601st Support Group (ADC) and its managerial responsibilities, and the responsibilities of NORAD. A revised draft of DEW O&M responsibilities was being considered at year's end.

Cancellation of DEW Line Improvements. On 1 July 1959, USAF cancelled General Operational Requirement 18, and its amendments, for the DEW system. Research and development to satisfy these documents was considered complete. Further improvements to the system were to be accomplished using other means.

ADC had three improvements programmed for the system at this time. These were: (1) standardization of detection to 100,000 feet all along the line; (2) extension of surveillance capability to 250 miles, and (3) development of an ECCM "burn-through" capability on the line. When inquiry was made of USAF as to what effect the cancellation would have on these improvements, it was discovered that USAF considered all three cancelled. USAF did state, however, that if ADC still considered the improvements necessary, it should resubmit and rejustify these requirements.

On 11 September, ADC forwarded the information received from USAF to NORAD, stating that any further action by ADC would depend upon NORAD's requirements. NORAD directed ADC to continue programming to standardize the detection capability of the system to 100,000 feet. The Greenland Extension was programmed to receive AN/FPS-30's with a height capability of 100,000 feet. The Aleutian Segment and the Main section of the line were using AN/FPS-19's with a height capability of 65,000 feet.

In January 1960, NORAD learned that all DEW improvements were cancelled because of a limited budget.





BALLISTIC MISSILE EARLY WARNING SYSTEM


Background. In January 1958, the Secretary of Defense authorized the Air Force to proceed immediately with development of a ballistic missile early warning system. At this time, the system authorized and planned was for three stations, one each in Alaska, Greenland, and the British Isles, and a ZI computer and display facility and interconnecting communications.

Shortly thereafter, the program was reduced partially by OSD. In May 1958, USAF announced that implementation was to proceed on a two-station (Thule, Greenland, and Clear, Alaska) basis. Planning for the British Isles station was to continue, but implementation was indefinitely deferred. The program was to be funded within a total of \$822 million over a four-year period. To meet this fund ceiling, a reduced or interim configuration was necessary. This configuration would provide four detection radars (AN/FPS-50) and two tracking radars (AN/FPS-49) at Thule (Site 1), three detection radars and two trackers at Clear (Site 2), and three trackers only at the British Isles site (Site 3). The original Air Force-approved configuration was for one additional tracker at Sites 1 and 2, and three scanners, in addition to the trackers, at Site 3.

USAF set operational dates for planning purposes as follows: Thule detection radars - September 1960, trackers - September 1961; Clear detection radars - September 1961, trackers - December 1961.

Deferral of Tracking Radars for Sites 1 and 2. In May 1959, USAF issued a new development directive (No. 108) that directed implementation of only the first phase of the interim configuration -- detection radars for Thule and Clear and trackers for Site 3. NORAD expressed concern over this deferral and reaffirmed the requirement for the interim configuration as the minimum acceptable. USAF replied that the interim configuration was to be attained, but on a two-phase basis. The trackers would be added to Thule and Clear later.

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NORAD then protested this reduction in a message to the JCS on 28 July 1959, reiterating its position on the minimum configuration. The Director of Defense Research and Engineering, Dr. Herbert F. York, replied to NORAD's message. He stated that the decisions that had been made had attempted to provide a balanced program considering early availability, coverage, reliability of support facilities, and detection capability. A final decision had not been made, he said, on the ultimate BMEWS configuration and CINCNORAD's views would be carefully considered in making the technical recommendations. He added that the design of BMEWS was such that trackers could be added if they were not installed initially.

In the meantime, on 14 September 1959, the office of the Director of Defense Research and Engineering authorized the Air Force to implement the third BMEWS site. The agreed configuration for this site was to be three tracking radars plus the necessary data processing and communications equipment.

On 10 November 1959, CINCNORAD replied to Dr. York, again urging the addition of trackers at sites 1 and 2. CINCNORAD stated that while the configuration programmed would provide the necessary coverage, it had many deficiencies. These were low reliability, degradation due to environmental disturbances (solar noise and aurora), susceptibility to enemy countermeasures, inability to properly identify targets which were still accelerating when sighted, and the high false alarm rate. CINCNORAD pointed out that a single section outage at any of the BMEWS sites would leave large sections of the U. S. exposed to undetectable ICBM attacks. During a detection radar outage, the tracking radar could be programmed to cover the disabled sector. But also tracking radars were essential in the detection evaluation process. Trackers would make possible a great reduction in the false alarm probability while at the same time reducing the false dismissal probability and permitting a lowering of the alarm threshold.



