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NRL REPORT 4128

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# U. S. NAVY RADAR SYSTEMS SURVEY

## SECOND EDITION

Charles B. Upp

Search Radar Branch  
Radio Division II

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Declassification Team

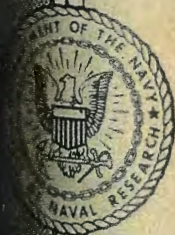
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April 24, 1953



NAVAL RESEARCH LABORATORY

WASHINGTON, D.C.

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# U. S. NAVY RADAR SYSTEMS SURVEY

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## PREFACE

This survey is a revision and expansion of similar material covered in NRL Report 3544.<sup>1</sup> It now covers over 300 models of Navy radar equipment. Not only those systems presently installed but also many proposed systems now under consideration and others under development are included in the survey. Surface, subsurface, airborne, amphibious, mobile, landbased, and beacon equipments are included.

Appendix A shows a classification of electronic equipment which was used in two previous surveys<sup>1,2</sup> issued by this Laboratory. Admittedly, the classification of a number of equipments under certain fields is controversial, but this listing was prepared principally as a means of organizing electronics into compartments of manageable size, and of permitting like systems to be grouped together. Using this classification, this report on radar systems includes 10 sections: Shipboard Search Radars, Landbased Search Radars, Airborne Search and Weapon Control Radars, Shipboard Weapon Control Radars, Landbased Control Radars, Indicators, Target Designation, Altimeters, Trainers, Beacons and Traffic Control.

Appendix B, "Summary of Joint Nomenclature System ("AN" System) for Communication-Electronic Equipment" is included because many of the model designations are taken from this system. The "Additional Indicators," such as certain letters in parentheses, indicating the development organization, is an example of the information available from this sheet. Appendix C is a master index in which all models or types are listed alphabetically, starting with those in the "AN" system.

Excellent cooperation and courtesy were received in all contacts with personnel in the bureaus of the Navy Department, through which most of the data were obtained. The presentation of data was reviewed by the activities which supplied the respective information so that the charts contained in this survey should be accurate as of the summer of 1952.

Although every effort has been made to assure accurate and complete data, some errors and omissions are anticipated. The author invites any corrections or additions of new material the reader may be able to provide. It is recommended that all holders of NRL Report 3544 destroy it in accordance with regulations upon receipt of this revised material.

## PROBLEM STATUS

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

## AUTHORIZATION

NRL Problem R02-50  
RDB Project NR 502-500

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

<sup>2</sup> McLaughlin, D. J., and Burke, C. F., "U. S. Navy Communication Equipment Survey," NRL Report 3566 (SECRET), Oct. 1949

Manuscript submitted February 19, 1953

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**Section 1**  
**Shipboard Search Radars**

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SEARCH  
RADARS

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| MODEL     | Function              | General Facts  | Sec. Class. |
|-----------|-----------------------|--|-------------|
| AN/BPA-2  |                       | Dual antenna system. Surface coverage same as SS-2a. Air coverage same as SV-3.  | C           |
| AN/BPS-1  | Attack                | Short exposure submarine attack radar.   | C           |
| AN/BPS-2  | Air Search            | Air search system for use on picket submarines. Used with BPS-3 for interception control. Similar to AN/SPS-6B series radars, uses VK-2 indicators.                                | C           |
| AN/BPS-3  | Height Finder         | Height-finding system 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            | Air search radar for submarines. Uses VK-2 indicators.   | C           |
| AN/BPS-5  | Surface Search        | Surface search radar for 250-ton submarines. Uses AN/SPA-4A (PPI) indicators.  | C           |
| AN/SPN-6  | Traffic Control CCA   | High scan rate 30 rpm high sensitivity radar for carrier air traffic control. Special antenna system stabilized combined with SG-3 components. Uses standard remote indicators.    | R           |
| AN/SPS-2  | Air Search and Height | Long range search and interception control. Multiple overlapping vertical beams. Multiple VK-3A and AN/SPA-7 (RHI) indicators.   | C           |
| AN/SPS-3  | Hemi-Spherical Search | Short range, rapid scan radar for target indication. Coverage to 80° elevation with high resolution. Dual transmit-receive system and dual beam Foster scanner antennas.           | 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" STD remotes.  | C           |
| AN/SPS-5  | Surface               | Radar for small craft. Four are "XN-1" models which are specifically for PT boats. 10 in. PPI; 5 in. PPI auxiliary bridge repeater.  | C           |
| AN/SPS-6B | Air                   | Air search radar for destroyers and larger. Any standard Navy PPI, VJ, VK, etc.  | R           |
| AN/SPS-6C | Air Search            | Similar to AN/SPS-6B except for improved receiver and more rugged antenna drive system.  | R           |
| AN/SPS-7  | Surface               | Multimeter wave system adapted to navigation in ice packs. Uses 10 in. SPA-4 as system indicator. STD remotes.   | C           |
| AN/SPS-8  | Height Finder         | Similar to height-finding part of SX radar. Rapid vertical scan of 11° while rotating in azimuth. Any 11° vertical scan may be chosen from 0° to 36°. Uses VK-2 and VL indicators. | C           |

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| Peak Power Output (kw) | Pulse Length ( $\mu$ sec) | Frequency (Mc)  | Pulse Rate (pps)           | Smallest Ship | Supplier          |
|------------------------|---------------------------|-----------------|----------------------------|---------------|-------------------|
| —                      | —                         | —               | —                          | —             | Western Elec. Co. |
| 75-110                 | 1/2                       | 8740 - 8890     | 600 $\pm$ 10% (adjustable) | SS            | Western Elec. Co. |
| 500                    | 1/4                       | 1250 - 1350     | 600<br>150                 | SS            | Raytheon Mfg. Co. |
| 500                    | 1                         | 6275 - 6575     | 625-650                    | SS            | Western Elec. Co. |
| 500                    | 1                         | 3400 - 3750     | 400 $\pm$ 5% (adjustable)  | SS            | Westinghouse      |
| 75-110                 | 1/2                       | 8740 - 8890     | 600 $\pm$ 10% (adjustable) | SS            | Stavid Eng. Co.   |
| 400                    | 1/3<br>1-1/4              | 3550 - 3700     | 750                        | CVE           | Raytheon Mfg. Co. |
| 10 mw                  | 7                         | 1250 - 1350     | 244                        | CLC           | G. E. Co.         |
| 200                    | 1/3<br>2/3                | 9080 - 9375     | 3000<br>1500               | CLC           | Sperry Gyr. Co.   |
| 200                    | 3/8<br>1-3/10             | 5450 - 5825     | 650                        | DD            | Raytheon Mfg. Co. |
| 200                    | 3/8                       | 6275 - 6575     | 683                        | PT            | Raytheon Mfg. Co. |
| 500                    | 1/4                       | 1250 - 1350     | 600<br>150                 | DD            | Westinghouse      |
| 500                    | 1/4                       | 1250 - 1350     | 600<br>150                 | DD            | Westinghouse      |
| 40                     | 3/16                      | 34,550 - 35,050 | 1500                       | PC            | Sylvania          |
| 700 to 2000            | 1/2                       | 3430 - 3570     | 1000<br>500                | DD            | G. E. Co.         |

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| Maximum Reliable Range (miles) |                                     | Scan Coverage |                                     | Scan Rate (rpm)                   |                            | Beamwidths |                                      |
|--------------------------------|-------------------------------------|---------------|-------------------------------------|-----------------------------------|----------------------------|------------|--------------------------------------|
| 2200 T DD                      | 20 m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°)                           | Hor.                              | Vert.                      | Hor. (°)   | Vert. (°)                            |
|                                |                                     |               |                                     | See General Facts                 |                            |            |                                      |
| 10                             | —                                   | 360           | 16                                  | 0-8                               | —                          | 2.6        | 16                                   |
| 20                             | 70                                  | 360           | 12                                  | 0-12                              | —                          | 4 ± 0.2    | 10 ± 0.5                             |
| —                              | 40                                  | 360           | 35                                  | 0.7 auto. sector scan 10, 20, 40° | 3-8 adjustable (scans/sec) | 2          | 1.4                                  |
| —                              | 15 (10,000 ft)                      | 360           | 60                                  | 0-6                               | —                          | 5.3        | 60                                   |
| —                              | —                                   | 360           | 16                                  | 0-8                               | —                          | 2.6        | 16                                   |
| 20                             | 45                                  | 360           | 12                                  | 15-30                             | .05-.25                    | 2.5        | 2                                    |
| —                              | 300                                 | 360           | 23                                  | 3.3 MTI and 10                    | —                          | 1.8        | Seven Beams 2.8 each                 |
| 20                             | 15                                  | 360           | 80                                  | 5-15                              | 0-10-30 per sec            | 2.9        | Two Beams 2.5 upper 1.7 lower        |
| 20<br>0                        | 20<br>15                            | 360           | 14 +<br>12 csc <sup>2</sup> θ<br>50 | 5-15                              | —                          | 2<br>2.2   | 14<br>12 csc <sup>2</sup> θ<br>to 50 |
| 15                             | 15                                  | 360           | 90                                  | 15                                | manual                     | 1.5        | 14<br>12 csc <sup>2</sup> θ          |
| 20                             | 50                                  | 360           | 30                                  | 5-10-15                           | —                          | 3.5        | 30                                   |
| 20                             | 50                                  | 360           | 30                                  | 5-15                              | —                          | 3.5        | 30                                   |
| 10                             | —                                   | 360           | 10                                  | 1.75<br>6.0                       | —                          | 0.6        | 10                                   |
| 20                             | 45                                  | 30<br>200     | 36                                  | 1/2/3<br>5/10                     | 0/5/10<br>20/sec           | 3.5        | 1.1                                  |

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| Main Lobe db Gain | Minor Lobe db Down           | Reflector                  |                        | Ant. Weight (lb) | Total System Weight (lb) | 90 Knot Wind Load (lb) | Range Resolution (yd) |
|-------------------|------------------------------|----------------------------|------------------------|------------------|--------------------------|------------------------|-----------------------|
|                   |                              | Type                       | Size (ft)              |                  |                          |                        |                       |
| See General Facts |                              |                            |                        | 800              | —                        | —                      | —                     |
| 29.3              | 24                           | linear (retractable)       | 3/4 x 3                | 480              | 3500                     | —                      | —                     |
| 27.9              | 22                           | paraboloid                 | 5 x 15                 | 1500             | —                        | —                      | —                     |
| 33                | Hor.-21<br>Vert.-25<br>21,18 | parabola                   | 5-1/2 x 7-1/2          | 500              | 6643                     | —                      | —                     |
| 23.5              | 26-28                        | paraboloid (retractable)   | 2 x 4                  | 400              | 2500                     | —                      | —                     |
| 29.3              | 24                           | linear (non-retractable)   | 3/4 x 3                | 480              | 2300                     | —                      | —                     |
| 35                | 30                           | parabolic section          | 12 x 10                | 2000             | —                        | —                      | —                     |
| 36.6              | 28                           | diamond contour paraboloid | 20 x 40                | 16-1/2 tons      | 30 tons                  | —                      | —                     |
| 34                | 20                           | parabolic cylinder         | 12 x 2-1/2             | 2000             | 6300                     | 1400                   | ± 100                 |
| 30<br>23          | 25<br>20                     | parabolic section          | 2 x 7<br>4-1/2 x 4-3/4 | 630              | —                        | 700                    | ± 100                 |
| 28                | 25                           | parabolic section          | 2 x 7                  | 125              | 1200                     | 250                    | —                     |
| 27.5              | 23 side<br>26 back           | parabolic section          | 5-3/4 x 17-1/6         | 800              | 2685                     | 1500                   | —                     |
| 27.5              | 23 side<br>26 back           | parabolic section          | 5-3/4 x 17-1/6         | 850              | 2700                     | 1500                   | —                     |
| 35                | 30                           | parabolic section          | 3/4 x 5                | 160              | 1000                     | 150                    | —                     |
| 37                | 17                           | parabolic section          | 15 x 5                 | 3000             | 5 tons                   | 1500                   | —                     |

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| Transmission Line           |               |                 |                        | No. in Use<br>or Tent.<br>Available<br>Date              | MODEL     |
|-----------------------------|---------------|-----------------|------------------------|--|-----------|
| Type                        | Number        | Size<br>(inch)  | 1 Way<br>db/ft<br>Loss |  |           |
| —                           | —             | —               | —                      | 1 Dev.<br>104 Prod.                                      | AN/BPA-2  |
| Guide                       | RG-51/U       | 5/8 x 1/4       | .044                   | Six (6)<br>FY 52   | AN/BPS-1  |
| Guide                       | RG-69/U       | 3-1/4 x 6-1/2   | .0025                  | 2 Dev. FY 52<br>12 Prod.<br>FY 53                        | AN/BPS-2  |
| Guide                       | RG-50/U       | 3/4 x 1-1/2     | 0.03                   | 2 Dev.<br>FY 52-53                                       | AN/BPS-3  |
| Guide                       | RG-48/U       | 1-1/2 x 3       | 0.00875                | 172<br>FY 52-54  | AN/BPS-4  |
| Guide                       | RG-51/U       | 5/8 x 1-1/4     | 0.044                  | 1 Dev. (1952)  | AN/BPS-5  |
| Guide                       | RG-48/U       | 1-1/2 x 3       | .00875                 | 9 Prod.<br>Models<br>FY 53                               | AN/SPN-6  |
| Guide                       | CAY-<br>14ACM | 6-1/2 x 3-1/4   | .00251                 | 2<br>FY 53   | AN/SPS-2  |
| Guide                       | RG-51/U       | 1-1/4 x 5/8     | .044                   | 1 Exp.<br>1 Preprod.<br>FY 54                            | AN/SPS-3  |
| Guide                       | RG-49/U       | 1 x 2           | .02                    | FY 52  | AN/SPS-4  |
| Guide                       | RG-50/U       | 3/4 x 1-1/2     | .0228                  | 366<br>FY 51   | AN/SPS-5  |
| Guide                       | CAY-<br>14ACM | 6-1/2 x 3-1/4   | .00251                 | 180<br>FY 49   | AN/SPS-6B |
| Thin Wall<br>Brass<br>Guide | RG-132/U      | 6-1/2 x 3-1/4   | .00251                 | 338 On Order<br>100 Del. in<br>FY 53                     | AN/SPS-6C |
| Guide                       | —             | 3/4<br>circular | .06                    | Prod. Order = 4<br>1 Del. and 1 Prod.<br>Delvd. July '52 | AN/SPS-7  |
| Guide                       | RG-75/U       | 1-1/2 x 3       | .0075                  | 2 Dev. Delvd.<br>12 Prod.<br>+ 8 Antennas                | AN/SPS-8  |

