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RADIO AND ELECTRICAL ENGINEERING DIVISION

ANALYZED

VHF/UHF ANTENNA PATTERNS FOR HMCS "CRESCENT"

J. Y. WONG

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Date: NOV 26 1992

OTTAWA
AUGUST 1956 NRC 35457

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ABSTRACT

Results of pattern measurements on five different VHF/UHF antennas for HMCS "Crescent" are presented. Measurements were carried out on a 1/6-scale model of the destroyer's foremast. Reliability calculations by personnel at Naval Technical Services, National Defence Headquarters, Ottawa, for the AT-150/SRC antennas reveal that on the average the performance is somewhat inferior to that of the DE-205 antenna arrangement.

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VHF/UHF ANTENNA PATTERNS FOR HMCS "CRESCENT"

- J.Y. Wong -

INTRODUCTION

In a previous report [1] VHF/UHF antenna pattern measurements using scaled model techniques were given for the destroyer escort, HMCS "St. Laurent" (DE-205). Naval Technical Services, National Defence Headquarters, Ottawa, has recommended that a different antenna arrangement be investigated to determine whether or not more effective all-round coverage can be obtained, especially with the AT-150/SRC antennas. It was intimated there was a possibility that the antenna arrangement used on HMCS "Crescent" might be a suitable replacement for the DE-205.

For this investigation a 1/6 scale model of the HMCS "Crescent" foremast was constructed. This report contains the results of these pattern measurements.

METHOD OF MEASUREMENT

A photograph of the model foremast is shown in Fig. 1. As before, patterns were measured on the following antennas:

- i) AT-150/SRC
- ii) AS-390/SRC
- iii) 3BA/15
- iv) 3BA/5-1
- v) AS-466/SR.

The various model antennas are shown in Fig. 2.

For convenience, the antenna under test was used as the transmitting source. The structure was mounted on a turntable located about 30 feet from the receiving antenna. The received signal was fed through a crystal detector to an amplifier and the pattern plotted on a polar recorder. Only the azimuthal patterns were recorded.

DISCUSSION OF RESULTS

A line drawing of the foremast shown in Fig. 3 is provided to facilitate identification of the various antenna locations. Unless otherwise noted, all measurements were conducted with the AN/SPS-10, AN/SPS-12, and the Sperry Radar antenna reflectors in position and looking forward (azimuthal angle zero).

Radiation patterns of the AT-150/SRC antenna are presented in Figs. 4 to 6. Patterns were measured at five different frequencies over the operating band of the antenna. The effect of orientation of the AN/SPS-10 and AN/SPS-12 reflectors on the pattern is illustrated in Figs. 4(f), 4(g), and 4(h). Reliability calculations by personnel at Naval Technical Services for the AT-150/SRC antennas reveal that on the average, the performance is somewhat inferior compared with that of the DE-205 antenna arrangement.

Patterns of the AS-390/SRC antenna are shown in Figs. 7 to 9.

The 3BA/15 antenna is located on the starboard quarter spur. Patterns of the antenna are shown in Figs. 10 and 11.

Patterns of the 3BA/5-1 antenna are given in Figs. 12 and 13. The antenna is mounted on the aft spur of platform No. 1.

The airborne early warning system employs two AS-466/SR antennas. Each antenna is located on adjacent sides of the pole mast. Patterns are presented in Figs. 14 and 15.

CONCLUSIONS

Radiation patterns of five different VHF/UHF antennas for HMCS "Crescent" have been measured on a 1/6-scale model of the destroyer's foremast. Reliability calculations for the AT-150/SRC antennas reveal that, on the average, the performance is somewhat inferior to that of the antenna arrangement for HMCS "St. Laurent" (DE-205).

REFERENCE

1. "VHF/UHF Antenna Patterns for the Destroyer Escort HMCS 'St. Laurent' (DE-205)", J.Y. Wong, NRC/REE Report ERB-386, March, 1956 (Confidential).

FIGURES

Fig. 1 1/6-scale model of HMCS "Crescent" foremast

Fig. 2 VHF/UHF model antennas

Fig. 3 Location of antennas on the foremast

Radiation Patterns:

Figs. 4 (a-h) AT-150/SRC antenna at No. 1 location

Figs. 5 (a-e) AT-150/SRC antenna at No. 2 location

Figs. 6 (a-e) AT-150/SRC antenna at No. 3 location

Figs. 7 (a-f) Port AS-390/SRC antenna

Figs. 8 (a-e) Starboard AS-390/SRC antenna

Figs. 9 (a-f) Aft AS-390/SRC antenna

Figs. 10 (a-d) 3BA/15 antenna

Figs. 11 (d-c) 3BA/15 antenna with AN/SPS-10 and AN/SPS-12 reflectors rotated 90°

Figs. 12 (a-d) 3BA/5-1 antenna

Figs. 13 (a-c) 3BA/5-1 antenna with AN/SPS-10 and AN/SPS-12 reflectors rotated 90°

Figs. 14 (a-c) Port AS-466/SR antenna

Figs. 15 (a-e) Starboard AS-466/SR antenna

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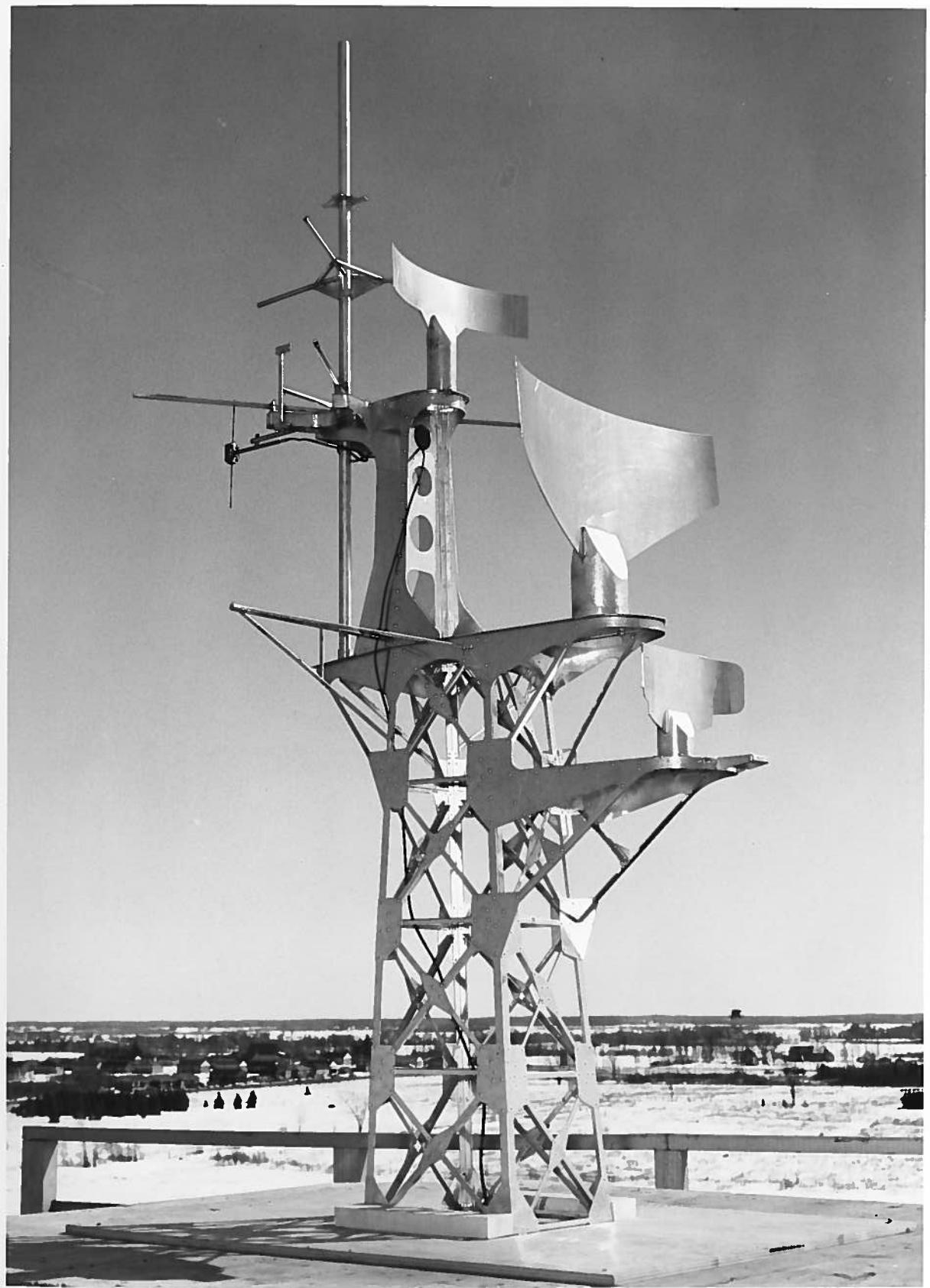