CHAPTER 5

NORAD Weapon Force

STATUS SUMMARY

On 31 December 1959, the operational weapons force available to NORAD consisted of 67 fighter-interceptor squadrons, two BOMARC missile squadrons, 258 Nike missile batteries and three Skysweeper batteries*. The December force structure showed a gain of two Nike fire units and two BOMARC squadrons over the July 1959 structure. The Nike batteries were new units located in the Minneapolis-St Paul defense. The two BOMARC squadrons, based at McGuire and Suffolk Air Force Bases, were the first ever to become operational. The December total also reflected the loss of one fighter-interceptor squadron (the 86th FIS which was released from its alert commitment on 18 November), and three Skysweeper batteries**. The loss of the 75mm batteries came with the inactivation of the Savannah River battalion (see page 100).

In addition to the regular forces, NORAD had available an augmentation force in December consisting of 108 aircraft squadrons, or their equivalents, with 2,299 aircraft; aircraft of six training wings (three owned by TAC and three by ATC) possessing 144 aircraft; and one Nike Ajax battery. This total reflected a gain of one Ajax battery and the loss of 1,187 aircraft from the July structure***

* See Appendix 2 for detailed Weapon Force.

** The 86th FIS is not included in the 67 squadron total. On 1 January 1960, this squadron had 12 F-102's in its inventory which were to be turned into AMC by 1 February 1960.

*** See the discussion under Augmentation Force.

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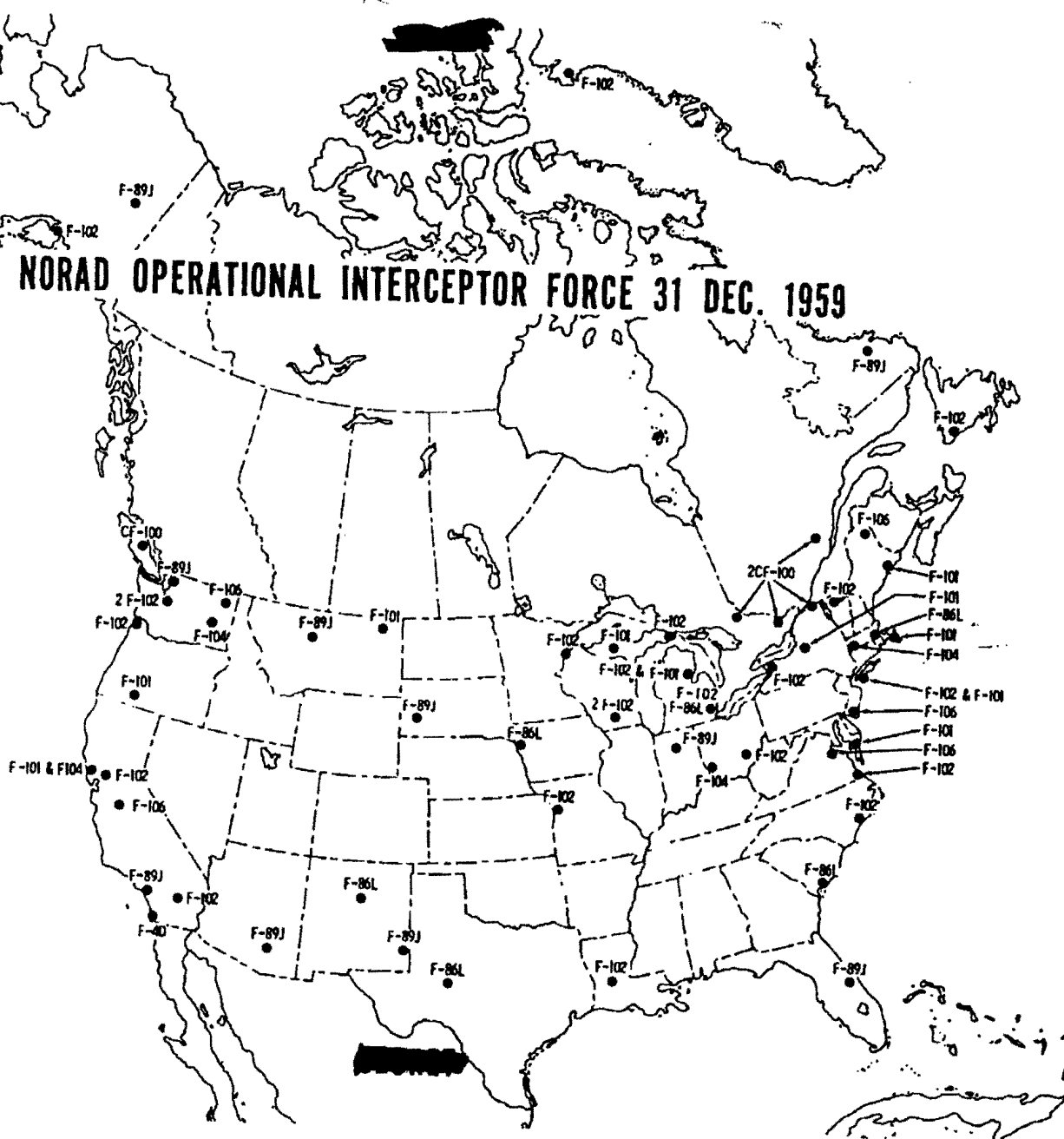
REGULAR FIGHTER-INTERCEPTOR FORCE