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| Peak Power Output (kw) | Pulse Length ( $\mu$ sec) | Frequency (Mc)                | Pulse Rate (pps)  | Smallest Ship | Supplier                          |
|------------------------|---------------------------|-------------------------------|-------------------|---------------|-----------------------------------|
| 2 mw                   | 2                         | 3450 - 3570                   | 700<br>450        | DD            | G. E. Co.                         |
| 200                    | 0.25<br>1.3               | 5450 - 5825                   | 650               | PC            | Sylvania                          |
| 10 mw                  | 7                         | 1250 - 1350                   | 244               | CL            | G. E. Co.                         |
| 500                    | 1<br>4                    | 1250 - 1350                   | 600<br>300        | CL            | R.C.A.                            |
| 2 mw                   | 10                        | 2770 - 2830                   | 400               | DD            | Sperry Gyro. Co.                  |
| 500                    | 1<br>4                    | 1250 - 1350                   | 600<br>150        | —             | Stanford Research Inst.           |
| 100 w                  | 0.5                       | 9190                          | 607               | DE            | Sylvania                          |
| 500                    | 2.4                       | 1250 - 1350                   | 416               | PC            | Westinghouse                      |
| 1.5 mw                 | 5                         | 215 - 225<br>and<br>420 - 415 | 300               | DD            | NRL Exp. G. E. Co. Preprod. Model |
| 180                    | 0.15<br>and<br>1.0        | 6275 - 6575                   | 683               | PT            | Raytheon Mfg. Co.                 |
| 40                     | 0.25                      | 6275 - 6575                   | 7000              | DE            | Dalmo-Victor /NEL                 |
| 40                     | 0.25                      | 5450 - 5825                   | 7000              | DC            | Dalmo-Victor /NEL                 |
| 23                     | 0.17                      | 23,744 - 24,244               | 750               | LSM           | Sylvania                          |
| 200                    | 5                         | 195 - 205<br>215 - 225        | 60                | DD            | G. E. Co.                         |
| 50                     | 2                         | 3019 - 3100                   | 750<br>800<br>850 | DD            | Raytheon Mfg. Co.                 |

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| Maximum Reliable Range (miles)        |                                     | Scan Coverage |                               | Scan Rate rpm  |                          | Beamwidths |                                   |
|---------------------------------------|-------------------------------------|---------------|-------------------------------|----------------|--------------------------|------------|-----------------------------------|
| 2200T DD                              | 20 m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°)                     | Hor.           | Vert.                    | Hor. (°)   | Vert. (°)                         |
| 20                                    | 90                                  | 30<br>360     | 36                            | 1/2/4 & Manual | 12/sec & Manual          | 1.6        | 1.3                               |
| 20                                    | 20                                  | 360           | 14 + 12<br>csc <sup>2</sup> θ | 16             | —                        | 1.3        | 14 + 12<br>csc <sup>2</sup> θ     |
| 20                                    | 200                                 | 360           | 30                            | 3.3/10         | —                        | 2.7        | 4.6 each Beam                     |
| 20                                    | 80                                  | 360           | 30                            | 2½ - 15        | —                        | 3.3        | 30                                |
| 20                                    | 180                                 | 360           | 23 to 90,000 ft               | 6/3            | Stacked Beam. No Scan.   | 1.5        | 7 Beams<br>2.8 each               |
| 20                                    | 50                                  | 360           | 30                            | 5/10/15        | —                        | 3.5        | 30                                |
| —                                     | —                                   | 360           | 3.8                           | 6              | 0                        | 1.9        | 3.8                               |
| 20                                    | 50                                  | 360           | 45                            | 5/15           | —                        | 4          | 45                                |
| 20                                    | 200                                 | 360           | 36                            | —              | —                        | 18<br>9    | 30<br>18                          |
| 20                                    | 30                                  | 360           | 0 - 60                        | 17             | 90 in 5 - 15 sec. period | 1.6        | 14 Fan<br>12 (csc <sup>2</sup> θ) |
| 6 ft periscope - 7 miles; state 3 sea |                                     | 360           | 3.0                           | 1000           | 0                        | 3.0        | 3.0                               |
| 6 ft periscope - 7 miles; state 3 sea |                                     | 360           | 3.5                           | 1000           | 0                        | 3.5        | 3.5                               |
| 8                                     | —                                   | 360           | 10                            | 0.6<br>6.0     | —                        | 0.8        | 10                                |
| 8                                     | 50                                  | 360           | 60                            | 4              | —                        | 22         | 60                                |
| 15                                    | 10                                  | 360           | 15                            | 4/8/16         | —                        | 5          | 15                                |

| Main Lobe DB Gain | Minor Lobe DB Down | Reflector                  |                | Ant. Weight (lb) | Total System Weight (lb) | 90 Knot Wind Load (lb) | Range Resolution (yd) |
|-------------------|--------------------|----------------------------|----------------|------------------|--------------------------|------------------------|-----------------------|
|                   |                    | Type                       | Size (ft)      |                  |                          |                        |                       |
| 42                | —                  | parabolic section          | 12 x 15        | 4500             | 6 tons                   | —                      | 333                   |
| 33                | 27                 | parabolic section          | 2 x 10         | 275              | 1600                     | —                      | —                     |
| 32.9              | 25 side<br>28 back | diamond contour paraboloid | 26 x 13        | 10 tons          | 24 tons                  | —                      | —                     |
| 27.5              | 23 side<br>26 back | parabolic section          | 5-3/4 x 17-1/6 | 1000             | 4500                     | 1100                   | —                     |
| 37.5              | 30                 | diamond contour paraboloid | 20 x 9-1/4     | 6000             | 13 tons                  | —                      | 1700                  |
| 27.5              | 23 side<br>26 back | parabolic section          | 5-3/4 x 17-1/6 | 803              | —                        | 1500                   | —                     |
| 32                | 27                 | truncated parabola         | 2-1/2 x 4-1/2  | 180              | 1800                     | —                      | 50 and 200            |
| 27.5              | —                  | parabolic section          | 4-1/2 x 16     | 450              | 1900                     | 1500                   | —                     |
| 18.2              | —                  | 4 x 7 array paraboloid     | 8-1/2 x 17-1/2 | 1200             | —                        | —                      | —                     |
| 22                | —                  |                            | 8-1/2 x 17-1/2 | 1200             | —                        | —                      | —                     |
| 29.5              | 28                 | cylindrical parabola       | 2-1/6 x 7      | 100              | 707                      | —                      | 30 and 200            |
| 33                | 27.5               | full parabola              | 3-1/2          | 175              | 3000 (approx.)           | —                      | 50                    |
| 33                | 27.5               | full parabola              | 3-1/2          | 175              | 3000 (approx.)           | —                      | 50                    |
| 34                | 30                 | parabolic section          | 3/4 x 5        | 305              | —                        | 450                    | —                     |
| 13.5              | 18.4               | 12 dipole mattress         | 4 x 15         | 600              | 2425                     | 1200                   | —                     |
| 23                | 19                 | parabolic section          | 1-1/4 x 4      | 340              | 2120                     | 330                    | —                     |

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| Maximum Reliable Range (miles)        |                                     | Scan Coverage |                               | Scan Rate rpm  |                          | Beamwidths |                                   |
|---------------------------------------|-------------------------------------|---------------|-------------------------------|----------------|--------------------------|------------|-----------------------------------|
| 2200T DD                              | 20 m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°)                     | Hor.           | Vert.                    | Hor. (°)   | Vert. (°)                         |
| 20                                    | 90                                  | 30<br>360     | 36                            | 1/2/4 & Manual | 12/sec & Manual          | 1.6        | 1.3                               |
| 20                                    | 20                                  | 360           | 14 + 12<br>csc <sup>2</sup> θ | 16             | —                        | 1.3        | 14 + 12<br>csc <sup>2</sup> θ     |
| 20                                    | 200                                 | 360           | 30                            | 3.3/10         | —                        | 2.7        | 4.6 each Beam                     |
| 20                                    | 80                                  | 360           | 30                            | 2½ - 15        | —                        | 3.3        | 30                                |
| 20                                    | 180                                 | 360           | 23 to 90,000 ft               | 6/3            | Stacked Beam. No Scan.   | 1.5        | 7 Beams<br>2.8 each               |
| 20                                    | 50                                  | 360           | 30                            | 5/10/15        | —                        | 3.5        | 30                                |
| —                                     | —                                   | 360           | 3.8                           | 6              | 0                        | 1.9        | 3.8                               |
| 20                                    | 50                                  | 360           | 45                            | 5/15           | —                        | 4          | 45                                |
| 20                                    | 200                                 | 360           | 36                            | —              | —                        | 18<br>9    | 30<br>18                          |
| 20                                    | 30                                  | 360           | 0 - 60                        | 17             | 90 in 5 - 15 sec. period | 1.6        | 14 Fan<br>12 (csc <sup>2</sup> θ) |
| 6 ft periscope - 7 miles; state 3 sea |                                     | 360           | 3.0                           | 1000           | 0                        | 3.0        | 3.0                               |
| 6 ft periscope - 7 miles; state 3 sea |                                     | 360           | 3.5                           | 1000           | 0                        | 3.5        | 3.5                               |
| 8                                     | —                                   | 360           | 10                            | 0.6<br>6.0     | —                        | 0.8        | 10                                |
| 8                                     | 50                                  | 360           | 60                            | 4              | —                        | 22         | 60                                |
| 15                                    | 10                                  | 360           | 15                            | 4/8/16         | —                        | 5          | 15                                |

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| Transmission Line           |                 |                |                        | No. in Use<br>or Tent.<br>Available<br>Date | MODEL              |
|-----------------------------|-----------------|----------------|------------------------|---|--------------------|
| Type                        | Number          | Size<br>(inch) | 1 Way<br>db/ft<br>Loss |   |                    |
| Guide                       | RC-75/U         | 1-1/2 x 3      | .0075                  | 1 Pre-Prod.<br>FY-54                        | AN/SPS-8A          |
| Guide                       | RC-49/U         | 1 x 2          | .02                    | 14 Prod. FY-53<br>260 Prod. FY-54           | AN/SPS -10<br>-10x |
| Guide                       | CAY -<br>14ACM  | 6-1/2 x 3-1/4  | .00251                 | 1<br>FY-54                                  | AN/SPS-11          |
| Thin Wall<br>Brass<br>Guide | —               | 6-1/2 x 3-1/4  | .00251                 | 136 on order<br>starting in<br>FY-53        | AN/SPS-12          |
| Guide                       | RC-75/U         | 1-1/2 x 3      | .0075                  | 2 in<br>FY-55                               | AN/SPS-13          |
| Guide                       | CAY -<br>14 ACM | 6-1/2 x 3-1/4  | .00251                 | —   | AN/SPS-14          |
| Guide                       | RG-51/U         | 1-1/4 x 5/8    | .004                   | Dev. 1<br>FY-54                             | AN/SPS-15          |
| Guide                       | Special         | 1 x 8          | —                      | 2 Dev. in<br>FY-53                          | AN/SPS-16          |
| —                           | —               | —              | —                      | 2 Dem. Models<br>FY-55                      | AN/SPS-17          |
| Guide                       | RG-50/U         | 1-1/2 x 3/4    | .0228                  | Dev. 2<br>FY-55                             | AN/SPS-18          |
| Guide                       | RG-50/U         | 1-1/2 x 3/4    | .0228                  | Dev. 1<br>Early 53                          | AN/SPS-19          |
| Guide                       | RG-49/U         | 2 x 1          | .02                    | Dev. 1<br>Early 53                          | AN/SPS-20          |
| Not required                |                 | —              | —                      | 14  | CXCJ<br>(CINDY)    |
| Coax.                       | RG-18/U         | 0.945          | .013                   | 41  | SC-5               |
| Guide                       | RG-48/U         | 1-1/2 x 3      | .00875                 | 300   | SG-1B              |

| MODEL         | Function          | General Facts   | Sec. Class. |
|---------------|-------------------|---|-------------|
| SG-3          | Surface           | 5 in. "A" 7 in. PPI console STD remotes.  | R           |
| SG-6          | Surface<br>Zenith | VJ repeater; 5 in. "A"; STD remotes; surface and Zenith search antennas on same pedestal.                             | R           |
| SG-7          | See AN/SPN-6      |   |             |
| SK-1<br>SK-2  | Air<br>Search     | Meter-wave search radar similar to SK. The SK-2 & SK-3 similar except antenna - 17 foot round, dipole fed paraboloid. | U           |
| SO-3          | Surface           | 5 in. PPI   | R           |
| SO-4          | Surface           | 5 in. PPI   | R           |
| SO-5          | Surface           | 5 in. PPI plus 5 in. PPI auxiliary bridge repeater.   | R           |
| SO-6, 10      | Surface           | 5 in. PPI SO-6 is 115V DC. SO-10 is 115V AC.  | R           |
| SP<br>SP-2    | Height<br>Finder  | 5 in. A/R, 7 in. PPI, 3 in. tracking, large console.<br>See AN/SPQ-2 SP-2 in mod. SP by Field Charge 23.              | R           |
| SRA           | Air<br>Search     | 7 in. PPI, 5 in. "A" STD remotes. SRA is field modified SR using plate modulation.                                    | U           |
| SR-2          | Air<br>Search     | 7 in. PPI, 5 in. "A" STD remotes.   | R           |
| SR-3<br>SR-3A | Air<br>Search     | 5 in. STD remote.<br>SR-3A is SR-3 with SPS-6 antenna.  | R           |
| SR-3B         | Air<br>Search     | SR-3 with SPS-6A antenna.<br>5 in. "A" STD remotes.   | R           |
| SR-6<br>SR-6A | Air<br>Search     | 5 in. "A" STD remotes.<br>SR-6A is SR-6 with SPS-6 antenna.   | R           |
| SR-6B         | Air<br>Search     | SR-6 with SPS-6B antenna.<br>5 in. "A" STD. remotes.  | R           |