FIG. 1 1/6-SCALE MODEL OF HMCS "CRESCENT" FOREMAST

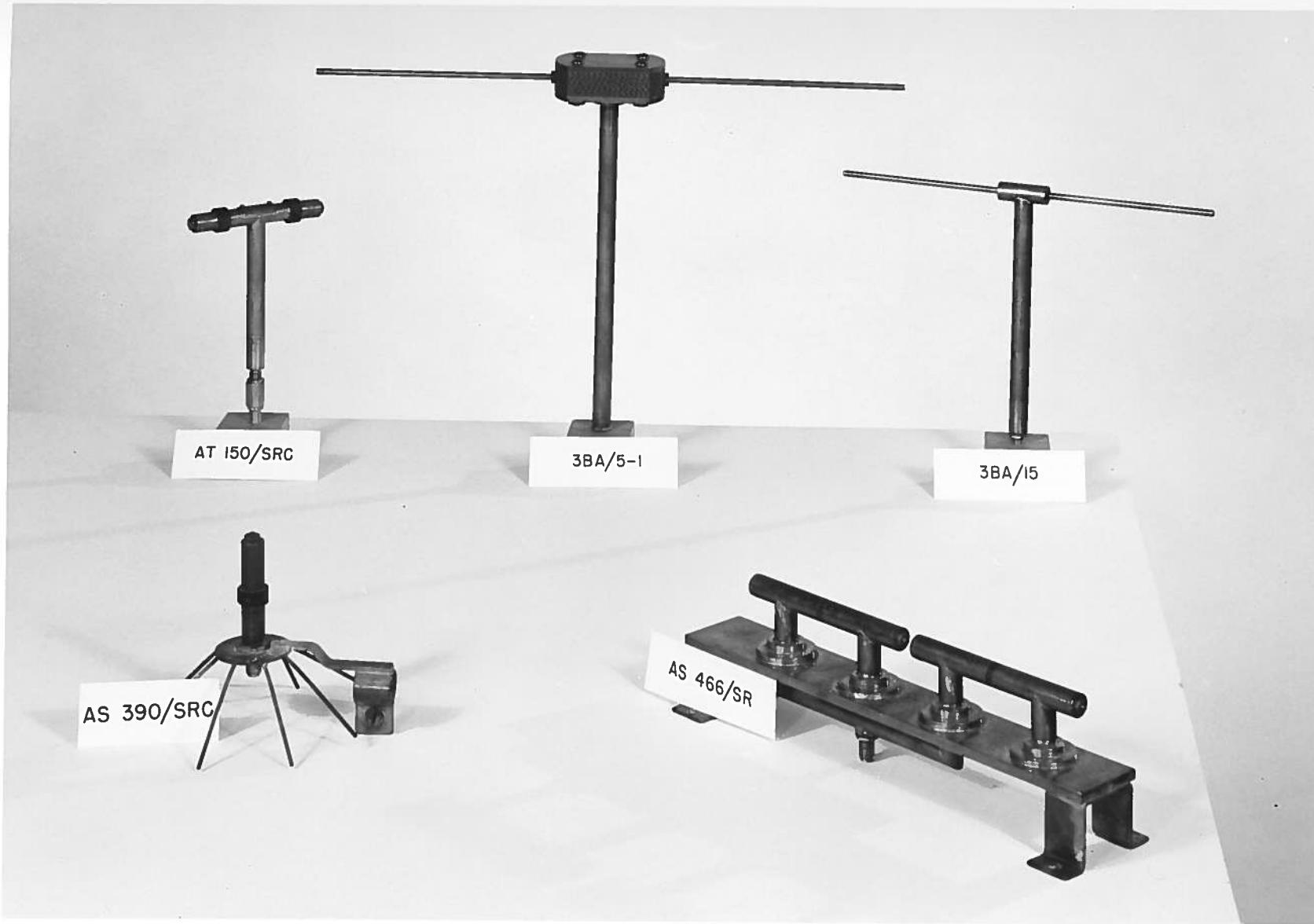


FIG. 2 VHF/UHF MODEL ANTENNAS