USAF ADC. On 31 December 1959, the USAF Air Defense Command had a total of 56 fighter-interceptor squadrons in its inventory, the same total as on 1 July 1959. But of the 56 squadrons, ten were considered by ADC as incapable of performing their operational mission. Seven of the units were in some stage of conversion to later model aircraft, one was testing, one had incomplete weapons storage facilities and internal communications, and the 86th FIS at Youngstown Municipal Airport, Ohio, had been relieved of its alert commitment in November in preparation for inactivation. In addition to these ten squadrons, the 465th Fighter-Interceptor Squadron (formerly the 49th FIS) based at L. G. Hanscom Field, Massachusetts, was more like an augmentation unit than a part of the regular force.

On 31 December 1959, as at mid-year, this squadron was not standing alert, but was, with USAF's concurrence, supporting an ARDC-Lincoln Laboratory test project. The squadron was authorized 18 F-86L's and a flying hour program of 360 hours per month for test support, air defense, and training. During normal conditions, the primary mission of the squadron was supporting a time-division data link computer programming test. As a secondary mission, the unit retained a limited capability to support pre-planned NORAD/ADC exercises. In cases of advanced states of readiness, air defense would be the unit's primary mission. This peculiar status of the squadron would soon end, however. In January 1960, ARDC agreed to release the unit from its test commitment. But it was programmed for inactivation in March 1960.

Another change that had taken place in the last six months of 1959 was the redeployment of four U. S. squadrons to provide an identification capability along the Southern ADIZ and to strengthen the defenses in the northeast area. The 332nd FIS from McGuire AFB, New Jersey, was moved to England AFB, Louisiana, in July 1959; and the 58th FIS from Otis AFB, Maine, to Walker AFB, New Mexico, in September. To strengthen the northeast defenses, the 62nd FIS, O'Hare International Airport, Illinois, was moved to K. I. Sawyer AFB, Michigan,

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in August, and the 27th FIS, Griffis, AFB, New York, was transferred to Loring AFB, Maine, in October 1959.

Interceptor Cut-Back. The Continental Air Defense Program (CADP), of June 1959, provided that the number of interceptor squadrons in the CONUS defenses would be reduced to 44 by the end of FY 1963. CONAD understood that the 44 squadron figure did not include planning for Alaska, Greenland, or the Northeast Area. But CONAD requested further guidance from the JCS.

On 24 July, the JCS stated that the 44 squadron figure included planning for the U. S. portion of the entire North American Continent. Using this guide, NORAD established the following U. S. interceptor objectives in NADOP 1961-1965. 50 squadrons in FY 1961, 48 by FY 1962, and 44 by FY 1963.

In December 1959, the JCS informed NORAD that USAF proposed a further reduction. USAF's program provided for 45 squadrons in FY 1961, 44 in FY 1962, and 42 by FY 1963. NORAD was asked to comment on this program and the deployment recommended. NORAD replied that it did not concur in reducing the interceptor program any lower than the 44 squadron level. Its position in regard to types of aircraft, number, and locations, was as stated in NADOP 81-85. CONAD reaffirmed the NORAD requirement on 8 January 1960. And it urged that every effort be made to achieve the force structure in NADOP. However, CONAD stated, if the JCS accepted USAF's program, a better deployment plan was needed. A recommended deployment plan, on a 42 squadron level, was submitted with CONAD's reply.

On 19 January 1960, ADC forwarded to NORAD a list of ten squadrons it proposed inactivating in the first eight months of 1960. NORAD approved inactivation of all but three of these units. It disapproved inactivating the 327th FIS at Thule, Greenland, the 14th FIS at Sioux City MAP, Iowa, and the 323rd FIS at Harmon AFB, Newfoundland. Release of these units, NORAD stated, would have to be deferred until differences between NORAD and USAF programs were resolved.

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Deletion of the F-108 Interceptor. NORAD had planned on replacing many of its interceptor types with a new, long-range interceptor under development by North American Aviation. The advanced-design interceptor was named the F-108 "Rapier."

In August 1959, the first hint of the eventual cancellation of the program came to NORAD. In this month, USAF advised ARDC that the F-108 development program would have to be continued on a very austere basis because of limited funds. Several components of the system were deleted from the program and the first flight date and the first squadron date were changed.