| Peak Power Output (kw) | Pulse Length ( $\mu$ sec)           | Frequency (Mc)                | Pulse Rate (pps) | Smallest Ship | Supplier          |
|------------------------|-------------------------------------|-------------------------------|------------------|---------------|-------------------|
| 400                    | 0.33<br>1.25                        | 3550-3700                     | 750              | CL            | Raytheon Mfg. Co. |
| 200                    | 0.37<br>1.3                         | 6275-6575                     | 650              | DD            | Raytheon Mfg. Co. |
|                        |                                     |                               |                  |               |                   |
| 200                    | 5                                   | 215-220                       | 60               | CL            | G. E. Co.         |
| 20                     | 1                                   | 9000-9160                     | 400              | PT            | Raytheon Mfg. Co. |
| 50                     | 1                                   | 9000-9160                     | 400              | PC            | Raytheon Mfg. Co. |
| 200                    | 0.37                                | 6275-6575                     | 400              | PT            | Raytheon Mfg. Co. |
| 200                    | 0.37<br>1.3                         | 6275-6575                     | 630              | PC            | Raytheon Mfg. Co. |
| 700                    | 1<br>5                              | 2785-2820                     | 600<br>120       | DDR           | G. E. Co.         |
| 300                    | 1 & 4 at<br>200 pps<br>20 at 60 pps | 175-185<br>195-205<br>215-225 | 200<br>&<br>60   | DD            | Westinghouse      |
| 350                    | 1<br>4                              | 550-660                       | 180<br>600       | CL            | R. C. A.          |
| 500                    | 1<br>4                              | 1244-1350                     | 150<br>600       | CL            | Westinghouse      |
| 500                    | 1<br>4                              | 1244-1350                     | 600<br>150       | CL            | Westinghouse      |
| 500                    | 2                                   | 1244-1350                     | 300              | DD<br>CL      | Westinghouse      |
| 500                    | 2                                   | 1244-1350                     | 300              | DD            | Westinghouse      |

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| Maximum Reliable Range (miles) |                                     | Scan Coverage |                                     | Scan Rate (rpm)  |        | Beamwidths |                                     |
|--------------------------------|-------------------------------------|---------------|-------------------------------------|------------------|--------|------------|-------------------------------------|
| 2200 T DD                      | 20 m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°)                           | Hor.             | Vert.  | Hor. (°)   | Vert. (°)                           |
| 20                             | 20                                  | 360           | 10                                  | 2.5 - 5          | -      | 2.6        | 10                                  |
| 15<br>0                        | 15<br>12                            | 360<br>360    | 14 +<br>12 csc <sup>2</sup> θ<br>50 | 5 - 15<br>5 - 15 | -<br>- | 2.5<br>2.2 | 14 +<br>12 csc <sup>2</sup> θ<br>50 |
| 12                             | 60                                  | 360           | 20                                  | 4                | -      | 20         | 20                                  |
| 9                              | -                                   | 360           | 9                                   | 9                | -      | 3.2        | 9                                   |
| 10                             | -                                   | 360           | 13                                  | 5                | -      | 1.5        | 13                                  |
| 12                             | -                                   | 360           | 17 +<br>15 csc <sup>2</sup> θ       | 15               | -      | 2.7        | 17 +<br>15 csc <sup>2</sup> θ       |
| 13                             | -                                   | 360           | 17 +<br>15 csc <sup>2</sup> θ       | 15               | -      | 2.7        | 17 +<br>15 csc <sup>2</sup> θ       |
| 20                             | 35                                  | 360           | 30                                  | 0 - 6            | Manual | 3          | 3                                   |
| 8                              | 50                                  | 360           | 50                                  | 7                | -      | 22         | 50                                  |
| 8                              | 55                                  | 360           | 22                                  | 7                | -      | 7.5        | 22                                  |
| 20<br>20                       | 30<br>70                            | 360           | 38<br>10                            | 5<br>5 - 15      | -<br>- | 4<br>3.2   | 38<br>10                            |
| 20                             | 60                                  | 360           | 20                                  | 5 - 15           | -      | 3.2        | 20                                  |
| 20<br>20                       | 25<br>75                            | 360<br>360    | 30<br>10                            | 5 - 15<br>5 - 15 | -<br>- | 8<br>3.2   | 30<br>10                            |
| 20                             | 50                                  | 360           | 30                                  | 5 - 15           | -      | 3.2        | 30                                  |

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| Main Lobe DB Gain | Minor Lobe DB Down | Reflector                |                            | Ant. Weight (lb) | Total System Weight (lb) | 90 Knot Wind Load (lb) | Range Resolution |
|-------------------|--------------------|--------------------------|----------------------------|------------------|--------------------------|------------------------|------------------|
|                   |                    | Type                     | Size (ft)                  |                  |                          |                        |                  |
| 27.5              | 24                 | Parabolic Section        | 1-2/3 x 7-1/2              | 425              | 3970<br>4205             | 425                    | --               |
| 28<br>23          | 25<br>20           | Parabolic Section        | 1-1/2 x 5<br>4-1/6 x 4-1/2 | 600              | -                        | 600<br>600             | --               |
| 19.5              | 18                 | 36 Dipole Mattress       | 17 x 17                    | 2400             | 4600                     | 2000                   | --               |
| 30                | 26                 | Parabolic Section        | 1/2 x 1/3                  | 125              | 875                      | 136                    | --               |
| 32                | 25                 | Parabolic Section        | 1/2 x 4                    | 160              | 1561                     | 237                    | --               |
| 27                | 25                 | Parabolic Section        | 1 x 4                      | 175              | 881                      | 200                    | --               |
| 27                | 25                 | Parabolic Section        | 1 x 4                      | 225              | 1870                     | 250                    | --               |
| 32                | 20                 | Parabola                 | 8' Dish                    | 2700             | 6235                     | 900                    | --               |
| 15                | 18                 | Mattress                 | 6 x 15                     | 711              | 2678                     | 1400                   | --               |
| 22                | 30                 | Parabolic Section        | 6 x 15                     | 790              | 4771                     | 1700                   | --               |
| 23<br>28.8        | -<br>21            | Parabolic Linear Section | 1-1/2 x 17<br>5 x 18       | 750<br>750       | 4317                     | 1600<br>1100           | --               |
| 27.3              | 22                 | Parabolic Section        | 6 x 17-1/2                 | 750              | -                        | 1450                   | --               |
| 21<br>28.8        | -<br>21            | Parabolic Linear Section | 1-1/2 x 9<br>5 x 18        | 375<br>750       | 2283                     | 425<br>1100            | --               |
| 27.0              | 26                 | Parabolic Section        | 6 x 17-1/2                 | 750              | -                        | 1500                   | --               |

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SECURITY INFORMATION

| Stabilization |           |            |             | Power Source                   |         |                |            |
|---------------|-----------|------------|-------------|--------------------------------|---------|----------------|------------|
| Type          | Accuracy  | Roll Limit | Pitch Limit | Volts                          | Phase   | Freq.          | KVA        |
| Stable Base   | --        | --         | --          | 440 - 220<br>or 115            | 1       | 60             | 4          |
| --            | --        | --         | --          | 440<br>220<br>115              | 1       | 60             | 4          |
| --            | --        | --         | --          | 115                            | 1       | 60             | 4.75       |
| --            | --        | --         | --          | 26                             | DC      | DC             | 1.7        |
| --            | --        | --         | --          | 115                            | DC      | DC             | 2.8        |
| --            | --        | --         | --          | 26                             | DC      | DC             | 2.1        |
| --            | --        | --         | --          | 115<br>115                     | 1<br>DC | 60<br>DC       | 2.5<br>3.0 |
| 3 Axis        | ± 25 min. | 30         | 10          | 220 or 440 AC<br>115 or 230 DC | 1<br>3  | 60<br>or<br>DC | 15         |
| --            | --        | --         | --          | 115                            | 1       | 60             | 7.5        |
| --            | --        | --         | --          | 115                            | 1       | 60             | 7.0        |
| --            | --        | --         | --          | 115<br>115                     | 1<br>1  | 60<br>60       | 5.0<br>5.0 |
| --            | --        | --         | --          | 115                            | 1       | 60             | 5.0        |
| --            | --        | --         | --          | 115<br>115                     | 1<br>1  | 60<br>60       | 5.0<br>5.0 |
| --            | --        | --         | --          | 115                            | 1       | 60             | 5.0        |

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| Transmission Line |               |               |                        | No. in Use<br>or Tentative<br>Available<br>Date            | MODEL         |
|-------------------|---------------|---------------|------------------------|--|---------------|
| Type              | Number        | Size<br>(in.) | 1 Way<br>db/ft<br>Loss |  |               |
| Guide             | RG-48/U       | 1-1/2 x 3     | .00875                 | 6  | SG-3          |
| Guide             | RG-50/U       | 1-1/2 x 3-1/4 | .0228                  | 48   | SG-6          |
|                   |               |               |                        |  | SG-7          |
| Coax              | Gas           | 1-5/8         | .00003                 | Several<br>Obsolescent                                     | SK-1<br>SK-2  |
| Guide             | RG-51/U       | 5/8 x 1-1/4   | .044                   |  | SO-3          |
| Guide             | RG-51/U       | 5/8 x 1-1/4   | .044                   | 50   | SO-4          |
| Guide             | RG-50/U       | 1-1/2 x 3/4   | .0228                  |  | SO-5          |
| Guide             | RG-50/U       | 1-1/2 x 3/4   | .0228                  | 3  | SO-6, 10      |
| Guide             | RG-48/U       | 1-1/2 x 3     | .00875                 | 8 (SP-2s)<br>FY 50<br>111 (SP's)                           | SP<br>SP-2    |
| Coax              | RG-20/U       | 1-1/5         | .011                   | 97   | SRa           |
| Coax              | Gas           | 1-5/8         | .00004                 |  | SR-2          |
| Guide             | RG-69/U       | 3-1/4 x 6-1/2 | .00251                 | 18(SR-3)   | SR-3<br>SR-3A |
| Guide             | CAY<br>14 ACM | 6-1/2 x 3-1/4 | .00251                 |  | SR-3B         |
| Guide             | CAY<br>14 ACM | 6-1/2 x 3-1/4 | .00251                 | {<br>Total of<br>SR-6 Series<br>}<br>= 60<br>Nearly All 6B | SR-6<br>SR-6A |
| Guide             | CAY<br>14 ACM | 6-1/2 x 3-1/4 | .00251                 |  | SR-6B         |

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| MODEL   | Function                     | General Facts   | Sec. Class. |
|---------|------------------------------|---|-------------|
| SS-1    | Surface Torpedo F. C.        | 5 in. PPI 3 in. A/B indicator console.  | R           |
| SS-2    |                              | Same as SS-1 with field changes.  | R           |
| SS-2A   |                              | Modification kit to replace SS-2 antenna with streamline AN/BPS-1 antenna and control box. AN/BPS-1 quick-look feature will be deleted.   | C           |
| ST-1    | Range Only                   | SS-1 below deck components. Antenna in periscope.   | R           |
| SU/SU-1 | Surface                      | 5 in. "A," 5 in. PPI, SU is 115V AC. SU-1 is 115 V DC.  | U           |
| SU-2    | Surface                      | Medium weight medium power X-band surface research systems 5 in. "A" 5 PPI STD remotes.   | R           |
| SV-1    | Air Search                   | 5 in. PPI 3 in. A/B console (CXLJ-triple antenna development for radar TFF and RCM).  | R           |
| SV-2    | Height Finder                | VF and SS indicator; amplidyne train and elevation control.   | C           |
| SV-2A   |                              | Modification kit to SV-2 to improve operation and increase vertical scan rate. VL used in lieu of VF and height computer.   | C           |
| SV-3    | Air Search                   | VK, 3 in. "A" scope, hydrogen thyratron modulator on basic SV-1. 2-12 in. PPI's.  | C           |
| SV-4    | G/M Track                    | Sector scan and large antenna on SV-1.  | C           |
| SV-5    |                              | Modification to SV-4 to accommodate new computer. New indicators (one for range, one for bearing). Retractable antenna.   | C           |
| SX      | Height Finder Early Warning  | Two radius in a common system and antenna mount - on re-search, on height. Height is determined by rapid vertical scan as antenna rotates in azimuth. Five 7-in. PPI/RHI/Map scan consoles or std. remote indicators. | R           |
| SX-2    | Height Finder Early Warning. | Two radius in a common system and antenna mount - on re-search, on height. Height finding antenna can be elevated from 0-25° permitting 11° scan to cover any 11° between 0° and 36°.                                 |             |
|         |                              |   |             |

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| Peak Power Output (kw) | Pulse Length ( $\mu$ sec) | Frequency (Mc)             | Pulse Rate (pps) | Smallest Ship | Supplier               |
|------------------------|---------------------------|----------------------------|------------------|---------------|------------------------|
| 85                     | 0.5                       | 8740 - 8890                | 600              | SS            | Western Elec. Co.      |
| -                      | -                         | -                          | -                | -             | Western Elec. Co.      |
| -                      | -                         | -                          | -                | -             | Western Elec. Co.      |
| 85                     | 0.5                       | 8740 - 8890                | 600              | SS            | Western Elec. Co.      |
| 50                     | 0.5<br>1                  | 9000 - 9160                | 600              | DE            | Raytheon Mfg. Co.      |
| 50                     | 0.25<br>1                 | 9000 - 9160                | 600              | DE            | Raytheon Mfg. Co.      |
| 500                    | 1                         | 3400 - 3650                | 400              | SS            | Western Elec. Co.      |
| 500                    | 1                         | 3400 - 3650                | 400              | SS            | Western Elec. Co.      |
| -                      | -                         | -                          | -                | -             | N. Y. Naval Shipyard   |
| 600                    | 1                         | 3400 - 3650                | 400              | SS            | Western Elec. Co.      |
| 500                    | 1                         | 3400 - 3650                | 400              | SS            | N.E.L./Stavid Eng. Co. |
|                        |                           |                            |                  |               | N.E.L./Stavid Eng. Co. |
| 700<br>1000            | 1                         | 3500 - 3550<br>2780 - 2900 | 1170<br>390      | -             | G. E. Co.              |
|                        |                           |                            |                  |               |                        |
|                        |                           |                            |                  |               |                        |

