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NRL Report 4963
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U. S. NAVY RADAR SYSTEMS SURVEY

[UNCLASSIFIED TITLE]

THIRD EDITION

Edward Ornstein

High Resolution Branch
Radar Division

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November 22, 1957



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Note: For a similar listing which included other radars than Navy system (as well as Navy) refer to "A Radar Directory" by E.O. Saltwedel (Rand Corp) RM-2000, ASTIA wloc # AD 150674 (SECRET) NRL wloc # X200499

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ABSTRACT
[Unclassified]

A summarization has been compiled of approximately 200 radar systems for which Navy nomenclature exists. This summary is the third in a series which began with NRL Report 3544, "U. S. Navy Radar Systems Survey," by D. J. McLaughlin and L. M. Johnson (Secret), Sept. 1949, and which was continued with NRL Report 4128, "U. S. Navy Radar Systems Survey, Second Edition," by C. B. Upp (Secret), April 1953. The present summary is actually a revision of the second edition. For each of the systems given, some 20 or more technical and operational characteristics are included. Where available, performance data is also included.

PROBLEM STATUS

This is a final report on one phase of the problem; work is continuing on the problem.

AUTHORIZATION

NRL Problem R02-12
Projects NR 412-000, NR 412-003,
NL 430-014-1, EL 43001, NO 051-631,
and B4f-246-9-56

Manuscript submitted May 28, 1957

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PREFACE

This report is the third in a series which began with NRL Report 3544, "U. S. Navy Radar Systems Survey."¹ It is, actually, a revision of NRL Report 4128, "U. S. Navy Radar Systems Survey, Second Edition,"² and includes substantially the same materials, with additions and deletions for the purpose of reflecting the current state of Naval radar. Some 200 models are now covered in full.

An additional section, Section 11, has been added to give a brief indication of the present status of Naval radar systems which would otherwise not have been mentioned in the present volume. In addition, each section now includes a column showing the source from which additional information on any radar can be obtained. Blank pages have been inserted in each section so that information can be added by the holders of this volume if they so desire.

Inclusion or deletion of material was based on equipment nomenclature and on the likelihood of future interest in any specific system. Some of the choices were necessarily arbitrary, as was the arrangement and ordering of the data included. It seems inevitable that inadvertent omissions have occurred, and the author would appreciate both omissions and errors being called to his attention.

The outstanding cooperation and courtesy shown by the personnel of the Navy Department's bureaus and field stations were major factors in making this report possible. The author wishes to express his gratitude for their unfailing help.

¹McLaughlin, D. J., and Johnson, L. M., "U. S. Navy Radar Systems Survey," NRL Report 3544 (SECRET), Sept. 1949

²Upp, Charles B., "U. S. Navy Radar Systems Survey, Second Edition," NRL Report 4128 (SECRET), April 1953

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Section 1

Shipboard Search Radars

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SECTION 1

SHIPBOARD SEARCH RADARS

The column headed "Calculated Range" in Section 1 and Section 2 contains values of detection ranges on a one-square-meter target calculated by L. V. Blake and A. G. Ferris of the Naval Research Laboratory, according to procedures more fully discussed in NRL Memorandum Report 611 (Confidential). The range values were obtained from the formula:

$$R_{50} = 30 \left[\frac{P_t \tau G_t G_r L F^4}{f^2 \overline{NF} V} \right]^{1/4}$$

P_t - transmitted pulse power

R_{50} - 50% blip-scan range, nautical miles

τ - pulse length, microseconds

G_t - transmitting antenna power gain

G_r - receiving antenna power gain

L - power loss factor (line and duplexer, antenna pattern shape, atmosphere, etc.)

f - radar frequency, megacycles

\overline{NF} - receiver noise figure

V - visibility factor (minimum detectable signal-to-noise power ratio)

Unless otherwise noted, the value $F = 1$ (free-space propagation) was assumed. In some cases, however, a larger value was used where sea reflection interference should be taken into account. In such cases, the value used is shown parenthetically in the charts under "Calculated Range." When the value $F = 2$ is indicated, the range figure is for a target in an interference-lobe maximum.

The parameters used for these calculations were taken as stated in the table. In the case of some radars, receiver noise-figure information was not available, and it was estimated. Typical estimated values at different frequencies are: 200 Mc, 5 db; 1300 Mc, 10 db; 3000 Mc, 10 db; 9000 Mc, 15 db. Antenna pattern loss factor for scanning radars is taken as 1.6 db, and an additional 0.5 db to 1.0 db is allowed for duplexer and line losses in the absence of specific information on actual losses. No atmospheric attenuation is assumed, although there would be some for the long-range radars.

SHIPBOARD
SEARCH
RADARS

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| MODEL | Function | General Facts | Sec. Class. |
|-----------------|-----------------------|--|-------------|
| AN/BPA-2 | Antenna Assembly | Dual antenna assembly. Surface coverage same as BPS-1. Air coverage same as SV-3. | C |
| AN/BPS-1 | Surface Attack | Short exposure submarine attack radar. | C |
| AN/BPS-2 | Air Search | Air search system for use on picket submarines. Used with AN/BPS-3 for interception control. Similar to AN/SPS-6B series radars, uses VK-2 indicators. | C |
| AN/BPS-3 | Height Finder | Height-finder for use on picket submarines. Used with AN/BPS-2 for interception control. Uses AN/SPA-8A(PPI) and VL-1(RHI) indicators. | C |
| AN/BPS-4 | Air Search | Submarine air search radar. VK-2 indicators. 563 class only. | C |
| AN/BPS-5 | Surface Search | Surface search radar for 250-ton submarines. Uses AN/SPA-4A(PPI) indicators. | C |
| AN/SPN-4 | Surface Navigation | Raytheon Pathfinder. Commercial radar; characteristics subject to change, 7-in. nonstandard PPI. | U |
| AN/SPN-5 | Surface Navigation | Radiomarine Corp. of America Model CR-101. Commercial radar; characteristics subject to change, 12-in. nonstandard PPI. | U |
| AN/SPN-11 | Surface Navigation | Radiomarine Corp. of America Model CR-103. Commercial radar; characteristics subject to change, 7-in. nonstandard PPI. | U |
| AN/SPN-13 | Surface Navigation | General Electric Model MN-5. Commercial radar; characteristics subject to change, 17-in. nonstandard rectangular PPI. | U |
| AN/SPN-18 | Surface Navigation | Radiomarine Corp. of America Model CR-104. Commercial radar; characteristics subject to change, 16-in. nonstandard PPI. | U |
| AN/SPN-21 | Surface Navigation | Raytheon Pathfinder Model 1500. Commercial radar; characteristics subject to change, 10-in. nonstandard PPI. | U |
| AN/SPN-22 | Surface Navigation | Radiomarine Corp. of America Model CR-105. Commercial radar; characteristics subject to change, 10-in. nonstandard PPI. | U |
| AN/SPS-2 (XN-1) | Air Search and Height | Long range search and intercept control. Multiple overlapping vertical beams. Multiple VK-3A and AN/SPA-7 (RHI) indicators. | C |
| AN/SPS-4 | Surface-Zenith Search | Surface and zenith search antennas on same pedestal. Similar to SG-6 except for frequency. VJ repeaters; 5-in. "A" standard remotes. | U |

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SHIPBOARD
SEARCH
RADARS

| Frequency (Mc) | Pulse Length (μ sec) | Pulse Rate (pps) |
|------------------------|------------------------------|-------------------------------|
| - | - | - |
| 8740-8890 | 0.5 | 600 \pm 10% (adjustable) |
| 1250-1350 | 1 4 | 600 150 |
| 6275-6575 | 1.3 | 625-650 |
| 3400-3750 | 1 | 400 \pm 5% (adjustable) |
| 8740-8890 | 0.5 | 600 \pm 10% (adjustable) |
| 3010-3100 | 0.4 | 1000 |
| 9320-9430 | 0.25 1.0 | 3000 750 |
| 9320-9430 | 0.4 | 1000 |
| 3030-3110 9320-9430 | 0.25 | 1200 |
| 9320-9430 | 0.25 0.65 | 2000 800 |
| 9320-9430 | 0.2 | 1500 |
| 9320-9430 | 0.2 | 2000 1500 |
| 1250-1350 | 7 | 244 |
| 5450-5825 | 0.37 1.3 | 650 |

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| Peak Power Output (kw) | Maximum Range (Miles) | | | Calculated* Range (Miles) |
|------------------------|-----------------------|----------------------------|---------------------------|--|
| | 2200 T DD | 20 m ² Aircraft | 1 m ² Aircraft | |
| - | - | - | - | - |
| 75-110 | 10 | - | - | 5 |
| 500 | 20 | - | 60 | 49 |
| 125 | - | 40 | - | 16 |
| 500 | - | 15 at 10,000 ft | - | 14 |
| 75-110 | - | - | - | 5 |
| 15 | 11 | - | - | antenna 2 gains estimated |
| 30 | 12 | - | - | antenna 6 gains estimated |
| 30 | 10 | - | - | antenna 5 gains estimated |
| 20 50 | 12 | - | - | 2 (3070 Mc) 7 (9375 Mc) Antenna gains estimated |
| 40 | 12 | - | - | 6 |
| 7 | 8 | - | - | 3 |
| 7 | 8 | - | - | 3 |
| 6500 | Horizon Limited | - | 165 at 40,000 ft | 170 (Beam No. 1) |
| 200 | 20 | Surf: 20 Zen: 15 | - | 18 |

* See note, page 6

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SEARCH
RADARS

| Scan Coverage (Degrees) | | Scan Rate (rpm) | |
|-------------------------|----------------------------------|---|---------------------------------|
| Hor. | Vert. | Hor. | Vert. |
| 360 | 16 | 0-8 | - |
| 360 | 60 | 0-6 | - |
| 360 | 16 | 0-8 | - |
| 360 | 20 (csc ²) | 0-12 | - |
| 360 | 35 | 0.7 auto. sector scan 10 ⁰ , 20 ⁰ , 40 ⁰ | 3-8 scans per sec. (adjustable) |
| 360 | 60 (csc ²) | 0-6 | - |
| 360 | 16 | 0-8 | - |
| 360 | - | 7 | - |
| 360 | - | 10 | - |
| 360 | - | 17 | - |
| 360 | - | 10 | - |
| 360 | - | 8.5 | - |
| 360 | - | 20 | - |
| 360 | - | 20 | - |
| 360 | 23 | 3.3 MTI and 10 | - |
| 360 | 14 ± 12 csc ² θ 50 | 5-15 | - |

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| Stabilization | | | | Antenna | |
|-------------------------|----------------|------------------|-------------------|---------------------------------|---------------------|
| Type | Accuracy (deg) | Roll Limit (deg) | Pitch Limit (deg) | Type | Size (H x W ft) |
| - | - | - | - | Linear (retractable) paraboloid | 0.75 x 3+ 2 x 4 |
| - | - | - | - | Linear (retractable) | 0.75 x 3+ |
| - | - | - | - | paraboloid | 5 x 15 |
| Mk 8 Mod 4 2 axis | 1 min. | ±20/10 sec | ±10/6 sec | zoned lens | 5.5 x 7.5 |
| - | - | - | - | paraboloid (retractable) | 2 x 4 |
| - | - | - | - | Linear (non-retractable) | 0.75 x 3+ |
| - | - | - | - | parabolic section | 1.5 x 7 |
| - | - | - | - | parabolic section | 1.5 x 5.17 |
| - | - | - | - | parabolic section | 1 x 4.7 |
| - | - | - | - | parabolic section | 1.5 x 9 |
| - | - | - | - | parabolic section | 1 x 4.17 |
| - | - | - | - | parabolic section | 1 x 4.17 |
| - | - | - | - | parabolic section | 1 x 4.17 |
| Stable base | ±1/3 | 25 | 8 | diamond paraboloid | 20 x 40 |
| - | - | - | - | parabolic sections | 2 x 7 4.5 x 4.75 |

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RADARS

| Beamwidths (Degrees) | | Main Lobe Gain (db) | Minor Lobe Down (db) |
|----------------------|-------------------------------------|--------------------------|-------------------------|
| Hor. | Vert. | | |
| 2.0 5.5 | 16 60 | 24 - Surf. 23.5 - Air | 24 26 |
| 2.0 | 16 | 24 | 24 |
| 4 ± 0.2 | 10 ± 0.5 | 27 | 26 |
| 2 | 1.4 | 34 | Hor. 21 Vert. 21, 18 |
| 5.3 | 10 | 23.5 | 24 |
| 2.6 | 16 | 24 | 24 |
| 3.5 | 13.5 | - | - |
| 1.8 | 19 | - | - |
| 1.9 | 20 | 28 | 25 |
| 3.4 1.2 | 20 | - | - |
| 1.9 | 20 | 28 | 25 |
| 2.2 | 16 | 28 | 25 |
| 1.9 | 20 | 28 | 25 |
| 1.8 | 2.8 on each of 7 beams | 36.6 | 28 |
| 2 2.2 | 14 + 12 csc ² θ to 50 | Surf. - 30 Zen. - 23 | 25 20 |

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| Transmission Line | Antenna Weight (lb.) | Total System Weight (lb.) |
|--------------------|----------------------------|---------------------------|
| - | - | - |
| RG-51/U | 300 | 3750 |
| RG-69/U | 1500 | 4939 |
| RG-50/U | 16,500 | 20,000 |
| RG-48/U | 300 | 2570 |
| RG-51/U | 300 | 2122 |
| RG-48/U | 150 | 750 |
| RG-51/U | 150 | 750 |
| RG-51/U | 150 | 600 |
| RG-48/U RG-51/U | 240 | 575 |
| RG-51/U | 160 | 850 |
| - | 140 (includes transmitter) | 230 |
| - | 110 (includes transmitter) | 240 |
| CAY-14ACM | 52,000 | 94,272 |
| RG-49/U | 630 | 3256 |

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| Supplier | No. in Use or Tent. Available Date | Source of Information | MODEL |
|-------------------------------|---|-----------------------|--------------------|
| Western Electric | 105 | BuShips, Code 821 | AN/BPA-2 |
| Western Electric | 6 | BuShips, Code 821 | AN/BPS-1 |
| Raytheon | 14 | BuShips, Code 821 | AN/BPS-2 |
| Western Electric | 14 | BuShips, Code 821 | AN/BPS-3 |
| Westinghouse | 172 | BuShips, Code 821 | AN/BPS-4 |
| Stavid Engineering Company | 2 | BuShips, Code 821 | AN/BPS-5 |
| Raytheon | MDAP and MSTs | BuShips, Code 821 | AN/SPN-4 |
| RMCA | MDAP and MSTs | BuShips, Code 821 | AN/SPN-5 |
| RMCA | MDAP and MSTs | BuShips, Code 821 | AN/SPN-11 |
| GE | 2 USN 20 MSTs | BuShips, Code 821 | AN/SPN-13 |
| RMCA | Sig. Corps | BuShips, Code 821 | AN/SPN-18 |
| Raytheon | 1 | BuShips, Code 821 | AN/SPN-21 |
| RMCA | 2 | BuShips, Code 821 | AN/SPN-22 |
| GE | 2 | BuShips, Code 821 | AN/SPS-2 (XN-1) |
| Raytheon | 67 | BuShips, Code 821 | AN/SPS-4 |

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| MODEL | Function | General Facts | Sec. Class. |
|---------------------|-------------------------------|---|-------------|
| AN/SPS-5 -5B | Surface Search | Small craft radar. Four XN-1 models with auxiliary bridge repeaters, specifically for PT boats. 10-in. PPI; 5-in. PPI auxiliary in XN-1. Only 5B has 20° vertical coverage. | U |
| AN/SPS-6B -6C | Air Search | Uses any standard Navy PPI. AN/SPS-6C has improved receiver and more rugged antenna drive. | U |
| AN/SPS-7 | Surface Search | Millimeter wavelength system for ice pack navigation. 10-in. SPA-4 as system indicator. Standard remotes. | C |
| AN/SPS-8 -8C | Height Finder | Rapid vertical scan of 11° while rotating in azimuth. Any 11° scan may be chosen from 0° - 36°. AN/SPS-8C uses antenna similar to AN/SPS-8D; AN/SPS-8 is retrofitted to AN/SPS-8C. | U |
| AN/SPS-8A | Height Finder | AN/SPS-8 with new magnetrons, new receiver, new antenna pedestal. To be field-changed to AN/SPS-8D. | U |
| AN/SPS-8B -8D | Search Height Finder | Modified AN/SPS-8A to incorporate large antenna with organ pipe scanner. Rapid vertical scan of any 12° between 0° and 36°. AN/SPS-8D differs from AN/SPS-8B only in minor mechanical details on antenna. | U |
| AN/SPS-10 -10X | Surface Search | AN/SPS-10 uses 115 VAC; AN/SPS-10X uses 115 VDC. Integral IFF antenna and beacon operation. VJ or AN/SPA-4 used as master indicator. | U |
| AN/SPS-12 | Air Search | Capable of being modified for 2 Mw. 2 MTI kits available (Confidential). Uses any standard Navy PPI. | U MTI-C |
| AN/SPS-13 | Air Search and Height Finding | Intermediate-to-long-range, stacked beam radar for search and interception control. | C |
| AN/SPS-17 (XN-2) | Air Search | VHF long range early warning radar for ships larger than DD. Uses any standard Navy PPI. 41 x 13 ft antennas on later models for 350 mile slant range capability. | C |
| AN/SPS-18 (XN) | Surface Search | (XN-1) has 10-in. indicator similar to AN/SPS-5 (XN-2) has 12-in. deck-mounted indicator. | C |
| AN/SPS-21 | Surface Search & Navigation | Small boat radar. Own master indicator, but can use standard repeaters. Transmitter mounting on mast is optional. | U |
| AN/SPS-26 | Search & Height Finder | Frequency-shift vertical scanning. Nonstabilized antenna, data stabilized by computer. "Frescanar." | C |
| AN/SPS-28 | Air Search | SRa transmitter, AN/SPS-17 type antenna and receiver. Uses any standard Navy PPI. | C |
| AN/SPS-29 | Air Search | Similar to AN/SPS-17 but with different, smaller, transmitter chain. Suitable for DD. | C |

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| Power Source | | | | Smallest Ship |
|-----------------------------|--------|---------|---------|---------------|
| Volts | Phase | Freq. | KVA | |
| - | - | - | - | - |
| 115 | 1 | 60 | 3 | SS |
| 115 | 1 | 60 | 5 | SS |
| 440 115 | 3 1 | - 60 | - - | SS |
| 115 | 1 | 60 | - | SS |
| 115 | 1 | 60 | 2.7 | SS |
| motor generator of any ship | | | 1.0-1.5 | - |
| motor generator of any ship | | | 1.5-2.3 | - |
| motor generator of any ship | | | 1.0-1.2 | - |
| 115 | 1 | 60 | 0.8 | - |
| motor generator of any ship | | | 1.5-2.0 | - |
| motor generator of any ship | | | 0.6-1.0 | LCPL |
| motor generator of any ship | | | 0.6-1.0 | LCPL |
| 440 | 3 | 60 | 300 | CLC |
| 440 220 or 115 | 1 | 60 | 4.0 | DD |

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| Frequency (Mc) | Pulse Length (μ sec) | Pulse Rate (pps) |
|---------------------------|------------------------------|---------------------|
| 6275-6575 | 0.37 | 683 |
| 1250-1350 | 1, 4 | 600, 150 |
| 34,550-35,050 | 0.16 | 1500 |
| 3430-3570 (tunable) | 1 or 2 | 1000 or 500 |
| 3430-3570 (tunable) | 2 | 450 700 |
| 3430-3570 (tunable) | 2 | 450 700 |
| 5450-5825 | 0.25 1.3 | 650 |
| 1250-1350 | 1 4 | 600 300 |
| 2770-2830 | 10 | 400 |
| 215-225 | 10 | 300 |
| 5450-5825 | 0.15 and 1.0 | 683 |
| 5500-5600 | 0.2 | 1500 |
| 2910-3060 at 40 cycles | 4 (1.2 momentary) | 400 to 4000 |
| 215-225 | 4 | 120 |
| 215-225 | 10 | 300 |

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| Peak Power Output (kw) | Maximum Range (Miles) | | | Calculated* Range (Miles) |
|------------------------|-----------------------|----------------------------|---------------------------|---------------------------|
| | 2200 T DD | 20 m ² Aircraft | 1 m ² Aircraft | |
| 200 | 15 | 15 | - | 8 |
| 500 | 6B: 20 6C: 20 | - | 6B: 55 6C: 60 | 57 (F=1.5) 69 (F=1.5) |
| 40 | 10 | - | - | 4 |
| 650 | - | - | 65 | 65: 12-sec data rate |
| 1000 | - | - | 75 | 70: 12-sec data rate |
| 1000 | - | - | 110 | 100: 15-sec data rate |
| 200 | 20 | 20 | - | 11 17 |
| 500 | 20 | - | 65 | 83 (F=1.5) |
| 2000 | Line of Sight | - | 140 | 140 |
| 750 | 20 | - | 200 | 230 (F=2) |
| 200 | 20 | 20 | - | 12 |
| 10 | 14 | - | - | 4 |
| 1000 | - | - | 90 | 68 |
| 300 | Line of Sight | - | 90 | 124 (F=2) |
| 750 | Line of Sight | - | 200 | 230 (F=2) |

*See note, page 6

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| Scan Coverage (Degrees) | | Scan Rate (rpm) | |
|-------------------------|-------------------------|---------------------------------------|----------------------------|
| Hor. | Vert. | Hor. | Vert. |
| 360 | 9 5B: 20 | 15 | Manual |
| 360 | 30 | 5-15 | - |
| 360 | 10 | 1.75 60 | - |
| 360 | 36 | Manual, 1,2,3,5,10, or sector scan | 0,5,10, or 20 per sec |
| 360 | 36 | Manual, 1,2,3,5,10, or sector scan | 0,5,10, or 20 per sec |
| 360 | 36 | Manual, 1,2,4,5, 10 | Manual, 6,12,16 per sec |
| 360 | $14 + 12 \csc^2 \theta$ | 16 | - |
| 360 | 30 | 2.5-15 | - |
| 360 | 23 (to 90,000 feet) | 6 3 | - |
| 360 | 36 | 0-15 | - |
| 360 | 20 | 17 | - |
| 360 | - | 20 | - |
| 360 | 0-50 | Manual, 15 | 40 per sec |
| 360 | - | 5-15 | - |
| 360 | - | 7.5 and 15 | - |

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| Stabilization | | | | Antenna | |
|------------------|----------------|------------------|-------------------|----------------------------|-----------------|
| Type | Accuracy (deg) | Roll Limit (deg) | Pitch Limit (deg) | Type | Size (H x W ft) |
| - | - | - | - | Parabolic Section | 2 x 7 |
| - | - | - | - | Parabolic Section | 5.75 x 17.2 |
| - | - | - | - | Parabolic Section | 0.75 x 5 |
| Stable base | ± 1/3 | 25 | 6 | Parabolic Section | 15 x 5 |
| Stable base | ± 1/3 | 25 | 6 | Parabolic Section | 15 x 5 |
| Stable base | ± 1/3 | 25 | 6 | Asymmetric Parabolic | 15 x 12 |
| - | - | - | - | Parabolic Section | 2 x 10 |
| - | - | - | - | Parabolic Section | 5.75 x 17.17 |
| Hyd. stable base | ± 0.33 | 30 | 6 | Diamond Contour Paraboloid | 9.25 x 20 |
| - | - | - | - | Mattress | 8.5 x 17.5 |
| - | - | - | - | Cylindrical Parabola | 2.17 x 7 |
| - | - | - | - | Parabolic Section | 1.5 x 8 |
| Com-puter | ± 20 min. | 20° deck tilt | | Parabolic Cylinder | 12 x 9 |
| - | - | - | - | Mattress | 8.5 x 17.5 |
| - | - | - | - | Mattress | 8.5 x 17.5 |