ADC was concerned with USAF's action as was NORAD. Lieutenant General J. H. Atkinson, ADC Commander, told General Thomas White, USAF Chief of Staff, that he had learned a reoriented B-70 bomber program might replace the F-108 program. He said that the B-70 would not meet air defense requirements. The F-108 was the only known manned vehicle which would meet the threat.

In September, General Kuter notified the JCS that he considered the F-108 as the first real break-through in solving the problem of long range interception of enemy aircraft. He said he felt that the B-70 could not do the job. It had a slow reaction time and poor maneuverability. A comparison of costs of the two systems indicated that use of the B-70 for air defense would be a more costly solution than would the F-108. He concluded that, "While I recognize that budgetary considerations will in the end prevail, if we...improve our defenses against current subsonic threats...and agreed future supersonic threats...I can see no alternative to the development of the F-108."

None of the arguments advanced seemed to help. On 23 September, USAF told ARDC of its decision to stop all efforts on development and production of the F-108 except the AN/FSG-18 fire control system and the GAR-9 missile. NORAD learned, however, that in October the JCS had presented CINCNORAD's views on the F-108 to the Secretary of Defense and had agreed that a long-range interceptor was needed to provide an adequate defense against the air breathing threat.

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Later, in December 1959, NORAD was informed that USAF and OSD (R&E) were studying several interceptor improvement programs which called for using semi-active air-to-air missiles and high-powered pulse doppler radars with certain current aircraft frames or a modified version of the F-108. The JCS asked NORAD to advise them of the aircraft that would best fulfill NORAD's needs based on funding levels of one billion, 750, and 500 million dollars. CINCONAD replied that he still considered the Mach 3 F-108 as the only interceptor capable of performing the long range air defense mission using NORAD's approved concept of operations. But based on the JCS funding guidelines, this aircraft could not be considered.

Within the funding levels outlined, CINCONAD recommended procurement of the Mach 2.5 F-108 (SCI) weapon system. The remaining aircraft were rejected for various reasons. However, CINCONAD concluded, if, in spite of his recommendation, monies were allocated for the procurement of any other system, purchase of the A3J aircraft was the least objectionable.

Withdrawal of the Navy's VFAW-3. One of NORAD's interceptor squadrons was a Navy unit based in the San Diego area at North Island NAS. The unit -- VFAW-3 -- was equipped with F4D's. In October, the JCS asked NORAD to comment on a CNO proposal to remove the squadron from air defense duty in FY 1963. NORAD agreed to its removal. NADOP 61-65 stated a requirement that all interceptors assigned to air defense have a nuclear weapons capability by FY 1963. Since no plans were being made to provide the squadron with a nuclear capability, NORAD saw no reason to retain it.

Canadian Aircraft. In February 1959, Canada had cancelled its plans for development of an advanced-design interceptor to replace its CF-100's (in ADC's nine squadrons). It was decided that the development program could not be completed and the interceptors ready before the manned bomber threat had been replaced by the missile threat.

As of 31 December 1959, definite plans had been

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made for the phase-out of the CF-100's by 1963, but it had not been decided whether they would be replaced with advanced interceptor aircraft. However, NORAD had stated an objective in NADOP 61-65 for six squadrons (108 aircraft) of F-101B's in Canada by FY 1963. This objective was being studied by the COSC.

Alaskan Program. As of 30 June 1959, the aircraft program for Alaska provided for replacing the F-89J's in the 449th Squadron at Ladd AFB with F-101B's beginning the fourth quarter of FY 1960. The remaining Alaskan squadron, the 317th at Elmendorf, would keep its F-102A's. During the next eight months the program was changed to provide two F-101B squadrons and then returned to its original form.

In October 1959, USAF proposed to AAC a new aircraft program. USAF wanted to convert both squadrons to F-101B's (18 aircraft each) and base them both at Elmendorf. AAC objected. It stated that 36 aircraft would not provide an acceptable air defense posture. AAC wanted both squadrons left where they were and asked that the 317th retain its F-102's. The 449th, it stated, could be converted to 18 F-101B's in FY 1960. The loss of aircraft from the 449th (i.e., 25 F-89J aircraft to 18 F-101B's) would be compensated for by the improved aircraft performance characteristics.

AAC advised NORAD of its recommendation and asked for NORAD's support and/or comments. On 21 October, NORAD concurred and so advised CINCAL and USAF. NORAD told USAF that its Alaskan fighter-interceptor requirements were as shown in NADOP 61-65: one squadron of F-102's with a UE of 33 aircraft deployed at Elmendorf, and one squadron of F-101B's based at Ladd with a UE of 20 aircraft.

USAF asked NORAD to reconsider, but NORAD would not change its requirement. Then on 12 February 1960, USAF advised NORAD that it was retaining the F-102A's at Elmendorf. The 449th was to convert to F-101B's in the fourth quarter of FY 1960.