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| Maximum Reliable Range (mile) |                                     | Scan Coverage |            | Scan Rate rpm                     |         | Beamwidths |           |
|-------------------------------|-------------------------------------|---------------|------------|-----------------------------------|---------|------------|-----------|
| 2200 T DD                     | 20 m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°)  | Hor.                              | Vert.   | Hor. (°)   | Vert. (°) |
| 12                            | —                                   | 360           | 16         | 0-8                               | —       | 2.6        | 16        |
|                               | —                                   | —             | —          | —                                 | —       | —          | —         |
|                               | —                                   | —             | —          | —                                 | —       | —          | —         |
| 10                            | —                                   | 360           | 12         | Hand                              | —       | 25         | 12        |
| 15                            | —                                   | 360           | 3.8        | 6                                 | —       | 3.8        | 3.8       |
| 20                            | —                                   | 360           | 3.8        | 6                                 | —       | 1.9        | 3.8       |
| 15                            | 25                                  | 360           | 60         | 0-6                               | —       | 5.5        | 60        |
|                               | 35 Loon                             | 360           | -10 to +80 | 0-6                               | 20°/sec | 5          | 2.3       |
|                               | —                                   | 360           | 30         | 10°/sec 30° sector scan in 10 sec | 2 cps   | —          | —         |
| 15                            | 30                                  | 360           | 60         | 0-6                               | —       | 5.5        | 60        |
| 15                            | 85 Beacon                           | 360           | 5          | 0-6                               | —       | 2.3        | 5         |
|                               | —                                   | —             | —          | —                                 | —       | —          | —         |
| 20                            | 40                                  | 360           | 11         | 0-4                               | 10°/sec | 3.5        | 1.1       |
| 20                            | 60                                  | 360           | 18         | 0-4                               | —       | 1.6        | 18        |
|                               |                                     |               |            |                                   |         |            |           |
|                               |                                     |               |            |                                   |         |            |           |

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| Main Lobe DB Gain | Minor Lobe DB Down | Reflector              |                  | Ant. Weight (lb) | Total System Weight (lb) | 90 Knot Wind Load (lb) | Range Resolution |
|-------------------|--------------------|------------------------|------------------|------------------|--------------------------|------------------------|------------------|
|                   |                    | Type                   | Size (ft)        |                  |                          |                        |                  |
| 26                | 21                 | Parabolic Section      | 3/4 x 2-1/2      | 200              | 6200                     | -                      | -                |
| -                 | -                  | -                      | -                | -                | -                        | -                      | -                |
| -                 | -                  | -                      | -                | -                | -                        | -                      | -                |
| 14                | 16                 | Parabolic Window       | 1/2 x 1/4        | -                | 844                      | -                      | -                |
| 33                | 25                 | Full Parabola          | 2 ft dia.        | 210              | 1275<br>1900             | 150                    | -                |
| 36                | 28                 | Parabolic Section      | 2 x 4-1/2        | 180              | 2500                     | 200                    | -                |
| 23.5              | 26                 | Parabolic Section      | 2 x 4            | 370              | 3400                     | -                      | -                |
| 33                | 24                 | Parabolic Section      | 8 x 3            | 3000             | -                        | -                      | -                |
| -                 | -                  | -                      | -                | 4000             | 8300                     | -                      | -                |
| 23.5              | 26                 | Paraboloid             | 2 x 4            | 370              | 5000                     | -                      | -                |
| 33                | 24                 | Parabolic Section      | 3 x 8            | 1000             | -                        | -                      | -                |
| -                 | -                  | -                      | -                | -                | 5000                     | -                      | -                |
| 37<br>34          | 17<br>20           | Parabola<br>Paraboloid | 15 x 5<br>5 x 14 | 6400<br>6400     | 22,000                   | 4000<br>4000           | -<br>-           |
|                   |                    |                        |                  |                  |                          |                        |                  |
|                   |                    |                        |                  |                  |                          |                        |                  |

| Stabilization |                   |                              |                               | Power Source |         |           |          |
|---------------|-------------------|------------------------------|-------------------------------|--------------|---------|-----------|----------|
| Type          | Accuracy          | Roll Limit<br>( $^{\circ}$ ) | Pitch Limit<br>( $^{\circ}$ ) | Volts        | Phase   | Frequency | KVA      |
| -             | -                 | -                            | -                             | 115          | 1       | 60        | 3.8      |
| -             | -                 | -                            | -                             | -            | -       | -         | -        |
| -             | -                 | -                            | -                             | -            | -       | -         | -        |
| -             | -                 | -                            | -                             | 115          | 1       | 60        | 3.8      |
| 2 Axis        | $\pm 2.5^{\circ}$ | $\pm 45$                     | $\pm 7$                       | 115<br>115   | 1<br>DC | 60        | 2.3<br>4 |
| 2 Axis        | $\pm 1.0^{\circ}$ | $\pm 30$                     | $\pm 5$                       | 115          | 1       | 60        | 3.5      |
| -             | -                 | -                            | -                             | 115          | 1       | 60        | 6        |
| 2 Axis        | $\pm 2.5^{\circ}$ | $\pm 25$                     | $\pm 10$                      | 115          | 1       | 60        | 6        |
| -             | -                 | -                            | -                             | -            | -       | -         | -        |
| -             | -                 | -                            | -                             | 115          | 1       | 60        | 6        |
| -             | -                 | -                            | -                             | 115          | 1       | 60        | 6        |
| -             | -                 | -                            | -                             | -            | -       | -         | -        |
| 3 Axis        | $\pm 30$ min.     | 15                           | 5                             | 440          | 3       | 60        | 37.5     |
| 3 Axis        | $\pm 30$ min.     | 15                           | 5                             | 440          | 3       | 60        | 37.5     |
|               |                   |                              |                               |              |         |           |          |
|               |                   |                              |                               |              |         |           |          |

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SECURITY INFORMATION

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| Transmission Line |         |               |                        | No. in Use<br>or Tent.<br>Available<br>Date | MODEL   |
|-------------------|---------|---------------|------------------------|---|---------|
| Type              | Number  | Size<br>(in.) | 1 Way<br>db/ft<br>Loss |   |         |
| Guide             | RG-51/U | 5/8x1-1/4     | .044                   | 70  | SS-1    |
| -                 | -       | -             | -                      | 66 Prod.<br>FY 52-53                        | SS-2    |
| -                 | -       | -             | -                      | 19 Prod.<br>(1953)                          | SS-2A   |
| Guide             | RG-51/U | 5/8x1-1/4     | .044                   | 30  | ST-1    |
| Guide             | RG-51/U | 5/8x1-1/4     | .044                   | 250   | SU/SU-1 |
| Guide             | RG-51/U | 5/8x1-1/4     | .044                   | -   | SU-2    |
| Guide             | RG-48/U | 1-1/2x3       | .00875                 | 17  | SV-1    |
| Guide             | RG-48/U | 1-1/2x3       | .00875                 | FY 50                                       | SV-2    |
| -                 | -       | -             | -                      | 2 Dev.<br>(1952)                            | SV-2A   |
| Guide             | RG-48/U | 1-1/2x3       | .00875                 | FY 51                                       | SV-3    |
| Guide             | RG-48/U | 1-1/2x3       | .00875                 | 1   | SV-4    |
| -                 | -       | -             | -                      | 3 Dev.<br>(1952)                            | SV-5    |
| Guide             | RG-48/U | 1-1/2x3       | .00875                 | 18  | SX      |
|                   |         |               |                        | 1 Built                                     | SX-2    |
|                   |         |               |                        |   |         |

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**Section 2**  
**Landbased Search Radars**

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| MODEL                  | Function  | General Facts  | Sec. Class. |
|------------------------|---|--|-------------|
| AN/APS-2               | Weather Trucking                                |  | U           |
| AN/CPS-1               | Microwave E.W.                                  |  | R           |
| AN/GMQ-2               | Ceilometer                                      |  | U           |
| AN/KPQ-1               | Mortar Locator                                  | To locate high trajectory projectiles and their source. Uses 6 stationary beams, amphibious.                               | C           |
| AN/MPQ-2A              | Air Search and Tracking                         | Modified SCR 584. For detection and tracking of close support aircraft. Includes plotting board.                           | C           |
| AN/MPS-4               | Height Finder                                   | Has RHI, PPI and "A" scope mounted in operations shelter. Elevation accuracy +200 feet at 20 miles under ideal conditions. | R           |
| AN/MSQ-3               | Ground Terminal of Airborne Early Warning (AEW) | Consists of AN/SRR-4 and AN/UPA-25.  |             |
| AN/MSQ-4               | Air Field Surveillance                          | Consists of AN/TPS-1D, AN/UPX-1, AN/UPH-25, and communication equipment.   | C           |
| AN/TPS-1B              | General Search                                  |  | R           |
| AN/TPS-1D or AN/TPS-15 | General Search                                  | To replace AN/TPS-1B, MTI, PPI, and "A" scopes   | R           |
| AN/TPX-17              | Mark-X IFF                                      | Provides Mark-X IFF for SO-12, AN/TPS-1D, AN/MSG-1 and other Marine Corps Equipments.                                      | C           |
| AN/TPX-18              | Mark-X IFF                                      | Provides Mark-X IFF for AN/CPS-5 and AN/MPS-11A.   | C           |
| AN/UPS-1               | General Search                                  | Transportable with miniature techniques. Will replace AN/TPS-1D.   | C           |
|                        |   |  |             |
|                        |   |  |             |

| Peak Power (kw)   | Pulse Length ( $\mu$ sec) | Frequency Range (Mc) | Pulse Rate (pps)        |
|-------------------|---------------------------|----------------------|-------------------------|
| 50                | 1.0                       | 3300                 | 650                     |
| 750               | 1.0                       | 2800                 | 350                     |
|                   |                           |                      |                         |
| 750               | 0.5                       | 2800-3000            | 1000 per beam           |
| 285               | 0.8                       | 2905-2845            | 731                     |
| 200               | 1.3 or .37                | 6275-6575            | 615 to 650 motor driven |
|                   |                           |                      |                         |
| Same as AN/TPS-1D |                           |                      |                         |
| 600               | 4.                        | 1200-1280            | 200                     |
| 500               | 2.0                       | 1220-1350            | 360-400                 |
| 2                 | Two 1 $\mu$ pulses        | 1010-1120            | 50-410                  |
| 2                 | Two 1 $\mu$ pulses        | 1010-1120            | 50-410                  |
| 600               | 4.                        | 1220-1350            | 200                     |
|                   |                           |                      |                         |
|                   |                           |                      |                         |



| Maximum Reliable Range (miles) |                                    | Scan Coverage |                 | Scan Rate (rpm) |                      |
|--------------------------------|------------------------------------|---------------|-----------------|-----------------|----------------------|
| 2200 T DD                      | 20m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°)       | Hor.            | Vert.                |
|                                |                                    | 360           | -20 to 20       | 12 or 24        |                      |
|                                |                                    |               |                 |                 |                      |
|                                |                                    |               |                 |                 |                      |
| -                              | -                                  | 3             | 5               |                 | -                    |
| -                              | -                                  | 360           | -70 +0<br>+1580 | 6               | Manual Tracking      |
| -                              | 65                                 | 360           | -5 to +25       | 6               | 1 to 1-1/2 Scan/Sec. |
|                                |                                    |               |                 |                 |                      |
|                                |                                    |               |                 |                 |                      |
| Horizon Limited                | 100                                | 360           | None            | 6               | -                    |
| -                              | 100                                | 360           | None            | 0-15            | -                    |
| -                              | -                                  | 360           | -               | 0-15            | None                 |
| -                              | -                                  | 360           | -               | 0-15            | None                 |
| -                              | 100                                | 360           | None            | 0-15            | -                    |
|                                |                                    |               |                 |                 |                      |
|                                |                                    |               |                 |                 |                      |