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| Beamwidths (Degrees) | | Main Lobe Gain (db) | Minor Lobe Down (db) |
|----------------------|-----------------------------|---------------------|----------------------|
| Hor. | Vert. | | |
| 1.5 | $14 + 12 \csc^2\theta$ | 28 | 25 |
| 3.5 | 30 | 27.5 | 23 side 26 back |
| 0.6 | 10 | 35 | 30 |
| 3.5 | 1.2 | 37 | 17 |
| 3.5 | 1.2 | 37 | 17 |
| 1.6 | 1.3 | 41 | 19 |
| 1.5 | $14 + 12 \csc^2\theta$ | 32 | 29 |
| 3.3 | 30 | 27.5 | 23 side 26 back |
| 1.5 | 7 beams 2.8° each | 37.5 | 30 |
| 18.5 | 27 | 18.5 | 27 |
| 1.6 | 14 fan $12 \csc^2\theta$ | 29.5 | 28 |
| 2 | 15 | 28 | 26 |
| 2.4 | 3 | 35 | 20 |
| 18 | 27.5 | 18.5 | 27 |
| 18 | 27.5 | 18.5 | 27 |

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| Transmission Line | Antenna Weight (lb.) | Total System Weight (lb.) |
|-----------------------------|-----------------------------|---------------------------|
| RG-50/U | 165 5B: 105 | 1200 |
| 6B:CAY-14ACM 6C:RG-132/U | 6B: 800 6C: 924 | 6B: 2685 6C: 2800 |
| 0.75" circular waveguide | 160 | 1000 |
| RG-75/U | 4000 | 12,000 |
| RG-75/U | 4000 | 12,000 |
| RG-75/U | 4700 | 14,000 |
| RG-49/U | 335 | 1600 |
| CG-925/U | 990 | 4700 |
| RG-75/U | 9300 | 36,000 |
| RG-154/U | 1240 | 8435 |
| RG-50/U | 100 | XN-1: 1090 XN-2: 1200 |
| RG-49/U | 169 209 with transmitter | 312 |
| S-band waveguide | 1800 | 8000 |
| RG-154/U | 1240 | 4440 |
| RG-154/U | 1000 | 4000 |

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RADARS

| Power Source | | | | Smallest Ship |
|--------------|-------|-------|-------|---------------|
| Volts | Phase | Freq. | KVA | |
| 115 | 1 | 60 | 2.25 | PT |
| 115 | 1 | 60 | 5.5 | DD |
| 115 | 1 | 60 | 1.7 | PC |
| 440 | 3 | 60 | 20 | DER |
| 440 | 3 | 60 | 20 | DER |
| 440 | 3 | 60 | 20 | DER |
| 115 | 1 | 60 | 3.5 | DE |
| 440 | 3 | 60 | 9 | CL |
| 440 | 3 | 60 | 110 | CL |
| 440 | 3 | 60 | 22 | CL |
| 115 | 1 | 60 | 30 | PT |
| 115 | 1 | 60 | 0.6 | LCPL |
| 440 | 3 | 60 | 20 | DE |
| 440 | 3 | 60 | - | DD |
| 440 | 3 | 60 | 16-18 | DD |

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| Supplier | No. in Use or Tent. Available Date | Source of Information | MODEL |
|-----------------|--|-----------------------|---------------------|
| Raytheon | 500 | BuShips, Code 821 | AN/SPS-5 -5B |
| Westinghouse | 6B: 180 6C: 301 U.S. 33 for allies | BuShips, Code 821 | AN/SPS-6B -6C |
| Sylvania | 2 | BuShips, Code 821 | AN/SPS-7 |
| GE | 77 | BuShips, Code 823 | AN/SPS-8 -8C |
| GE | 88 | BuShips, Code 823 | AN/SPS-8A |
| GE | 8B: 8 to be delivered starting August 1957 8D: 6 to be ordered | BuShips, Code 823 | AN/SPS-8B -8D |
| Sylvania | 479 | BuShips, Code 821 | AN/SPS-10 -10X |
| RCA | 136 | BuShips, Code 821 | AN/SPS-12 |
| Sperry Gyro. | 1 in fiscal year 1958 | BuShips, Code 823 | AN/SPS-13 |
| GE | 2 prototype in fiscal year 1956 | BuShips, Code 821 | AN/SPS-17 (XN-2) |
| Raytheon | 20 in 1957 | BuShips, Code 821 | AN/SPS-18 (XN) |
| Raytheon | 10 | BuShips, Code 821 | AN/SPS-21 |
| Hughes Aircraft | 6 for delivery Apr. - Oct. 57 | BuShips, Code 823 | AN/SPS-26 |
| Westinghouse | 55 on order, delivery starts 1957 | BuShips, Code 821 | AN/SPS-28 |
| Westinghouse | 74 on order, delivery starts June 1958 | BuShips, Code 821 | AN SPS-29 |

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| MODEL | Function | General Facts | Sec. Class. |
|------------------|------------------------------|--|---------------------------|
| AN/SPS-30 | Search and height finder | Modernization of existing SPS-8 series by adding high-power klystron transmitter, anti-jam features, 6 second data rate and long pulse with "pulse compression." | C |
| AN/SPS-31 (XN-1) | Air Search | UHF long-range early warning. Uses any standard Navy PPI. | C |
| AN/SPS-32 | Air Search | 400-mile radar for Nuclear Ships. Four stationary arrays integral to ship's structure, each electronically scanning 90° in azimuth. Two-dimensional data only. Parameters subject to change before delivery. | C |
| CXRX | Target Indicator | AN/SPS-8 modified for wide-angle scanning, and higher prf for short-range hemispheric coverage. | C |
| SC-5 | Air Search | 12-in. PPI, 5-in. A-scope, standard remotes, AVC. | U |
| SG-1B | Surface Search | 5-in. A-scope, 7-in. PPI. Standard remotes. Now being replaced by AN/SPS-10. | U |
| SG-6-6b | Surface and Zenith Search | Similar to AN/SPS-4, except for frequency. SG-6b uses different antenna and waveguide. Surface and zenith antennas on same pedestal. Standard remotes. | U |
| SK-2 SK-3 | Air Search | Similar except for antenna. | U |
| SRa SRb | Air Search | 7-in. PPI, 5-in. A-scope, standard remotes. SRb is SRa with improved receiver and noise figure monitor. | U |
| SR-3C | Air Search | SR-3 with AN/SPS-6b antenna. All of SR-3 series converted to SR-3C. | U |
| SR-6B | Air Search | SR-6 with SPS-6B antenna. All of SR-6 series converted to SR-6B. | U |
| SS-2 | Surface Torpedo Fire Control | Field changed SS-1. 5-in. PPI, 3-in. A/B indicator console. | U |
| SS-2a | Surface Torpedo Fire Control | SS-2 antenna replaced by AN/BPS-1 antenna and control box. Quick look feature deleted. | C (modification kit only) |
| ST-1 | Range only | SS-2 below-deck components. Antenna in periscope. | U |
| SU SU-1 | Surface Search | 5-in. A-scope, 5-in. PPI. SU is 115 v AC, SU-1 is 115 VDC. | U |

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| Peak Power Output (kw) | Maximum Range (Miles) | | | Calculated* Range (Miles) |
|-------------------------------|-----------------------|----------------------------|---------------------------|---|
| | 2200 T DD | 20 m ² Aircraft | 1 m ² Aircraft | |
| 2500 | - | - | 395 (est) | 151: 6-sec data rate 198: 30-sec data rate |
| 2000 | Line of Sight | - | 225 | 279 (F = 2) |
| 2000 (each of 4 transmitters) | Horizon Limited | - | 300 (est) | - |
| 650 | - | - | 25 | 35 |
| 200 | 8 | - | 40 | 64 (F = 2) |
| 50 | 15 | 10 | - | 9 |
| 200 | Srch:15 Zen: 0 | Srch:15 Zen: 12 | - | 8 ($\tau = 0.37$) 11 ($\tau = 1.33$) |
| 200 | 12 | - | 50 | 114 (F = 2) |
| 300 | - | - | 75 | 114 (F = 2) |
| 500 | - | - | 50 | 54 (F = 1.5) |
| 500 | - | - | 50 | 52 (F = 1.5) |
| 85 | 12 | - | - | 5 |
| 85 | 12 | - | - | 4 |
| 85 | 12 | - | - | 1 (Search-lighting A-scope) |
| 50 | 15 | - | - | 10 |

* See note, page 6

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| Frequency (Mc) | Pulse Length (μ sec) | Pulse Rate (pps) |
|---|--|----------------------|
| 3430-3570 (tunable) | 12 synthetic (resolu- tion of 0.25 pulse) | 200 300 |
| 420-450 | 6 | 300 |
| 216.5 to 224.5 continuously scanning | 20 | 50 \pm 5 or 200 |
| 3400-3570 (tunable) | 0.67 | 2000 |
| 195-205 215-225 | 5 | 60 |
| 3019-3100 | 2 | 750 800 850 |
| 6275-6575 | 0.37 1.3 | 650 |
| 215-220 | 5 | 60 |
| 175-185 195-205 215-225 | 1 and 4 at 200 pps 20 at 60 pps | 200 and 60 |
| 1244-1350 | 1 4 | 600 150 |
| 1244-1350 | 2 | 300 |
| 8740-8890 | 0.5 | 600 |
| 8740-8890 | 0.5 | 600 |
| 8740-8890 | 0.5 | 600 |
| 9000-9160 | 0.5 1 | 600 |

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| Scan Coverage (Degrees) | | Scan Rate (rpm) | |
|--------------------------------------|---|-----------------------------|-------------------|
| Hor. | Vert. | Hor. | Vert. |
| 360 | 11 (steerable 0-36) | Manual, 2,3,5,10 | 8,12,20, 40 (sec) |
| 360 | - | 7.5 and 15 | - |
| 360° four antennas each cover 90° | Aircraft Operational Heights (csc ²) | 8.3 to 66 scans per min. | None |
| 360 | 0-73 | 15 | 29 per sec |
| 360 | 60 | 4 | - |
| 360 | 15 | 4,8, or 16 | - |
| 360 | Sch: 14 ± 12 csc ² θ Zen: 50 | 5-15 | - |
| 360 | 20 | 4 | - |
| 360 | 50 | 7 | - |
| 360 | 20 | 5-15 | - |
| 360 | 30 | 5-15 | - |
| 360 | 16 | 0-8 | - |
| 360 | 16 | 0-8 | - |
| 360 | 12 | Hand | - |
| 360 | 3.8 | 6 | - |

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| Stabilization | | | | Antenna | |
|---------------|----------------|------------------|-------------------|---------------------------------------|---------------------------------|
| Type | Accuracy (deg) | Roll Limit (deg) | Pitch Limit (deg) | Type | Size (H x W ft) |
| 4 Axis | ± 20 min. | 25 | 6 | Asymetric Parabola | 15 x 12 |
| - | - | - | - | Parabolic Section | 8.5 x 17.5 (approx.) |
| None | - | - | - | Four fixed arrays in ship's structure | 20 x 40 ft (each array) |
| 4 Axis | ± 20 min. | 25 | 6 | Parabolic Cylinder | 11 x 17 |
| - | - | - | - | 12-Dipole Mattress | 4 x 15 |
| - | - | - | - | Parabolic Section | 1.25 x 4 |
| - | - | - | - | Parabolic Section | Sch: 1.5 x 5 Zen: 4.17 x 4.5 |
| - | - | - | - | 17-ft. Round Dipole Fed Paraboloid | - |
| - | - | - | - | Mattress | 6 x 15 |
| - | - | - | - | Parabolic Section | 6 x 17.5 |
| - | - | - | - | Parabolic Section | 6 x 17.5 |
| - | - | - | - | Parabolic Section | 0.75 x 2.5 |
| - | - | - | - | Linear (retractable) | 0.75 x 3+ |
| - | - | - | - | Leaky Waveguide Window | 0.5 x 0.25 |
| 2 Axis | ± 2.5 | ± 45 | ± 7 | Circular Parabola | 2 ft. diameter |

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RADARS

| Beamwidths (Degrees) | | Main Lobe Gain (db) | Minor Lobe Down (db) |
|----------------------------------|---|------------------------|-------------------------|
| Hor. | Vert. | | |
| 1.6 | 1.3 | 41 | 19 |
| 10 | 20 | 23 | 30 |
| 5.7 normal to array 8.4 at 45 | 15 | 24 (average) | 0.24 |
| 3.0 | 4.5 hor. 12 max. elev. | 33 | 15 |
| 22 | 60 | 13.5 | 18.4 |
| 5 | 15 | 23 | 19 |
| Sch: 2.5 Zen: 2.2 | Sch: $14 + 12 \csc^2 \theta$ Zen: 50 | Sch: 28 Zen: 23 | Sch: 25 Zen: 20 |
| 22 | 20 | 18.6 | 26 |
| 22 | 50 | 15 | 18 |
| 3.2 | 20 | 27.3 | 22 |
| 3.2 | 30 | 27.0 | 26 |
| 2.6 | 16 | 24 | 21 |
| 2.0 | 16 | 24 | 24 |
| 30 | 16 | 14 | 16 |
| 3.8 | 3.8 | 33 | 25 |

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| Transmission Line | Antenna Weight (lb.) | Total System Weight (lb.) |
|--------------------------------|--------------------------|---------------------------|
| S-band waveguide | 4700 | 16000 |
| RG-154/U | 1100 | 3750 |
| RG-154/U 3 1/8-in. air coax | 5000 per array | 52,250 |
| S-band waveguide | 4500 | 12000 |
| RG-18/U | 600 | 2425 |
| RG-48/U | 340 | 2120 |
| 6: RG-50/U 6b: RG-49/U | 600 | 3042 |
| 1.625-in. Coax. | SK-2: 1600 SK-3: 1655 | 3583 4257 |
| RG-20/U | 711 | 2678 |
| CAY-14 ACM | 930 | 4410 |
| CAY-14 ACM | 930 | 2561 |
| RG-51/U | 100 | 3315 |
| RG-51/U | 480 | 3725 |
| RG-51/U | 525 | 3709 |
| RG-51/U | 210 | 1275 1900 |

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SEARCH
RADARS

| Power Source | | | | Smallest Ship |
|-------------------|---------|----------|--------------|-----------------------------|
| Volts | Phase | Freq. | KVA | |
| 440 | 3 | 60 | 50 | DER |
| 440 | 3 | 60 | 25-30 | DD |
| 440 | 3 | 60 | 300 (est) | Special for CVAN and CGN |
| 440 | 3 | 60 | 20 | CAG |
| 115 | 1 | 60 | 3.5 | DD |
| 440 220 115 | 1 | 60 | 30 | DD |
| 440 220 115 | 1 | 60 | 4 | DD |
| 115 | 1 | 60 | 4.75 | CL |
| 115 | 1 | 60 | 7.5 | DD |
| 115 | 1 | 60 | 5.0 | CL |
| 115 | 1 | 60 | 5.0 | DD |
| 115 | 1 | 60 | 3.8 | SS |
| 115 | 1 | 60 | 3.0 | SS |
| 115 | 1 | 60 | 3.8 | SS |
| 115 115 | 1 DC | 60 DC | 2.3 4 | DE |

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| Circuit | Power (Watts) | | |
|---------|---------------|-------|-------|
| | VVA | Power | Phase |
| 100 | 100 | 80 | 0 |
| 100 | 100 | 80 | 1 |
| 100 | 100 | 80 | 2 |
| 100 | 100 | 80 | 3 |
| 100 | 100 | 80 | 4 |
| 100 | 100 | 80 | 5 |
| 100 | 100 | 80 | 6 |
| 100 | 100 | 80 | 7 |
| 100 | 100 | 80 | 8 |
| 100 | 100 | 80 | 9 |
| 100 | 100 | 80 | 10 |
| 100 | 100 | 80 | 11 |
| 100 | 100 | 80 | 12 |
| 100 | 100 | 80 | 13 |
| 100 | 100 | 80 | 14 |
| 100 | 100 | 80 | 15 |
| 100 | 100 | 80 | 16 |
| 100 | 100 | 80 | 17 |
| 100 | 100 | 80 | 18 |
| 100 | 100 | 80 | 19 |
| 100 | 100 | 80 | 20 |
| 100 | 100 | 80 | 21 |
| 100 | 100 | 80 | 22 |
| 100 | 100 | 80 | 23 |
| 100 | 100 | 80 | 24 |
| 100 | 100 | 80 | 25 |
| 100 | 100 | 80 | 26 |
| 100 | 100 | 80 | 27 |
| 100 | 100 | 80 | 28 |
| 100 | 100 | 80 | 29 |
| 100 | 100 | 80 | 30 |

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SHIPBOARD
SEARCH
RADARS

| Supplier | No. in Use or Tent. Available Date | Source of Information | MODEL |
|------------------|---|-----------------------|---------------------|
| GE | 1 dev. for Nov. 1957 | BuShips, Code 823 | AN/SPS-30 |
| Stavid | April 1958 | BuShips, Code 821 | AN/SPS-31 (XN-1) |
| Hughes Aircraft | One in 1958 One in 1960 | BuShips, Code 821 | AN/SPS-32 |
| GE | 2 | BuShips, Code 823 | CXRX |
| GE | 16 Fleet 27 Reserve | BuShips, Code 821 | SC-5 |
| Raytheon | 300 (Now being re- placed by AN/SPS-10) | BuShips, Code 821 | SG-1B |
| Raytheon | 6: 48 6b: 63 | BuShips, Code 821 | SG-6 -6b |
| GE | 8 in active fleet, 45 reserve fleet | BuShips, Code 821 | SK-2 SK-3 |
| Westinghouse | 100 | BuShips, Code 821 | SRa SRb |
| Westinghouse | 19 | BuShips, Code 821 | SR-3C |
| Westinghouse | 40 | BuShips, Code 821 | SR-6B |
| Western Electric | 66 | BuShips, Code 821 | SS-2 |
| Western Electric | 19 | BuShips, Code 821 | SS-2a |
| Western Electric | 30 | BuShips, Code 821 | ST-1 |
| Raytheon | 126 | BuShips, Code 821 | SU SU-1 |

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| 5 | Section 1 | 5 | Section 1 |
| 6 | Section 1 | 6 | Section 1 |
| 7 | Section 1 | 7 | Section 1 |
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| 11 | Section 1 | 11 | Section 1 |
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| 13 | Section 1 | 13 | Section 1 |
| 14 | Section 1 | 14 | Section 1 |
| 15 | Section 1 | 15 | Section 1 |
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| 17 | Section 1 | 17 | Section 1 |
| 18 | Section 1 | 18 | Section 1 |
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Section 2

Landbased Search Radars

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| MODEL | Function | General Facts | Sec. Class |
|----------------------|-------------------------------|--|------------|
| AN/KPQ-1 AN/SPQ-6 | Mortar Locator | Locates high-trajectory projectiles and their sources. 5 stationary beams. AN/SPQ-6 is ship-board version. | C |
| AN/MPS-4 | Height Finder | RHI, PPI, and A-scope in operations center. | U |
| AN/MPS-21 (XN-1) | Air Search and Height Finding | V-beam height-finder. | C |
| AN/MPS-24 | Air Search | Helicopter transportable, very-long-range, VHF air search radar. Uses modified SK-1M transmitter. | C |
| AN/MSQ-3 | Airfield Surveillance | Combination of AN/TPS-1D, AN/UPX-1, AN/UPA-25, AN/CPN-6, and communications. | C |
| AN/TPS-1D -1G | General Search | AN/TPS-1G is improved model with csc ² antenna. | U |
| AN/TPS-21 | Battle-field Surveillance | Personnel and vehicle detector. Converts video scintillation into audio signal (Butterfly). | C |
| AN/UPS-1 (XN-1) | General Search | Miniature techniques, transportable. Intended to replace AN/TPS-1D. | C |
| SO-12M/N | Surface Search | Limited present use. | U |
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| Frequency (Mc) | Pulse Length (μ sec) | Peak Power (kw) |
|-------------------|------------------------------|--------------------------|
| 2800-3000 | 1.0 | KPQ-1: 250 SPQ-6: 750 |
| 6275-6575 | 1.3 or 3.7 | 220 |
| 1250-1350 | 5.0 | 5000 (each beam) |
| 200-225 | 5.0 | 1000 |
| - | - | - |
| 1220-1350 | 2.0 | 500 |
| 9375 | 0.4 | 8 |
| 1220-1350 | 1.4 4.2 | 1000 |
| 9000-9160 | 1.0 | 50 |
| | | |
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| Pulse Rate (pps) | Maximum Range (Miles) | | | Calculated* Range (Miles) |
|-------------------------|-----------------------|-------------------------------|------------------------------------|------------------------------|
| | 2200 T DD | 20 m ² Aircraft | 1 m ² Aircraft | |
| 2000 | - | - | 4 on 81 mm mortar | - |
| 615-650 motor driven | - | 65 | - | 45 |
| 360 | - | 280 | - | 235 |
| 170-190 | - | 200 | - | 277 (F = 2) (over water) |
| - | - | - | - | - |
| 380-400 | - | 1D: 100 1G: 130 (est) | - | 75 (F = 1.5) 73 (F = 1.5) |
| 1600 | - | - | 11.3 on vehicle, 0.57 on man | 2 |
| 800 267 | - | - | 78 (est) | 105 (F = 1.5) |
| 465 | 35 | - | - | 24 |
| | | | | |
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* See note, page 6