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THE MISSILE/GUN FORCE

BOMARC Squadrons Operational. The newest weapon in the NORAD force was the IM-99A (BOMARC) missile. In the last six months of 1959, two IM-99A squadrons became operational and assumed an air defense role. The first to assume its air defense mission was the 46th Air Defense Missile Squadron (BOMARC) based at McGuire AFB, New Jersey. This unit was activated on 1 January 1959 and became operational on 1 September 1959 with three missiles. It was followed by the 6th Air Defense Missile Squadron (BOMARC) at Suffolk AFB, New York. The 6th ADMS was activated on 1 February 1959 and became operational on 1 December 1959. As of 1 January 1960, the McGuire squadron had 24 IM-99A missiles and the Suffolk squadron had four missiles available for air defense.

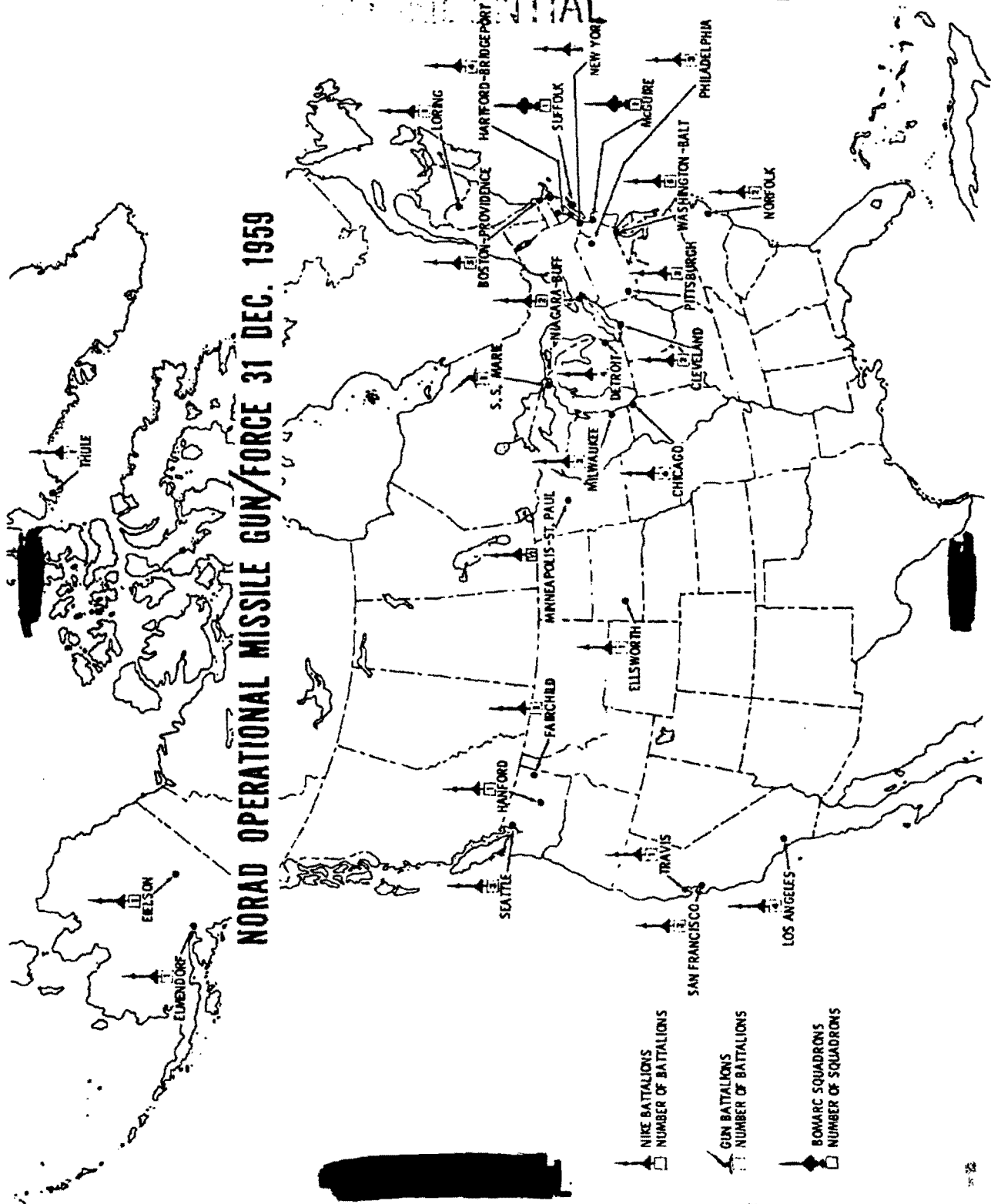
Three other BOMARC squadrons were activated in 1959. These were: the 26th ADMS, activated at Otis AFB, Massachusetts, on 1 March 1959; the 30th ADMS, activated on 1 June 1959 at Dow AFB, Maine; and the 22nd ADMS, activated on 1 September 1959 at Langley AFB, Virginia. These units were expected to become operational in 1960.