| Beamwidth |           | Main Lobe DB Gain | Minor Lobe DB Gain | Reflector            |           |
|-----------|-----------|-------------------|--------------------|----------------------|-----------|
| Hor. (°)  | Vert. (°) |                   |                    | Type                 | Size (ft) |
| 9         | 9         |                   |                    |                      |           |
|           |           |                   |                    |                      |           |
|           |           |                   |                    |                      |           |
| -         | -         | -                 | -                  | -                    | -         |
| 3         | 3         | 34                | -                  | Circular Paraboloid  | 8         |
| 4         | 8         | 36.5              | Coma lobe 9 db     | Paraboloidal Section | 3 x 15    |
|           |           |                   |                    |                      |           |
|           |           |                   |                    |                      |           |
| 3         | 11        | 28                | -                  | Paraboloid           | 4 x 15    |
| 4         | 12        | 26                | -                  | Paraboloid           | 4 x 15    |
|           |           |                   |                    |                      |           |
| 7         | 30        | -                 | -                  | Linear array         | 1 x 10    |
| 7         | 30        | -                 | -                  | Linear array         | 1 x 10    |
|           |           |                   |                    |                      |           |
| 3         | 11        | 28                | -                  | Paraboloid           | 4 x 15    |
|           |           |                   |                    |                      |           |
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| Total System Weight | Range Resolution | Transmission Line |        |             |  |
|---------------------|------------------|-------------------|--------|-------------|--|
|                     |                  | Type              | Number | Size (in.)  |  |
| 350                 |                  |                   |        |             |  |
|                     |                  |                   |        |             |  |
|                     |                  |                   |        |             |  |
| -                   | -                | -                 | -      | -           |  |
| -                   | ±150             | Coax.             | -      | 7/8         |  |
| 5 Tons              | -                | Guide             | RG/50  | 1-1/2 x 3/4 |  |
|                     |                  |                   |        |             |  |
|                     |                  |                   |        |             |  |
| 2000                | -                | Coax.             | -      | 1 x 5/8     |  |
| 3000                | -                | Coax.             | -      | 1 x 5/8     |  |
| 1000                | -                | Coax.             | RG-8/U | -           |  |
| 1100                | -                | Coax.             | RG-8/U | -           |  |
| 1000 (Est.)         | -                | Coax.             | -      | 1 x 5/8     |  |
|                     |                  |                   |        |             |  |
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|  | Power Source         |                |                    |                  | Supplier                          | MODEL     |
|--|----------------------|----------------|--------------------|------------------|-----------------------------------|-----------|
|  | Volts                | Phase          | Frequency          | KVA              |                                   |           |
|  | 26 DC<br>115         | 1              | 400-2400           | 0.541<br>0.782   |                                   | AN/APS-2  |
|  | 120/208              | 3              | 60                 | 50               | G. E. Co.                         | AN/CPS-1  |
|  |                      |                |                    |                  |                                   | AN/GMQ-2  |
|  |                      |                |                    |                  |                                   | AN/KPQ-1  |
|  | 115                  | 3              | 60                 | 12               | L. H.<br>Terpenning<br>Co.        | AN/MPQ-2A |
|  | 115                  | 1 or 3Δ        | 60                 | 4.2              | Hazeltine<br>Electronics<br>Corp. | AN/MPS-4  |
|  |                      | 1              | 60                 |                  | Hazeltine<br>Electronics<br>Corp. | AN/MSQ-3  |
|  | 120-120<br>115<br>26 | 3-1<br>1<br>DC | 60-60<br>400<br>DC | 10-10<br>10<br>5 | Adler<br>Eng.<br>Co.              | AN/MSQ-4  |
|  | 115<br>27 DC         | 1              | 400                | 2.8<br>0.45      | Western<br>Elec. Co.              | AN/TPS-1B |
|  | 115                  | 1              | 400                | 5                | Raytheon<br>Mfg. Co.              | AN/TPS-1D |
|  | 115                  | 1              | 60                 | 2.5              | G. E. Co.                         | AN/TPX-17 |
|  | 115                  | 1              | 60                 | 2.5              | G. E. Co.                         | AN/TPX-18 |
|  | 115                  | 1              | 400                | 3                | RCA                               | AN/UPS-1  |
|  |                      |                |                    |                  |                                   |           |
|  |                      |                |                    |                  |                                   |           |

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| MODEL    | Function           | General Facts   | Sec. Class. |
|----------|--------------------|---|-------------|
| MK-33    | Surface and Air    |   | R           |
| SG-2S    | Surface Search     |   | U           |
| SK-1M    | Air Search         |   | U           |
| SO-7M/N  | Surface            | PPI.  | U           |
| SO-12M/N | Surface            | PPI. Noncoherent MTI developed.   | R           |
| SP-1M    | Height Finder      | "A," "R" scopes. PPI electrical hoist on antenna. 2 in use.   | R           |
| SX-1     | Height Finder (EW) |   | C           |
| ---      | Long Range Air     | To detect targets moving up to 700 mph. Provide multibeam scan every 4 sec height indication by V-beam. For tactical use. | C           |
|          |                    |   |             |
|          |                    |   |             |
|          |                    |   |             |
|          |                    |   |             |
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| Maximum Reliable Range (miles) |                                    | Scan Coverage |           | Scan Rate (rpm) |          |
|--------------------------------|------------------------------------|---------------|-----------|-----------------|----------|
| 2200 T DD                      | 20m <sup>2</sup> Aircraft B/S = .5 | Hor. (°)      | Vert. (°) | Hor.            | Vert.    |
|                                |                                    |               |           |                 |          |
| 15                             | 35                                 | 360           |           | 4, 8, 12        |          |
| 12                             | 60                                 | 360           | 20        | 0 - 5           |          |
| 35                             | -                                  | 360           | None      | 6               | -        |
| 35                             | -                                  | 360           | 2 or 6    | 6               | -        |
| -                              | 80                                 | 360           | 0 to 30   | 0 to 6          | -        |
| 20<br>20                       | 40<br>60                           | 360           | 11<br>18  | 0 - 4           | 10°/sec. |
| -                              | 200                                | 360           | 0 to 20   | 15°             |          |
|                                |                                    |               |           |                 |          |
|                                |                                    |               |           |                 |          |
|                                |                                    |               |           |                 |          |
|                                |                                    |               |           |                 |          |
|                                |                                    |               |           |                 |          |
|                                |                                    |               |           |                 |          |
|                                |                                    |               |           |                 |          |
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|                                |                                    |               |           |                 |          |
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| Total System Weight             | Range Resolution (yd) | Transmission Line |        |            |
|---------------------------------|-----------------------|-------------------|--------|------------|
|                                 |                       | Type              | Number | Size (in.) |
| 3000                            | ± 400                 | Guide             |        | 1-1/2 x 3  |
| 4600                            |                       |                   |        |            |
| 3212<br>(Less Trailer)          |                       | Guide             |        | 1-1/2 x 3  |
| 2590<br>(Less Trailer)          | ± 100                 | Guide             |        | 1-1/2 x 1  |
| 58, 391                         | -                     | Guide             |        | 1-1/2 x 3  |
|                                 |                       |                   |        |            |
| 35,000<br>(Less target vehicle) |                       |                   |        |            |
|                                 |                       |                   |        |            |
|                                 |                       |                   |        |            |
|                                 |                       |                   |        |            |
|                                 |                       |                   |        |            |
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|  | Power Source |        |           |      | Supplier          | MODEL    |
|--|--------------|--------|-----------|------|-------------------|----------|
|  | Volts        | Phase  | Frequency | KVA  |                   |          |
|  |              |        |           |      | Raytheon Mfg. Co. | MK-33    |
|  | 110/440      | 1      | 60        | 3    | Raytheon Mfg. Co. | SG-2S    |
|  | 115          | 1      | 60        | 4.75 | G. E. Co.         | SK-1M    |
|  | 115          | 1      | 60        | 2.2  | Raytheon Mfg. Co. | SO-7M/N  |
|  | 115          | 1      | 60        | 2.5  | Raytheon Mfg. Co. | SO-12M/N |
|  | 115          | 1 or 3 | 60        | 15   | G. E. Co.         | SP-1M    |
|  | 115          | 1 or 3 | 60        | 25   | G. E. Co.         | SX-1     |
|  |              | -      | -         | -    | -                 | -        |
|  |              |        |           |      |                   |          |
|  |              |        |           |      |                   |          |
|  |              |        |           |      |                   |          |
|  |              |        |           |      |                   |          |
|  |              |        |           |      |                   |          |
|  |              |        |           |      |                   |          |
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**Section 3**  
**Airborne Search and Weapon Control Radars**

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| MODEL                  | Function                        | General Facts   | Sec. Class. |
|------------------------|---------------------------------|---|-------------|
| AN/APA-5A              | Bombing Equipment               | Electronic bombing attachment to search radars.   | R           |
| AN/APA-5B              | Bombing Equipment               | Indicator equipment enables accurate LAB, HAB, and rocket release under any condition of AN/APA-5. Includes radial offset.  | C           |
| AN/APA-16              | Bombing Equipment               | Electronic bombing attachment to search radars.   | R           |
| AN/APA-44              | Nav. and Bombing Computer       | Ground position indicator.  | C           |
| AN/APA-88<br>AN/APS-37 | Anti-Snorkeling and Mine Laying | North stabilization and ground stabilization of all indicators. Attack indicator dark trace tube also relating stabilized. Gives pilot an integrated electronics display for radar, IFF beacon. | C           |
| AN/APB-3               | Bombing                         | Radar bombing system.   | C           |
| AN/APG-30              | Airborne Range Only             | Feeds continuous automatic radar range to optical fire-control computers.   | R           |
| AN/APG-34 (XN-1)       | Airborne Range Only             | Feeds continuous automatic radar range to optical fire-control computers.   | C           |
| AN/APG-34 (XN-2)       | Airborne Range Only             | Will probably become AN/APG-30A.  | C           |
| AN/APG-34 (XN-3)       | Airborne Range Only             | Fixed 18° x 18° antenna may be replaced by Servoed antenna. Subminiaturized. Designed for use against electronic and window jamming.  | C           |
| AN/APG-39 (XN-1)       | Airborne Range Only             | Designed particularly for flexible gunnery application antenna servoed to sight line supplies range and range rate.   | C           |
| AN/APG-43              | Intercept and Missile Radar     | Search, intercept, automatic tracking radar operating on FM/CW technique.   | C           |
| AN/APG-44              |                                 | Air to air ranging. Range and range rate outputs.   | C           |
| AN/APG-45              | Airborne Range Only             | Principally for development of subminiaturization techniques as applied to radar. Works in ambient temperature of approx. 85° C.  | C           |
| AN/APG-46 (XN-1)       |                                 | For air to air and air to ground ranging. Uses mono-pulse dual beam for air to ground ranging. Range and range rate outputs.  | C           |

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| Peak Power Output (kw) | Pulse Length ( $\mu$ sec) | Frequency Range (Mc)       | Pulse Rate (pps) | Aircraft Installation    |
|------------------------|---------------------------|----------------------------|------------------|--------------------------|
| -                      | Parent Radar              | Parent Radar               | -                | P2V - PBM                |
| -                      | Parent Radar              | Parent Radar               | -                | XP5Y<br>VA - VP          |
| -                      | Parent Radar              | Parent Radar               | -                | AD                       |
| -                      | -                         | -                          | -                | -                        |
| 70                     | 0.5    2.25<br>3.25       | 9375 $\pm$ 55              | 800, 300         | S2F-2                    |
| 70                     | 0.5    2.25<br>4.5        | 9375 $\pm$ 55              | 200, 800<br>400  | Attack and patrol bomber |
| 5-10                   | 0.5                       | 9335 - 9415                | 800              | F2H-2<br>F9F-2, 4, 5, 6  |
| 40                     | 0.5                       | 9125 - 9275                | 2000             | Fighter Type             |
| 5-10                   | 0.5                       | 9000 - 9290<br>9330 - 9600 | 800              | Fighter Type             |
| 5-10                   | 0.5                       | 9000 - 9290<br>9330 - 9600 | 800              | Fighter Type             |
| 20                     | 0.5                       | 9375 $\pm$ 55              | 2000             | VB & VP                  |
| 0.2 (Avg)              | -                         | 10,000-10,250              | -                | F4D<br>F3H               |
| 10                     | 0.5                       | 3300 $\pm$ 33              | 2000             | VA & VF                  |
| 5-10                   | 0.5                       | 9000-9290<br>9330-9600     | 800              | Fighter Type             |
| 17                     | 0.25                      | 9375 $\pm$ 55              | 2000             | VA & VF                  |

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| Max. Relative Range<br>20 m <sup>2</sup> Aircraft<br>B/S = .5 | Min. Range<br>(yd)             | Max. Altitude<br>(ft) | Scan Coverage                 |  | Accuracy       |                |
|---|--------------------------------|-----------------------|-------------------------------|--|----------------|----------------|
|   |                                |                       | Hor. (°)                      | Vert. (°)                              | Range          | Azimuth        |
| Parent Radar  | —                              | 35,000                | —                             | —                                      | 25 mil Bombing | 25 mil Bombing |
| Parent Radar  | —                              | 50,000                | —                             | —                                      | 25 mil Bombing | 25 mil Bombing |
| Parent Radar  | —                              | 500                   | —                             | —                                      | 35 ft          | Ap             |
| —   | —                              | —                     | —                             | —                                      | —              | —              |
| —   | 200                            | 10,000                | 360                           | View 270                               | ± 2%           | ± 0.5          |
| —   | 200                            | 50,000                | 175<br>25                     | csc <sup>2</sup><br>70                 | 25 mil Bombing | 25 mil Bombing |
| Jet: 2000 yd<br>Prob: 3000 yd                                 | 225                            | 45,000                | —                             | —                                      | ± 25 yd        | —              |
| Jet 3200 yd   | 150                            | 50,000                | —                             | —                                      | ± 12 yd        | —              |
| Jet 2500 yd   | 150                            | 60,000                | —                             | —                                      | ± 25 yd        | —              |
| Jet 2500 yd   | 150                            | 60,000                | —                             | —                                      | ± 25 yd        | —              |
| 6000  | 200                            | 50,000                | Antenna servoed to sight line |  | ± 1% Range     | —              |
| 20 miles  | 100                            | 50,000                | Search -130<br>Track ±65      | Search 20<br>positionable<br>Track ±65 | 1% or better   | .25°           |
| 5000  | 150                            | 50,000                | —                             | —                                      | ± 1%           | —              |
| Jet 2500 yd   | 150                            | 70,000                | —                             | —                                      | ±25 yds        | —              |
| 5000 A to A<br>20,000 A to G                                  | 150<br>A to A<br>250<br>A to G | 50,000                | Antenna servoed to sight line |  | ± 1%           | —              |