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| Scan Coverage (Degrees) | | Scan Rate (rpm) | |
|-------------------------|----------|-----------------|-----------------|
| Hor. | Vert. | Hor. | Vert. |
| 20 | 5 | Lobing | Sequential |
| 360 | -5 to 25 | 6 | 1-1.5 scan/sec. |
| 360 | 30 | 0-6 | None |
| 360 | 22 | 5 | None |
| - | - | - | - |
| 360 | - | 0-15 | - |
| 360 | 5 | - | - |
| 360 | 11 | 0-15 | None |
| 360 | 2 or 6 | 6 | None |
| | | | |
| | | | |
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| Total System Weight (lbs) | Antenna | | Beamwidth (Degrees) | |
|---------------------------|--------------------------------|---------------------|---------------------|----------|
| | Type | Size (ft) | Hor. | Vert. |
| 1800 | Parabolic Sections (5) | 3 x 4 (complete) | 0.5 | 0.3 |
| 10,000 | Parabolic Section | 3 x 15 | 4 | 0.8 |
| 35,500 | Bipolarized Parabola - csc^2 | 32 x 20 | 1.8 | 30 |
| 60,000 | Cylindrical Paraboloid | 33 x 11 | 9 | 22 |
| - | - | - | - | - |
| 3000 | 1D: Paraboloid 1G: csc^2 | 4 x 15 6 x 15.75 | 4 3.7 | 12 40 |
| 250 | Parabolic Section | 3 x 1 | 10 | 3 |
| 1800 | Paraboloid | 4 x 15 | 3 | 11 |
| 2590 | Paraboloid | 3 x 5 | 1.5 | 2 or 6 |
| | | | | |
| | | | | |
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LANDBASED
SEARCH
RADARS

| Power Source | | | | Number in Use or Tentative Available Date | Supplier | Source of Information | MODEL |
|-------------------------|-------------------|-----------------------|---------------------|---|-------------------------------|--------------------------|----------------------|
| Volts | Phase | Freq. | KVA | | | | |
| - | - | - | - | 3 exp. | Emerson Electric | BuShips, Code 828 | AN/KPQ-1 AN/SPQ-6 |
| 115 | 1 or 3 | 60 | 4.2 | Approx. 100 | Hazeltine | BuShips, Code 828 | AN/MPS-4 |
| 440 | 3 | 400 | 120 | One in May 1959 | Sperry | BuShips, Code 827 | AN/MPS-21 (XN-1) |
| 115 | 3 | 60 | 20 | 12 | Hazeltine | BuShips, Code 827 | AN/MPS-24 |
| 120 120 115 26 | 3 1 1 DC | 60 60 400 DC | 10 10 10 5 | - | Adler Engineering | BuShips, Code 827 | AN/MSQ-3 |
| 115 | 1 | 400 | 5 | 1G: 200 starting 1957 | 1D: Raytheon 1G: Hazeltine | BuShips, Code 827 | AN/TPS-1D -1G |
| 115 | 1 | 400 | 0.5 | - | Hoffman Laboratories | BuShips, Code 827 | AN/TPS-21 |
| 115 | 3 | 400 | 7.5 | 3 | RCA | BuShips, Code 827 | AN/UPS-1 (XN-1) |
| 115 | 1 | 60 | 2.5 | - | Raytheon | BuShips, Code 828 | SO-12M/N |
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1. AUTHORITY
2. DATE
3. BY



| Serial | Date | Description | Location | Time | | Remarks |
|--------|----------|-------------|----------|-------|-----|---------|
| | | | | Start | End | |
| 10001 | 10/1/50 | ... | ... | ... | ... | ... |
| 10002 | 10/2/50 | ... | ... | ... | ... | ... |
| 10003 | 10/3/50 | ... | ... | ... | ... | ... |
| 10004 | 10/4/50 | ... | ... | ... | ... | ... |
| 10005 | 10/5/50 | ... | ... | ... | ... | ... |
| 10006 | 10/6/50 | ... | ... | ... | ... | ... |
| 10007 | 10/7/50 | ... | ... | ... | ... | ... |
| 10008 | 10/8/50 | ... | ... | ... | ... | ... |
| 10009 | 10/9/50 | ... | ... | ... | ... | ... |
| 10010 | 10/10/50 | ... | ... | ... | ... | ... |



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Section 3

Airborne Search and Weapon Control Radars

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

| MODEL | Function | General Facts | Sec. Class |
|-------------------------|----------------------------|--|------------|
| AN/APG-30 30A | Airborne Range Only | Feeds radar range to optical fire control computers. | U |
| AN/APG-51 51A 51B | Intercept and Fire Control | For target search and track. AN/APG-51 was formerly designated E-10 fire control system. AN/APG-51A is used with Aero 19A. 51B with Aero 19G or Sparrow III. | C |
| AN/APN-59 | Navigation | USAF navigation and search. None yet in use by USN. | U |
| AN/APQ-35 35A 35B | Intercept and Fire Control | Consists of AN/APS-21, AN/APG-26, and AN/APS-28. Search, track, and tail warning. | C |
| AN/APQ-36 | Missile Guidance | Search, intercept, and guidance for Sparrow I beam rider. | C |
| AN/APQ-47 | Intercept and Fire Control | Transistorized all-weather AI. Monopulse for control of guns, rockets, and missiles. Research and development only. | C |
| AN/APQ-50 | Intercept and Fire Control | Cylindrically packaged tracking radar. Part of Aero 13F. | C |
| AN/APQ-51 | Missile Guidance | Search and limited tracking for optical Sparrow I beam rider. | C |
| AN/APQ-56 | Reconnaissance | USAF side-looking strip map. | S |
| AN/APQ-67 | Intercept and Fire Control | Research set for control of FM-CW equipment. | C |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

| Peak Power Output (kw) | Pulse Length (μ sec) | Frequency (Mc) |
|-----------------------------|--|---|
| 30: 5 - 10 30A: 4 | 0.5 | 30: 9335-9415 30A: 9000-9600 |
| 51, 51A: 180 51B: 159 | 0.5, 2.35 | 9375 \pm 40 8500-9400 |
| 70 | 0.35, 0.8 2.35, 4.5 | 9375 \pm 40 |
| 21: 250 26: 40 28: 40 | 0.4, 1.75, 2.25 0.4 0.5 | 9375 \pm 30 9245 \pm 30 9245 \pm 30 |
| 250 | 0.4, 0.67, 1.2 2.35, 3.1 | 9375 \pm 30 |
| 250 | 0.5 2.2 | 9375 \pm 30 |
| 180 150 | 0.5 1.75 | 9375 \pm 30 |
| 250 | Tracking: 0.42 Guidance: 0.66, 4/scan | 9375 \pm 30 |
| 100 | 0.1 | 35,000 |
| 0.2 | CW | 10,000 10,250 |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

SECRET

| Pulse Rate (pps) | Aircraft Installation | Maximum Range (yd) | |
|--|--|---|---|
| | | 20 m ² | 1 m ² |
| 800 | F2H-2, F9F-2,4,5,6,8 FJ-3 | 3000 | 2000 |
| 910, 410, 330 | 51: F2H-4 51A: F2H-2N 51B: F3H-2 | 51, 51A: 22,000 (90% on F2H-2) | - |
| 2000, 1025 180, 350 | - | - | - |
| 2400-2500, 300/550 2400-2500, 300/550 2000 | F3D-1, 2 | 25 miles 2 miles 4 miles | - |
| 325, 800 2400 | F3D | 23,000 | - |
| 2000 400 | Experimental only | - | - |
| 1200 330 or 550 | F4D-1 | 32,000 (90% on F2H-2) | - |
| 1200 | F7U-3 | - | 2° off axis: 12,000 4° off axis: 3,000 |
| 4000 | RB47 A3D (experimental) | 15 miles ground mapping | - |
| - | - | - | - |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

SECRET

| Minimum Range (yd) | Maximum Altitude (ft) | Scan Coverage (Degrees) | |
|-----------------------|---------------------------|--|--|
| | | Hor. | Vert. |
| 225 | 30: 45,000 30A: 60,000 | - | - |
| 150 | 50,000 | Sch: ±67.5 Trk: ±64 (+30 steering) | 51A: 13 51B: 11.5 (±30 steering) |
| - | 50,000 | 360 or sector | +10 to -15 |
| 150 | 50,000 | ±85 ±60 144 | ±60, -30 ±60 144 |
| 300 | 50,000 | 80 | 24 |
| - | 50,000 | - | - |
| 200 | 52,000 | Sch: ±56 Trk: ±45 | Sch: ±56 Trk: ±45 |
| 350 | 50,000 | 7 | 7 |
| - | 50,000 + | Aircraft Motion | 0 to -35 |
| - | - | - | - |

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**AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS**

SECRET

| Accuracy | | Maximum Track Rate | | Indicator Scan | |
|--|-----------------------|-----------------------------|------------------|-------------------------------------|---------------------------|
| Range | Azimuth | Range (knots) | Angular (deg) | Search | Track |
| ±25 yd | - | 1500 | - | - | - |
| 20 yd ±1% R | - | 1200 closing 200 opening | 20/sec | 90° B-scope | F-scope |
| - | - | - | - | - | - |
| ±100 yd ±25 yd - | ±3° ±0.25° - | 900 closing - - | - 45/sec - | 170° x 30 170° x 15 120° cone | Conical |
| ±25 yd | 2 mils circular | -2000 +200 ft/sec | - | Step Wigwag | Conical |
| - | - | - | - | - | - |
| ±25 yd or one percent to 10 mi., then 2 % | ±5 mil | 1600 closing 900 open | 15/sec | 90° B-scope | F-scope |
| ±25 yd | 2.5 mils rms | - | - | Range Voltage Meter | Range Voltage Meter |
| ±50 ft (resolution) | 0.15° (resolution) | - | - | Film Only | - |
| - | - | - | - | - | - |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

| Scan Rate | | Beamwidths (degrees) | | Reflector | |
|--------------------------|----------------------------|-------------------------|----------------------------|---------------------|------------------------------|
| RPM | Looks Per Min. | Hor. | Vert. | Type | Size |
| - | 2 per sec in range | 18 | 18 | Horn | 4 in. x 6 in. |
| 2400 | - | 51, 51A: 9 51B: 7 | 9 7 | Parabola | 21 in. |
| 12-45 | - | 3.0 | 3.2 (csc ²) | Modified Paraboloid | 30 in. x 18 in. |
| 4000 66.7 cps 1200 | 20, 40 continuous 40 | 2.9 18.8 cone 7.2 | 2.9 18.8 cone 7.2 | Parabola | 2.5 ft 0.75 ft 12.5 ft |
| 3000 50 cps | 3.4 sec frame time | 4.5 | 4.5 | Parabola | 2 ft |
| - | - | - | - | Parabola | 2 ft |
| - | 30 | 3.6 | 3.6 | Parabola | 24 in. |
| Trk: 50 cps | Trk: 50 cps | 4.2 | 4.4 | Parabola | 2 ft |
| Aircraft Motion | | 1.5 | 35 (csc ²) | Linear Array | 15 ft |
| - | - | - | - | - | - |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

SECRET

| Power Source | | | | Total System Weight (lb) | Indicators | |
|--------------------------|--------------------|---------------------------|-------------------|--------------------------|------------|---|
| Volts | Phase or Amps. | Freq. (cps) | KVA | | PPI | Others |
| 28 102-124 102-124 | 3 amps 1 1 | DC 380-420 320-1760 | - 0.95 2.30 | 65 plus cable | - | - |
| 115/200 28 | 3 DC | 400 DC | 2.7 0.36W | 391 | No | B-scope, augmented C-scope, artificial horizon. |
| 115 115 27 | - - 5.5 amps | 380-1000 380-420 DC | 1.1 0.25 - | 175 | 2-5 in. | - |
| 109-124 24-29 | 1 96 amps | 380-420 DC | 3.25 - | 980 | Yes | B, C, O-scope Pilots gun aim. |
| 115 115 | 3 3 | 380-420 320-1000 | 2.5 9.0 | 1050 | - | B and C-scope attack indicator with error indication. |
| 115/200 28 | 3 - | 320-420 DC | 8.5 Kw 1 Kw | 300 | - | B and C-scope search. Range, range rate, time to go, horizon, attack. |
| 115/200 28 | 3 - | 400 DC | 4.5 400 W | 499 (radar only) | No | B-scope, augmented C-scope, artificial horizon. |
| 115 28 | 3 12.5 amps | 380-420 DC | 2.0 - | 500 | No | Meter |
| - | - | - | - | 650 | - | Film only. |
| - | - | - | - | | | |

SECRET

| Display | | Number in Use or Available Date | Supplier | Source of Information | MODEL |
|---------|----------------------------|--|----------------------|-----------------------|-------------------------|
| IFF | Beacon | | | | |
| - | - | 30: 25,000 30A: 200 per month | Admiral and Hoffman | BuAer, Code AV-33122 | AN/APG-30 30A |
| Yes | 51, 51A: Yes 51B: No | 51: 100 51A: 225 51B: 25 plus 10 per month | Hughes | BuAer, Code AV-3310 | AN/APG-51 51A 51B |
| - | Yes | USAF | Sperry | BuAer, Code AV-33222 | AN/APN-59 |
| Yes | Yes | - | Westinghouse and RCA | BuAer, Code AV-33111 | AN/APQ-35 35A 35B |
| Yes | Yes | 10 | Sperry Gyro | BuAer, Code AV-33112 | AN/APQ-36 |
| Yes | Yes | - | North American | BuAer, Code AV-33112 | AN/APQ-47 |
| Yes | No | 220 plus 30 per month | Westinghouse | BuAer, Code AV-3310 | AN/APQ-50 |
| No | No | 250 | Sperry Gyro | NRL, Code 5364 | AN/APQ-51 |
| No | No. | 10 USAF 1956 1 USN 1957 | Westinghouse | BuAer, Code AV-3322 | AN/APQ-56 |
| - | - | - | Raytheon | BuAer, Code AV-33111 | AN/APQ-67 |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

SECRET

| MODEL | Function | General Facts | Sec. Class. |
|-------------------------|------------------------------|---|-------------|
| AN/APQ-72 | Intercept and Fire Control | Modified APQ-50. Part of AMCS Aero 1A. | C |
| AN/APQ-74 | Intercept and Fire Control | Part of AMCS Aero 1B. | C |
| AN/APS-19C -19D | Search | Surface search radar. | C |
| AN/APS-20C 20E | AEW | Used for AEW, ASW, and mine-laying. | C |
| AN/APS-31, A B, C | Reconnaissance | Forward only search for carrier based aircraft. | C |
| AN/APS-33A, F | Reconnaissance | Medium patrol aircraft 360° reconnaissance. | C |
| AN/APS-33B AN/APA-91 | Reconnaissance | ASW and minelaying. Improved into AN/APS-38. Csc ² antenna modification kit. | C |
| AN/APS-37 AN/APA-88 | Anti-Snorkel and Mine Laying | North and ground stabilized indicators. Dark trace attack indicator. Integrated electronics display for radar, IFF, beacon. | C |
| AN/APS-38 38A | ASW | 360° medium power anti-snorkel radar. Csc ² antenna modification kit. | C |
| AN/APS-42 42B | Transport Search | AN/APS-42A used by USAF only. | U |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

| Peak Power Output (kw) | Pulse Length (μ sec.) | Frequency (Mc) |
|---------------------------|-------------------------------|---|
| 180 150 | 0.5 1.75 | 9375 \pm 30 |
| 180 150 | 0.5 1.75 | 9375 \pm 30 |
| 40 | 2.35 | 9375 \pm 40 |
| C: 1000 E: 2000 | 2 | 2880 \pm 30 |
| 70 | 0.5, 4.5 2.25 (Beacon) | 9375 \pm 55 9310 \pm 10 (Beacon) |
| 70 | 4.5, 0.5 2.25 (Beacon) | 9375 \pm 55 9310 \pm 10 (Beacon) |
| 70 | 4.5, 0.5 2.25 (Beacon) | 9375 \pm 55 9310 \pm 10 (Beacon) |
| 70 | 0.5, 2.25 3.25 | 9375 \pm 55 |
| 70 | 4.5, 0.5 2.25 (Beacon) | 9375 \pm 55 9310 \pm 10 (Beacon) |
| 40 | 0.75, 3.5 2.25 (Beacon) | 9375 \pm 55 9310 \pm 10 (Beacon) |

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**AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS**

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| Pulse Rate (pps) | Aircraft Installation | Maximum Range (yd) | |
|--------------------------|---|-----------------------------|------------------|
| | | 20 m ² | 1 m ² |
| 1200 330 or 550 | F4H-1 | 32,000 (90% on F2H-2) | - |
| 1200 330 or 550 | F8U-3 | 32,000 (90% on F2H-2) | - |
| 425 | A2D, AD | 40,000 | - |
| 300 | C:AD-3W,4W,AF-2W,P2U- 3W, P2U-4, P2V-5 E:AD-5W, P2V-5,7,WV-2,3 ZPG-2, 2W | - | - |
| 200, 800 400 (Beacon) | PBM-5, 5A,AF-2S P2V-4,UF-1,AJ-1 | 31A:50,000 31B:96,000 | - |
| 200, 800 400 (Beacon) | P2V-1, 2, 3, ZP2K | A:72,000 F:120,000 | - |
| 200, 800 400 (Beacon) | P2V-1, 2, 3, 6 ZP2K | 120,000 | - |
| 800, 300 | S2F-2 | - | - |
| 200, 800 400 (Beacon) | S2F-1, 2 | 140,000 | - |
| 200, 800 300 (Beacon) | R5D, R6D, R7V, R3Y, R4Q-1 | - | - |

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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

| Minimum Range (yd) | Maximum Altitude (ft) | Scan Coverage (Degrees) | |
|-----------------------|--------------------------|-------------------------|-----------|
| | | Hor. | Vert. |
| 200 | 30,000 | 44: 360 44A: 170 | 5 Tilt |
| - | 80,000 | 360 | -5 +11 |
| - | 5,000 | 29 steerable | 30 Tilt |
| - | 80,000 | 360 | -5 +11 |
| 300 | 60,000 | ±45 | 15 |
| - | 20,000 | ±40 | ±6 preset |
| 4,000 | 80,000 | - | - |
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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

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| Power Source | | | | Total System Weight (lb) | Indicators | |
|---------------|---------------|----------------------------|----------|-----------------------------------|--|--|
| Volts | Phase or Amps | Freq. (cps) | KVA | | PPI | Others |
| 115/208 28 | 3 100 amps | 380-420 DC | 10 | 1600 | 4 & 10 in. | 44: 3 in. A 2-7 in. book 44A: 2-7 in. book |
| 115 | 3 | 380-1000 | 3.3 | 1105 | 7 in. | 7 in. (RHI) |
| 115/208 | 3 37 amps | 320-1000 | 4 | 2000 | - | B-scope |
| 115 | 3 | 380-1000 | 3.3 | 1105 | 7 in. | 7 in. (RHI) |
| 115 | 3 | 380-420 | - | 115 | - | I-scope |
| 115 28 | 1 1.5 amps | 380-420 DC | 0.5 - | 75 | 1-3 in. | - |
| 115 115 | 3 3 | 70:380-1000 70A:380-420 | 15 | 1800 (with- out antenna) | 70: 7 in. 70A: 10 in. (Optional) | 70A: direct feed to data processing equipment |
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AIRBORNE SEARCH
AND WEAPON
CONTROL RADARS

| Display | | Number in Use or Tentative Available Date | Supplier | Source of Information | MODEL |
|---------|--------|---|-----------------------|--|---------------------|
| IFF | Beacon | | | | |
| Yes | Yes | 44: 1 in June 1956 44A: 300 in June 1956 | Philco | BuAer, Code AV-3322 | AN/APS-44 44A |
| No | No | 200 | Philco Texas Inst. | BuAer, Code AV-3321 | AN/APS-45 |
| No | No | 1 | RCA | BuAer, Code AV-3322 | AN/APS-56 (XN-1) |
| No | No | - | LaVoie | BuAer, Code AV-3321 | AN/APS-62 |
| Yes | - | Being evaluated | Magnavox | BuAer, Code AV-33122 NRL Code 5364 | AN/APS-67 (XN-1) |
| - | - | USAF 1958 | RCA | BuAer, Code AV-33222 | AN/APS-69 |
| Yes | No | 70: 10 in 1957 70A: 30 to be contracted | 70: GE | BuAer, Code AV-3321 | AN/APS-70 70A |
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| MODEL | Function | General Facts | Sec. Class. |
|------------------|--|--|-------------|
| AN/RPG-1 | Missile Guidance | Permits tracking and control of Rogues I. Submarine installation. | C |
| AN/RPG-2 | Missile Guidance | Tracking and control of Rogues I & II. Submarine installation. Mark X IV integral. | S |
| AN/RPG-3A | AA Fire Control | Similar to MK 34 Mod 10, with improved target acquisition features and a new operator's console. | C |
| AN/RPG-4A | AA Auto Track Fire Control | Antenna reflector on gun mount. | C |
| AN/RPG-4B | Missile Control | Provides automatic target tracking and target identification. | S |
| AN/RPG-50 | AA Fire Control | Improved version of MK 34 radar with automatic target tracking. | C |
| AN/RPG-51 (CW-1) | AA Fire Control | Completely automatic pulse doppler with illustration terminal guidance for Tartar. | S |
| AN/RPG-52 | AA Fire Control | Range only radar for manual director with optical angle tracking. | C |
| AN/RPG-53 | Surface and AA Auto Track Fire Control | Formerly AN/RPG-48 (CW-4). Adapted to Gun Director Mk 55. | C |
| AN/RPG-55 55A | Missile Control | Beam rider with monopulse tracking. AN/RPG-55A also contains X-band firing. All AN/RPG-55's will be retrofitted to AN/RPG-55A on installation. | C |
| AN/RPG-56 | Missile Tracking Radar | Tracking radar used with AN/RPW-3 for Talos missile. "Frequency comparison" for range restriction. Related to AN/RPG-55. | C |
| AN/RPG-57 | Missile Control | Similar to AN/RPG-55, but without beam rider. | C |
| AN/RPG-58 | AA Fire Control | Modified SP to include stabilization. Maximum ranges will use beam-ride to missile. | C |

Section 4

Shipboard Weapon Control Radars

DECLASSIFIED

SHIPBOARD WEAPON
CONTROL RADARS

| MODEL | Function | General Facts | Sec. Class. |
|------------------|--|--|-------------|
| AN/BPQ-1 | Missile Guidance | Permits tracking and control of Regulus I. Submarine installation. | C |
| AN/BPQ-2 | Missile Guidance | Tracking and control of Regulus I & II. Submarine installation. Mark X IFF integral. | S |
| AN/SPG-34 | AA Fire Control | Similar to Mk 34 Mod 16, with improved target acquisition features and a new operator's console. | C |
| AN/SPG-48 | AA Auto Track Fire Control | Antenna reflector on gun mount. | C |
| AN/SPG-49 | Missile Control | Furnishes precision target tracking and target illumination for Talos missile. Two transmitters. | S |
| AN/SPG-50 | AA Fire Control | Improved version of Mk 34 radar with automatic range tracking. | C |
| AN/SPG-51 (XN-1) | AA Fire Control | Completely automatic pulse doppler with illumination terminal guidance for Tartar. | S |
| AN/SPG-52 | AA Fire Control | Range only radar for manual director with optical angle tracking. | C |
| AN/SPG-53 | Surface and AA Auto Track Fire Control | Formerly AN/SPG-48 (XN-4). Adapted to Gun Director Mk 68. | C |
| AN/SPG-55 55A | Missile Control | Beam rider with monopulse tracking. AN/SPG-55A also contains X-band homing. All AN/SPG-55's will be retrofitted to AN/SPG-55A on installation. | C |
| AN/SPG-56 | Missile Tracking Radar | Tracking radar used with AN/SPW-2 for Talos missile. "Frequency comparison" for range resolution. Inflated radome. | C |
| AN/SPG-57 | Missile Control | Similar to AN/SPG-55, but without beam rider. | C |
| AN/SPQ-2 | Auto Missile Tracking | Modified SP to include stabilization. Maximum ranges will use beacon in missile. | C |

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SHIPBOARD WEAPON CONTROL RADARS

| Frequency (Mc) | Peak Power (kw) | Pulse Length (μ sec.) |
|--|---------------------|----------------------------|
| 3400-3700 (Secret) | 500 | 1.0 |
| 3400-3700 | 500 | 1.0 4.0 |
| 8740-9168 | 50 | 0.3 |
| 8500-9600 | 250 | 0.25 |
| 5400-5900 | 3000 | 0.3 and 3.0 |
| 8500-9600 | 40-50 | 0.25 |
| Track: 5450-5825 Illumination: 10250-10500 | 30 2 | 2.0 or 3.0 cw |
| 16,300-16,500 | 50 | 0.5 |
| 8500-9600 | 250 | 0.25 |
| Track & Acq: 5400-5900 Cap. & Guid: 5400-5900 cw 10250-10500 | 300 30 | 2 0.2 |
| Track: 5250-5750 Home: 5850-6000 (Secret) | 30 Joules 2-5 kw | 20 (est.) cw |
| Track & Acq: 5400-5900 cw 10,250-10,500 | 300 2 | 2 cw |
| 3400-3700 | 500 | 1 |