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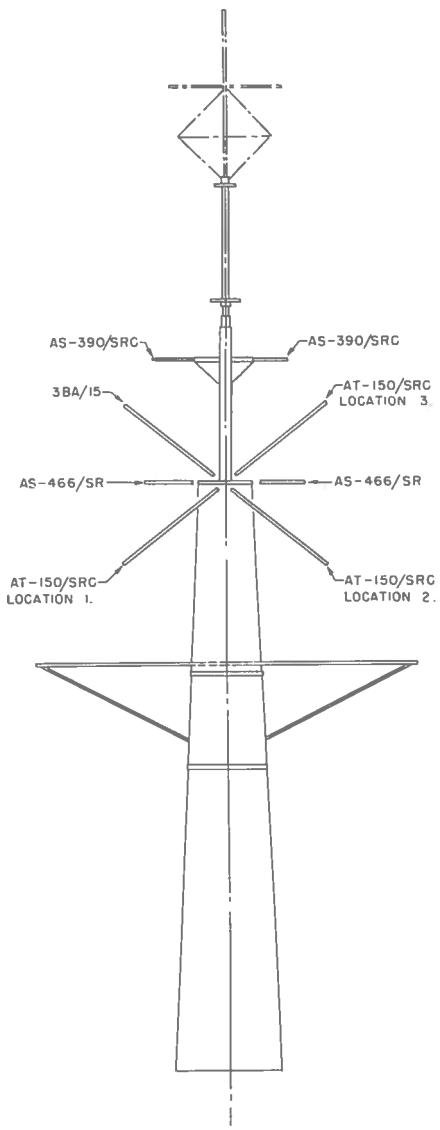
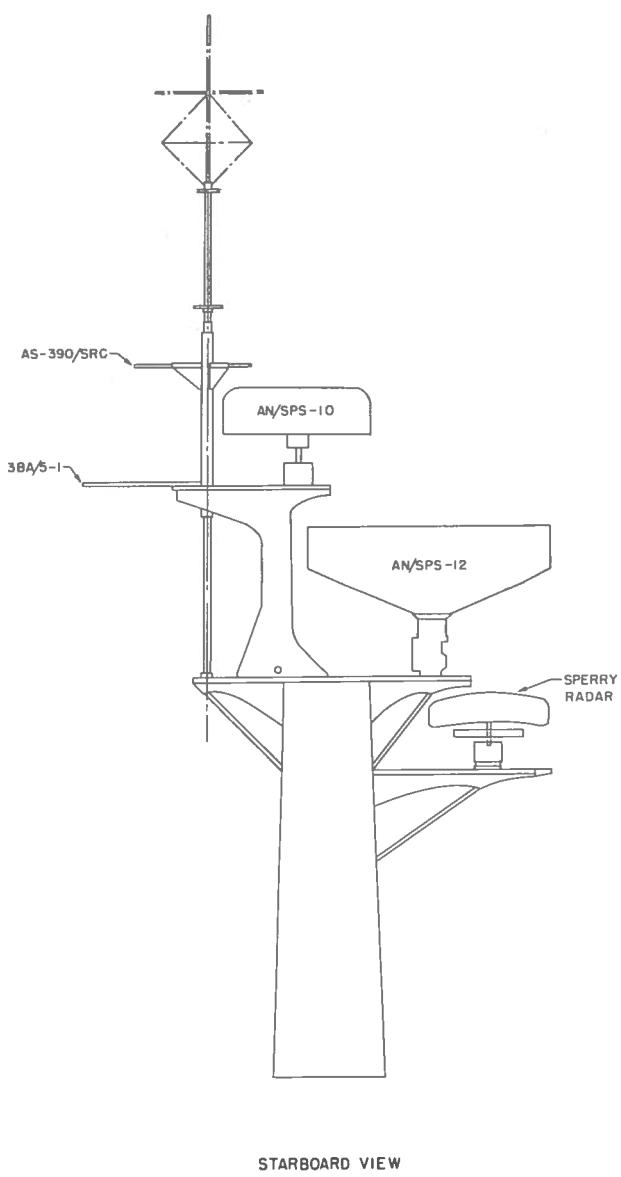
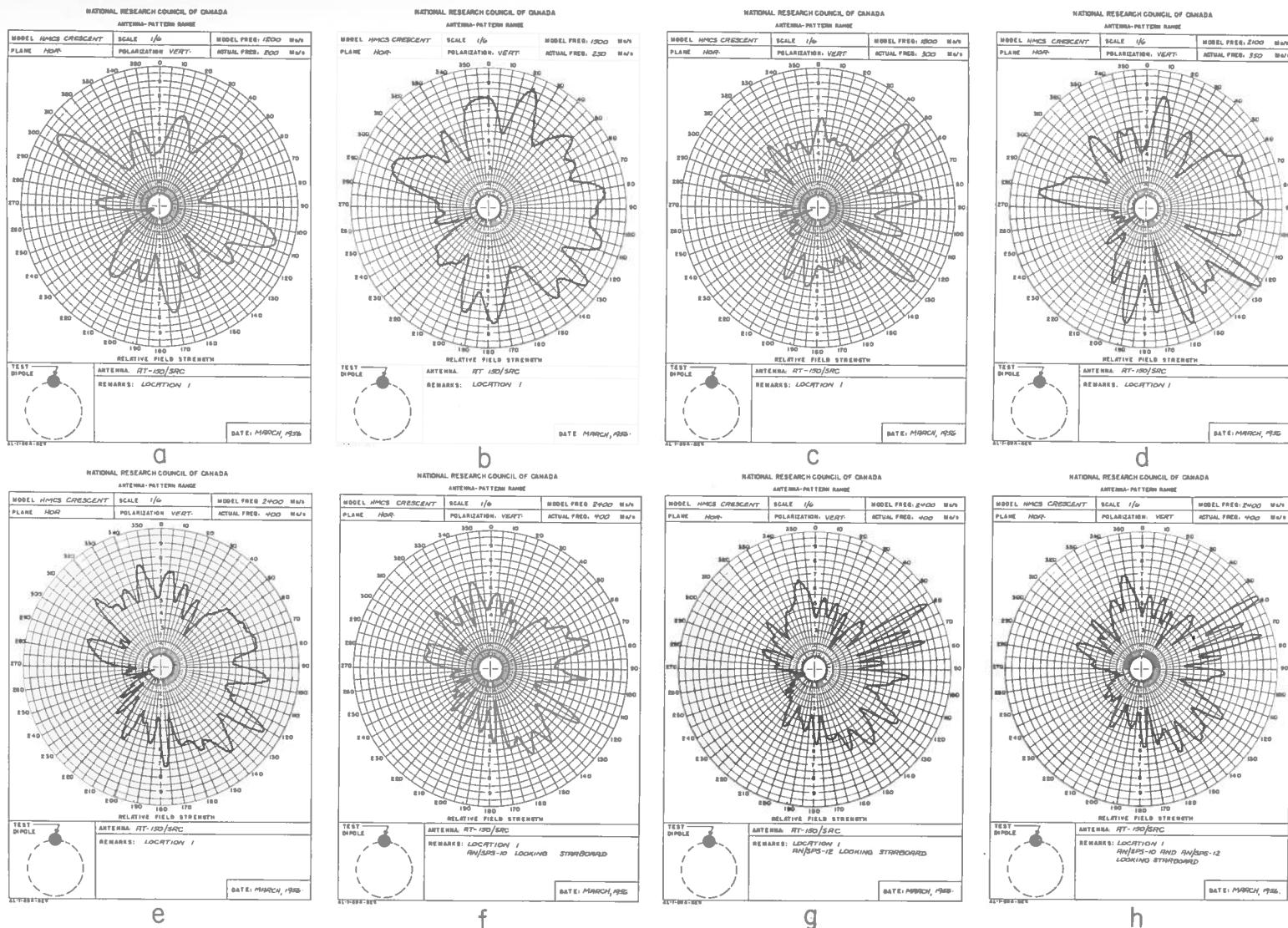