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| Max. Track Rate             |  | Indicator Scan |                                | Scan Rate          |                            | Beamwidths |                        |
|-----------------------------|--|----------------|--------------------------------|--------------------|----------------------------|------------|------------------------|
| Range (knots)               | Angular  | Search         | Track                          | RPM                | Looks Per min.             | Hor. (°)   | Vert. (°)              |
| 400                         | -  |                |                                |                    |                            |            |                        |
| 750                         | -  |                |                                |                    |                            |            |                        |
| 400                         | -  |                |                                |                    |                            |            |                        |
|                             |  | 360            | Sector                         | 6<br>12            | 6<br>12                    | 2.4        | 3.2                    |
| 750                         |  | Wig-wag        | Wig-wag                        | 25°<br>25°<br>175° | 2/sec<br>10/sec<br>1/2/sec | 2.7        | csc <sup>2</sup><br>70 |
| 1500                        |  |                |                                |                    | 2/sec<br>in range          | 18         | 18                     |
| 1500                        |  |                |                                |                    | 2/sec<br>in range          | 18         | 18                     |
| 1500                        |  |                |                                |                    | 2/sec<br>in range          | 18         | 18                     |
| 1500                        |  |                |                                |                    | 2/sec<br>in range          | 18         | 18                     |
| Opening 1300<br>Closing 200 | Follow rate<br>20°/sec                                       |                | 180°<br>+5°                    |                    |                            | 10         | 10                     |
| 1300                        | undetermined   | Wig-wag        | Simultaneous<br>Lobing         |                    | 20                         | 5          | 5                      |
| >1500                       |  |                |                                |                    |                            | 20         | 20                     |
| 1500                        | -  | -              | -                              | -                  | 2/sec<br>in range          | 18         | 18                     |
| >1500                       | Follow rate<br>50°/sec<br>Max. acc.<br>100°/sec <sup>2</sup> | None           | 60° down<br>10° up<br>±10° az. |                    |                            | 8½         | 17                     |

| Reflector                                    |                | Power Source                |                      |                                 |                           | Total System Weight (lb) |
|--|----------------|-----------------------------|----------------------|---------------------------------|---------------------------|--------------------------|
| Type   | Size           | Volts                       | Phase or Amps.       | Frequency (cps)                 | KVA                       |                          |
| Parent Radar                                 | 1'             | 115                         | 1                    | 400-2400                        | 300                       | 175                      |
| Parent Radar                                 | 1'             | 115                         | 1                    | 380-1000                        | 500                       | 135                      |
| Parent Radar                                 | 1'             | 115                         | 1                    | 400-2400                        | 140                       | 50                       |
|  |                |                             |                      |                                 |                           |                          |
| Paraboloid                                   | 45" W<br>26" H | 28 DC<br>115/208<br>115/208 | 25 Amps<br>3<br>3    | DC<br>380-420<br>320-1000       | 0.65<br>0.70<br>4.2       | 750                      |
| Paraboloid                                   | 36"            | 115<br>28 DC                | 3<br>-               | 320-1000                        | 1<br>.6                   | 750                      |
| Horn   | 4" x 6"        | 28 DC<br>102-124<br>102-124 | 3 Amps<br>1<br>1     | 380-420<br>320-1760             | 0.95<br>2.30              | 65<br>less cables        |
| Horn   | 4" x 6"        | 28 DC<br>110-120            | 4 Amps<br>1          | 380-420                         | 8.5                       | 150                      |
| Horn   | 4" x 6"        | 28 DC<br>102-124<br>102-124 | 3 Amps<br>1<br>1     | 380-420<br>320-1760             | 0.95<br>2.30              | 75                       |
| Horn<br>(May eventually use<br>servoed dish) | 4" x 6"        | 28 DC<br>102-124            | 4 Amps<br>3 $\phi$   | 380-420                         | 4.0                       | 40-45                    |
| Parabola                                     | 9"             | 115                         | 3                    | 380-420                         |                           | 139                      |
| Paraboloid                                   | 26"            | 115<br>115<br>Hydraulic     | 3 $\phi$<br>3 $\phi$ | 320-1000<br>380-420<br>1500 psi | 2500 VA<br>200 VA<br>2 HP | 225                      |
| Parabola                                     | 10"            | 115                         | 1                    | 380-420                         |                           | 86                       |
| Horn   | 4" x 6"        | 28 DC                       | 4 amps<br>3 $\phi$   | - 380-420                       | 4.0                       | 40-45                    |
| Parabola                                     | 10"            | 115/208                     | 3                    | 380-420                         |                           | 100                      |

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AIRBORNE SEARCH  
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| Indicators                             |  | Display |        | No. in Use<br>or Available<br>Date              | Supplier  | MODEL                  |
|--|--|---------|--------|---|---|------------------------|
| PPI                                    | Others   | IFF     | Beacon |   |   |                        |
| Electronic Computer - Rocket Provision |  |         |        | 600   | Capehart Farnsworth<br>Texas Instruments<br>Waterman Products | AN/APA-5A              |
| Electronic Computer - Rocket Provision |  |         |        | Exp. 2  | Capehart<br>Farnsworth  | AN/APA-5B              |
| Electronic Computer - Rocket Provision |  |         |        | 2000  |   | AN/APA-16              |
|  |  |         |        |   |   | AN/APA-44              |
| 2-7" DTT<br>1-10"<br>10BP17            | 2-J Scope<br>Indicator   | Yes     | Yes    |   |   | AN/APA-88<br>AN/APS-37 |
| Sector<br>10"                          | -  | Yes     | Yes    | Sept. 1952                                      | Emerson Electric  | AN/APB-3               |
|  |  |         |        | Approx. 7000<br>Start; 400/mo.<br>Fin; 1000/mo. | G. E. Co., Hoffman,<br>Admiral, Canadian<br>G. E. Co.         | AN/APG-30              |
|  | "A"  |         |        | 2 Dec. 1952                                     | G. E. Co.   | AN/APG-34<br>(XN-1)    |
|  | "A" may be used  |         |        | 2 Oct. 1952                                     | G. E. Co.   | AN/APG-34<br>(XN-2)    |
|  | "A"  |         |        | 2 Feb. 1953                                     | G. E. Co.   | AN/APG-34<br>(XN-3)    |
| None                                   | Range<br>Meter   | No      | No     | 4   | Stavid Eng.   | AN/APG-39<br>(XN-1)    |
| -                                      | AZ, EL, Speed,<br>Tracking, Art.<br>Horizon Break-<br>away, Pull-out | Yes     | No     | Early<br>1953                                   | Raytheon Mfg. Co.   | AN/APG-43              |
| None                                   | Range<br>Meter   | No      | No     | 8<br>1952                                       | NOPI  | AN/APG-44              |
| -                                      | "A" may<br>be used   | -       | -      | 1 Dec. 1952<br>2 June 1953                      | Bureau of<br>Standards  | AN/APG-45              |
| None                                   | Range Meter<br>"A" Scope<br>Available                                | No      | No     | 6<br>prototypes<br>Jan. 1953                    | NOPI  | AN/APG-46              |

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| MODEL                  | Function                            | General Facts   | Sec. Class |
|------------------------|-------------------------------------|---|------------|
| AN/APQ-35<br>-35A, 35B | Intercept<br>and<br>Fire Control    | Search, track and tail warning. Consists of AN/APS-21, AN/APG-26, and AN/APS-28.  | C          |
| *AN/APS-28             | Tail<br>Warning<br>Radar            | *Part of AN/APQ-35.   | C          |
| AN/APQ-36              | Missile<br>Guidance                 | Search, intercept, and missile guidance radar for sparrow I. Beam rider missile.  | C          |
| AN/APQ-41              | Intercept<br>and<br>Fire Control    | A high power intercept and fire control radar designed for single seat fighter aircraft.  | C          |
| AN/APQ-42              | Intercept<br>and<br>Fire Control    | Production cancelled. Three evaluation models to be delivered for test by NADC (2), Bu. Ships (1).  | C          |
| AN/APQ-43              | Intercept<br>and<br>Fire Control    | Same as AN/APQ-35 series; less tail warning.  | C          |
| AN/APQ-47              | Intercept<br>and<br>Fire Control    | Part of intergrated flight and fire control, consisting of radar and flight data computer. Computer and maneuverable auto-pilot for accomplishing semi-automatic intercept. | C          |
| AN/APQ-50              | Intercept<br>and<br>Fire Control    | Cylindrically packaged AN/APQ-41 and with guns (2) and rocket computer; search stabilized.  | C          |
| AN/APR-12<br>(XN)      | AEW<br>Beacon                       | Provides an AEW beacon system used with AN/APS-20A.   | C          |
| AN/APS-4               | Air<br>and<br>Surface               | PRS 1000 for 4-20 50 mile ranges and 600 for 100-mile ranges. A forward looking carrier based air search for bomb rack mounting.  | U          |
| AN/APS-15,<br>15A, 15B | 360° Looking<br>Reconnais-<br>sance | Heavy patrol aircraft.  | U          |
| AN/APS-19,<br>19A      | Intercept                           | Incorporates surface search, wide spiral scan for acquisition and narrow spiral scan for gun aim.   | R          |
| AN/APS-19B             | Intercept                           | Incorporates surface search 2 step wig-wag scan for longer range acquisition, wide spiral acquisition scan and narrow spiral gun aim scan.                                  | R          |
| AN/APS-19C             | Search                              | Surface search only.  | R          |
| AN/APS-20,<br>20A, 20E | AEW                                 | Also used as ASW radar.   | R          |

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SECURITY INFORMATION

APS-21  
APG-26

| Peak Power Output (kw) | Pulse Length ( $\mu$ sec.)   | Frequency Range (Mc)              | Pulse Rate (pps)                                     | Aircraft Installation                                      |
|------------------------|--|-----------------------------------|--|--|
| 250<br>40              | 0.4<br>1.75<br>2.25<br>0.4 only  | 9375 $\pm$ 30<br>9245 $\pm$ 30    | 2400 - 2500<br>300 / 550<br>300 / 550<br>2400 - 2500 | F3D-1, 2   |
| 40                     | 0.5  | 9245 $\pm$ 30                     | 2000   | F3D-1, 2   |
| 250                    | .4, .67, 1.2,<br>2.35, 3.1   | 9375 $\pm$ 30                     | 325, 800<br>2400                                     | F3D  |
| 250                    | 0.5<br>1.75<br>2.25  | 9375 $\pm$ 30                     | 2000<br>550<br>300                                   | F2H-3  |
| 250                    | 0.5<br>1.85<br>2.35  | 9375 $\pm$ 30                     | 2000<br>380<br>380                                   | F10F   |
| 250<br>40              | Same as search and track portion of AN/APQ-35 series. (Listed on APQ-35, 35A, 35B lines) |                                   |  | F3D-3  |
| 250                    | .5<br>2.2  | 9375 $\pm$ 30                     | 2000<br>400  | F3H-1<br>FO-1<br>FY-1                                      |
| 250                    | 0.5<br>1.75<br>2.25  | 9375 $\pm$ 30                     | 2000<br>550<br>300                                   | F3H-1, F10F-1<br>F4D-1, F2Y-1                              |
| -                      | -  | -                                 | -  | -  |
| 40<br>(mean)           | 0.6,<br>2.1(B)   | 9375 $\pm$ 55<br>9310 $\pm$ 10(B) | 600<br>1000  | SB2C-4E, 5.<br>TBM-3E, AD-1.2<br>AM-1                      |
| 40<br>(mean)           | 1.0, 0.5,<br>2.0 (B)   | 9375 $\pm$ 55<br>9310 $\pm$ 10(B) | 622, 1155,<br>1347, 350(B)                           | PB4Y-2<br>K-Airship  |
| 40                     | 0.25   | 9375 $\pm$ 40                     | 4000   | F4U<br>AD  |
| 40                     | 0.5<br>1.75  | 9375 $\pm$ 40                     | 2000<br>570  | F4U<br>AD  |
| 40                     | 2.35   | 9375 $\pm$ 40                     | 425  | A2D<br>AD  |
| 1000                   | 2  | 2880 $\pm$ 30                     | 300  | TMB-3W, PB-1W,<br>AD-3W, 4W, AF-2W<br>P2U-3W, P2U-4, P2V-5 |

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| Max. Relative Range, 20m <sup>2</sup> Aircraft B/S = .5 | Min. Range (yd) | Max. Altitude (ft) | Scan Coverage   |                        | Accuracy                                |   |
|---|-----------------|--------------------|---|------------------------|---|---|
|   |                 |                    | Hor. (°)  | Vert. (°)              | Range                                   | Azimuth                                   |
| 25 miles<br>4000 yd                                     | 150<br>150      | 50,000             | ± 85<br>± 60  | + 60, -30<br>± 60      | ± 100 yd<br>± 25 yd                     | ± 3°<br>± 1/4°                            |
| 4 miles   | 150             | 50,000             | 144   | 144                    |   |   |
| 23,000 yd   | 300             | 50,000             | 80  | 24                     | ± 25 yd                                 | 2 miles circular                          |
| 24 miles<br>(Lock-on)                                   | 150             | 52,000             | ± 60  | ± 60                   | ± 25 yd                                 | ± 1/4°                                    |
| 25 miles  | 150             | 50,000             | 150-search-45<br>150-track +30 to -60<br>30-Posit Sector-15 |                        | ± 15 yd<br>on ±1/2°6                    | ± 1 mil                                   |
|   |                 | 50,000             |   |                        |   |   |
|   |                 | 50,000             |   |                        |   |   |
| 24 miles<br>(Lock-on)                                   | 150             | 52,000             | ± 60<br>(F4D- ±45)  | ± 60<br>(F4D- ±45)     | ± 25 yd                                 | ± 1/4°                                    |
| -   | -               | -                  | -   | -                      | -                                       | -   |
|   | 250             | 30,000             | 150   | 31 to -33<br>13 to -37 | ± 5%                                    | +3 over center 50°<br>± 50 over remainder |
| 15  | 250             | 35,000             | 360   | +21 to -32             | ±1 -7%                                  | ± 3%                                      |
| 20 miles  | 150             | 35,000             | 135 (wigwag)<br>135 (spiral)                                | +15 to -20<br>135      | ± 25 yd<br>at 200-<br>350 yd            | ±3° +15%<br>of av. scale<br>in sock.      |
| 20 miles  | 150             | 50,000             | ±65, ±30<br>30 and 130<br>(spiral)                          | +15 to -20<br>130      | in gun aim<br>±2% of full<br>scale plus | 1/2° in<br>gun aim.                       |
| 20 miles  | 150             | 50,000             | ± 65 and<br>± 30  | +3 to -5               | 10% of<br>range.                        |   |
|   | 2000            | 30,000             | 360   |                        | ± 2%                                    | ± 1.5%                                    |