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SHIPBOARD WEAPON CONTROL RADARS

| Pulse Rate (pps) | Smallest Ship | Display |
|---------------------------------------|---------------|--|
| 400 ±5% | SS | PPI and 2 B-scopes |
| 400 200 | SS | - |
| 1800 ±10% (variable) | DE | 5 in. A-scope 2 - 2 in. F-scope |
| 1320 ±10% | DL | 5 in. A/R-scope 5 in. B-scope 5 in. E-scope 2 in. F-scope |
| 900 and 500 | CL | 5 in. B-scope (3D) 5 in. E/R-scope 5 in. R-scope, 10 in. PPI |
| 2000 ±10% | DE | 3 in. A/R-scope 2 - 2in. F-scope |
| 10.2, 11.0, 15.2, or 16.3 kc cw | DDG | Monitor A-scope |
| 1500 with 400 cps modulation | Aux. | A-scope |
| 1320 ±10% | DD | 5 in. A/R-scope 5 in. B-scope 5 in. E-scope 2 in. F-scope |
| 450-900 cw | CLG & DLG | - |
| 250 cw | - | 5-plane B-scope, R-scope, Angle Error Scope, TV scope |
| 450 cw | DDG | - |
| 205 or 820 | AV-11 | A-scope PPI |

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SHIPBOARD WEAPON CONTROL RADARS

| Reflector | | Beamwidth (Degrees) | | Transmission Line |
|-------------------------------------|------------------|---------------------|------------------------|-------------------|
| Type | Size (ft) | Hor. | Vert. | |
| Parabolic Section | 2 x 4 | 4 | csc ² to 60 | RG-48/U |
| Parabolic Section | 2.5 x 5.6 | 3.5 | - | RG-48/U |
| Paraboloid | 3.33 | 2.6 | 2.6 | RG-51/U |
| Paraboloid | 3.33 | 2.6 | 2.6 | RG-51/U |
| "Egg-crate" Lens | 8 x 8 | 1.6 | 1.6 | Waveguide |
| Paraboloid | 3.33 | 2.6 | 2.6 | RG-51/U |
| Paraboloid | 8 x 7.5 | 1.9 cw 0.9 | 1.9 0.9 | Waveguide |
| Off-set Paraboloid | 0.75 | 5 | 5 | RG-53/U |
| Paraboloid | 5 | 1.6 | 1.6 | RG-51/U |
| Guid: Paraboloid Cap: Paraboloid | 8 8 26 in. | 1.5 1.5 6 | 1.5 1.5 6 | RG-49/U |
| Paraboloid with Subreflector | 15.5 | 0.8 | 0.8 | RG-49/U |
| Paraboloid cw uses same ant. | 8 8 | 1.5 - | 1.5 - | RG-49/U |
| Paraboloid | 8 | 3 | 3 | RG-48/U |

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SHIPBOARD WEAPON CONTROL RADARS

| Associated Control or Director System | Acquisition Scan | | | |
|---|------------------------------|----------------------------------|--------------------|------------------------|
| | Type | Rate (cps) | Coverage (Degrees) | |
| | | | Hor. | Vert. |
| Regulus I | Sector | - | 15, steerable 360 | Csc ² to 60 |
| Regulus I & II | 360° | - | 360 | - |
| GFCS Mk 63 Mod 14, 18, 20, 21, 22 | Spiral | 30-cps nutation and 2-cps spiral | 12.6 | 12.6 |
| Gunar Mk 1, 2, 3 GFCS Mk 69 | Spiral | 30-cps nutation and 2-cps spiral | 12.6 | 12.6 |
| Talos Weapon System | Raster | - | 10 | 5 |
| GFCS Mk 63 Mod 23, 24, 25 GFCS Mk 75 | Spiral | 30-cps nutation and 2-cps spiral | 12.6 | 12.6 |
| GFCS Mk 74, Mod 0 for Tartar | Conical scan on receive only | 10-70 | Program Beam | Program Beam |
| GFCS Mk 70 | None | None | 5 | 5 |
| GFCS Mk 68 | Spiral | 30-cps nutation and 2-cps spiral | 11.6 | 11.6 |
| GFCS Mk 76 (Terrier) | Program Search | - | 4 | 6 |
| Talos | 5 x 5 | Average acquisition time 5 sec | 5 | 5 |
| Tartar | Program Search | - | 4 | 6 |
| Regulus I | - | 24 | - | - |

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SHIPBOARD WEAPON
CONTROL RADARS

| Tracking Scan | | Maximum Tracking Range (yd) | |
|------------------|--------------------|-----------------------------|-------------------|
| Type | Coverage (Degrees) | DD | F6F |
| Sector | 15 | - | 300,000 on beacon |
| Lock on beacon | - | - | 400,000 on beacon |
| Conical | 4.1 | - | 20,000 |
| Conical | 4.1 | - | 30,000 |
| Monopulse | 1.6 | - | 112,000 |
| Conical | 4.1 | - | 20,000 |
| Receiver Phasing | 2.6 | - | 85,000 |
| None | 5 | - | 8,500 |
| Conical | 3.1 | Horizon | 45,000 |
| Monopulse | 1.5 | Horizon | 100,000 (est) |
| Monopulse | 0.8 | - | 325,000 (est) |
| Monopulse | 1.5 | Horizon | 100,000 (est) |
| Conical | 2 | Horizon | 100,000 |

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SHIPBOARD WEAPON
CONTROL RADARS

| Resolution | | Tracking Accuracy | | |
|------------|-------------------|---------------------|-----------------------|-------------------------|
| Range (yd) | Bearing (Degrees) | Range (yd) | Bearing (mil) | Elevation (mil) |
| 200 | 5 | ±50 at 200 miles | ±0.5 | - |
| 200 | 5 | ± 50 at 200 miles | 6 min at 200 miles | - |
| 200 | 2.2 | ± 15 ± 0.1% R | ±0.75 Reset | ±0.75 Reset |
| 80 | 2.2 | ±10 ±0.025% R | ±0.75 Reset | ±0.75 Reset |
| 50 | 1.3 | ±15 ±0.025% R | ±0.2 | ±0.2 |
| 200 | 2.2 | ± 50 ± 0.025 % R | ±0.75 Reset | ±0.75 Reset |
| 50 | 1.0 | ±50 ±0.1 % R | +0.8 | ±0.8 |
| | | | | |
| 98 | 5 | ±20 or ±2% R | - | - |
| 80 | 1.3 | ±10 ± 0.025 % R | 0.5 (RMS) | Above 1° 0.5 (RMS) |
| 300 | 0.75 | ±15 ± 0.025 % R | 0.25 (est) | 0.25 (est) |
| 10 | 0.4 | ±33 w/SPW-2 | 0.25 (est) | 0.25 (est) |
| 300 | 0.75 | ±15 ±0.025 % R | 0.25 (est) | 0.25 (est) |
| 150 | 2.5 | ±25 | 1° at 10° per sec. | 0.1° at 10° per sec. |

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SHIPBOARD WEAPON CONTROL RADARS

| Bearing | | Maximum Range (miles instrumented) | Minimum Range (yd) |
|--------------------------|--------------------------------------|---------------------------------------|----------------------------|
| Track Rate (deg/sec.) | Slew Rate (deg/sec.) | | |
| - | - | 200 | 300 |
| - | - | 200 | 300 |
| Manual | Manual | 18 | 350 |
| 30 | 30 | 20 | 300 |
| 78 | 3.5 sec for 180° start to stop | 150 | 500 |
| Manual | Manual | 18 | 300 |
| 60 | 120 | 50 | 400 |
| Manual | Manual | 5 | 200 |
| 30 | 50 | 25 | 300 |
| 120 | 120 | 100 | 500 |
| 60 | 60 | 200 | Track: 5000 Acq: 10,000 |
| 120 | 120 | 100 | 500 |
| 30 | 36 | 200 | 500 |

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SHIPBOARD WEAPON CONTROL RADARS

| Power Requirements | | | | Weight (lb) | | |
|---------------------------------------|----------------------------|------------------------------------|--|--------------------------------|--------------|---------|
| Volts | Phase | Freq. (cps) | KVA | Topside | Lower Deck | Antenna |
| 110 | 1 | 60 | - | - | - | 370 |
| - | - | - | - | - | - | 800 |
| 115 440 | 1 3 | 60 60 | 1.9 0.4 | 130 | 2580 | 130 |
| 115 440 | 1 3 | 60 60 | 3.3 0.4 | 130 | 4500 | 130 |
| 440 115 115 115 115 28 | 3 3 3 1 - - | 60 60 400 400 DC DC | 220 Amp 156 Amp 3 Amp 4 Amp 7.5 Amp 6.0 Amp | 30,000 | 15,000 | 4,000 |
| 115 440 | 1 3 | 60 60 | 2 0.4 | 130 | 1200 | 130 |
| 440 115 | 3 - | 400 60 | 30 8.5 | 1500 | 3100 | 300 |
| 115 50 | 1 3 | 60 DC | 9.0 0.5 | | | |
| 440 | 3 | 60 | 2 | 200 (est) | 750 (est) | 2 |
| 115 440 | 1 3 | 60 60 | 3.3 0.4 | 180 | 4500 | 180 |
| 440 | 3 | 400 | 90 | 55: 11,000 55A: 12,000 | 7000 8000 | 500 |
| - - - | - - - | 60 400 DC | 120 Kw 150 Kw 10 Kw | 8000 in- cluding antenna | - | |
| 440 | 3 | 400 | 65 | 9000 | 6000 | 500 |
| 440 | 3 | 60 | 13 | 3,320 | 8907 | - |

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SHIPBOARD WEAPON
CONTROL RADARS

| Number in Use or Tentative Available Date | Supplier | Source of Information | MODEL |
|--|-------------------------------------|-----------------------|---------------------|
| 6 | Stavid | BuShips, Code 821 | AN/BPQ-1 |
| 4 developmental 1957 12 production 1958 | Stavid | BuShips, Code 821 | AN/BPQ-2 |
| 252 (includes equipment in storage) | Western Electric and Hoffman Labs | BuOrd, Code ReS4-c | AN/SPG-34 |
| 45 | Western Electric | BuOrd, Code ReS4-c | AN/SPG-48 |
| 1-(XN-1) 1-(XN-2) Production June 1957 | Sperry Gyroscope | BuOrd, Code ReS4-b | AN/SPG-49 |
| 49 | Western Electric | BuOrd, Code ReS4-c | AN/SPG-50 |
| 1 prototype 17 in 1958 | Raytheon | BuOrd, Code ReS4-a | AN/SPG-51 (XN-1) |
| 58: 1957 20: 1958 | Stavid | BuOrd, Code ReS4-c | AN/SPG-52 |
| 14 | Western Electric | BuOrd, Code ReS4-c | AN/SPG-53 |
| 55: April 1959 55A: April 1960 | Sperry Gyroscope | BuOrd, Code ReS4-a | AN/SPG-55 55A |
| July 1960 (Prototype) | Sperry Gyroscope | BuOrd, Code ReS4-b | AN/SPG-56 |
| April 1960 | Sperry Gyroscope | BuOrd, Code ReS4-a | AN/SPG-57 |
| 4 | Fairchild Engine and Airplane Corp. | BuShips, Code 823 | AN/SPQ-2 |

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SHIPBOARD WEAPON
CONTROL RADARS

| MODEL | Function | General Facts | Sec. Class. |
|--------------------|--|--|-------------|
| AN/SPQ-5 | Missile Control | Furnishes acquisition, track, capture, and guidance for Terrier beam rider missile. | C |
| AN/SPR-6 (XN-1) | Missile Guidance | Radar receiver, used in conjunction with AN/SPW-1 (XN-2). For Talos missile. | C |
| AN/SPW-1 (XN-2) | Guidance Transmitter | Transmitter for missile guidance, used with R.S. AN/SPG-49. | C |
| AN/SPW-2 | Missile Guidance | Guidance transmitter and beacon receiver for Talos missile. Klystron chain transmitter. | C |
| Mk 8 Mod 2 | Main Battery Fire Control | Surface only. Not presently manufactured but still in fleet use. | U |
| Mk 8 Mod 3 | Main Battery Fire Control | Mk 8 Mod 2 converted to X-band. Surface only. Not presently manufactured but still in fleet use. | U |
| Mk 13 | Main Battery Fire Control | Surface only. Not presently manufactured but still in fleet use. | C |
| Mk 25 Mod 3 | Surface and AA Auto Track Fire Control | Used with GFCS Mk 37. Replaces Mk 25 Mod 2. | C |
| Mk 25 Mod 5 | Surface and AA Auto Track Fire Control | Adaptation of Mk 25 Mod 3 for GFCS Mk 67. | C |
| Mk 25 Mod 7 | Missile Guidance and AA Gun Fire Control | Special-purpose missile guidance radar for Terrier; provides guidance and capture beams both triple coded for use with missile receiver. | C |
| Mk 25 Mod 8 | Missile Guidance and AA Gun Fire Control | Special-purpose missile guidance radar for Terrier; provides guidance and capture beams both triple coded for use with missile receiver. | C |
| Mk 34 Mod 2, 6, 16 | AA Fire Control | Mod 2 controls 40 mm guns; Mod 6 controls 3-in./50 guns. No longer manufactured for USN use. | U |

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SHIPBOARD WEAPON CONTROL RADARS

| Frequency (Mc) | Peak Power (kw) | Pulse Length (μ sec) |
|----------------------|-----------------|--|
| 5650 \pm 250 | 250 | Track: 0.3 or 2.0 Acq: 0.3 or 2.0 Capt. & Guid: 0.23 |
| 5635 | - | - |
| 5635 \pm 10 | 20 | 0.23 |
| 5400-5900 | 25 | 0.3 |
| 3050 \pm 50 | 20-30 | 0.4 |
| 8815 \pm 75 | 35-45 | 0.3 |
| 8815 \pm 75 | 25-35 | 0.3 |
| 8500-9600 | 250 | 0.25 |
| 8500-9600 | 250 | 0.25 |
| 8500-9600 (FM 5%) | 250 | Trk: 0.25 Guid. & Capt: 0.23 |
| 8500-9600 (FM 5%) | 250 | Trk: 0.25 Guid. & Capt: 0.23 |
| 8740-8890 | 25-35 | 0.3 |

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SHIPBOARD WEAPON
CONTROL RADARS

| Pulse Rate (pps) | Smallest Ship | Display |
|--------------------------------------|---------------|---|
| 500 or 900 500 or 900 900 | DLG | 5 in. track, 5 in. R-scope 5 in. acquisition (3D), 10 in. PPI |
| - | - | A-scope (modified Tektronix 315D) |
| 900 Frequency Modulated | - | - |
| 900 $\pm 5\%$ Frequency Modulated | CL | - |
| 1500 $\pm 10\%$ | CL | 5 in. B-scope 3 in. B-scope |
| 1500 $\pm 5\%$ | - | 5 in. B-scope 3 in. B-scope |
| 1800 $\pm 10\%$ | CL | 6-3 in. B-scopes |
| 1320 $\pm 10\%$ | DD | 5 in. B or E-scope 3 in. A-scope 5 in. E or ΔE -scope |
| 1320 $\pm 10\%$ | DD | 5 in. B or E-scope 3 in. A-scope 5 in. E or ΔE -scope 5 in. A or R-scope |
| 1350 $\pm 1\%$ | CL | 5 in. B or E-scope 3 in. A-scope 5 in. E or ΔE -scope |
| 1350 $\pm 1\%$ | DDG | 5 in. B or E-scope 3 in. A-scope 5 in. E or ΔE -scope |
| 1800 $\pm 10\%$ | DE | 5 in. A-scope 2- 2 in. F-scope 3 in. EE-scope |

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SHIPBOARD WEAPON CONTROL RADARS

| Reflector | | Beamwidth (degrees) | | Transmission Line |
|-------------------------------------|--------------------------------------|---------------------|------------------|-------------------|
| Type | Size (ft) | Hor. | Vert. | |
| Capture: Paraboloid Others: Lens | 26 in. x 26 in. 112 in. x 112 in. | 6 1.6 | 6 1.6 | RG-49/U |
| R.S. AN/SPW-1 (XN-2) | - | - | - | RG-49/U |
| Paraboloid | 2 | 6.8 | 6.8 | Waveguide |
| Paraboloid | 42 in. | 3.8 +0.2 -0.5 | 3.8 +0.2 -0.5 | RG-49/U |
| Polyrod Array | 10.17HX 2.83V | 2 | 6 | RG-48/U |
| Elliptical Paraboloid | 8HX 2V | 0.9 | 3.6 | RG-51/U |
| Elliptical Paraboloid | 8 x 2 | 0.9 | 3.6 | RG-51/U |
| Paraboloid | 5 | 1.6 | 1.6 | RG-51/U |
| Paraboloid | 5 | 1.6 | 1.6 | RG-51/U |
| "Plate" lens | 7.5 | 1 | 1 | RG-51/U |
| Paraboloid | 6 | 1 | 1 | RG-51/U |
| Paraboloid | 2.5 | 3 | 3 | RG-51/U |

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SHIPBOARD WEAPON CONTROL RADARS

| Associated Control or Director System | Acquisition Scan | | | |
|---------------------------------------|-------------------------|-----------------------------------|--------------------|-------|
| | Type | Rate (cps) | Coverage (Degrees) | |
| | | | Hor. | Vert. |
| Terrier Missile | "5 ft. x 5 ft. angle" | - | - | - |
| Talos Weapon System | - | - | - | - |
| Talos Weapon System | - | - | - | - |
| Talos Weapon System | - | - | - | - |
| Mk 34, Mk 38 | Linear Horizontal | 10 | 29 | - |
| Mk 34, Mk 38 | Sinusoidal Horizontal | 5 | 11.5 | - |
| Mk 34, Mk 38 Mk 54 | Sinusoidal Horizontal | 5 | 11.5 | - |
| Mk 37 | Spiral | 30-cps nutation at 2-cps spiral | 12 | 12 |
| GFCS Mk 67 | Spiral | 30-cps nutation at 2-cps spiral | 12 | 12 |
| Mk 37 for Terrier | Spiral | 30-cps nutation at 2.4-cps spiral | 7 | 7 |
| Mk 37 for 5 in./38 and Terrier | Spiral | 30-cps nutation at 2.4-cps spiral | 7 | 7 |
| GFCS Mk 63, Mod 6 10, 11, 12, 13. | Conical and Antenna Nod | 30-cps nutation at 0.67-cps nod | 4.5 | 34.5 |

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SHIPBOARD WEAPON
CONTROL RADARS

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| Tracking Scan | | Maximum Tracking Range | |
|-----------------------|--------------------|------------------------|----------------------------------|
| Type | Coverage (Degrees) | DD (yd) | F6F (yd) |
| Monopulse | 1.6 | - | 60,000 |
| - | - | - | - |
| - | - | - | - |
| Conical | - | - | 140,000 on beacon (Instrumented) |
| Linear Horizontal | 29 | 35,000 | - |
| Sinusoidal Horizontal | 11.5 | 40,000 | - |
| Sinusoidal Horizontal | 11.5 | 40,000 | - |
| Conical | 2.6 | Horizon | 50,000 |
| Conical | 2.6 | Horizon | 50,000 |
| Conical | 1.7 | - | 35,000 |
| Conical | 1.7 | - | 35,000 |
| Conical | 4.5 | - | 17,000 |

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SHIPBOARD WEAPON
CONTROL RADARS

| Resolution | | Tracking Accuracy | | |
|------------|-------------------|-----------------------|---------------------|---------------------|
| Range (yd) | Bearing (Degrees) | Range (yd) | Bearing (mil) | Elevation (mil) |
| 50 | - | ±15 ±0.025% R | ±0.2 rms | ±0.2 rms |
| - | - | ±15 ±0.025% R | - | - |
| - | - | - | - | - |
| - | - | 67 on ΔR at 10,000 | - | - |
| 120 | 1.0 | ±15 +0.1% R | ±2 | - |
| 100 | 0.5 | ±15 +0.1% R | ±3.62 reset ±1.5 | - |
| 100 | 15 mils | ±15 +0.1% R | ±3.62 reset ±1.5 | - |
| 80 | 1.3 | ±15 ±0.025% R | 0.5 (rms) | 0.5 rms above 1° |
| 80 | 1.3 | - | - | - |
| 80 | 1 | ±15 ±0.1% Range | ±0.5 (rms) | ±0.5 (rms) |
| 80 | 1 | ±15 ±0.1% Range | ±0.5 (rms) | ±0.5 (rms) |
| 200 | 3.0 | ±15 +0.1% R | ±2 reset | ±2 reset |

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SHIPBOARD WEAPON CONTROL RADARS

| Bearing | | Maximum Range (miles instrumented) | Minimum Range (yd) |
|--------------------------|-------------------------|---------------------------------------|-----------------------|
| Track Rate (deg/sec.) | Slew Rate (deg/sec.) | | |
| - | 36 | 100 | 500 |
| 5000 yards per sec. | | 57.5 | 2000 |
| - | - | - | - |
| 5 | 30 | 70 | 4000 |
| - | - | 30 | 250 |
| - | - | 30 | 200 |
| - | - | 40 | 350 |
| 16 | 30 | 50 | 300 |
| - | - | 50 | 300 |
| 16 | 25 | 50 | 300 |
| 16 | 25 | 50 | 500 |
| Manual | Manual | 18 | 350 |

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SHIPBOARD WEAPON
CONTROL RADARS

| Power Requirements | | | | Weight (lb) | | |
|--------------------|-------|-------------|---------|-------------|------------|-----------------------------------|
| Volts | Phase | Freq. (cps) | KVA | Topside | Lower Deck | Antenna |
| 115 | 3 | 60 | 30 | | | 35,000 total |
| 440 | 3 | 60 | 60 | | | |
| 115 | 3 | 60 | 1.2 | | | |
| 115 | DC | - | 2 kw | | | |
| 26.5 | DC | - | 0.3 kw | | | |
| 440 | 3 | 400 | 2 | | | |
| 115 | 1 | 60 | 600 VA | - | - | - |
| 115 | 1 | 60 | 500 VA | - | - | - |
| 440 | 3 | 60 | 4 Amps | 1060 | 2500 | - |
| 208 | 3 | 60 | 2 Amps | | | |
| 115 | 3 | 60 | 15 Amps | | | |
| 115 | 1 | 60 | 25 Amps | | | |
| 115 | 1 | 400 | 5 Amps | | | |
| 115 | - | DC | 3 Amps | | | |
| 440 | 60 | 3 | 5 Amps | 2800 | - | - |
| 115 | 60 | 3 | 70 Amps | | | |
| 115 | 3 | 400 | 2 Amps | | | |
| 115 | 1 | 400 | 7 Amps | | | |
| 115 | - | DC | 4 Amps | | | |
| 28 | - | DC | 2 Amps | | | |
| 115 | 1 | 60 | 2.2 | 3209 | 1229 | 2750 |
| 440 | 3 | 60 | 2.5 | | | |
| 440 | 1 | 60 | 2.4 | 1780 | 1229 | 1300 |
| 440 | 3 | 60 | 0.9 | | | |
| 115 | 1 | 60 | 3 | 1795 | 3070 | 1300 |
| 440 | 3 | 60 | 0.9 | | | |
| 115 | 1 | 60 | 3.5 | 2000 | 5000 | 625 (includes part of ant. mount) |
| 115 | 3 | 60 | 0.2 | | | |
| 115 | 1 | 60 | 3.5 | 1000 | 5500 | 175 (plus mount) |
| 115 | 3 | 60 | 0.2 | | | |
| 115 | 1 | 60 | 18 | 8000 | 11,000 | 5500 (including mount) |
| 440 | 3 | 60 | 5 | | | |
| 115 | 1 | 60 | 18 | 4000 | 6000 | 1500 |
| 440 | 3 | 60 | 5 | | | |
| 115 | 1 | 60 | 1.5 | 115 | 2200 | 115 |
| 440 | 3 | 60 | 1.7 | | | |