FIG. 3 LOCATION OF ANTENNAS ON THE FOREMAST

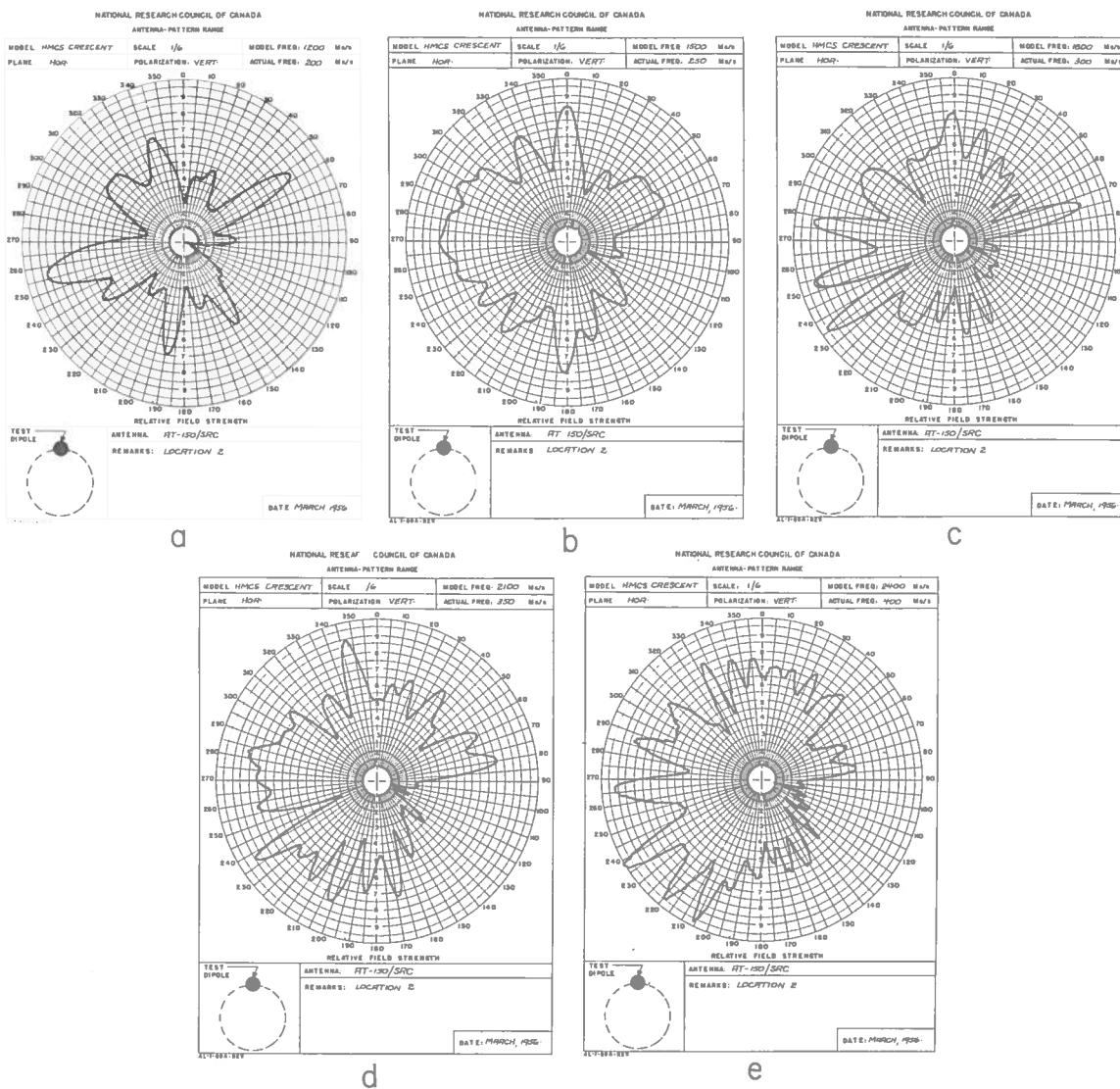
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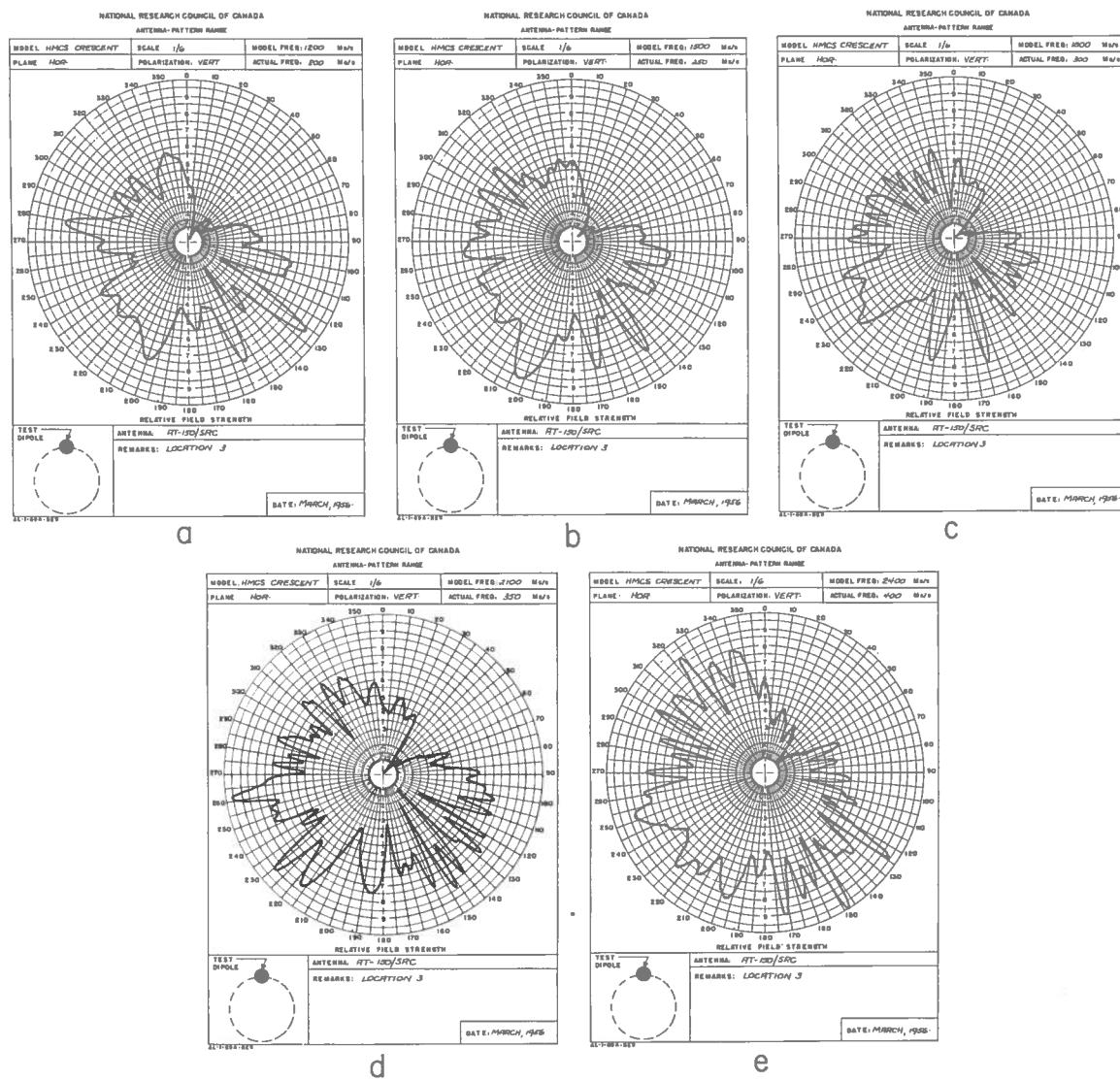
FIGS. 4 (a-h) AT-150/SRC ANTENNA AT NO. 1 LOCATION