BOMARC Program Reduction. The first NORAD Objectives Plan (NADOP 1959-1963, dated 16 December 1958) stated a requirement for FY 1963 of 36 IM-99B sites and 2,772 launchers. Thirty-two of the sites were to be in the U. S. (excluding Alaska), two in the 84th Air Division's area, and two in Canada. Guidance received from the JCS on this plan stated that the approved objectives for BOMARC were contained in the OSD Continental Air Defense Program.

The OSD CADP, dated 19 June 1959, approved a BOMARC structure of 16 sites and 504 launchers for the U. S. to be deployed along the northern border and the east and west coasts. The program noted that there would be two Canadian squadrons also. Installation of two 30-missile IM-99B squadrons in Canada had been agreed to by the U. S. and Canadian Governments in January 1959. Both squadrons were to be constructed and funded in the RCAF-USAF CADIN program.

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According to planning at the end of 1959, of the 16 U. S. squadrons, two would be "A" squadrons, 11 "B", and three A/B. Both Canadian squadrons were to receive BOMARC B's.

But this program would not be realized either. In March 1960, the JCS told NORAD that they were considering reducing the BOMARC program to eight U. S. and two Canadian squadrons. This reduction and the results will be discussed in subsequent histories.

Nike Ajax and Hercules. The 258 operational Nike units on 31 December 1959 represented an increase of two fire units over the 1 July 1959 total. Both new units were in the Minneapolis-St Paul defense. There was also an increase in the number of Hercules atomic-armed units.

On 1 July 1959, only 54 of the 256 fire units, or 22 per cent of the force, were Hercules-equipped. Of these 54 units, 42 were located in defenses within the U. S., the others in Alaska and Greenland. By 31 December, 84 of the 258 fire units -- approximately 33 per cent of the total -- were equipped with Hercules, and 82 were atomic capable. The 30 new Hercules units were located in the U. S. and represented converted Ajax units.

ARADCOM programmed for the end of FY 1960 172 Ajax units, of which 120 would be manned by ARADCOM personnel and 52 by National Guard personnel. At the same time, there would be 104 Hercules fire units (92 in the U. S., four in Greenland, and eight in Alaska) manned by Regular Army personnel.

Eventually, all Ajax units were to be phased out of the Regular Army inventory. The Ajax force would be manned by National Guard units and would consist of 76 fire units. The Regular Army units would man Hercules. The OSD Continental Air Defense Program provided for 126 Hercules batteries in the Continental U. S. defenses. In addition, according to planning at the end of 1959, 13 additional Hercules batteries were to be provided for outside CONUS (four at Thule and nine in Alaska), for a total force of 139 Hercules fire units by the end of FY 1963.



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The other change in the missile force in the last six months of 1959 was an increase in manning of Ajax batteries by National Guard personnel. On 1 July 1959, three Guard missile battalions had assumed an operational role in the defense of the continent. These three battalions were manning eight batteries in the Los Angeles and Seattle defenses. On 31 December 1959, 17 National Guard missile battalions were manning 36 batteries in ten defenses.

Guns. On 15 November 1959, one of the two remaining gun battalions in the ARADCOM inventory, the 4th Gun Battalion (Skysweeper), Savannah River, Georgia, was relieved of its air defense mission. The unit began turning in its guns and was expected to be completely closed out by 25 January 1960.

ARADCOM had proposed to DA that the other gun battalion, the 2d Gun Battalion (Skysweeper), at Sault Ste Marie, Michigan, be inactivated right away also. ARADCOM pointed out that CINCONAD no longer had a requirement for Skysweeper units and its removal would be a saving. DA refused, however, because of a need for this unit for STRAC forces until a Hawk replacement became available in May 1960. Therefore, the last gun unit could not deactivate until its scheduled date, June 1960. However, it was to be relieved of its air defense mission on 15 April 1960.

NIKE ZEUS

The 1959-1963 NORAD Objective Plan (NADOP 59-63), submitted in December 1958, stated a requirement for Zeus deployment at 16 locations by FY 1962 and at 44 locations by FY 1963. The OSD Continental Air Defense Program, dated 19 June 1959, provided that the Zeus research and development program would be carried out at a maximum rate and that the Army could proceed with production feasibility studies and the engineering, tooling, and facilities necessary to prepare Zeus for production. The CADP also authorized FY 1960 funding of \$137 million for this preparation for production, subject to Congressional action. However, although Congress

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Line



aircraft (included in this figure were the aircraft of three ATC training wings and three TAC training wings reporting a total of 965 possessed aircraft). As of 31 December 1959, the reported NORAD augmentation force consisted of 2,443 aircraft (which included a reported total of 144 aircraft in these six training wings). In the six months NORAD had lost 1,187 aircraft.