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SHIPBOARD WEAPON
CONTROL RADARS

| Number in Use or Tentative Available Date | Supplier | Source of Information | MODEL |
|--|---|-----------------------|-----------------------|
| 4 in use. 20 to 27 starting May 1957. | Sperry Gyroscope | BuOrd, Code ReS4-a | AN/SPQ-5 |
| 1 | Sperry Gyroscope | BuOrd, Code ReS4-b | AN/SPR-6 (XN-1) |
| 1 | Sperry Gyroscope | BuOrd, Code ReS4-b | AN/SPW-1 (XN-2) |
| XN-1: August 1956 Prod: April 1957 | Sperry Gyroscope | BuOrd, Code ReS4-b | AN/SPW-2 |
| 19 | Western Electric | BuOrd, Code ReS4-c | Mk 8 Mod 2 |
| 82 | Western Electric | BuOrd, Code ReS4-c | Mk 8 Mod 3 |
| 107 | Western Electric | BuOrd, Code ReS4-c | Mk 13 |
| 564 | Western Electric | BuOrd, Code ReS4-c | Mk 25 Mod 3 |
| 5 | Western Electric and Stavid Eng. | BuOrd, Code ReS4-c | Mk 25 Mod 5 |
| 5 | Western Electric and Reeves Instr. Co. | BuOrd, Code ReS4-a | Mk 25 Mod 7 |
| 1 | Western Electric and Reeves Instr. Co. | BuOrd, Code ReS4-a | Mk 25 Mod 8 |
| 684 (Includes equipment in reserve fleet in storage) | Western Electric | BuOrd, Code ReS4-c | Mk 34 Mod 2, 6, 16 |

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Section 5
Landbased Control Radars

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LANDBASED
CONTROL
RADARS

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| Pulse Rate (pps) | Maximum Range (Miles) | | Instrumented Range | |
|---------------------|----------------------------------|---------------------------------|--------------------|--------------|
| | Aircraft (20 m ²) | Aircraft (1 m ²) | Min. (yd) | Max. (mi) |
| 320-1707 | 320 | 150 | 40 | 200 |
| 350-850 570 | Horizon | 50 | 50 | 300 |
| 1000 | - | 20 | 500 | 40 |
| - | - | - | - | - |
| - | - | - | - | - |
| 1300 | - | - | 1000 | - |
| 1300 | - | - | 1000 | 55 |
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| Presentation | Reflector | | Beamwidth (Degrees) | |
|---------------------------------|-------------------------|-----------|-----------------------|------------|
| | Type | Size | Hor. | Vert. |
| 1 J-scope 1 A-scope 1 PPI | Circular Paraboloid | 12 ft | 1.25 | 1.25 |
| A-scope PPI | Paraboloid | 8 ft | 3 | 3 |
| 7-in. B-scope | Circular Parabola | 68.75-in. | 5 | 5 |
| - | - | - | - | - |
| - | - | - | - | - |
| - | - | - | - | - |
| - | Cylindrical Parabola | 4 x 6 ft | Surv: 1.1 Trk: 1.1 | 4.8 1.6 |
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LANDBASED
CONTROL
RADARS

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| Resolution | | Acquisition Scan | | | |
|-------------------------|-------|----------------------------|-----------------------|----------------|-------------------------|
| Bearing (Degrees) | Range | Type | Rate | Coverage (deg) | |
| | | | | Hor. | Vert. |
| 0.7 | 40 yd | Circular | - | 4 | 4 |
| | | Sector | - | - | - |
| | | Range | - | 1000 yd | - |
| 150 | 2.5 | Manual | 24 | - | - |
| 90 miles Az. and El. | - | Sector (Az) Manual (El) | 800 mils per 3 sec | 360 | +1540 mils -125 mils |
| - | - | - | - | - | - |
| - | - | - | - | - | - |
| - | - | - | - | 360 | - |
| - | - | - | - | 360 | - |
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LANDBASED
CONTROL
RADARS

| System Weight (lb) | No. in Use or Tent. Available Date | Supplier | Source of Information | MODEL |
|--------------------|------------------------------------|---------------------------------------|-----------------------|------------------|
| - | 2 in use, 25 more by March 1958 | RCA | NRL, Code 5343 | AN/FPS-16 (XN-2) |
| 64,000 (with vans) | 4 | Fairchild | NRL, Code 5364 | AN/MPQ-5 |
| - | 14 | Sperry Gyro, Mod. by Ultrasonic Corp. | BuAer, Code AV-3101 | AN/MPQ-10B |
| - | - | - | BuAer, Code AV-3101 | AN/MPQ-14A |
| - | - | Fairchild | BuShips, Code 828 | AN/MPQ-26 |
| - | 1 under construction | GE | BuShips, Code 825 | AN/MPQ-27 |
| 3600 | 20-50 in FY 1959 | GE | BuShips, Code 828 | AN/TPQ-10 () |
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**Section 6
Indicators**

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INDICATORS

| MODEL | Function | General Facts |
|--------------|---|--|
| AN/APA-88 | | See AN/APS-37 |
| AN/APA-91 | | See AN/APS-33B |
| AN/APA-125 | AEW-ASW Indicator | General purpose indicator for display and plotting. |
| AN/MSQ-3 | Ground AEW Terminal | Contains two AN/UPA-25, one AN/UPN-7, one AN/SSR-4. |
| AN/SPA-4 | Range-Azimuth Repeater | Lightweight, spraytight PPI repeater. For use in CIC, Captain's Pilot, and Open Bridge. |
| AN/SPA-4A | Range-Azimuth Repeater | Lightweight, spraytight PPI repeater. For use in CIC, Captain's Pilot, and Open Bridge. Differs from AN/SPA-4 in ranges. |
| AN/SPA-7 | Range-Height Indicator | RHI for height data from stacked-beam and pencil-beam systems. |
| AN/SPA-8 | Azimuth-Range Repeater | For use with wide variety of radars and with AN/SPA-9 in AEW system. |
| AN/SPA-8A-8B | Azimuth-Range Indicator | General purpose remote indicator. Off-center cursor. Ship-centered AEW presentation. AN/SPA-8B has changes only in minor construction details. |
| AN/SPA-9 | Azimuth-Range Repeater | For use with a wide variety of radars and with AN/SPA-8 in AEW system. |
| AN/SPA-18 | Remote PPI | Indicator for locations where weight and space are problems. |
| AN/SPA-22 | Intercept Tracking Control | Aided tracker for intercept control aboard ship. Eight-channel control system. VL-1 plus 2 AN/SPA-8A displays. |
| AN/SPA-23 | Large Direct View Plotting PPI Repeater | For use as surface or air summary plot. |
| AN/SPA-24 | Large Projected PPI | Projected plot for air or surface summary, using Schmidt optics. Modification of a Dutch system. |
| AN/SPA-25 | Remote PPI | Transistorized, lightweight. |

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| Security Classification | Presentation | Pulse Rate (pps) |
|-------------------------|-----------------------------------|------------------|
| - | - | - |
| - | - | - |
| C | 10-in. PPI | 300-1000 |
| C | - | - |
| U | 10-in. PPI | 57-3000 |
| U | 10-in. PPI | 57-3000 |
| U | 10-in. RHI | 57-3000 |
| U | 10-in. PPI (10KP7) | 60-2000 |
| U | 10-in. PPI | 60-3000 |
| U | 10-in. PPI (10KP7) | 60-2000 |
| U | 7-in. flatface PPI | 60-300 |
| C | VL-1 and 2 AN/SPA-8A | 60-3000 |
| U | 22-in. flatface PPI | 60-3000 |
| C | 2-in. CRT projected to 20-in. PPI | 60-500 |
| C | 10-in. PPI | 57-3000 |

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| Range (miles) | Elevation Scan (Degrees) | Max. Height (feet) |
|---|--------------------------|--------------------|
| - | - | - |
| - | - | - |
| 10, 20, 50, 150, 250 | No | None |
| - | - | - |
| 1-5, 4-20, 10-50, and 40-200 "Rubber" | No | None |
| 1-300, continuously variable | No | None |
| 20-300, continuously variable | - | 90,000 |
| 4-250, continuously variable | No | None |
| 4-300, continuously variable | No | None |
| 4-250, continuously variable | No | None |
| 2-300, continuously variable | No | None |
| 20-200, continuously variable 4-300, continuously variable | -2 to 88 | 100,000 |
| 4, 10, 20, 40, 80, 200, 300 | No | None |
| 60, 90, 120, 180 | No | None |
| 4-300, continuously variable | No | None |

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| Input Data | Output Data |
|---|---|
| - | - |
| - | - |
| 1 speed bearing, standard video and trigger, remote strobe. | None |
| - | - |
| 1 and 36 speed synchro, standard video and trigger. | 1 and 36 speed bearing. 2,000, 72,000, and 1,296,000 yd range |
| 1 and 36 speed synchro, standard video and trigger. | 1 and 36 speed bearing. 2,000, 72,000, and 1,296,000 yd range |
| Pencil beam: bearing synchro sin-cos reference, video trigger. Stacked beam: bearing synchro sector from PPI, height video, video, trigger. | Height data transmission from 1G synchro at 90,000 ft per revolution |
| 1 speed bearing, AEW synchro, DRA synchro. Standard video and trigger. | 1 speed synchro bearing, 72,000 and 1,296,000 yd range. |
| 1 speed bearing, AEW synchro, DRA synchro. Standard video and trigger. | 1 speed synchro bearing, 72,000, and 1,296,000 yd range, AEW synchro |
| 1 speed bearing, standard video and trigger. | 1 speed synchro bearing, 72,000 and 1,296,000 yd range, AEW synchro |
| 1 speed bearing from radar; standard video and trigger. | None |
| Raw radar plus designation from AN/SPA-26. | Analog outputs for conversion to digital data link and strobes for operator |
| 1 speed bearing plus standard video and trigger. | None |
| 1 speed bearing and 1 speed range from standard Navy shipboard radars. | None |
| 1 speed bearing, standard video and trigger. | None |

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| Power Source | | | | Size (H x W x D, inches) | Total System Weight (lb) |
|------------------|--------------|------------------|--------------------|--|-----------------------------------|
| Volts | Phase | Freq. | KVA | | |
| - | - | - | - | - | - |
| - | - | - | - | - | - |
| 28 115 115 | DC 1 3 | DC 400 400 | 0.3 0.15 1.0 | 19 x 12.5 x 24.5 15 x 11.8 x 24 (power) | 150 |
| - | 3 | 60 | 20 | - | - |
| 115 | 1 | 60 | 1.2 | 38 x 18 x 19.75 | 330 |
| 115 | 1 | 60 | 1.2 | 38 x 18 x 19.75 | 360 |
| 115 | 1 | 60 | - | 38 x 22 x 20 | 350 |
| 115 | 1 | 60 | 1.95 | 38 x 25.5 x 24 | 846 |
| 115 | 1 | 60 | 1.95 | 38 x 21 x 20 | 888 |
| 115 | 1 | 60 | 1.95 | 38 x 25.5 x 24 | 846 |
| 115 | 1 | 60 | 0.65 | Indicator: 14.75 x 13.13 x 37.75 Other: 30.75 x 19.25 x 18.87 | 107 and 198 |
| 115 | 1 | 60 | 3 | 32 x 21 x 18 +76 x 21 x 20 | 800 |
| 115 | 1 | 60 | 1.2 | 50.25 x 37.5 x 33.5 | 787 |
| 115 | 1 | 60 | 0.7 | 28 x 32 x 51.5 18 x 24 x 24.75 (Power) | 397 |
| 115 | 1 | 60 | - | 17 x 19 x 27 | 150 |

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INDICATORS

| Supplier | Number in Use or Tentative Available Date | Information Source | MODEL |
|--|---|-------------------------|------------------|
| - | - | - | AN/APA-88 |
| - | - | - | AN/APA-91 |
| Hazeltine | XN-1: 2 Production: 10 in May 1957 | BuAer, Code AV-33221 | AN/APA-125 |
| Hazeltine | - | BuShips, Code 827 | AN/MSQ-3 |
| GE | - | BuShips, Code 824 | AN/SPA-4 |
| RCA | - | BuShips, Code 824 | AN/SPA-4A |
| GE | 22 | BuShips, Code 824 | AN/SPA-7 |
| Hazeltine | 100 (approx.) | BuShips, Code 824 | AN/SPA-8 |
| 8A: Hazeltine 8B: Crosley | 1405 under construction | BuShips, Code 824 | AN/SPA-8A -8B |
| Hazeltine | 100 (approx.) | BuShips, Code 824 | AN/SPA-9 |
| Austin Co. | 330 | BuShips, Code 824 | AN/SPA-18 |
| Cornell Aero. Labs | More than 20 by 1959 | BuShips, Code 824 | AN/SPA-22 |
| Stromberg Carlson | 3 (test) | BuShips, Code 824 | AN/SPA-23 |
| Phillips Eindhoven (Indicator SGM116) | 2 | BuShips, Code 824 | AN/SPA-24 |
| Westinghouse | 2 in 1957 | BuShips, Code 824 | AN/SPA-25 |

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INDICATORS

| MODEL | Function | General Facts |
|------------|-------------------------|---|
| AN/SPA-26 | Data Processing | Uses several AN/SPA-8A and several VL-1 in various combinations. Input and storage facilities for position, velocity, height, size, identity, and track number of 24 targets. |
| AN/SPA-29 | Evaluation Display | Completely synthetic display for threat evaluation computer. For use with AN/SPA-26 and AN/SPA-22. |
| AN/UPA-25 | Azimuth Range Indicator | Repackaged AN/SPA-8A for Marine Corps. Counter-type height repeater and four video mixers added. |
| CXSA | - | AN/SPA-9 modified to use two-color cathode-ray tube ("Chromatron"). |
| IP-199 | Remote PPI | AN/SPA-4A modified to use electrostatic display tube ("Deflectron"). |
| VG-2/VG-3 | Projection Repeater | 10- to 20-mile sector of overall range may be expanded to fill entire scope. |
| VH | Repeater | Lightweight, bulkhead mounted PPI for exposed installations. Used with any standard search radars. |
| VHa | Repeater | Remote PPI for use with search radars capable of transmitting 400-cycle PPI information. |
| VJ/VJa | Repeater | Electronic cursor, independent instantaneous ranging strobe. VJa is 400-cycle modification. |
| VK/VK-2 | Repeater | Deck mounted. Provision for manual off-centering. Accepts tracking from DRA or AEW. VK-2 is mechanically redesigned VK. |
| VK-3 | Repeater | Electronic cursor and automatic off-centering. Separate power supply. |
| VK-4a/VK-5 | Repeater | Shore, ship, or submarine use as repeater with standard, off-center, or expanded off-center PPI. Wandering cursor and rubber range added. |
| VL | Remote RHI Repeater | 5:1 vertical expansion. |
| VL-1 | RHI Repeater | Repeater for any standard shipboard radar supplying range-height indication. |
| | | |

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INDICATORS

| Security Classification | Presentation | Pulse Rate (pps) |
|-------------------------|--------------------------------|-----------------------------|
| C | AN/SPA-8A and VL-1 | AN/SPA-8A and VL-1 |
| C | 12-in. synthetic | - |
| U | 10-in. PPI plus counter | 60-3000 |
| U | 10-in. rectangular Chromatron | 60-2000 |
| C | 12-in. Deflectron | 140-3000 |
| U | Projects onto DRT | 60-85 60-325 60-1050 |
| U | 5-in. PPI | 57-300 57-820 57-1000 |
| U | 5-in. PPI | 57-300 57-820 57-1000 |
| U | 12-in. PPI Added delay unit | 57-1000 |
| U | 12-in. delayed off-center PPI | 57-3000 |
| U | 10-in. | 57-3000 |
| U | 10-in. flatface PPI (10KP7) | 57-3000 |
| U | 12-in. delayed 0-180 mile | 60-3000 |
| U | 12-in. (12DP7) | 60-3000 |
| | | |

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| Range (miles) | Elevation Scan (degrees) | Max. Height (feet) |
|--------------------------------------|--------------------------|--------------------|
| Same as AN/SPA-8A and VL-1 | -2 to +88 | 100,000 |
| 500 | - | - |
| 4-300, continuously variable | No | - |
| 4-250, continuously variable | No | None |
| 2-300, continuously variable | No | None |
| 4, 10, 20, 80, 200 | No | None |
| 2, 4, 10, 20, 80, 200 | - | - |
| 2, 4, 10, 20, 80, 200 (fixed scales) | No | None |
| 2, 4, 10, 20, 80, 200 | No | None |
| 4, 10, 20, 40, 80, 200 | - | - |
| 4-200, continuously variable | - | - |
| 4-300, continuously variable | - | - |
| 20, 40, 80, 200 | -2 to +88 | 100,000 |
| 20-200, continuously variable | -2 to +88 | 100,000 |
| | | |

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| Input Data | Output Data |
|---|--|
| Raw radar plus teletype data link. | See "General Facts" |
| Output from AN/SPA-22 and AN/SPA-26. | Data on evaluated targets |
| Same as AN/SPA-8A plus height. | Same as AN/SPA-8A |
| Two simultaneous video inputs, each similar to AN/SPA-9. | Similar to SPA-9 for only one CSXA's two inputs. |
| 1 speed bearing, standard video and trigger. | 1 speed synchro bearing 2,000 and 72,000 yd or 72,000 and 1,296,000 yd range at installer's discretion |
| Trigger: 5-40 V peak. Video: 3 V peak max. OSC plus radar bearing, S ₁ , S ₂ , S ₃ , R ₁ , R ₂ . | None |
| Standard video and trigger, 1 speed radar bearing. | - |
| Standard video and trigger, 1 speed synchro bearing. Relative bearing warning light. | None |
| 5-40V trigger; 3V peak video; 1 speed synchro bearing and relative bearing. | Range: (5G) 2000 yd and (5G) 72,000 yd, 1 speed bearing (5G) |
| Standard inputs on VK. VK-2 inputs same as VK-3. | 1 speed true bearing and range |
| SP bearing, trigger, and video. IFF trigger and video. AEW DRA off-center. | Radar selector, remote range, on-target buzzer, remote bearing, range marker |
| Trigger, video, plus 1 and 26 speed bearing. | Range marker bearing cursor |
| Range and height from SX or modified SP. | Angle line elevation and angle line buzzer |
| Video, trigger, 1 speed bearing, sin and cos reference from radar. Range line and sector selection from PPI. | Elevation angle from synchro |
| | |

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INDICATORS

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| Power Source | | | | Size (H x W x D, Inches) | Total System Weight (lb) |
|--------------|-------|-------|------------------------------|---|-----------------------------------|
| Volts | Phase | Freq. | KVA | | |
| 115 | 1 | 60 | Approx. 5 + indicators | - | 3000 plus indicators |
| 115 | 1 | 60 | - | Similar to AN/SPA-8 | - |
| - | - | - | - | 42 x 30 x 40 | 800 |
| 115 | 1 | 60 | 1.95 | 28 x 25.5 x 24 | - |
| 115 | 1 | 60 | Approx. 1 | 38 x 19.75 x 19.75 | 300 |
| 115 | 1 | 60 | 1.765 1.5 | 35 x 32 x 59 38 x 42 x 89 | 1280 2650 |
| 115 | 1 | 60 | 0.45 | 20 x 8 x 10 | 437 |
| 115 | 1 | 60 | 4.31 amps | 11.5 x 8.25 x 22.5 37 x 19.5 x 14.6 13.6 x 9.75 x 8.5 | 457 |
| 115 | 1 | 60 | 0.66 | 32 x 20 x 21.5 | 815 |
| 115 | 1 | 60 | VK:1.84 1.69 VK-2:0.08 | VK:37.5 x 18.3 x 16.6 VK-2: 17 x 19 x 32 12 x 20 x 24 | VK: 450 VK-2: 400 |
| 115 | 1 | 60 | - | 40 x 18 x 24 | 445 |
| 115 | 1 | 60 | - | 40 x 18 x 22 | - |
| 115 | 1 | 60 | - | 32 x 17 x 19 | 400 |
| 115 | 1 | 60 | - | 32 x 17 x 19 | - |
| | | | | | |

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| Supplier | Number in Use or Tentative Available Date | Information Source | MODEL |
|----------------------------------|---|--------------------|------------|
| Motorola | 1 in use, 20 in 1957 | BuShips, Code 824 | AN/SPA-26 |
| Motorola | 2 in 1958 | BuShips, Code 824 | AN/SPA-29 |
| - | - | BuShips, Code 828 | AN/UPA-25 |
| Chromatic Television Labs., Inc. | 1 under test | BuShips, Code 824 | CXSA |
| Motorola | 4 in 1957 | BuShips, Code 824 | IP-199 |
| GE | - | BuShips, Code 824 | VG-2/VG-3 |
| Raytheon | 100 | BuShips, Code 824 | VH |
| Raytheon | 1 | BuShips, Code 824 | VHa |
| Raytheon | VJ: 600 VJa: 4 | BuShips, Code 824 | VJ/VJa |
| GE | 150 150 | BuShips, Code 824 | VK/VK-2 |
| GE | 136 | BuShips, Code 824 | VK-3 |
| Westinghouse | VK-4: 475 VK-5: 485 | BuShips, Code 824 | VK-4a/VK-5 |
| GE | 36 | BuShips, Code 824 | VL |
| GE | 400 contracted | BuShips, Code 824 | VL-1 |
| | | | |

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Section 7

Target Designation and Weapon Direction Systems

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Section 1

Target Designation and Weapon Direction Systems

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SECTION 7

TARGET DESIGNATION AND WEAPON DIRECTION SYSTEMS

In order to distinguish between the many variations in target designation systems, four types have been established. These are based on the functional and operational characteristics of the systems and not on the particular technique used to attain these characteristics. Definitions of the four basic types are:

Type A - Types of systems synthesized from a variety of equipments such as standard PPI's, Target Designation Transmitters Mk 11, PD panels and dial indicators. These systems may be found in all classes of ships. The Target Designation System Mark 1 is included.

Type B - Integrated manual systems utilizing three-coordinate search radar information and manual or aided tracking of targets. Switching between designation channels and directors is provided. These systems are suitable for ships with weapon batteries not sufficiently complex to warrant the use of automatic evaluation equipment.

Type C - These systems, for use in larger ships, are essentially automatic in operation and utilize data from either two- or three-coordinate search radars. Automatic track-while-scan channels with automatic evaluation and assignment of targets to directors are employed. When the associated gun or guided missile installation warrants the complexity, automatic switching of guns (or guided missile launchers) to directors will be provided.

Type D - Integrated manual systems utilizing two-coordinate search radar information and manual or aided tracking of targets. Switching of target designation channels to directors may be provided in cases where the weapon installation warrants the resultant complexity. These systems are for use in ships where either the limited size of the weapon installation or space and weight considerations preclude the installation of more automatic equipment. Type D systems are suitable for use in modernizing various classes of existing ships in which weight and space limitations are critical.

The need for high-speed liaison and coordination between ship's target designation system and gun/missile fire control system has led to the development of Weapon Direction Systems (WDS). These systems utilize data from search radars and other sources which is processed in a "Designation Equipment" or "Weapon Direction Equipment." Director and weapon status are displayed, and assignments of directors and weapons are made after raids are evaluated and priority determined. Automatic and semi-automatic methods are used throughout the system wherever practical in order to conserve time.