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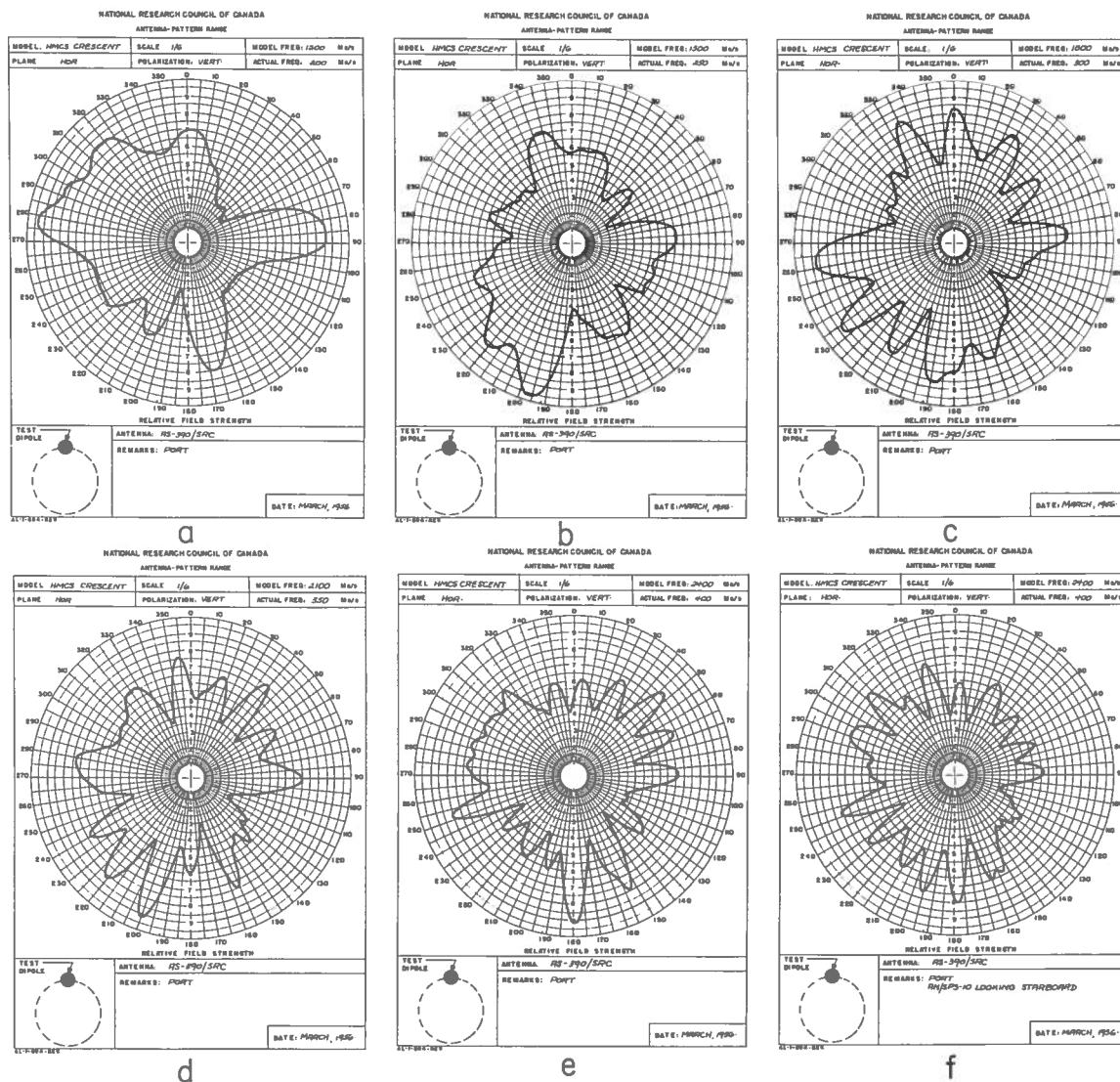
FIGS. 5 (a-e) AT-150/SRC ANTENNA AT NO. 2 LOCATION

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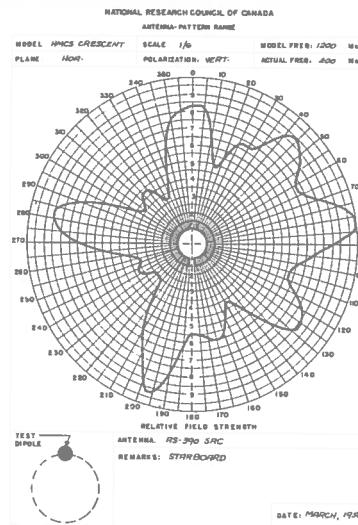
FIGS. 6 (a-e) AT-150/SRC ANTENNA AT NO. 3 LOCATION

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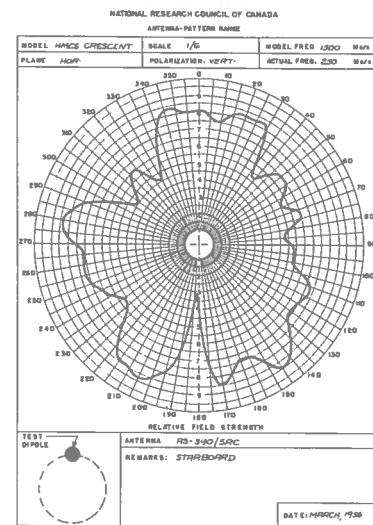