Most of the loss in aircraft was a paper loss, however, as the result of the adoption of a more realistic reporting procedure. Until August 1959, the TAC and ATC wings reported all of their possessed aircraft. USAF ADC felt this was unrealistic. Certainly not all of the aircraft could have been used. Some were scheduled to deploy overseas. Others could not have been used because of a lack of proper equipment or because of location. It was decided to have TAC and ATC report only those aircraft which could be properly equipped and deployed.

In this period, NORAD had gained an Ajax battery. On 1 July 1959, the 4th Battalion, 44th Artillery (Nike Ajax) at Fort Bliss, Texas, was carried in the NORAD augmentation force list as a Category III (not desired) unit. It was placed in this category because no plan was available to effectively use the unit. A plan was under study, however, which would place the missile battalion in Category I (to be retained) with a secondary mission of air defense of Biggs AFB.

On 16 November, ARADCOM told NORAD that an interim plan for the emergency defense of Biggs had been developed. One battery of the missile battalion had been placed at a site east of Biggs and the plan provided that it would be manned upon the declaration of an Air Defense Emergency. ARADCOM said CONARC had an alternate plan under study, which would be forwarded after approval. The alternate plan called for use of Hercules rather than Ajax and provided for maximum use of available personnel and equipment of the Army Air Defense Center at Fort Bliss.

The Future Augmentation Force. In February 1959,



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categories were along the lines of the recommendations forwarded to the components in October. A quality rather than a quantity force was required. This force was to be compatible, insofar as possible, with the NORAD control system. A perimeter defense and defense in depth of the industrial heartline were minimum requirements. Augmentation units were to be used to fill gaps in the system caused by a reduction in the regular force. Augmentation units needed first line equipment and a capability equivalent to the regular force. The assignment of forces to a command should carry with it the necessary authority to train, exercise, and evaluate.

On the basis of these criteria, NORAD recommended keeping 19 ANG fighter-interceptor squadrons (one from TAC and 18 from ADC) in Category I, and 11 Navy/Marine fighter squadrons in Category II. Another 12 ANG squadrons were to be retained as Category II units to provide transport and target aircraft. NORAD proposed using 26 missile battalions (only ten were currently available). These included seven STRAC battalions (six Hawk and one Hercules) and the 19 Guard battalions manning Ajax. The Ajax battalions were placed in Category I and the remaining battalions in Category II. NORAD also wanted 19 radar squadrons. Seventeen of these were FAA squadrons and were to be Category I units; the remaining two were TAC squadrons classed as Category II units.

NORAD also told the JCS that certain actions were being taken so the plan could be implemented. To provide CINCNORAD with the authority to control and employ Guard augmentation forces during periods of Maximum Readiness, the National Guard Bureau and the Services concerned were already negotiating individual agreements with interested states. These agreements would give CINCNORAD the operational authority to use those Guard forces committed to air defense prior to initiation of hostilities. Action was being taken through ADC to have USAF vest the authority to train, exercise, and evaluate the augmentation forces in the tactical command to which they were assigned.

The authority for the Reserve augmentation forces

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to maintain custody of and to use nuclear weapons for training and during periods of Increased Readiness prior to initiation of hostilities had to be determined. ADC had asked USAF to determine policy for this. NORAD also asked the JCS to assist in providing policy guidance on this matter.

Lastly, NORAD stated that ADC was to ask USAF to coordinate the NORAD plan with the National Guard Bureau and get its concurrence. If the NGB approved the plan in principle, NORAD continued, implementing actions would be taken to revise existing programs and to realign forces and equipment.

Policy on Weapons Manning by Guard Units. In December 1958, General E. E. Partridge, who was then CINCNORAD, had written to the JCS that he was concerned with the trend toward using National Guard rather than regular units to man first-line air defense weapons. He noted that the Army was starting to man Nike Ajax units with National Guard personnel. But also he understood that there was consideration of using Guard personnel to man Bomarc, Hercules, and Hawk units. He urged that the policy be established that the equipping, manning and operation of air defense units needed on a full-time basis be the responsibility of the regular military establishment and that National Guard units be used as augmentation forces only.

The JCS had advised General Partridge that existing plans did not provide for manning of BOMARC, Hercules, and Hawk units with Guard personnel except at certain test sites. A final decision on use of the Guard units on a full-time basis was not to be made until these tests were completed. General Partridge had then presented the problem to Mr. Neil McElroy, Secretary of Defense.