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TARGET DESIGNATION
AND WEAPON
DIRECTION SYSTEMS

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| MODEL | General Facts |
|-------------------|---|
| TDS Mk 1 | Manual tracking system using standard radar FPis or optical target designators (TDTs) to control target designations to one or more fire control systems. The fire control systems are selected by manual or automatic switches from the target designation station. |
| TDS Mk 3 | Target is placed in system manually from radar or optical stations. Track-while-scan channels provide information for assigning targets and guns to directors in automatic or manual modes. Accurate elevation on RH indicator. |
| TDS Mk 4 | Lightweight two-coordinate system designed for use in auxiliary and destroyer type vessels. Threat evaluation, tracking and assignment are performed manually. Search radar information is converted into a television PPI type presentation. Electronic symbols representing the X and Y position of four designation joysticks and four gun directors are included in the display information. |
| TDS Mk 5 | Lightweight destroyer and auxiliaries TDS. Two-coordinate display utilizing time-sharing techniques for introducing designation and repeat-back symbols by electronic means. |
| TDS Mk 6 | Manual system using two-coordinate radar information for developing target designations for transmission to as many as four separate gun fire control systems. The techniques used in this system are similar to those in TDS Mk 4. Electronic symbols display range and train information in X and Y coordinates for 8 gun directors. Arbitrary elevation is included in the designation quantities based on position angle information relayed from CIC via electronic plotter links. Optical target designations and rapid interdirector designations are made possible by the remote control of an automatic fire control switchboard from control panels in the Air Defense and Target Designation Stations. |
| WDS Mk 1 MOD 0 | Includes Designation Equipments Mk 4 and Mk 7. DE Mk 7 in primary WCS uses 16 auto-track-while-scan-three-coordinate gun and guided missile target channels, 2 manual long-range GM target channels with PPI and RH indicators. Manual evaluation and assignment of targets to GM directors. Automatic evaluation and assignment of targets to gun directors. Designation Equipment Mk 4 is intended as an auxiliary equipment paralleling the functions of DE Mk 7 except for the automatic features. |

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| Type | Security Classification | Performance |
|------|-------------------------|--|
| A | U | Range display (max) 200 miles designation range to maximum of gun fire control system receivers. |
| C | C | Range display (max) 30 miles designation range (max) 60,000 yards. |
| D | C | Range display (max) 240 miles designation range (max) 60,000 yards. |
| D | C | Range display (max) 240 miles designation range (max) 60,000 yards. |
| D | C | Range display (max) 240 miles designation range (max) 60,000 yards. |
| | C | Tracking range 120,000 yards. |

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TARGET DESIGNATION
AND WEAPON
DIRECTION SYSTEMS

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Input Data

1. Search radar video and trigger to standard PPI. 2. Antenna bearing and relative bearing. 3. Own ship course. 4. Director repeat-back synchro signals. 5. TDT bearing and elevation.

1. Search radar video and trigger. 2. Antenna bearing and relative bearing warning. 3. Sin E, cos E, blanking. 4. Own ship course. 5. Director repeat-back signals of train range and elevation and director status information. 6. Gun orders and status for evaluation and assignment of gun mounts to directors. 7. From optical stations, target bearing and elevation estimated range.

1. Search radar video and trigger. 2. Antenna bearing and relative bearing warning. 3. Optical input bearing, elevation, estimated range. 4. Own ship course. 5. Director repeat-back signals (synchro) of train, range, and director status.

1. Search radar video and trigger. 2. Antenna bearing and relative bearing warning. 3. Optical input bearing, elevation, estimated range. 4. Own ship course. 5. Director repeat-back signals (synchro) of train, range, and director status.

1. Search radar video and trigger. 2. Antenna bearing (1X synchro) ship's heading (1X synchro). 3. Optical target information train elevation estimated range. 4. Director train from four directors (1X synchro).

1. Search radar video and trigger. 2. Antenna bearing and relative bearing warning. 3. Optical input, guns only, target bearing, elevation and estimated range. 4. Elevation blanking signal. 5. Own ship course. 6. Gun and GM director repeat-back of train, range, elevation, and status. 7. Missile-in-flight indication. 8. Launcher repeat-back of train elevation and status. 9. Missile status.

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TARGET DESIGNATION
AND WEAPON
DIRECTION SYSTEMS

| Output Data | Ship Class | Used With |
|---|--|---|
| Target coordinates: bearing and elevation (synchro). | DDE CV DL | Director Mk 37 GFCS Mk 56 Mk 63 |
| Target coordinates: bearing, range, and elevation (synchro). | CLG | GFCS Mk 56 Mk 67 |
| Target coordinates: bearing, range, and elevation (synchro). Elevation data is estimated. | CAG DD931 CVS AGC | GFCS Mk 37, Mk 56, Mk 63 Terrier Missile |
| Same as for Mk 4. Employs 4 joysticks, permitting 4 operators to designate to 4 directors simultaneously. | DD445 DD692 DDE764 DD937 DDR LSD AO AGC | Director Mk 37 GFCS Mk 56 Mk 63 |
| Same as for Mk 4. Employs 4 joysticks, permitting 4 operators to designate to 4 directors simultaneously. | CA CL CAV BB BB | GFCS Mk 37 Mk 56 |
| <ol style="list-style-type: none"> 1. Target coordinate: bearing, range, and elevation (X, Y, E, voltages) 2. Launching and loading operation orders. 3. Warmup orders 4. Salvo numbers 5. Missile firing orders 6. Recommended course to steer | CAG | Director Mk 37 GMFCS Mk 71 GFCS Mk 56 (Terrier) |

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TARGET DESIGNATION
AND WEAPON
IDENTIFICATION NUMBER

DATE



| Designation | Weapon | Description |
|--------------|--------|--|
| XXXXXX 01 01 | 001 | Target designation, bearing and elevation |
| XXXXXX 02 01 | 002 | Target designation, bearing, range and elevation |
| XXXXXX 03 01 | 003 | Target designation, bearing, range and elevation |
| XXXXXX 04 01 | 004 | Target designation, bearing, range and elevation |
| XXXXXX 05 01 | 005 | Target designation, bearing, range and elevation |
| XXXXXX 06 01 | 006 | Target designation, bearing, range and elevation |
| XXXXXX 07 01 | 007 | Target designation, bearing, range and elevation |
| XXXXXX 08 01 | 008 | Target designation, bearing, range and elevation |
| XXXXXX 09 01 | 009 | Target designation, bearing, range and elevation |
| XXXXXX 10 01 | 010 | Target designation, bearing, range and elevation |



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TARGET DESIGNATION
AND WEAPON
DIRECTION SYSTEMS

| Power Supply | | | | Supplier | Source of Information | MODEL |
|-------------------|-------------|-----------------|-------------------|------------|-----------------------|-------------------|
| Volts | Phase | Freq. | KVA | | | |
| 115 | 3 | 60 | 3-4 | Yard | BuOrd, Code ReS4-a | TDS Mk 1 |
| 440 115 | 3 3 | 400 60 | 28 KW 9 KW | BTL | BuOrd, Code ReS4-b | TDS Mk 3 |
| 115 115 | 1 3 | 60 60 | 5.6 1.8 | RCA | BuOrd, Code ReS4-a | TDS Mk 4 |
| 115 115 440 | 1 3 3 | 60 60 60 | 1.36 2 1 | Raytheon | BuOrd, Code ReS4-a | TDS Mk 5 |
| 440 115 115 | 3 3 1 | 60 60 60 | 1.5 2.2 9.0 | RCA | BuOrd, Code ReS4-a | TDS Mk 6 |
| 440 115 115 | 3 3 1 | 400 60 60 | 50 10 18 | RCA BTL | BuOrd, Code ReS4-a | WDS Mk 1 MOD 0 |

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TARGET DESIGNATION
AND WEAPON
DIRECTION SYSTEMS

| MODEL | General Facts |
|-------------------|--|
| WDS Mk 2 MOD 0 | Includes Designation Equipment Mk 8 Mod 0, Coordinate Converter Mk 26 Mod 2, Stabilization Computer Mk 117 Mod 0, and miscellaneous signaling and indicating devices. Designation Equipment Mk 8 utilizes the basic equipment of TDS Mk 6 with added control console equipment to suit the requirements for a designation system for Talos guided missile control equipment. |
| WDS Mk 3 MOD 0 | Includes DE Mk 9 and optical Transmitters Mk 24. DE Mk 9 uses 6 manual rate aided channels for designation to gun and GM Directors. Manual evaluation and assignment of targets to gun and GM Directors. |
| WDS Mk 3 MOD 1 | Same as Mark 3 Mod 0 |
| WDS Mk 4 MOD 0 | Substitutes WDE Mk 1 for DE Mk 9. Has auto-launcher assignment and firing. |
| | |
| | |
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| Type | Security Classification | Performance |
|------|-------------------------|---|
| | C | Display 240,000 yards |
| | C | 120,000-yd display Designation to 120,000 yd |
| | C | 120,000-yd display Designation to 120,000 yd |
| | C | 120,000-yd display Designation to 120,000 yd |
| | | |
| | | |
| | | |
| | | |
| | | |

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Input Data

1. Search radar video and trigger. 2. Antenna bearing and true bearing indication. 3. Own ship course. 4. Director repeat-back of train range, elevation, status. 5. Missile-in-flight indication.

6. Launch repeat-back train elevation, status. 7. Missile status. 8. Target height.

1. Search radar video and trigger. 2. Antenna bearing and true bearing indication. 3. Own ship course. 4. Target height. 5. Director repeat-back of train, range, elevation status. 6. Missile status. 7. Launcher repeat-back train elevation status. 8. Input from TDT range bearing elevation. 9. Supplies information for firing guns at air target.

1. Search radar video and trigger. 2. Antenna bearing and true bearing indication. 3. Own ship course. 4. Target height. 5. Director repeat-back of train, range, elevation status. 6. Missile status. 7. Launcher repeat-back train elevation status. 8. Input from TDT range bearing elevation. 9. Supplies information for firing guns at air target.

1. Search radar video and trigger. 2. Antenna bearing and true bearing indication. 3. Own ship course. 4. Target height. 5. Director repeat-back of train, range, elevation status. 6. Missile status. 7. Launcher repeat-back train elevation status. 8. Input from TDT range bearing elevation. 9. Supplies information for firing guns at air target.

| Output Data | Ship Class | Used With |
|--|------------|---|
| <ol style="list-style-type: none"> 1. Target coordinates: bearing, range, and elevation (synchro) 2. Launcher orders 3. Recommended course to steer | CLG 93 | (Talos) |
| <ol style="list-style-type: none"> 1. Bearing and range in X, Y coordinates, elevation in synchro signals 2. Launcher load and warmup orders 3. Firing order 4. Recommended course to steer | DLG | (Terrier) GMFCS Mk 73 Mod 0 |
| <ol style="list-style-type: none"> 1. Bearing and range in X, Y coordinates, elevation in synchro signals 2. Launcher load and warmup orders 3. Firing order 4. Recommended course to steer | CLG | (Terrier) GMFCS Mk 73 Mod 1 |
| <ol style="list-style-type: none"> 1. Bearing and range in X, Y coordinates, elevation in synchro signals 2. Director assignment 3. Launcher assignment 4. Launcher load orders 5. Firing order 6. Recommended course to steer | DDG 952 | Gun and guided missile FCS Mk 74 (Tartar) |
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DECLASSIFIED

TARGET DESIGNATION
AIR WARFARE
DIRECTION SYSTEMS



| Input Data | Map Class | Output Data |
|------------------------------------|-----------|---|
| (Target) | OTC 34 | <ol style="list-style-type: none"> 1. Target coordinates bearing range and elevation (azimuth) 2. Launching order 3. Recommended course to steer |
| (Target) ELECTRIC AIR TO WAR | OTC | <ol style="list-style-type: none"> 1. Bearing and range in X-Y coordinates 2. Elevation in azimuth signals 3. Launching load and carrying orders 4. Launch order 5. Recommended course to steer |
| (Target) ELECTRIC AIR TO WAR | OTC | <ol style="list-style-type: none"> 1. Bearing and range in X-Y coordinates 2. Elevation in azimuth signals 3. Launching load and carrying orders 4. Launch order 5. Recommended course to steer |
| (Target) ELECTRIC AIR TO WAR | OTC | <ol style="list-style-type: none"> 1. Bearing and range in X-Y coordinates 2. Elevation in azimuth signals 3. Launching load and carrying orders 4. Launching order 5. Recommended course to steer |

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TARGET DESIGNATION AND WEAPON DIRECTION SYSTEMS

| Power Supply | | | | Supplier | Source of Information | MODEL |
|--------------|-------|-------|-----|----------|-----------------------|-------------------|
| Volts | Phase | Freq. | KVA | | | |
| 440 | 3 | 60 | 1.5 | RCA | BuOrd, Code ReS4-b | WDS Mk 2 MOD 0 |
| 115 | 3 | 60 | 2.0 | | | |
| 115 | 1 | 60 | 9.0 | | | |
| 115 | 1 | 400 | 1.4 | BTL | BuOrd, Code ReS4-a | WDS Mk 3 MOD 0 |
| 28 | 1 | AC | 0.6 | | | |
| 28 | | DC | 1.5 | | | |
| 440 | 3 | 400 | 20 | BTL | BuOrd, Code ReS4-a | WDS Mk 3 MOD 1 |
| 115 | 3 | 60 | 5 | | | |
| 115 | 1 | 400 | 3 | | | |
| 115 | 1 | 60 | 3 | | | |
| 440 | 3 | 400 | 20 | BTL | BuOrd, Code ReS4-a | WDS Mk 4 MOD 0 |
| 115 | 3 | 60 | 5 | | | |
| 115 | 1 | 60 | 3 | | | |
| 115 | 1 | 400 | 3 | | | |
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Section 8

Altimeters

SECRET

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ALTIMETERS

SECRET

| Antenna Pattern (Degrees) | Antenna | Weight (lb) |
|------------------------------|--------------------|----------------|
| 100 x 60 | Dipole or Slotted | 35 |
| - | Flush Mounted Horn | 31.5 |
| - | - | - |
| | | |
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SECRET

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| MODEL | General Facts |
|---------------------------|--|
| 15-4-2 | Trainer to instruct aircraft tail turret gunner in radar tracking and firing techniques. |
| 15-4-3 | Trains fire control team and CIC crew to detect air targets. |
| 15-AM-1-a | Height-finding attachment to 15-1-1-c to allow operation with APS-42 (incomplete system without 15-1-1-c). |
| XIS-0-8 | Standardize the procedure phase of GCA. |
| 15-1-1-c Type I,II,III | Multi-target generator presents targets on PPI (no aircraft). |
| 15-1-1-c Type V | Permits field modification to include aircraft target signals (incomplete without 15-1-1-c). |
| 15-1-1-c Type VI | Permits field modification to include aircraft target signals (incomplete without 15-1-1-c). |
| 15-1-1-d | Moving radar target generator for CIC and limited search radar trainer. Not currently listed by NTDC. |
| 15-1-1-e | Simulates surface and aircraft target signals fed to shipboard radars. |
| 15-1-1-f | Simulates targets for AEW aircraft radar equipment (uses 15-1-1-c system). |
| 15-1-1-m | Simulates targets for AEW aircraft radar equipment (uses 15-1-1-c system). |
| 15-1-1-l | Generates and displays radar targets on self-contained scope. |
| 15-1-1-k | Generates radar targets for standard PPI and elevation scanning search radars. |
| 15-V-8 | All-weather airborne intercept radar trainer. |
| 15-W-11 | Activates all indicators in the GCA room. |

Section 9

Trainers

DECLASSIFIED

TRAINERS

| MODEL | General Facts |
|---------------------------|--|
| 3A-49 | Trainer to instruct aircraft tail turret gunner in radar tracking and firing techniques. |
| 3D-32 | Trains fire control team and CIC crew to detect air targets. |
| 15-AM-1-a | Height-finding attachment to 15-J-1-c to allow operation with APS-45 (incomplete system without 15-J-1-c). |
| X15-G-8 | Simulates the precision phase of GCA. |
| 15-J-1-c Type I,II,III | Multi-target generator presents targets on PPI (no aircraft). |
| 15-J-1-c Type V | Permits field modification to include aircraft target signals (incomplete without 15-J-1-c). |
| 15-J-1-c Type VI | Permits field modification to include aircraft target signals (incomplete without 15-J-1-c). |
| 15-J-1-d | Moving radar targets generator for CIC and limited search radar trainer. Not currently listed by NTDC. |
| 15-J-1-e | Simulates surface and aircraft target signals fed to shipboard radars. |
| 15-J-1-l | Simulates targets for AEW aircraft radar equipment (uses 15-J-1-c system). |
| 15-J-1-m | Simulates targets for AEW aircraft radar equipment (uses 15-J-1-c system). |
| 15-J-1-t | Generates and displays radar targets on self-contained scope. |
| 15-J-4-k | Generates radar targets for standard PPI and elevation scanning search radars. |
| 15-V-6 | All-weather airborne intercept radar trainer. |
| 15-W-15 | Activates all indicators in the CCA room. |

DECLASSIFIED

| Function | Sec. Classification | Number of Operators That are Trained |
|---|---------------------|--------------------------------------|
| Aero 21 B Operator Aircraft Turret System Trainer | C | 1 |
| Anti-Aircraft Gunnery Team Trainer | C | CIC and fire control teams |
| Height Finder Simulator for AEW/CIC Crew Team Trainer | C | AEW Crew CIC Crew |
| Primary Ground Control Trainer | U | 6 |
| Search Radar Trainer | U | Unlimited |
| Height-Finder Attachment to 15-J-1-c | U | Unlimited |
| Height-Finder Attachment to 15-J-1-c | U | Unlimited |
| | | |
| Shipboard Radar Targets Generator | U | - |
| Mobile AEW Trainer | U | CIC Crew |
| Trailerized AEW Crew Trainer | U | CIC Crew |
| Radar Trainer | U | Unlimited |
| Multi-Target Radar Simulator | U | Unlimited |
| All-Weather Fighter Radar Simulator for OFT's | C | 1 |
| CCA Controller Trainer | C | CCA Crew |

DECLASSIFIED

TRAINERS

| Maneuvering Simulator | | | | |
|---|-----------------------------|------------------------|-----------------------------|---------------------------------|
| Target | | Own Ship | | Max. Vert. Speed (ft/min) |
| Turn Rate (deg/sec) | Speed (knots) | Turn Rate (deg/sec) | Speed (knots) | |
| 0-30 | 400-800 | - | 300-600 | 0-60,000 climb and dive |
| Same as 15-J-1-c | | None | | 0-66,000 climb and dive |
| - | | - | | Manual |
| 0-12 | 0-250 | - | | 0-1000 |
| 0-0.5 0-10 0-20 | 5-30 100-600 200-1200 | 0-0.5 0-10 0-20 | 5-30 100-600 200-1200 | None |
| - | | - | | 100-50,000 |
| - | | - | | 100-50,000 |
| 0-10 | 0-1200 | 0-10 | 0-1200 | 500 |
| Same as 15-J-1-c | | Same as 15-J-1-c | | None |
| Same as 15-J-1-c | | Same as 15-J-1-c | | None |
| Manual or 15-J-1-c type course generator | | - | | None |
| Manual or 15-J-1-c type course generator | | - | | Manual |
| 0-15 | 0-Mach 1.4 | - | | 0-35,000 climb 0-90,000 dive |
| 0-6 | 0-300 | 5-30 | | 0-10,000 |

DECLASSIFIED

| Signal Simulator | | | |
|---|---------------------|---------------------|--|
| Rep. Rate (cps) | Pulse Length (μsec) | Beamwidth (Degrees) | Types |
| | | | A. Target B. Sea Return C. Altitude Line D. Range Attenuation E. Noise F. Fading G. Jamming H. Land Mass I. IFF |
| 2300 | 165 | 12 | A, B, C, E |
| Search: Same as 15-J-1-c Fire Control: Same as Operational Fire Control Radar | | | A, B, C, D, E |
| - | - | - | A, C |
| - | - | - | A and Wind Velocity Effect |
| 250-450 40-1400 | 1, 5, 4 2 | 1.5 4, 5-10 | A, B, D, F, I |
| - | - | - | A, C |
| - | - | - | A, C |
| 100-450 | 2 | 2-4 | A, C, D |
| Same as 15-J-1-c | | | A, B, D, F, I |
| Same as 15-J-1-c | | | A, B, D, I (F planned) |
| 350 | - | - | A |
| 500 or 1000 | 1.5 | 2-10 | A |
| Match corresponding radar | 0.5-5.0 | - | A, E, G, I |
| 500, 4000 | 1, 2.5 | - | A, I, F (Blind Area) and Wind Velocity Effect |

DECLASSIFIED

TRAINERS

| Output | Space Simulator | |
|------------------------------|---|-------------------|
| | Problem Area (sq. miles) | Number of Targets |
| B | 5 miles ±60° hor. ±60° elevation | 1 (2 planned) |
| A. Fire Control B. Search | 120 x 120 70,000 ft in altitude | - |
| B | Target: 0-57,000 ft. Own Aircraft: 0-30,000 ft in altitude | 30 |
| B | 10 x 10 0-5000 ft in altitude | 6 |
| B | 30 x 30 120 x 120 240 x 240 | 6 |
| B | 50,000 ft in altitude | 6 |
| B | 50,000 ft in altitude | 6 |
| B | 250 x 250 72,000 ft in altitude | 6 |
| B | 30 x 30 120 x 120 240 x 240 | 6 |
| B | 30 x 30 120 x 120 240 x 240 | 30 |
| B | Uncalibrated | 6 |
| B | 60 x 60 120 x 120 | 12 |
| B | 0-100 Search 0-20 Track | 1 |
| B | 50 x 50 0-100,000 ft in altitude | 16 |

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SECRET

TRAINERS

| Service Equipment | | Radar | Size L-W-H (ft) |
|---|-------------|--|--|
| A. Trigger B. 1x Synchro Azimuth C. Voltage Prop to Azimuth and El D. LO Tuning Voltage E. 1x360° Potentiometer Ant. Az. | | | |
| 6.0 | A, B, C | Aero 21B | 2x4x2 2x4x2 |
| 8 | A, B Search | MK-35 MK-25 and Search radars | 6x12 Room |
| - | - | Simulated APS-45 and APA- 56 console | 2x6x1.5 2x6x1.5 3x4x3 |
| - | - | AN/MPN-5 Indicator (Simulated) | - |
| 1 | A, B | All air search PPI's | 1.5x1.5x2 2x1.5x1.5 2x4x1.5 1.5x1.5x2 |
| 8.1 | A, B | AN/FPS-5 AN/TPS-10D | 1.5x1.5x2 2x1.5x3 1x4x1 1.5x1.5x2 |
| 8.1 | A, B | SPS-8 | 1.5x1.5x2 1x4x1 1.5x1.5x2 2x1.5x3 |
| - | A, B, C | SPA-8 VL, VK repeater indicators | 1x0.5x1 1x2x1 Total: 1x5x1 |
| 1 | A, B | APS-20 | 4x2 Truck 1 ton capacity Model F3 |
| 08 | A, B | APS-20 APA-56 | 40 ft trailer |
| - | None | Self-contained scope | 3x3x1.5 1x1x1 |
| - | A, C | SG-6 SPS-6 SPS-8 SX | - |
| 08 | - | AN/APQ-41 Aero 19A Aero 13F Aero 24A | 34 ft trailer |
| 8.1 | A, B | AN/SPN-8 AN/SPS-8 AN/SPN-6 VK Indicator VL Indicator | Floor Plan Size: 24 x 15 27 x 16 |