FIGS. 7 (a-f) PORT AS-390/SRC ANTENNA

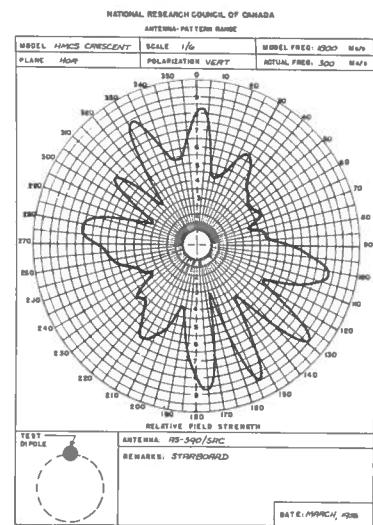
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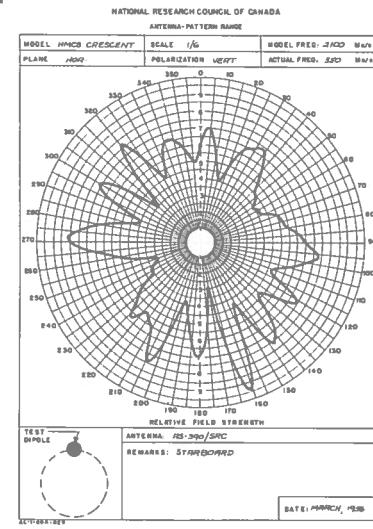
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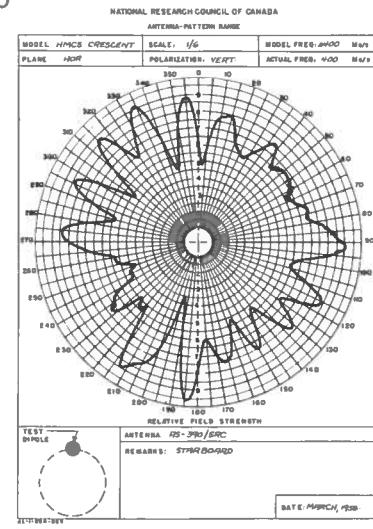
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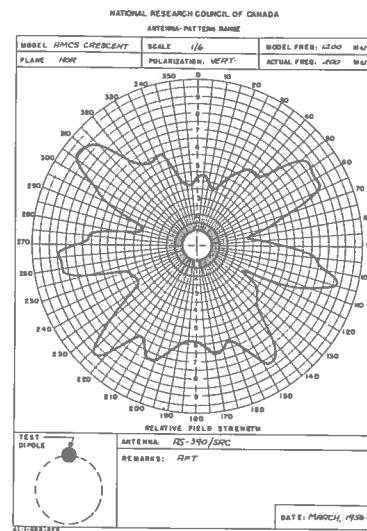
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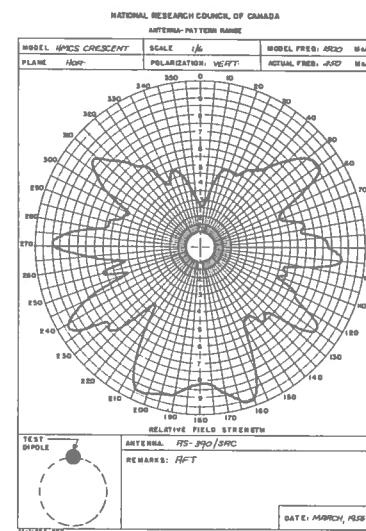
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FIGS. 8 (a-e) STARBOARD AS-390/SRC ANTENNA

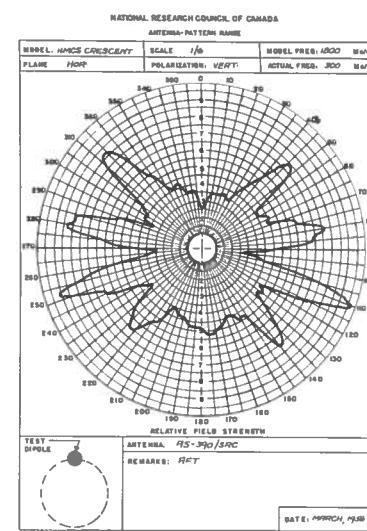
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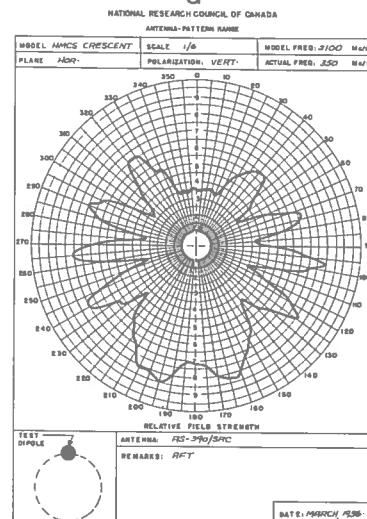
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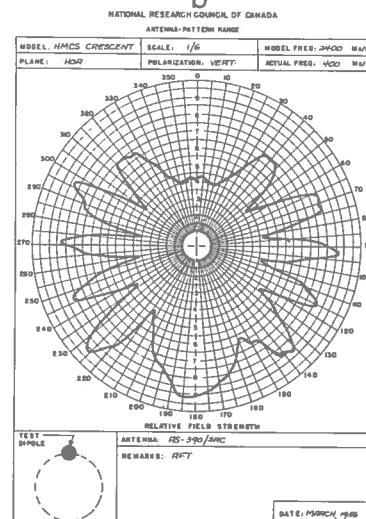
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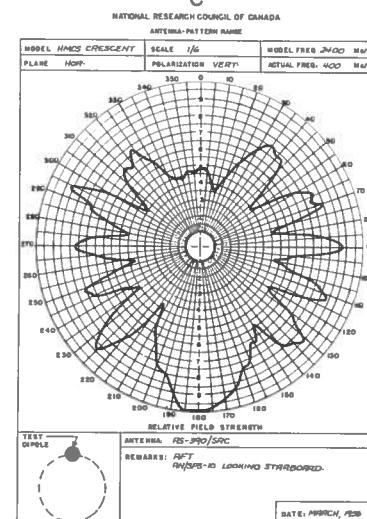
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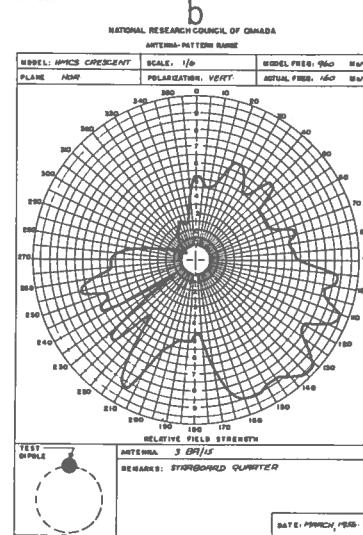
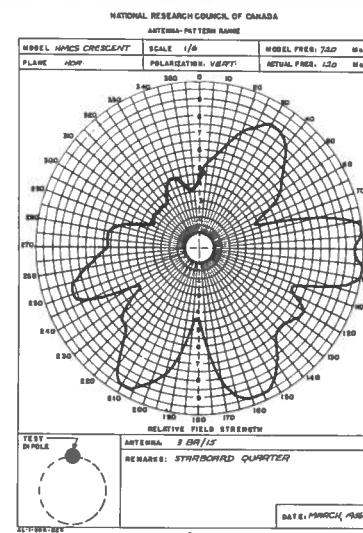
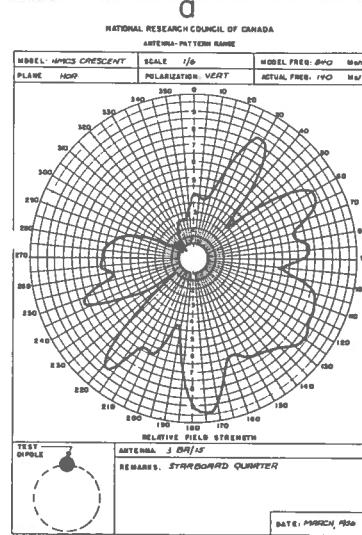
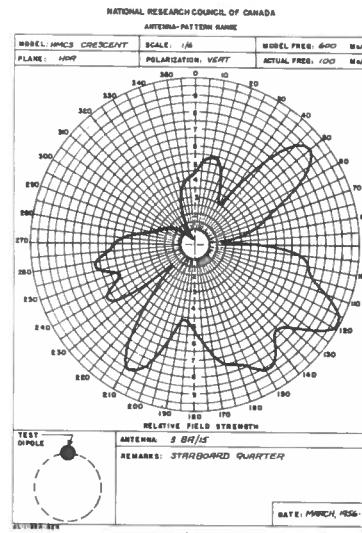
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f