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| Max. Track Rate         |         | Indicator Scan              |                | Scan Rate              |                           | Beamwidths             |                                 |
|-------------------------|---------|-----------------------------|----------------|------------------------|---------------------------|------------------------|---------------------------------|
| Range                   | Angular | Search                      | Track          | RPM                    | Looks per. min.           | Hor. (°)               | Vert. (°)                       |
| 900 Kn. C               | 45°/sec | 170° x 30                   | Conical        | 4000                   | 20                        | 2.9                    | 2.9                             |
|                         |         | 170° x 15                   |                | 66.7 cps               | 40                        |                        |                                 |
|                         |         | 120° cone                   |                |                        | continuous                | (18.8 cone)            | 9.4                             |
|                         |         | Conical                     |                | 1200                   | 40                        | 7.2                    | 7.2                             |
| -2000<br>+200<br>ft/sec | -       | step<br>wigwag              | Conical        | 3000<br>50 cps         | 3.4 sec.<br>frame<br>time | 4.5                    | 4.5                             |
| 900 Kn. C<br>300 Kn. O  | 45°/sec | 120° x 15°<br>2 line raster | Conical        | 50 cps                 | 30                        | 3.9                    | 3.9                             |
| -                       | 45°/sec | 15° Nod<br>at<br>23 eps     | Mono-<br>pulse |                        | 27                        | 4.5                    | 3.0                             |
|                         |         |                             |                |                        |                           |                        |                                 |
|                         |         |                             |                |                        |                           |                        |                                 |
| 900 Kn. C<br>300 Kn. O  | 45°/sec | 120° x 15°<br>2 line raster | Conical        | 50 cps                 | 30                        | 3.9                    | 3.9                             |
| -                       | -       | -                           | -              | -                      | -                         | -                      | -                               |
|                         |         |                             |                |                        | 30 - 50<br>55 - 70        | 24 - (A.I)<br>10 - (S) |                                 |
|                         |         |                             |                | For 15<br>12-24<br>10% | For 15A,B<br>12 or 24     | -                      | 15                              |
|                         |         | Wigwag                      | Spiral         | 1200                   |                           | 5                      | 5                               |
|                         |         | Wigwag<br>9° Nod            | Spiral         | 1200                   |                           | 5                      | 5                               |
|                         |         | Wigwag                      | Spiral         | 1200                   |                           | 5                      | 5 and 70<br>(csc <sup>2</sup> ) |
|                         |         |                             |                | 6-10                   | 6 or 10                   | -                      | 8-<br>depressed<br>2-down       |

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| Reflector            |              | Power Source  |                  |                           |                   | Total System Weight                     |
|----------------------|--------------|---|------------------|---------------------------|-------------------|---|
| Type                 | Size (ft)    | Volts   | Phase or Amps.   | Frequency (cps)           | KVA               |   |
| Parabola<br>Parabola | 2-1/2<br>3/4 | 109-124<br>24-29                                      | 1<br>96 amps     | 380-420<br>DC             | 3.25<br>2.7       | 980                                     |
| Parabola             | 12-1/2       | Combined in APQ-35 series                             |                  |                           |                   |   |
| Parabola             | 2            | 115   | 3<br>3           | 380-420<br>320-1000       | 2.5<br>9.0        | 1050                                    |
| Parabola             | 2            | 109-124<br>24-29                                      | 1<br>40amps      | 380-420<br>DC             | 3.6<br>1.1        | 462.5<br>(Including computer)           |
| Twin<br>Parabola     | 2            | 115/200<br>115/200<br>28                              | 3<br>3<br>35amps | 380-420<br>320-1000<br>DC | 0.675<br>3.0<br>- | 590<br>(No computer or cables)          |
| Parabola             | 2            | 115/200<br>28   | 3<br>-           | 380-420<br>-              | 8.5 KW<br>1 KW DC | radar - 300 complete system 550 approx. |
| Parabola             | 2            | Not available - similar to AN/APQ-41 except 3 - phase |                  |                           |                   | 378                                     |
| -                    | -            | -   | -                | -                         | -                 | -                                       |
| Paraboloid           | 1-1/6        | 115<br>28   | 1<br>3 amps      | 800-2400<br>DC            | 0.69<br>0.084     | 185                                     |
| Paraboloid           | 2-1/2        | 115<br>28   | 20 amps          | 400-2400                  | 0.95              | 399                                     |
|                      |              |   |                  |                           |                   | 185                                     |
| Parabola             | 1-1/2        | 110-120<br>17-29                                      | 1<br>25amps      | 320-1760<br>DC            | 0.65<br>0.7       | 230                                     |
|                      |              |   |                  |                           |                   | 200                                     |
| Paraboloid           | 3 x 8        | 120<br>120/208<br>28                                  | 1<br>1<br>27amps | 380-420<br>400-800<br>DC  | 220<br>2750       | 1275                                    |

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AIRBORNE SEARCH  
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| Indicators |   | Display |              | No. in Use or Available Date                                  | Supplier             | MODEL               |
|------------|---|---------|--------------|---|----------------------|---------------------|
| PPI        | Others  | IFF     | Beacon       |   |                      |                     |
| Yes        | B-C-O-Gun-Aim (Pilots)  | Yes     | Yes          | Respectively<br>42 [F3D-1] 85 [F3D-2] 210 [F3D-2]             | Westinghouse and RCA | AN/APQ-35-35A, 35B  |
| No         | 0   | No      | No           | Same as AN/APQ-35 data  | Westinghouse         | AN/APS-28           |
| No         | B and C scan attack presentation with error indication.                                 | Yes     | Yes          | 4 R and O models<br>25 evaluation models                      | Sperry Gyro. Co.     | AN/APQ-36           |
| No         | B-C Gun-Aim   | Yes     | Yes          | Approx. 500 for F2H-3 A/C by 1954                             | Westinghouse         | AN/APQ-41           |
| No         | B - C Gun-Aim 2-3" scopes   | Yes     | Yes          | 24 Mar. 1952  | G. E. Co.            | AN/APQ-42           |
|            |   |         |              | Original requirement cancelled; British version in production | Westinghouse         | AN/APQ-43           |
| No         | B and C scans search. Attack mode: range, range rate, time to go, artificial horizontal | Yes     | Yes expanded | 5 models on order   | North American       | AN/APQ-47           |
| No         | B - C Gun-Aim   | Yes     | Yes          | Model-Sep. 1952 Prod. June 1953 for F3H-1, F10F-1             | Westinghouse         | AN/APQ-50           |
| -          | -   | -       | -            |   |                      | AN/APR-12 (XN)      |
|            | Two 3" (B) double dot   |         |              | 15,000  |                      | AN/APS-4            |
| 5" 5" Rep. | 2" (A)  |         |              |   |                      | AN/APS-15, 15A, 15B |
| No         | B-O-V   | Yes     | Yes          | F4U-5N  | Sperry Lavoie        | AN/APS-19, 19A      |
| No         | B-O-V   | Yes     | Yes          | AD-4  | Lavoie               | AN/APS-19B          |
| No         | B   | Yes     | Yes          | A2D   | Lavoie Magnavox      | AN/APS-19C          |
| 3 - 5"     | 1 - 3" (A)  |         |              | Approx. 500   |                      | AN/APS-20, 20A, 20E |

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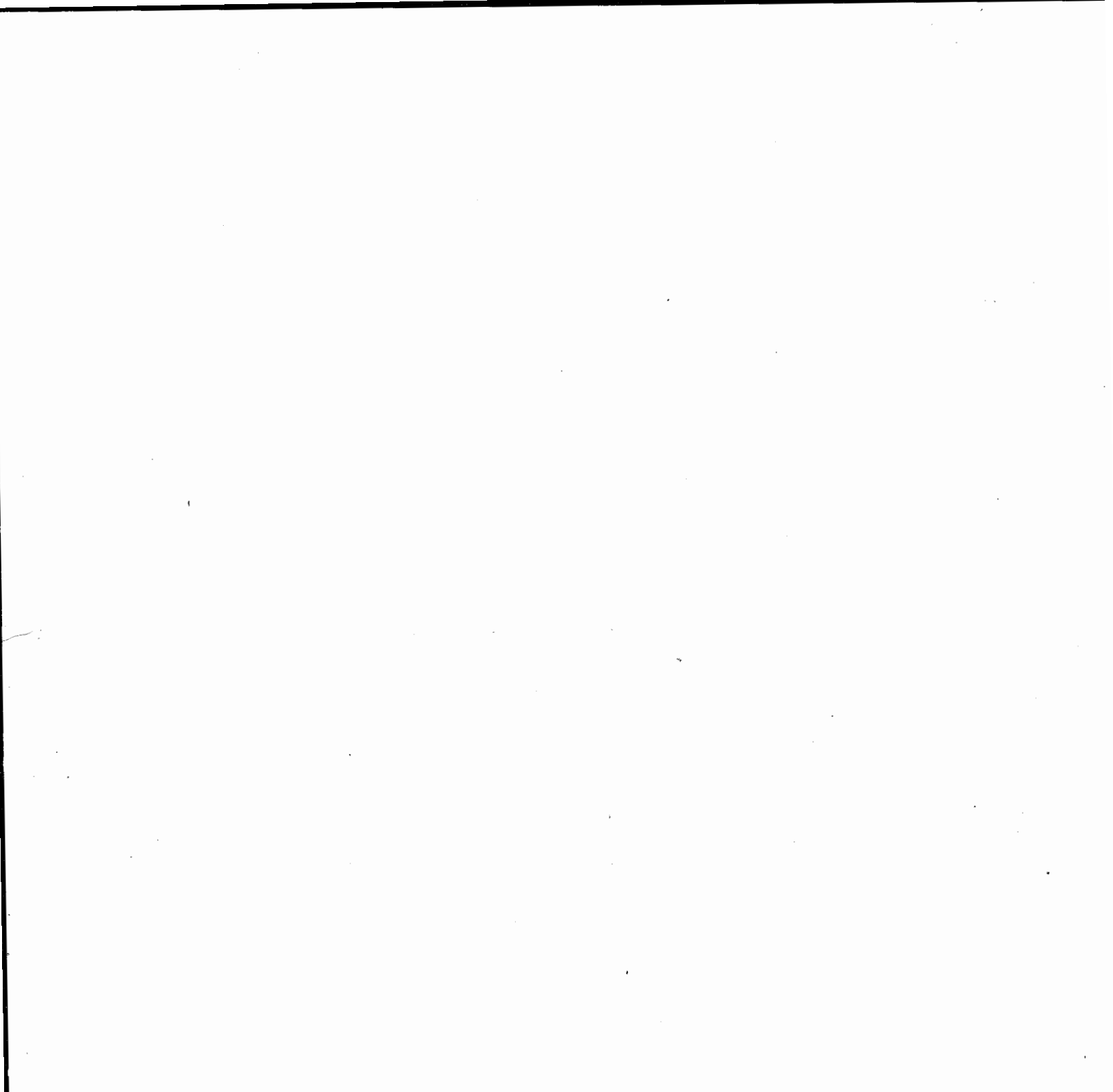
SECURITY INFORMATION

| MODEL                    | Function                        | General Facts  | Sec. Class |
|--------------------------|---------------------------------|--|------------|
| AN/APS-20B               | AEW                             | Carrier and patrol LTA.  | C          |
| AN/APS-25                | Intercept and Fire Control      | 2 X-models plus 7 pre-production models will be procured.  | C          |
| AN/APS-31                | F. L. Recon. Radar              | Forward search only. For carrier based aircraft.   | R          |
| AN/APS-33                | 360° Looking Reconnaissance     | For medium patrol aircraft.  | R          |
| AN/APS-37<br>AN/APA-88   | Anti-Snorkeling and Mine laying | North stabilization and ground stabilization of all indicators. Attack indicator dark trace tube also relating stabilized. Gives pilot an intergrated electronics display for radar, IFF beacon. | C          |
| AN/APS-42<br>A, B        | Transport Search                | Transport radar.   | R          |
| AN/APS-44                | Anti-Snorkeling                 | Long range high power ASW radar operating at one of two frequencies with sequential RF transmission.   | C          |
| AN/APS-44A               | Anti-Snorkeling                 | Long range high power ASW radar operating at one of two frequencies with sequential RF transmission.   | C          |
| AN/APS-49<br>(XN-1)      | Anti-Snorkeling                 | High definition ASW radar employing rapid scan radar techniques for sea clutter elimination.   | C          |
| AN/APS-56<br>(XN-1)      | High Definition Search          | High definition, airborne, low altitude search.  | C          |
| AN/APW-4                 | Mid-Course Guidance             | Beam rider system for LARK XSAMN-4 and SKYLARK XSAMN-2. 2 receivers only. Works with AN/SPQ-2.   | C          |
| AN/ASB-1                 | Bomb Release                    | Bombing equipment for carrier based planes.  | C          |
| E-10 Fire Control System | Intercept and Fire Control      | Space stabilized antenna $\pm 15^\circ$ pitch $\pm 90^\circ$ roll position able sector, manual search, look follow. MIPR-2183-52-74.   | C          |
| SCR-720                  | Intercept                       | Will be used for remaining service life of F7F-3N only.  | U          |
|                          |                                 |  |            |

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| Peak Power Output (kw) | Pulse Length ( $\mu$ sec)         | Frequency Range (Mc)               | Pulse Rate (pps)          | Aircraft Installation                 |
|------------------------|-----------------------------------|------------------------------------|---------------------------|---------------------------------------|
| 2000                   | 2                                 | 2880 $\pm$ 30                      | 300                       | ZPN                                   |
| 250                    | 0.4<br>1.55<br>3.2<br>2.35        | 9375 $\pm$ 30                      | 2250<br>600<br>300<br>300 | F4D                                   |
| 70                     | 4.5, 0.5,<br>2.25 (B)             | 9375 $\pm$ 55<br>9310 $\pm$ 10(B)  | 200, 800,<br>400 (B)      | PEM-5, 5A, AFZS.<br>P2V-4, UF-1, AJ-1 |
| 70                     | 4.5, 0.5<br>2.25 (B)              | 9375 $\pm$ 55<br>9310 $\pm$ 10(B)  | 200, 800,<br>400 (B)      | P2V-1, 2, 3,<br>ZP2K                  |
| 70                     | 0.5, 2.25<br>3.25                 | 9375 $\pm$ 55                      | 800, 300                  | S2F-2                                 |
| 40                     | 0.75, 3.5,<br>2.25 (B)            | 9375 $\pm$ 55<br>9310 $\pm$ 10 (B) | 200, 800,<br>300 (B)      | R6D<br>R4Q-1, R70, RBY                |
| 500<br>1000            | 0.5, 2.35, 3.2,<br>0.5, 2.35, 3.2 | 9375 $\pm$ 45<br>5280 $\pm$ 30     | 270<br>270                | P2V-25                                |
| 500<br>1000            | 0.5, 2.35, 3.2<br>0.5, 2.35, 3.2  | 9375 $\pm$ 45<br>5280 $\pm$ 30     | 270<br>270                | P5M-1                                 |
| 800                    | 0.1, 2.35, 1.8                    | 9375 $\pm$ 45                      | 1875 200                  | S2F                                   |
| 40                     | .01, - .02                        | 35,000 $\pm$                       | 16,000                    | P2V-3W                                |
| 112                    | -                                 | 2700 - 2900                        | 576                       | LARK                                  |
| -                      | -                                 | X-Band                             | -                         | -                                     |
| 250                    | 0.5<br>2.35<br>2.35               |                                    | 910<br>416<br>330         | F2H-4                                 |
| 100                    | 2.25<br>0.75                      |                                    | 380<br>1520               | F7F-3N                                |
|                        |                                   |                                    |                           |                                       |