DECLASSIFIED

TRAINERS

| Weight (lb) | Power Source | | | |
|-------------|--------------|--------|-----------|-----|
| | Volts | Phase | Freq. | KVA |
| 680 | 115 | 1 | 60 | 0.6 |
| 5000 | 440 | 3 | 60 | 5 |
| 800 | - | - | - | - |
| - | 115 | 1 | 60 | - |
| 600 | 105-125 | 1 | 60 | 1 |
| 611 | 105-125 | 1 | 60 | 1.8 |
| 611 | 105-125 | 1 | 60 | 1.8 |
| | | | | |
| 350 | 115 | 1 | 60 or 400 | - |
| - | 115 | 1 | 60 | 1 |
| 35, 270 | 208 or 220 | 3 | 60 | 40 |
| 130 | 115 | 1 | 60 | - |
| - | 115 | 1 | 60 | - |
| 19, 000 | 208/120 | 3 | 60 | 20 |
| 1800 | 115 | 3 or 1 | 400 or 60 | 1.5 |

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DECLASSIFIED

TRAINERS

| Number of Equipments Produced | Available Date | Supplier | Source of Information | MODEL |
|-------------------------------|----------------|----------|-----------------------|-----------------------------|
| 1 3 under dev. | 1956 | NTDC | NTDC, Code 3131 | 3A-49 |
| 1 | 1956 | NTDC | NTDC, Code 3133 | 3D-32 |
| under development | 7 as of 1957 | NTDC | NTDC, Code 3111 | 15-AM-1-a |
| 1 under development | 1957 | NTDC | NTDC, Code 3111 | X15-G-8 |
| approximately 700 | 1956 | NTDC | NTDC, Code 3111 | 15-J-1-c Type I, II, III |
| 130 | 1956 | NTDC | NTDC, Code 3111 | 15-J-1-c Type V |
| 1 Prototype | 1956 | NTDC | NTDC, Code 3111 | 15-J-1-c Type VI |
| | | | Navexos P-1307 | 15-J-1-d |
| 1 Prototype | 1956 | NTDC | NTDC, Code 3111 | 15-J-1-e |
| 1 | 1956 | NTDC | NTDC, Code 3111 | 15-J-1-l |
| 2 | 1956 | NTDC | NTDC, Code 3111 | 15-J-1-m |
| 1 | 1954 | NTDC | NTDC, Code 3111 | 15-J-1-t |
| 1 | 1956 | NTDC | NTDC, Code 3111 | 15-J-4-k |
| 2 (7 in production) | 1956 1958 | NTDC | NTDC, Code 3154 | 15-V-6 |
| 1 | 1956 | NTDC | NTDC, Code 3111 | 15-W-15 |

SECRET

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TRAINERS

| MODEL | General Facts |
|----------------------------|---|
| 15-WV-2 (Cadillac Type) | Simulated CIC compartment of WV-2 aircraft and targets generator. |
| 15-WV-2m (Mobile Type) | Trailerized version of CIC compartment of WV-2 aircraft. Targets generator and problem control center housed in second trailer. |
| 15-Z-1 | Trains radar operator in use of radar for navigation, ranging and bombing. Beams ultrasonic waves in water to map and receive echoes. |
| 15-Z-4 | High-altitude bombing trainer. |
| 15-Z-5 | High-altitude bombing trainer. |
| 15-Z-8 | Navigational and Mine-Laying Trainer. |
| AN/SPG-T10 | Provides target acquisition training. Targets recorded on 35 mm film. |
| AN/SPN-T1* (XG-1) | Now installed at CIC/TTC, San Diego, California. |
| AN/SPS-T1 | Repackaged 15-J-1-d to meet shipboard specifications. |
| AN/SSQ-T2 (XG-1) | Now installed at CIC/TTC San Diego, California. |
| AN/UPS-T4 | Repackaged 15-J-1-c. Being replaced by AN/SPS-T1. Shipboard use on interim basis. |
| RS-12 | Activates operational equipment in four CIC mockups. Simulates motion of air and surface targets. |
| RS-14 | Activates operational equipment in four CIC mockups. Simulates motion of air and surface targets. |
| | |
| | |

SECRET

TRAINERS

| Function | Sec. Classification | Number of Operators That are Trained |
|---|---------------------|--------------------------------------|
| AEW/CIC Crew Trainer for WV-2 Aircraft | C | AEW/CIC Crew |
| AEW/CIC Crew Trainer for WV-2 Aircraft | C | AEW/CIC Crew |
| AN/APS-T3 Radar Trainer | U | 1 |
| Radar Operator Trainer | C | 1 |
| AN/ASB-1 Advanced Operator Trainer | C | 1 |
| P6M-2 Aircraft Armament Control System Trainer | C | 1 |
| Fire Control Trainer | U | Crew for GFCS Mk 37, 56, or 63 |
| CIC Team Training in Radar Navigation and Shore Bombardment | U | 1 Complete CIC Team (6 to 14 men) |
| Search Radar Trainer | U | - |
| CIC Team Trainer | U | CIC Team |
| Search Radar Trainer | U | - |
| Fleet Air Defense Training Center Simulation Equipment | C | CIC and fire control teams |
| Fleet Air Defense Training Center Simulation Equipment | C | CIC and fire control teams |
| | | |
| | | |

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TRAINERS

SECRET

| Maneuvering Simulator | | | | |
|------------------------|-------------------------|-------------------------------|--------------------------|------------------------------|
| Target | | Own Ship | | Max. Vert. Speed (ft/min) |
| Turn Rate (deg/sec) | Speed (knots) | Turn Rate (deg/sec) | Speed (knots) | |
| Same as 15-J-1-c | | Same as 15-J-1-c | | Manual |
| Same as 15-J-1-c | | Same as 15-J-1-c | | Manual |
| - | - | Manual or OFT turn rate | 0-500 | 500-2000 |
| - | - | 0-20 | 1500 | 3000 climb 6000 dive |
| - | - | 0-20 | 1500 | 3000 climb 6000 dive |
| - | - | 0-20 | 1500 | 3000 climb 6000 dive |
| - | - | - | - | - |
| 0-10 | 0-50 | 0-10 | 0-50 | - |
| - | - | - | - | - |
| 0-6 | 0-50 0-500 0-5000 | 0-6 | 0-50 | - |
| - | - | - | - | - |
| - | 0-40 0-1200 | - | 0-40 (4 Own Ships) | 0-66,000 Climb & Dive |
| - | 0-40 0-1200 | - | 0-40 (6 Own Ships) | 0-66,000 Climb & Dive |
| - | - | - | - | - |
| - | - | - | - | - |

SECRET

DECLASSIFIED

| Signal Simulator | | | |
|---------------------------|---------------------------------|------------------------|---|
| Rep. Rate (cps) | Pulse Length (μ sec) | Beamwidth (Degrees) | Types |
| | | | A.Target B.Sea Return C.Altitude Line D.Range Attenuation E.Noise F.Fading G.Jamming H.Land Mass I.IFF |
| Same as 15-J-1-c | | | A,B,C,D,F,G,I |
| Same as 15-J-1-c | | | A,B,C,D,F,G,I |
| Radar Set Trigger | - | - | C,H |
| 300 800 2400 | 0.75 3.0 0.25 | 2.5 | H |
| 300 800 2400 | 0.75 3.0 0.25 | 2.5 | H |
| 300 800 2400 | 0.75 3.0 0.25 | 2.5 | H |
| | | | A |
| 200 to 1 kc | 1 | 2-20 | A. 0.3 surface and 2 escorts, E, D, H |
| - | - | - | - |
| 60-2000 | 0-5 | 0-360 | A. Ship, aircraft, missile, D, E, F, I |
| - | - | - | - |
| Same as Operational Radar | | | A,B,C,D,E |
| Same as Operational Radar | | | A,B,C,D,E |
| | | | |
| | | | |

DECLASSIFIED

TRAINERS

| Output | Space Simulator | |
|---|---|----------------------|
| | Problem Area (sq. miles) | Number of Targets |
| A. 30-60 Mc if B. Video C. Trigger D. 1x Sync. Ant. | | |
| B | 30 x 30 120 x 120 240 x 240 0-57,000 ft in altitude | 30 |
| B | 30 x 30 120 x 120 240 x 240 0-57,000 ft in altitude | 30 |
| A | 50 x 100 20,000 ft in altitude | - |
| B | 0-60 Search 60-200 Search 0-25 Track 0-50,000 ft in altitude | - |
| A | 0-60 60-200 Search 0-25 Track 0-50,000 ft in altitude | - |
| A | 0-60 Search 60-200 Search 0-25 Track | - |
| | | 3 |
| A. 30 Mc B. positive C. neg. or pos. 30V, 2 μsec. D. 1x | 50 | 5 |
| - | - | - |
| A. 11 Mc, 15 Mc, 30 Mc B. Positive C. Pos. and Neg. D. 1x, 36x | 1600 (40 x 40) 160,000 (400 x 400) | 3 |
| - | - | - |
| A. Fire Control B. Search | 240 x 240 Surface 480 x 480 Air 70,000 ft in altitude | 12 Surface 18 Air |
| A. Fire Control B. Search | 240 x 240 Surface 480 x 480 Air 70,000 ft in altitude | 12 Surface 18 Air |
| | | |
| | | |

SECRET

| Service Equipment | Radar | Size L-W-H (ft) |
|---|--|---|
| A. Trigger B. 1x Synchro Azimuth C. Voltage Prop to Azimuth and El D. LO Tuning Voltage E. 1x360° Potentiometer Ant. Az. | | |
| A, B | AN/APS-20E AN/APS-45 (Sim) AN/APA-81 (Ind) | Floor Plan Size: 19 x 56 |
| A, B | AN/APS-20E (Ind) AN/APS-45 (Sim) AN/APA-56 | 42 ft trailer 2 of 42x12x12.5 (exp) |
| A | AN/APS-2,3,4 AN/APS-15 AN/APQ-13 | 30 x 20 Room |
| A, C | AN/APS-38A AN/APS-31 AN/APS-33 AN/APS-20,SG-6 | 35 ft trailer |
| A, C | AN/ASB-1A | 35 ft trailer |
| A, C | AN/ASB-1 (modified) | 40 ft trailer |
| | Mk 25,34,35 | |
| A, B, D, E | SG1b radar | 36x60x10 in. 22x17x48 in. 12x17x48 in. 17x48x60 in |
| - | - | - |
| A, B | SG 1b SR/SRA(radar) | See * below |
| - | - | - |
| A, B, C | SPS-8,SPS-6, SG-6, MK-35, MK-34, MK-25 | 40 x 40 Room |
| A, B, C | SPS-8,SPS-6, SG-6, MK-35, MK-34, MK-25 | 40 x 40 Room |
| | | |
| *36x24x76 in., 102x54-3/8x51 in., 23x24x56-3/8 in., 24-1/4x31x72-1/2 in., 24-1/4x31x72-1/2 in., 24-1/2x31x72-1/2 in., 24-1/4x31x72-1/2 in., 47-1/2x24-3/4 in. x70-3/4 in. | | |

SECRET

DECLASSIFIED

TRAINERS

| Weight (lb) | Power Source | | | |
|-------------|--------------|--------|----------|------------|
| | Volts | Phase | Freq. | KVA |
| 40,000 | 220 | 3 | 60 | 24 |
| 80,000 | 220 | 3 | 60 | 30 |
| 3000 | 220 115 | 3 1 | 60 60 | 1.8 1.1 |
| 22,000 | 208/120 | 3 | 60 | 15 |
| 22,000 | 208/120 | 3 | 60 | 15 |
| 22,000 | 208/120 | 3 | 60 | 20 |
| | | | | |
| 6000 | 115 | 1 | 60 | 6 |
| - | - | - | - | 1 |
| 6500 | 115/230 | 1 | 60 | 16 |
| - | - | - | - | - |
| 50,000 | 208/120 | 3 | 60 | 80 |
| 50,000 | 208/120 | 3 | 60 | 80 |
| | | | | |
| | | | | |

DECLASSIFIED

| Number of Equipments Produced | Available Date | Supplier | Source of Information | MODEL |
|-------------------------------|----------------|-----------------------------|-----------------------|-------------------------|
| 3 under development | 1957 | NTDC | NTDC, Code 3111 | 15-WV-2 (Cadillac Type) |
| 4 under development | 1957 | NTDC | NTDC, Code 3111 | 15-WV-2m (Mobile Type) |
| Approximately 100 | 1945 | NTDC | NTDC, Code 4212 | 15-Z-1 |
| Under development | 1957 | NTDC | NTDC, Code 3154 | 15-Z-4 |
| 1 under development | 1956 | NTDC | NTDC, Code 3154 | 15-Z-5 |
| Contract within two months | 1958 | NTDC | NTDC, Code 3154 | 15-Z-8 |
| 9 | - | Stavid Eng. Co. | BuOrd, Code Ma4-a | AN/SPG-T10 |
| 1 | - | NEL | BuShips, Code 824 | AN/SPN-T1 (XG-1) |
| 100 on order | - | Aeromotive Equipments Corp. | BuShips, Code 824 | AN/SPS-T1 |
| 1 | - | Gilfillan Bros. | BuShips, Code 824 | AN/SSQ-T2 (XG-1) |
| 50 | - | - | BuShips, Code 824 | AN/UPS-T4 |
| 1 | 1956 | NTDC | NTDC, Code 3133 | RS-12 |
| 1 | 1956 | NTDC | NTDC, Code 3133 | RS-14 |
| | | | | |
| | | | | |

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TRAINERS

| MODEL | Source of Information | General Facts | Available | Number of Equipments Produced |
|---------------------------|-----------------------|----------------------------|-----------|-------------------------------|
| 15-W-1 (Cathodic Type) | WTDC, Code 3111 | WTDC | 1957 | 3 under development |
| 15-W-2 (Mobile Type) | WTDC, Code 3111 | WTDC | 1957 | 4 under development |
| 15-Z-1 | WTDC, Code 3112 | WTDC | 1949 | Approximately 100 |
| 15-Z-2 | WTDC, Code 3114 | WTDC | 1957 | Under development |
| 15-Z-3 | WTDC, Code 3114 | WTDC | 1956 | 1 under development |
| 15-Z-4 | WTDC, Code 3114 | WTDC | 1958 | Contract within two months |
| AN/SPQ-710 | BuOrd, Code Mat-2 | Navis Eng. Co. | - | 2 |
| AN/SPH-71 (XO-1) | Buships, Code 824 | WEL | - | 1 |
| AN/SPS-71 | Buships, Code 824 | Automotive Equipment Corp. | - | 100 on order |
| AN/SPS-71 (XO-1) | Buships, Code 824 | Outlines Bree. | - | 1 |
| AN/SPS-74 | Buships, Code 824 | - | - | 50 |
| RS-12 | WTDC, Code 3122 | WTDC | 1956 | 1 |
| RS-14 | WTDC, Code 3122 | WTDC | 1956 | 1 |
| | | | | |
| | | | | |

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Section 10
Traffic Control

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TRAFFIC CONTROL

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| MODEL | Function | General Facts | Sec. Class. |
|-----------------|------------------------------------|---|-------------|
| AN/FPN-28 | Ground Controlled Approach | Reorganized AN/MPN-5 for fixed ground installation. | U |
| AN/FPN-29 | Harbor Control | Raytheon "Pathfinder" with special 41-ft antenna. | U |
| AN/FPS-8 | Air Traffic Control (Surveillance) | Medium-range air traffic control, using coherent MTI. | C |
| AN/FPS-37 | Air Traffic Control | Uses two AN/FPS-8 radars with improved MTI (cascade cancellation) and high-gain antenna. Provision for remote installation. | C |
| AN/GPN-2 | Air Traffic and Approach Control | Ground mobile. Airport surveillance portion of GCA. Has its own PPI. | U |
| AN/GPN-6 | Air Traffic and Approach Control | Airport surveillance portion of GCA and seaplane approach and landing. 2 PPI's, MTI. Packaged for air lift transportation. | U |
| AN/MPN-1B | Ground Controlled Approach | Both surveillance and final approach. 2 PPI's. Ground mobile. | U |
| AN/MPN-5 -5A | Ground Controlled Approach | Ground mobile for surveillance and final approach. Optional circular polarization on AN/MPN-5A. | U |
| AN/MPS-11A | Air Traffic Control | Mobile version of AN/FPS-8 for Marine Corps use. AN/MPS-11 is AF equipment. | C |
| AN/SPN-6 | Air Traffic Control | SG-3 components combined with stabilized antenna system, VK-4 indicator. Only 6 equipments in use; used only as a search radar. | C |
| AN/SPN-8 | Carrier Controlled Approach | Azimuth precision approach. 100° sector off-center PPI. | U |
| AN/SPN-12 | Carrier Controlled Approach | Aircraft speed measurement for CCA. | C |

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| Peak Power Output (kw) | Pulse Length (μ sec) | Frequency (Mc) |
|---------------------------|------------------------------|-------------------|
| Surv: 350 | 0.8 | 2740-2900 |
| Appr: 35 | 0.5 | 9000-9180 |
| 22.5 | 0.2 0.6 | 3020-3120 |
| 1000 | 3 | 1280-1350 |
| - | - | 1280-1350 |
| 200 | 0.5 | 2860-2900 |
| 470 | 0.9 | 2700-2900 |
| Surv: 85 | 0.5 | 2780-2820 |
| Appr: 25 | | 9000-9180 |
| Surv: 350 | 0.8 | 2740-2900 |
| Appr: 35 | 0.5 | 9000-9180 |
| 1000 | 3 | 1280-1350 |
| 650 | 0.3-1.3 | 3550-3700 |
| 35 | 0.25 | 9000-9180 |
| 0.010 | FM/CW | 10,000-10,250 |

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TRAFFIC CONTROL

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| Pulse Rate (pps) | Mounting or Smallest Ship | Maximum Range (Miles) | | |
|---------------------|--------------------------------------|-----------------------|-------------------------------|------------------------------|
| | | 2200 T DD | 20 m ² Aircraft | 1 m ² Aircraft |
| 1200 | Search: Tower | - | Surv: 31 | - |
| 2400 | Precision: Trailer | | Appr: 10 | |
| 800 1600 | - | Horizon Limited | - | - |
| 360 | Ground | - | 140 (claim) | 70 (claim) |
| - | Ground | - | - | 120 (design) |
| 2000 | Truck Mounted | - | 30 | - |
| 1000 | Trailer Mounted - 2 Vehicles | - | - | 26 |
| 2000 | Trailer Mounted - 3 Vehicles | - | Surv: 30 Appr: 10 | - |
| 1200 | Semi-Trailer Mounted - 4 Vehicles | - | Surv: 31 | - |
| 2400 | | | Appr: 10 | |
| 360 | - | - | - | - |
| 760 | CVE | - | - | 47 |
| 4000 | CVE | - | 6 | - |
| - | CVE | - | 3 | - |

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| Scan Coverage (Degrees) | | Scan Rate (rpm) | | Reflector | |
|-------------------------|----------------------|---|---|-------------------------------|--|
| Hor. | Vert. | Hor. | Vert. | Type | Size (H-W) |
| Surv: 360 | 2 to 10 local adjust | 15+30 | Remote Manual | Convergent Full | 9 ft x 9 ft |
| Appr: 20 Az 7 Elev | 7 Az 20 Elev | <u>2 per sec</u> Remote Manual | <u>Remote Manual</u> 2 per sec | Convergent Half | <u>37 in. x 8 ft</u> 37 in. x 11 ft |
| 360 | - | 8 15 | - | Parabolic Section | 8 ft x 41 ft |
| 360 | 30 | 0-10 plus sector | - | Parabola | 12 ft x 20 ft |
| - | - | - | - | - | - |
| 360 | 2 to 10 | 30 | Manual With Servo | Truncated Parabola | 8 ft x 5 ft |
| 360 | -2 to 10 | 15 & 30 | Manual With Servo | Doubly Divergent Curved | 8 ft x 12 ft |
| Surv: 360 | 2 to 10 local adjust | 30 | Thumb Screw | Truncated Paraboloid | 4 ft x 8 ft |
| Appr: 20 Az 7 Elev | 7 Az 20 Elev | <u>1 per sec</u> <u>+4 per sec</u> Manual | <u>Manual</u> 1 per sec <u>+4 per sec</u> | Truncated Parabolic Cylinders | <u>3.5 ft x 8.5 ft</u> 14 ft x 2 ft |
| Surv: 360 | 2 to 10 local adjust | 15+30 | Remote Manual | Convergent Full | 9 ft x 9 ft |
| Appr: 20 Az 7 Elev | 7 Az 20 Elev | <u>2 per sec</u> Remote Manual | <u>Remote Manual</u> 2 per sec | Convergent Half | <u>37 in. x 8 ft</u> 37 in. x 11 ft |
| - | - | - | - | - | - |
| 360 | 14 | 15 | - | Parabola | 9 ft x 12 ft |
| 100 | 0-5 Elevation | 3 per sec | Manual Remote Servo | Paraboloid | 1.5 ft x 5 ft |
| 120 | -15 to +30 Elevation | Steerable | | Paraboloid | 2.5 ft diam. |

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TRAFFIC CONTROL

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| Beamwidth (Degrees) | | Reflector Gain | | Antenna Weight (lb) |
|--------------------------|--|----------------|-------------------|---------------------|
| Hor. | Vert. | Major Lobe | Minor Lobe (down) | |
| 2.5 | 3 csc ² 29 to 10,000 | 33 | 20 | 515 |
| 57 min. | 2.5 | 40 | 20 | 125 |
| 3 csc ² to 15 | 47 min. | 40 | 20 | 115 |
| 0.7 | 10 | 35 | 25 | - |
| 2.5 | 9 csc ² to 30 | - | - | 1500 |
| 1.3 | 5 csc ² to 58 | 35 | 25 (min) | - |
| 5 | 3 csc ² 10 to 5000 ft | 31 | 15 | 605 |
| 2 | 5.7 csc ² 4-29 to 10,000 ft | 34 | 20 (min) | 635 |
| 5 | 3 csc ² 10 to 5000 ft | 31 | 15 | 430 |
| 1.2 | 2 | 40 | 20 | 216 |
| 3.6 | 0.6 | 40 | 20 | 251 |
| 2.5 | 3 csc ² 29 to 10,000 | 33 | 20 | 515 |
| 57 min. | 2.5 | 40 | 20 | 125 |
| 3 csc ² to 15 | 47 min. | 40 | 20 | 115 |
| - | - | - | - | 2 |
| 2.3 | 14 | 38 | 26 | 2130 |
| 1.5 | 6 | 40 | 13 | 375 |
| 4.25 | 4.25 | - | - | - |

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| Total System Weight (lb) | Transmission Line | Power Requirements | | | |
|--------------------------|-------------------|--------------------|-------|-------|---------------|
| | | Volts | Phase | Freq. | KVA |
| 50,000 (approx) | RG-48/U | 120/208 | 3 | 60 | - |
| | RG-52/U | | | | |
| 10,080 | RG-48/U | 120/208 | 3 | 60 | 13 |
| 15,000 | RG-69/U | 120/208 | 3 | 60 | 15 |
| | RG-69/U | 120/208 | 3 | 60 | - |
| 28,480 | RG-48/U | 115 | 1 | 60 | 9.8 |
| 45,000 | RG-75/U | 120/208 | 3 | 60 | Approx. 15 |
| 46,500 | RG-48/U | 110/220 | 1 | 60 | 15 |
| | RG-52/U | | | | |
| 96,000 | RG-48/U | 120/208 | 3 | 60 | 30 |
| | RG-52/U | | | | |
| - | - | - | - | - | - |
| - | RG-48/U | 115 | 1 | 60 | - |
| 3040 | RG-52/U | 115 | 3 | 400 | 7 |
| | | 115 | 1 | 60 | 0.2 |
| 1450 | None | 115 | 1 | 60 | 2 |