FIGS. 9 (a-f) AFT AS-390/SRC ANTENNA

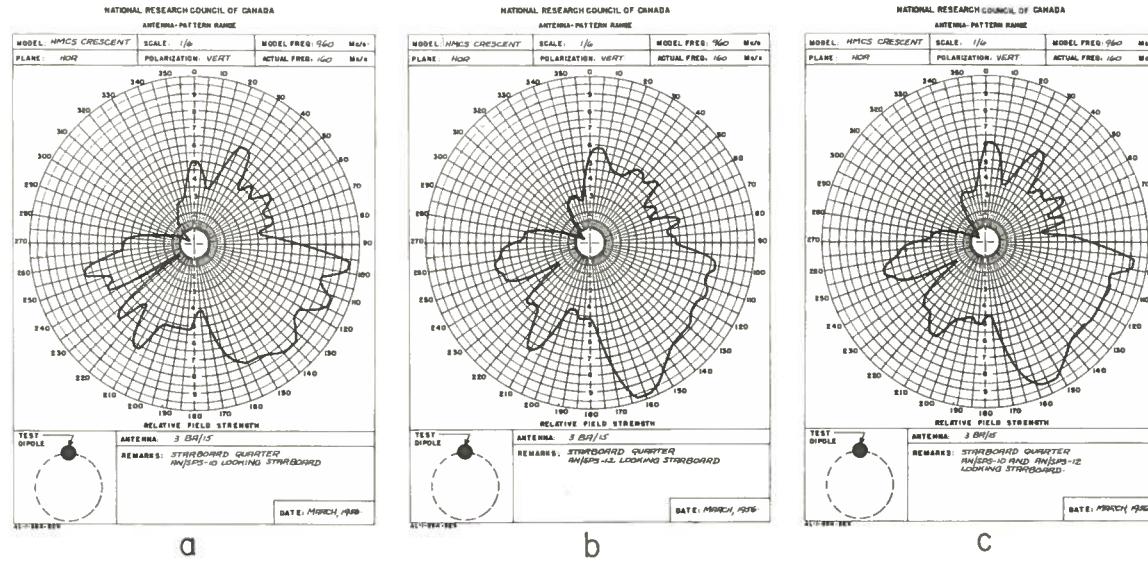
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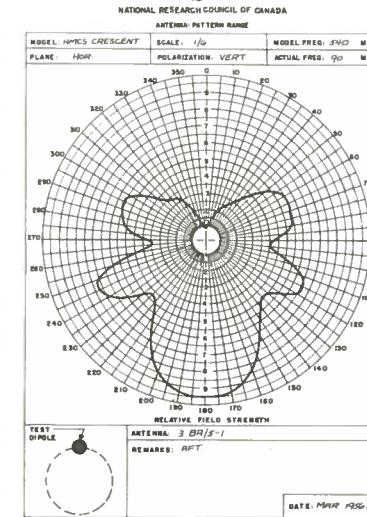
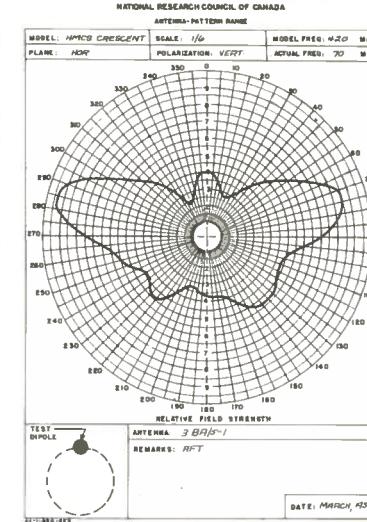
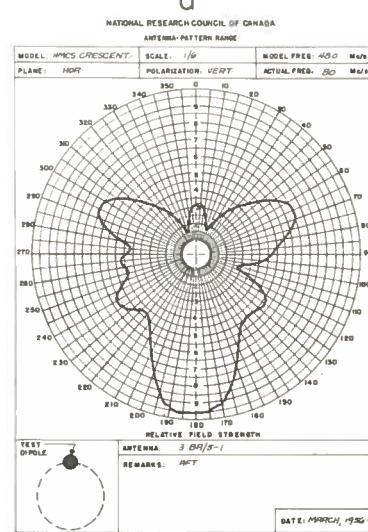
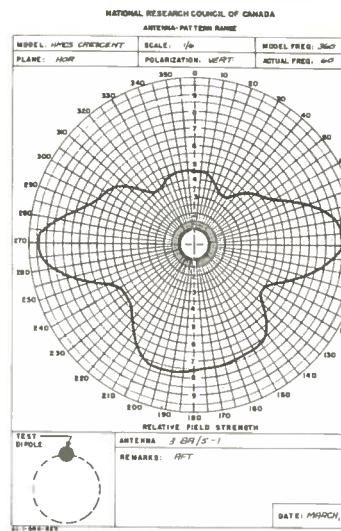
FIGS. 10 (a-d) 3BA/15 ANTENNAS