Shortly after this, General Partridge retired and General Laurence S. Kuter became the new Commander-in-Chief of NORAD. Meanwhile, General Partridge's letter to the Secretary of Defense was referred to the JCS and they requested that NORAD present its views on the problem to them.

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NORAD representatives met with the JCS on 26 August. NORAD presented the following proposals on using the Guard in air defense. A quality rather than a quantity force was needed. Use of the Guard units in an augmentation role should not be based solely on the availability and existence of such units, but on whether these units could fill gaps left by the regular NORAD force deployment. First line weapons should not be assigned to Guard units until these weapons had been fully developed, tried, and proven and then only after they were excess to the regular force. Finally, nuclear weapons should be provided only after they had become excess to the regular force needs and suitable custodial procedures and policies were developed.

In November 1959, the JCS informed NORAD that, as a matter of general policy, they concurred in using active military personnel to operate first line weapons on a full-time basis. However, they continued, it had been and might continue to be, necessary, for budgetary or other reasons, to use Guard units to man air defense weapons in certain instances. However, they stated that the Services had no plans to use Guard units to man BOMARC, Hercules or Hawk in the NORAD system. Also, on-site Ajax units, both regular and Guard-manned, were eventually to be phased out of the NORAD system.

Because of the latter information, NORAD dropped the matter at this time, feeling that it had at least partially accomplished its objectives. There were still problems to be ironed out, however. Among these were the matter of the availability of the Guard to meet NORAD's increased alert conditions, training, control and other readiness requirements and there had to be assurance that the Governor of a state could not divert units from alert commitments to meet local needs.

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APPENDIX

THE SURVEILLANCE NETWORK
31 DECEMBER 1959

PROGRAM	PROG SITES	OPRL SITES	OPERATIONAL PRIME SEARCH	
			Equipment	No.
Permanent (P-sites)	72	71	GPS-3	7
			CPS-6B/FPS-10	16
			MPS-7/FPS-3	11
			FPS-20	35
			FPS-7	2
1st Ph Mobile (M-sites)	29	29	MPS-11/FPS-8	10
			MPS-7/FPS-3	4
			FPS-20	15
2nd Ph Mobile (SM-sites)	19	15	MPS-11/FPS-8	5
			MPS-7/FPS-3	5
			FPS-20	5
3rd Ph Mobile (TM-sites)	21	15	FPS-3	8
			FPS-20	7
Surveillance Stations (Z-sites)	2	1	ARSR-1	1
Canadian Sites (RCAF Funded)	12	9	FPS-3	6
			CPS-6B	2
			FPS-20	1
Canadian Sites (USAF Funded)	30	25	FPS-3/MPS-7	12
			CPS-6B	5
			FPS-20	8
ZI Gap Fillers	195	108	FPS-14	60
			FPS-18	48
Gap Fillers (Canada)	45	0		
Gap Fillers (64th ADiv)	6	6	FPS-14	6
Thule, Greenland	1	1	FPS-20	1

[REDACTED]

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THE SURVEILLANCE NETWORK

31 DECEMBER 1959

PROGRAM	PROG SITES	OPRL. SITES	OPERATIONAL PRIME SEARCH	
			Equipment	No.
Alaska	18	18	FPS-20	11
			FPS-3(A)	2
			FPS-3	1
			GPS-3/FPS-3	1
			FPS-8	3
Texas Towers	3	3	FPS-20	3
East Coast	5	3		
AEW&Con Stations			AN/APS-20	
West Coast	5	4		
East Coast	5	5		
Picket Ship Sta			AN/SPS-17 or 28	
West Coast	5	5		
AEW Airships				
East Coast	1	1	AN/APS-20E or 70	
DEW Line	57	57	FPS-23	57
			FPS-19	29
Aleutian DEW Extension	6	6	FPS-19	6
Greenland DEW Extension	4	0		
Mid-Canada Line	90	90	Doppler Detection Equipment	
	3	3	Surveillance Radars at Section Control Stations	
Atlantic Barrier			4 DER's and 4 AEW aircraft oper- ating between Argentina and the Azores	
Pacific Barrier			5 DER's and an average of 4.5 AEW aircraft operating between Unak and Midway Island	

THE WEAPONS STRUCTURE

31 DECEMBER 1959

INTERCEPTORS	
NUMBER OF UNITS	EQUIPMENT
10 Sqdns	F-101B
22 Sqdns	F-102A
5 Sqdns	F-106A
4 Sqdns	F-104A
6 Sqdns	F-86L
10 Sqdns	F-89J
9 Sqdns	CF-100
1 Sqdn	F-4D
<u>67 Sqdns</u> TOTAL	
MISSILE/GUN	
174 Batteries	Nike Ajax
84 Batteries	Nike Hercules
<u>258</u> TOTAL	
3 Batteries	75mm Guns (Skysweeper)
2 Sqdns	BOMARC A

9-17



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