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| Supplier | No. in Use or Tent. Available Date | Source of Information | MODEL |
|-------------------------------|---|-----------------------|-----------------|
| Bendix | 13 | BuShips, Code 822 | AN/FPN-28 |
| Raytheon | - | BuShips, Code 821 | AN/FPN-29 |
| GE | 13 | BuShips, Code 822 | AN/FPS-8 |
| GE | To be contracted | BuShips, Code 822 | AN/FPS-37 |
| Bendix | 10 | BuShips, Code 822 | AN/GPN-2 |
| Laboratory for Electronics | 10 | BuShips, Code 822 | AN/GPN-6 |
| Bendix | 40 | BuShips, Code 822 | AN/MPN-1B |
| Bendix | 5: 24 5A: 2 | BuShips, Code 822 | AN/MPN-5 -5A |
| GE | 20 U.S.M.C. and AF equipments | BuShips, Code 822 | AN/MPS-11A |
| Raytheon | 67 | BuShips, Code 822 | AN/SPN-6 |
| Bendix | 67 | BuShips, Code 822 | AN/SPN-8 |
| Raytheon | 41 | BuShips, Code 822 | AN/SPN-12 |

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| NO. | DESCRIPTION | DATE | STATUS |
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Section 11

Additional Radar Equipments

SECRET

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ADDITIONAL
RADAR
EQUIPMENTS

SECRET

| MODEL | General Facts | Source of Information | Sec. Class. |
|----------------------|---|--|-------------|
| 15-F | AN/APS-T1 radar trainer for presentation of fixed targets or terrain. Obsolete, 50 produced. | NTDC, Code 4212 | U |
| AN/APG-34 (XN-1,2,3) | X-band airborne range only. Dropped in development, no future plans. | BuAer, Code AV-33122 | C |
| AN/APG-39 | Airborne range only for gunnery applications. Obsolescent. | BuAer, Code AV-3311 | C |
| AN/APG-43 | FM/CW automatic tracking radar for search and intercept. Obsolescent. | BuAer, Code AV-3311 | C |
| AN/APG-44 | S-band air-to-air range and range rate. Obsolescent. | BuAer, Code AV-3311 | C |
| AN/APG-45 | Subminiaturized X-band airborne range only. Dropped | BuAer, Code AV-33122 | C |
| AN/APG-46 | X-band air-to-air and air-to-ground range and range rate. Monopulse on air-to-ground. Obsolescent. | BuAer, Code AV-3311 | C |
| AN/APQ-42 | X-band intercept and fire control. Production cancelled. | BuAer, Code AV-3311 | C |
| AN/APQ-64 | AN/APQ-50 with tracking loop closed through a computer. For use with Sparrow II. 20 in existence; further production cancelled. | BuAer, Code AV-33112 NRL, Code 5364 | C |
| AN/APQ-65 65B | Improved AN/APQ-41 for French Navy use. | BuAer, Code AV-3311 | C |
| AN/APQ-65A | American version of AN/APQ-65. Requirement cancelled. | BuAer, Code AV-3311 | C |
| AN/APS-4 | Bomb-rack mounting, forward-looking, X-band search radar for carrier based aircraft. Obsolete. | BuAer, Code AV-33222 | U |
| AN/APS-15 | X-band, 360° reconnaissance radar for heavy patrol aircraft. Obsolete. | BuAer, Code AV-33222 | U |
| AN/APS-49 | Rapid scan for sea clutter elimination in ASW. Dropped. | BuAer, Code AV-33221 | C |
| AN/BPN-1 | Submarine picket for missile navigation grid. S-band. Terminated. | BuShips, Code 822 | C |

SECRET

| MODEL | General Facts | Source of Information | Sec. Class. |
|-----------------|---|-----------------------|-------------|
| AN/FPN-1A | Fixed GCA with remote indicators. Height finding and final approach. Only one built. | BuShips, Code 822 | U |
| AN/MPQ-2A | Modified SCR-584 for detection and tracking of close support aircraft. Three made, all scrapped or modified. | BuShips, Code 828 | U |
| AN/MPQ-6 (XB-1) | X-band, high speed electronic lobing radar. Variable prf, scans, and scan rate. Research use only. | NRL, Code 5340 | U |
| AN/MSG-1 | S-band AA fire control for 90 mm guns. USMC. Obsolescent. | BuShips, Code 825 | U |
| AN/SPA-10 | Indicator using long persistence orange phosphor (British W2168). One developmental model built. | BuShips, Code 824 | C |
| AN/SPA-12 | Indicator with RHI and PPI combined in one console. One engineering model, then dropped. | BuShips, Code 824 | C |
| AN/SPN-2 | CCA air speed indicator. Replaced by AN/SPN-12. | BuShips, Code 822 | U |
| AN/SPS-3 | 200 Kw, X-band hemispherical search radar. Foster antenna. One in existence, no longer being used. | BuShips, Code 823 | U |
| AN/SPN-3 | CCA X-band radar. Replaced by AN/SPN-8. | BuShips, Code 822 | U |
| AN/SPS-11 | AN/SPS-2 with smaller antenna assembly. No foreseeable future use. | BuShips, Code 821 | C |
| AN/SPS-14 | AN/SPS-6B with fault-finding features. No present plans. | BuShips, Code 821 | C |
| AN/SPS-15 | Cross-correlation modification of SU-2 for periscope detection. No further work after first experimental model. | BuShips, Code 821 | C |
| AN/SPS-16 | Lightweight 1300-Mc air search, intended as SA replacement. Not approved by OPDEVFOR. | BuShips, Code 821 | U |
| AN/SPS-19 | Rapid scan (1000 rpm) for periscope detection. SG-6 plus Dalmo Victor antenna. | BuShips, Code 821 | C |
| AN/SPS-20 | Rapid scan (1000 rpm) for periscope detection. AN/SPS-4 plus Dalmo Victor antenna. | BuShips, Code 821 | C |

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ADDITIONAL
RADAR
EQUIPMENTS

| MODEL | General Facts | Source of Information | Sec. Class. |
|----------------------|--|-----------------------|-------------|
| AN/SPS-27 | Nomenclature cancelled. Equipment now known as CXRX. | | |
| AN/TPS-1B | 1240 Mc, 600 Kw ground based general search radar. Obsolete. | BuShips, Code 827 | U |
| AN/TPS-13 -13A | S-band velocity measurements for fire control. Obsolete. | BuShips, Code 825 | C |
| AN/UPA-32 | 24-in. PPI for use as direct view surface or air summary plot. Cancelled. | BuShips, Code 824 | U |
| AN/UPA-33 | 7-in. bulkhead mounted PPI repeater. Lightweight. Contract cancelled. | BuShips, Code 824 | U |
| CXJG (Cindy) | 24000-Mc surface search. None presently in use except as research equipment. | BuShips, Code 821 | U |
| Mk 7 series | Experimental AA automatic tracking radar. Obsolete. | BuOrd, Code ReS4-c | U |
| Mk 12, Mod 1 | 945-Mc surface and AA fire control. Reserve fleet only. | BuOrd, Code ReS4-C | U |
| Mk 20, Mod 0- 1-3 | L-band searchlight control. Obsolete. | BuShips, Code 825 | U |
| Mk 22, Mod 1 | X-band AA fire control radar for elevation data below 10° elevation. Reserve fleet only. | BuOrd, Code ReS4-c | U |
| Mk 25, Mod 2 | X-band surface and AA automatic tracking fire control. Replaced by Mk 25, Mod 3. | BuOrd, Code ReS4-c | C |
| Mk 25, Mod 4 | Mk 25, Mod 2 radar adapted to GFCS Mk 67. Replaced by Mk 25, Mod 5. | BuOrd, Code ReS4-c | C |
| Mk 25, Mod 6 | X-band special-purpose guidance for Terrier. One equipment, now being dismantled. | BuOrd, Code ReS4-a | C |
| Mk 27, Mod 0, 2 | S-band main battery surface fire control. Obsolete. | BuOrd, Code ReS4-c | U |
| Mk 28, Mod 2 | S-band AA fire control for use with GFCS Mk 63. Replaced by Mk 34 radars. | BuOrd, Code ReS4-c | U |

| MODEL | General Facts | Source of Information | Sec. Class. |
|-----------------------|--|-----------------------|-------------|
| Mk 29, Mod 2 | X-band radar for AA fire control with GFCS Mk 57. Obsolete. | BuOrd, Code ReS4-c | U |
| Mk-33 | X-band surface and air search. Obsolete. | BuShips, Code 828 | U |
| Mk 34, Mod 3, 4, 7-14 | X-band AA fire control. All being converted to Mk 34, Mod 16. | BuOrd, Code ReS4-c | U |
| Mk 44 | Experimental K _u -band fire control radar for submarines. | BuOrd, Code ReS4 | C |
| Mk 47 | Automatic X-band angle-tracking for AA fire control. Obsolete. | BuOrd, Code ReS4-c | C |
| Mk 50 | X-band simultaneous lobing for gun director or missile guidance. Only one made, in use at NRL only. | NRL, Code 5343 | C |
| OAC | Radar trainer. Out of use except in some schools. | BuShips, Code 824 | U |
| OCJ OCJ-1 | Air search trainer. Out of use except in some schools. | BuShips, Code 824 | U |
| OCZ OCZ-1 | Air search trainer. Out of use except in some schools. | BuShips, Code 824 | U |
| SCR-584 | S-band missile guidance and control (Hermes A-1 or Bumblebee). Obsolete. | BuShips, Code 825 | C |
| SG-2S | Marine Corps 3000 Mc surface search. Obsolete. | BuShips, Code 828 | U |
| SG-3 | 3600 Mc, 400 kw surface search. None in active fleet, one in reserve fleet. | BuShips, Code 821 | U |
| SG-7 | 3600 Mc, high scan rate (30 rpm) for carrier air traffic control. One built as forerunner of AN/SPN-6. | BuShips, Code 821 | U |
| SK-1 | 215-Mc air search. None in active fleet, three in reserve fleet. | BuShips, Code 821 | U |
| SK-1M | 200-Mc Marine Corps air search. Reserve use only. Modification known as AN/MPS-24. | BuShips, Code 827 | U |

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ADDITIONAL
RADAR
EQUIPMENTS

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| MODEL | General Facts | Source of Information | Sec. Class. |
|---------------|--|-----------------------|-------------|
| SO series | Surface search radars. Obsolescent. Possibly a few SO-4 radars in use by USCG. | BuShips, Code 821 | U |
| SO-7 M/N | 3000 Mc, 80-kw Marine Corps surface search. Obsolete. | BuShips, Code 828 | U |
| SP | S-band, 700-kw height-finder. Coming out of fleet. | BuShips, Code 823 | U |
| SP-1M | 3000 Mc, 750-kw Marine Corps height-finder. Obsolete. | BuShips, Code 828 | U |
| SP-2 | Height finder. Never approved. | BuShips, Code 823 | U |
| SR-2 | 600 Mc air search. None in use by fleet. | BuShips, Code 821 | U |
| SS-1 | 8800-Mc torpedo fire control for submarines. All field-changed to SS-2. | BuShips, Code 821 | U |
| SV-1 | SS radar for air search, using CXLJ antenna. S-band Out of fleet. | BuShips, Code 821 | U |
| SV-2 SV-2A | 3500-Mc height-finder for SS. SV-2A modification kit to improve vertical scan rate. Out of fleet. | BuShips, Code 821 | C |
| SV-3 | 3500-Mc air search for SS. Out of fleet. | BuShips, Code 821 | C |
| SV-4 | 3500-Mc missile tracking system for SS. Out of fleet. | BuShips, Code 821 | C |
| SV-5 | SV-4 plus computer and new indicators. Now part of AN/BPQ-1. | BuShips, Code 821 | C |
| SX | Two radars with a common antenna mount for combined early warning and height finding. S-band, 700 to 1000 kw. Out of fleet and scrapped. | BuShips, Code 823 | U |
| SX-1 | Shore version of SX without stabilization. Now used mainly for training. | BuShips, Code 828 | U |
| SX-2 | Height-finder, early-warning radar system using two radars. Only one bought. No future plans. | BuShips, Code 823 | U |

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| MODEL | General Facts | Source of Information | Sec. Class. |
|--------------------|---|-----------------------|-------------|
| TDS/MK 2 | High-speed manual track TDS with three-coordinate display and elevation in color. Only one experimental model made. | BuOrd, Code ReS4-b | C |
| TDS/MK 3 Mod 2 | Slave bearing and range indicator. Obsolete. | BuOrd, Code ReS4-b | U |
| TDS/MK 11 Mod 1 | Obsolete. | BuOrd, Code ReS4-b | - |
| TR/MK 2 | Tape-recording type trainer for Mk 12 radar. Obsolete. | BuOrd, Code Ma-4c | U |
| TR/MK 8 | AA gunnery trainer for use with Mk 28, 29, or 34 radars. Obsolete. | BuOrd, Code Ma-4c | U |
| VC/VC-1 | 7-in. remote PPI, 12-in. modification. Selector switch for choice of five radars. Obsolete. | BuShips, Code 824 | U |
| VD to VD-2 | Splash-proof 7-in. PPI repeater. Obsolete. | BuShips, Code 824 | U |
| VE/VE-1/ VE-1A | Remote PPI repeater for use with radars having pulse rates between 60 and 1100 pulses per second. Obsolete. | BuShips, Code 824 | U |
| VF/VFa | Precision PPI repeater and B-scope. VFa for 400 cycles only. Obsolete. | BuShips, Code 824 | U |
| VF-1 | Precision repeater. PPI and B-scope. Obsolete. | BuShips, Code 824 | U |
| VF-2 | Repeater. Increased VF range to 100 miles. Obsolete. | BuShips, Code 824 | U |
| VG/VG-1 | Repeater, projects on to 24-in. horizontal plotting unit. Obsolete. | BuShips, Code 824 | - |
| VG-1A | Graphecon projection repeater. Obsolete. | BuShips, Code 824 | U |
| VM | 12-in. PPI repeater using two different color PPI displays optically superimposed. Three purchased, but not future plans. | BuShips, Code 824 | C |
| VN | 20-in. repeater similar to VK. Channels for use with MK 5 IFF. Three purchased, but no further plans. | BuShips, Code 824 | C |

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SUMMARY OF JOINT NOMENCLATURE SYSTEM ("AN" SYSTEM FO

TABLE OF COMPONENT INDICATORS

Table with columns: COMP. IND., FAMILY NAME, EXAMPLES OF USE (Not to be construed as limiting the application of the component indicator), and additional codes like IN5, A--Air, B--Un, etc.

Approved and published by the COMMUNICATION-ELECTRONIC NOMENCLATURE under the authority of the JOINT COMMUNICATIONS-ELECTRONICS COM Washington 25, D. C.

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R COMMUNICATION - ELECTRONIC EQUIPMENT)

TABLE OF SET OR EQUIPMENT INDICATOR LETTERS

| TALLATION | TYPE OF EQUIPMENT | PURPOSE |
|---|--|--|
| borne (installed operated in air-ft) | A--Invisible light, heat radiation | A--Auxiliary assemblies (not complete operating sets used with or part of two or more sets or sets series) |
| erwater mobile, marine | B--Pigeon | B--Bombing |
| transportable (in-activated, do not use wireless carrier.) | C--Carrier | C--Communications (receiving and transmitting) |
| ound, general use (include or more ground installations) | D--Radiac | D--Direction finder and/or reconnaissance |
| phibious | E--Nupac | E--Ejection and/or release |
| ound, mobile (in-cluded as operating in a vehicle which no function other than transporting the equipment) | F--Photographic | G--Fire control or searchlight directing |
| ork portable (air-l or man) | G--Telegraph or teletype | H--Recording and/or reproducing (graphic meteorological and sound) |
| ter surface craft | I--Interphone and public address | L--Searchlight control (inactivated, use "G") |
| ound, transporta- | J--Electro-mechanical (not otherwise covered) | M--Maintenance and test assemblies (including tools) |
| eral utility (in-cludes two or more installation classes, airborne, inboard, and und) | K--Telemetering | N--Navigational aids (including altimeters, beacons, compasses, racons, depth sounding, approach, and landing) |
| ound, vehicular stalled in vehicle designed for functions or than carrying electronic equipment, .., such as tanks) ter surface and erwater | L--Countermeasures | P--Reproducing (inactivated, do not use) |
| | M--Meteorological | Q--Special, or combination of purposes |
| | N--Sound in air | R--Receiving, passive detecting |
| | P--Radar | S--Detecting and/or range and bearing |
| | Q--Sonar and under-water sound | T--Transmitting |
| | R--Radio | W--Control |
| | S--Special types, magnetic, etc., or combinations of types | X--Identification and recognition |
| | T--Telephone (wire) | |
| | V--Visual and visible light | |
| | W--Armament (peculiar to armament, not otherwise covered) | |
| | X Facsimile or television | |

MODIFICATION LETTERS

Component modification suffix letters will be assigned for each modification of a component when detail parts and sub-assemblies used therein are no longer interchangeable, but the component itself is interchangeable physically, electrically, and mechanically.

Set modification letters will be assigned for each modification not affecting interchangeability of the sets or equipment as a whole, except that in some special cases they will be assigned to indicate functional interchangeability and not necessarily complete electrical and mechanical interchangeability. Modification letters will only be assigned if the frequency coverage of the unmodified equipment is maintained.

The suffix letters X, Y, and Z will be used only to designate a set or equipment modified by changing the power input voltage, phase or frequency. X will indicate the first change, Y the second, Z the third, XX the fourth, etc., and these letters will be in addition to other modification letters applicable. (For examples see JANAP 196.)

ADDITIONAL INDICATORS

Experimental Sets. In order to identify a set or equipment of an experimental nature with the development organization concerned, the following indicators will be used within the parentheses:

- XA --Communications-Navigation Laboratory, WADC, Dayton, Ohio.
- XB --Naval Research Laboratory, Washington, D. C.
- XC --Coles Signal Laboratory, Fort Monmouth, N. J.
- XD --Cambridge Research Center, Cambridge, Mass.
- XE --Evans Signal Laboratory, Fort Monmouth, N. J.
- XF --Frankford Arsenal, Philadelphia, Pa.
- XG --U. S. N. Electronic Laboratory, San Diego, Calif.
- XH --Aerial Reconnaissance Laboratory, WADC, Dayton, Ohio.
- XI --Naval Air Development Center, Johnsville, Pa.
- XK --Flight Control Laboratory, WADC, Dayton, Ohio.
- XL --Signal Corps Electronics Research Unit, Mountain View, Calif.
- XM --Squier Signal Laboratory, Fort Monmouth, N. J.
- XN --Department of the Navy, Washington, D. C.
- XO --Redstone Arsenal, Huntsville, Ala.
- XP --Canadian Department of National Defense, Ottawa, Canada.
- XR --Engineer Research and Development Laboratory, Fort Belvoir, Va.
- XS --Electronic Components Laboratory, WADC, Dayton, Ohio.
- XU --U. S. N. Underwater Sound Laboratory, Fort Trumbull, New London, Conn.
- XW --Rome Air Development Center, Rome, N. Y.
- XY --Armament Laboratory, WADC, Dayton, Ohio.

Example: Radio Set AN/ARC-3 () might be assigned for a new airborne radio communication set under development. The cognizant development organization might then assign AN/ARC-3(XA-1), AN/ARC-3(XA-2), etc., type numbers to the various sets developed for test. When the set was considered satisfactory for use, the experimental indicator would be dropped and procurement nomenclature AN/ARC-3 would be officially assigned thereto.

Training Sets. A set or equipment designed for training purposes will be assigned type numbers as follows:

1. A set to train for a specific basic set will be assigned the basic set type number followed by a dash, the letter T, and a number. Example: Radio Training Set AN/ARC-6A-T1 would be the first training set for Radio Set AN/ARC-6A.

2. A set to train for general types of sets will be assigned the usual set indicator letters followed by a dash, the letter T, and a number. Example: Radio Training Set AN/ARC-T1 would be the first training set for general airborne radio communication sets.

Parentheses Indicator. A nomenclature assignment with parentheses, () following the basic type number is made to identify an article generally, when a need exists for a more general identification than that provided by nomenclature assigned to specific designs of the article. Examples: AN/ARC-5(), AM-6()/GRC-5, SB-8()/GG. A specific design is identified by the plain basic type number, the basic type number with a suffix letter, or the basic type number with an experimental symbol in parentheses. Examples: AN/GRC-5, AN/GRC-5A, AN/GRC-5(XC-1), AM-6B/GRC-5, SB-8(XE-3)/GG.

The letter V within the parentheses is used to identify systems with varying parts list.

NOMENCLATURE POLICY

(See JANAP 196 for Statement of Policies)

1. AN nomenclature will be assigned to:
 - A. Complete sets of equipment and major components of military design.
 - B. Groups of articles of either commercial or military design which are grouped for a military purpose.
 - C. Major articles of military design which are not part of or used with a set.
 - D. Commercial articles when nomenclature will facilitate military identification and/or procedures.
2. AN nomenclature will not be assigned to:
 - A. Articles cataloged commercially except in accordance with Paragraph 1. D.
 - B. Minor components of military design for which other adequate means of identification are available.
 - C. Small piece parts such as capacitors and resistors.
 - D. Articles having other adequate identification in joint military specifications.
3. Nomenclature assignments will remain unchanged regardless of later changes in installation and/or application.

IMPORTANT. --All personnel are cautioned against originating or changing any part of any nomenclature assignment, including modification letters, without authorization.

EXAMPLES OF "AN" TYPE NUMBERS

| NUMBER | INDICATES |
|------------|--|
| Q-3() | General reference set nomenclature for water surface craft radio communication set No. 3. |
| Q-3 | Original procurement set nomenclature applied against AN/SRC-3(). |
| Q-3A | Modification set nomenclature applied against AN/SRC-3. |
| Q-13-T1() | General reference training set nomenclature for the AN/APQ-13 set. |
| Q-13-T1 | Original procurement training set nomenclature applied against AN/APQ-13-T1(). |
| Q-13-T1A | Modification training set nomenclature applied against AN/APQ-13-T1. |
| T-T3() | General reference training set nomenclature for general utility radar transmitting training set No. 3. |
| T-T3 | Original procurement training set nomenclature applied against AN/UPT-T3(). |
| T-T3A | Modification training set nomenclature applied against AN/UPT-T3. |
| ARQ-8 | General reference component nomenclature for transmitter No. 51, part of or used with airborne radio special set No. 8. |
| RQ-8 | Original procurement component nomenclature applied against T-51()/ARQ-8. |
| ARQ-8 | Modification component nomenclature applied against T-51/ARQ-8. |
| U/U | General reference component nomenclature for recorder-reproducer No. 31 for general utility use, not part of a specific set. |
| T | Original procurement component nomenclature applied against RD-31()/U. |
| U | Modification component nomenclature applied against RD-31/U. |

NOTES

This chart was formerly titled SUMMARY OF JOINT ARMY-NAVY NOMENCLATURE SYSTEM ("AN" SYSTEM) FOR COMMUNICATION AND ASSOCIATED EQUIPMENT.

The "AN" does not mean that the Army, Navy and Air Force jointly that the type number was assigned in the "AN" system. In the nomenclature system, nomenclature consists of a name followed by a type number which will consist of indicator letters shown on this chart.

If an independent major unit not part of or used with a specific component indicator, a number, the slant and such of the set or sets as apply. Example: SB-5/PT would be the type number for a switchboard for independent use.

Nomenclature assignments will be submitted on the Department form and prepared in accordance with the item names and descriptions listed in the Office of The Assistant Secretary of Defense.

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