FIGS. 11 (a-c) 3BA/15 ANTENNA WITH AN/SPS-10 AND AN/SPS-12 REFLECTORS ROTATED 90°

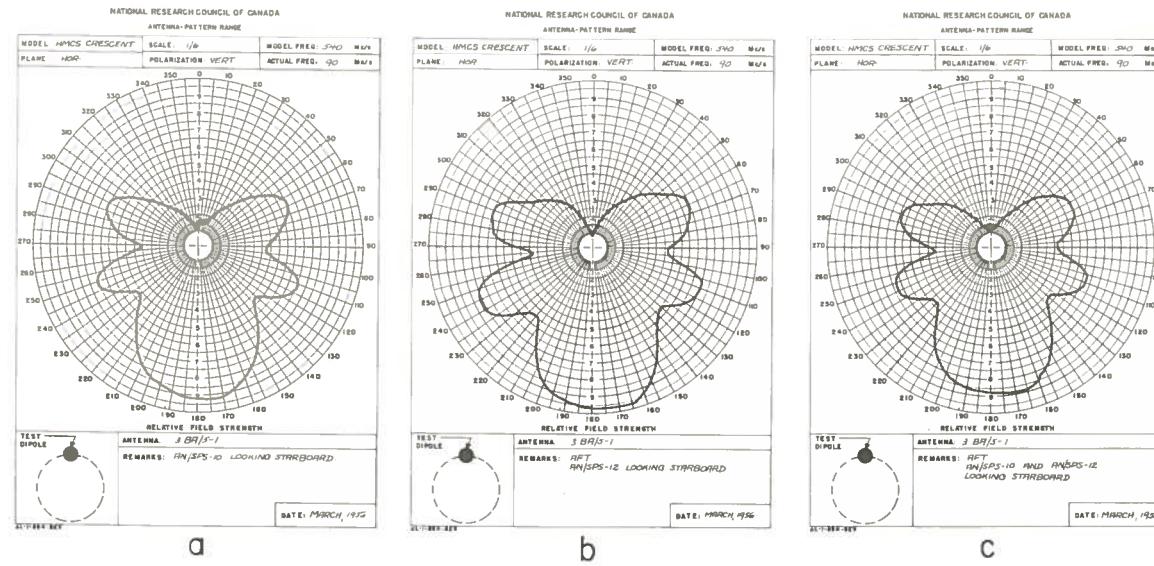
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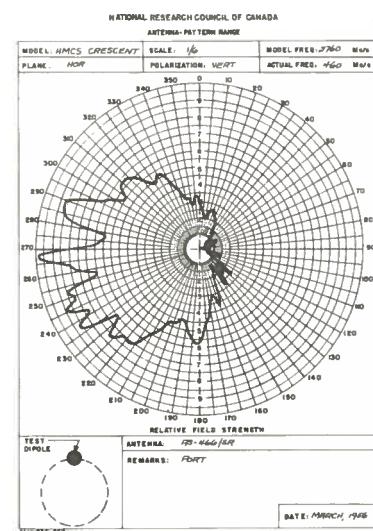
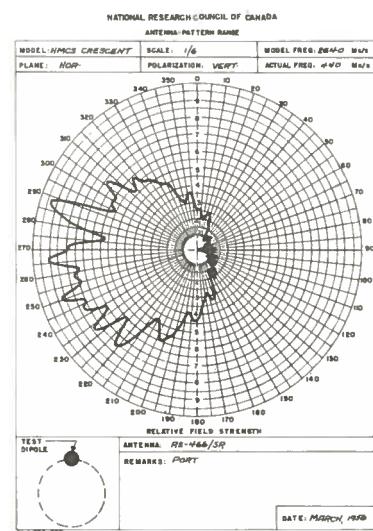
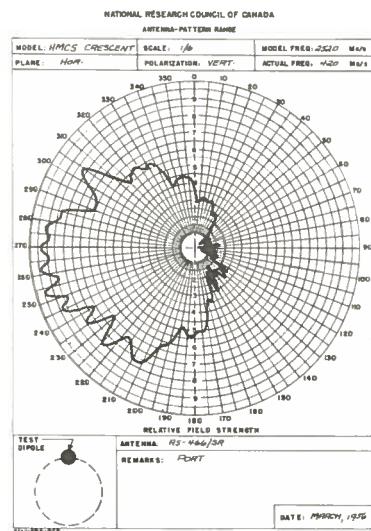
FIGS. 12 (a-d) 3BA/5-1 ANTENNA

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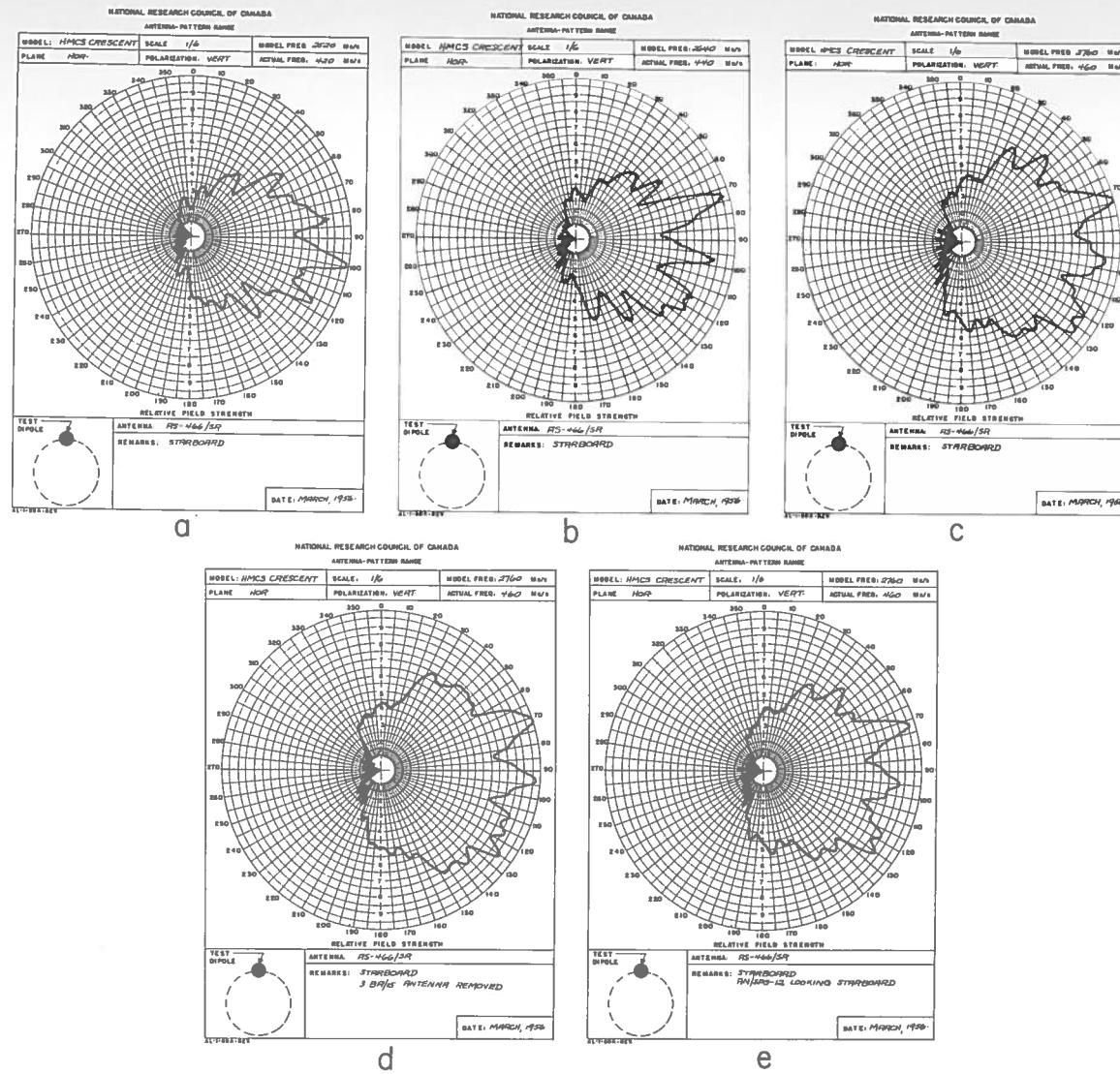
FIGS. 13 (a-c) 3BA/5-1 ANTENNA WITH AN/SPS-10 AND AN/SPS-12 REFLECTORS ROTATED 90°

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FIGS. 14 (a-c) PORT AS-466/SR ANTENNA

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FIGS. 15 (a-e)

STARBOARD AS-466/SR ANTENNA