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| Max. Relative Range<br>20m <sup>2</sup> Aircraft<br>B/S = .5 | Min. Range (yd) | Max. Altitude (ft) | Scan Coverage              |   | Accuracy |                       |
|--|-----------------|--------------------|----------------------------|---|----------|-----------------------|
|  |                 |                    | Hor. (°)                   | Vert. (°)                                 | Range    | Azimuth               |
|  | 2000            | 30,000             | 360                        | 8° Beam<br>Dep. 2° down                   | ± 2%     | ± 1.5%                |
| 25 miles   | 300             | 50,000             | ± 60                       | ± 45                                      | ± 25 yd  | ± 2 mils              |
|  | 200             | 40,000             | 150 (A)<br>6 (B)           | View 20 csc <sup>2</sup><br>+18 to -55    | ± 3%     | ± 2°                  |
|  | 200             | 40,000             | 360 (A)<br>60 (B)          | View 27<br>(csc <sup>2</sup> )            | ± 3%     | ± 2°                  |
|  | 200             | 10,000             | 360                        | View 270                                  | ± 2%     | ± 0.5°                |
|  | 150             | 50,000             | 360, 240,<br>120           | ± 15 pencil<br>(csc <sup>2</sup> ) 6 - 40 | ± 2%     | ± 2°                  |
|  | 200             | 30,000             | 360                        | 2.6 ± 5° tilt<br>4.8 ± 5° tilt            | ± 3%     | ± 0.5°                |
|  | 200             | 30,000             | 170                        | 1.8 ± 5° tilt<br>3.2 ± 5° tilt            | ± 3%     | ± 0.5°                |
|  | 200             | 20,000             | 360                        | 8   | ± 3%     | ± 0.5%                |
|  | 300             | 5,000              | 30                         |   |          |                       |
| 90,000 yd  |                 | 50,000             |                            |   |          |                       |
|  |                 |                    |                            |   |          |                       |
| 25 miles   | 150             | 50,000             | Search ± 70<br>Track ± 133 | 13 posit. ± 15<br>cone                    | ± 25 yd  | ± 5 milli-<br>radians |
|  |                 | 35,000             | ± 90                       | +50<br>-30                                |          |                       |
|  |                 |                    |                            |   |          |                       |

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| Max. Track Rate |         | Indicator Scan                   |         | Scan Rate        |                       | Beamwidths |                                  |
|-----------------|---------|----------------------------------|---------|------------------|-----------------------|------------|----------------------------------|
| Range           | Angular | Search                           | Track   | RPM              | Looks per. min.       | Hor (°)    | Vert (°)                         |
|                 |         |                                  |         | 6 - 10           | 6 or 10               | -          | 8-depressed<br>2-down            |
| 700 yd per sec  | 45°/sec | 5 line raster<br>120° x 15°      | Conical | 50 cps           | 60                    | 3.7        | 3.7                              |
|                 |         |                                  |         | -                | 50-20(A)<br>100-55(B) | -          | 10 to -10                        |
|                 |         |                                  |         | 24<br>4-7(A)     | 100-50(B)             |            | csc <sup>2</sup>                 |
|                 |         | 360                              | Sector  | 6<br>12          | 6<br>12               | 2.4        | 3.2                              |
|                 |         |                                  |         | 40-15            | 50-18<br>90-35        | 5-1/2      | 5-1/2<br>pencil csc <sup>2</sup> |
|                 |         |                                  |         |                  | 3, 6, 12              |            |                                  |
|                 |         |                                  |         |                  | 6, 12,<br>24          | 1.8<br>3.2 | 1.8<br>3.2                       |
|                 |         |                                  |         | 600<br>6         |                       | 2          | 8                                |
|                 |         |                                  |         |                  |                       | 0.4        | 2                                |
|                 |         |                                  |         | 1440             |                       |            |                                  |
|                 |         |                                  |         |                  |                       |            |                                  |
| 1200 k          | 20°/sec | 2 line raster<br>140° x 13°      | Conical | 75 cps           | 30                    | 4.0        | 4.0                              |
|                 |         | Select<br>10° to 80°<br>Auto Nod |         | 100<br>or<br>360 | 100<br>360            | 10.0       | 10.0                             |
|                 |         |                                  |         |                  |                       |            |                                  |

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| Reflector                   |                | Power Source                |                        |                           |                     | Total System Weight             |
|-----------------------------|----------------|-----------------------------|------------------------|---------------------------|---------------------|---------------------------------|
| Type                        | Size           | Volts                       | Phase or Amps          | Frequency (cps)           | KVA                 |                                 |
| Paraboloid                  | 3' x 8'        | 115<br>115/208<br>29        | 3<br>3<br>40 amps      | 400<br>400-800            | 0.3<br>6.5          | 1350                            |
| Parabola                    | 2'             | 115/200<br>28               | 3<br>35 amps           | 380-420<br>DC             | 5<br>-              | 566 (Including computer)        |
| Modified Paraboloid         | 1-1/2'         | 115<br>27                   | 9 amps<br>20 amps      | 380-160                   |                     | 380                             |
| Modified Paraboloid         | 29"            | 115<br>27                   | 1<br>9 amps<br>20 amps | 380-1600<br>DC            |                     | 400                             |
| Paraboloid                  | 45" W<br>26" H | 28 DC<br>115/208<br>115/208 | 25 amps<br>3<br>3      | DC<br>380-420<br>320-1000 | 0.65<br>0.70<br>4.2 | 750                             |
| Paraboloid csc <sup>2</sup> | 18"            | 115<br>28                   | 1<br>11 amps           | 380-420<br>DC             | 1.5                 | 200                             |
| Modified Paraboloid         | 3' x 8'        | 115/208<br>28               | 3<br>100 amps          | 380-420<br>DC             | 10                  | 1500                            |
| Paraboloid                  | 54"            | 115/208<br>28               | 3<br>100 amps          | 380-420<br>DC             | 10                  | 1500                            |
| Modified Paraboloid         | 40"            | 115/208<br>28               | 3<br>50 amps           | 380-420<br>DC             | 7                   | 1000                            |
|                             | 42" x 72"      |                             |                        |                           |                     |                                 |
|                             |                | 28                          | 4 amps                 | DC                        |                     | 25                              |
|                             |                |                             |                        |                           |                     |                                 |
| Parabola                    | 22"            | 115<br>28                   | 3                      | 380-420<br>DC             | 3.91<br>0.5         | 460<br>No computer<br>No cables |
| Parabola                    | 29"            | 27.5                        | 100 amps               | DC                        |                     | 500<br>approx.                  |
|                             |                |                             |                        |                           |                     |                                 |

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| Indicators                      |                         | Display |        | No. in Use<br>or Available<br>Date | Supplier   | MODEL                          |
|---------------------------------|-------------------------|---------|--------|------------------------------------|--|--------------------------------|
| PPI                             | Others                  | IFF     | Beacon |                                    |  |                                |
| 3", 5", 7",<br>7" special       |                         |         |        |                                    |  | AN/APS-20B                     |
| No                              | B-C<br>Gun Aim          | Yes     | Yes    | 27 on order<br>(1-18-52)           | Capehart<br>Farnsworth                           | AN/APS-25                      |
| 2 - 5"<br>sector                |                         |         |        | 1948-PBM-5<br>1950-P2V-4           |  | AN/APS-31                      |
| 2 - 5 "                         | -                       | -       | -      | 250                                | -  | AN/APS-33                      |
| 2 - 7" QTT<br>1 - 10"<br>10BP17 | 2-J Scope<br>Indicator  | Yes     | Yes    | -                                  | -  | AN/APS-37                      |
| 2 - 5"                          | -                       | Yes     | Yes    | 35<br>Spring 1952                  | -  | AN/APS-42                      |
| 4"<br>and<br>10"                | 3" A<br>2 - 7" book     | Yes     | Yes    | July 1952                          | -  | AN/APS-44                      |
| 4"<br>and<br>10"                | 2 - 7" book             | Yes     | Yes    | April 1952                         | -  | AN/APS-44A                     |
| 10"                             | Assemble<br>of B scopes | Yes     | Yes    | January 1954                       | -  | AN/APS-49<br>(XN-1)            |
| B scan                          | 7"                      | No      | No     | 1953                               | -  | AN/APS-56<br>(XN-1)            |
| -                               | -                       | -       | -      | 45                                 | -  | AN/APW-4                       |
| -                               | -                       | -       | -      | -                                  | -  | AN/ASB-1                       |
| None                            | B-C-Gun Aim             | Yes     | Yes    | June 1952                          | Hughes Aircraft                                  | E-10 FIRE<br>CONTROL<br>SYSTEM |
| -                               | B-C                     | Yes     | Yes    | 94<br>F7F-3N A/C                   | Western Electric<br>(No longer in<br>production) | SCR-720                        |
| -                               | -                       | -       | -      | -                                  | -  |                                |

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| Item | General Facts   | Features      | Notes       |
|------|---|---------------|-------------|
| U    | Transmitter type false beam.  | Miscellaneous | AWSP-1 (X)  |
| E    | For GM and P/A tracking.  | Miscellaneous | AWSP-2 (X)  |
| C    | Beam-precise homing (CYLARK); AWSP-2 used as illuminating source.   | Tracking      | AWSP-3 (X)  |
| E    | Similar to MIC-34 Mod. 1B except for improved target acquisition features.  | Fire Control  | AWSP-3A (X) |
| E    | Antenna reflector mounted on gun mount, elev. tracking and acceleration rates dependent on gun mount drive characteristics. | Fire Control  | AWSP-4 (X)  |
| E    | AWSP-4 is a Fire Control System (X-1)   | Fire Control  | AWSP-4 (X)  |
| C    | AWSP-4B adapted to Gun Director (X-2)   | Fire Control  | AWSP-4B (X) |
| E    | Same as AWSP-4B but with better resolution.   | Fire Control  | AWSP-4C (X) |
| D    | Improved version of target equipment.   | Fire Control  | AWSP-4D (X) |
| C    | Single only radar. Manual gun director with optical range finder.   | Fire Control  | AWSP-4E (X) |
| E    | Modified SP to include substitution. Maximum range to empty weapon in objective.  | Fire Control  | AWSP-4F (X) |
| B    | Same as AWSP-4B but with better guidance indicator.   | Fire Control  | AWSP-4G (X) |
| B    | Used in connection with AWSP-4B in target identification system as well as course guidance.                                 | Fire Control  | AWSP-4H (X) |
| E    | Improved version of false beam AWTP-1.  | Fire Control  | AWTP-1 (X)  |
| C    | Used in connection with false beam AWTP-1.  | Fire Control  | AWTP-1A (X) |

**Section 4**  
**Shipboard Weapon Control Radars**

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SHIPBOARD WEAPON CONTROL RADARS

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| MODEL               | Function                                    | General Facts   | Sec. Class. |
|---------------------|---|---|-------------|
| AN/APN-4<br>(XN)    | Missile Guidance                            | Transponder type pulse beacon.  | U           |
| AN/APN-62           | Missile Guidance                            | For GM and P/A tracking.  | C           |
| AN/DPN-7            | Passive Homing                              | Semi-passive homing SKYLARK;<br>AN/SPG-2 used as illuminating source.   | C           |
| AN/SPG-34           | AA Fire Control                             | Similar to MK-34 Mod. 16 except for improved target acquisition features.   | R           |
| AN/SPG-48           | AA Auto Track Fire Control                  | Antenna reflector mounted on gun mount, slew, tracking and acceleration rates dependent on gun mount drive characteristics. | C           |
| AN/SPG-48<br>(XN-3) | Surface and AA Auto Track Fire Control      | AN/SPG-48 adapted to Gun Fire Control System X-1.   | C           |
| AN/SPG-48<br>(XN-4) | Surface and AA Auto Track Fire Control      | AN/SPG-48 adapted to Gun Director Mk-68.  | C           |
| AN/SPG-49<br>(XN)   | AA Missile Guidance and Gun Fire Control    | Same as AN/SPG-49 but with terrier guidance injection.  | S           |
| AN/SPG-50<br>(XN-1) | AA Fire Control                             | Improved version at radar equipment Mk-34   | C           |
| AN/SPG-52<br>(XN-1) | AA Fire Control                             | Range only radar. Manual gun director with optical angle tracking.  | C           |
| AN/SPQ-2            | Auto Missile Tracking                       | Modified SP to include stabilization. Maximum ranges to employ beacons in missiles.   | C           |
| AN/SPQ-49*<br>(XN)  | AA Missile Guidance and Gun Fire Control    | Same as AN/SPG-49 but with terrier guidance injection.  | S           |
| AN/SPW-49*<br>(XN)  | Guidance Transmitter for Beam Rider Missile | Used in connection with AN/SPG-49 in Talos missile system as mid-course guidance transmitter.                               | S           |
| AN/TPN-7<br>(XN-1)  | Shore Bombardment Beacon                    | Improved version of radio beacon AN/TPQ-7.  | C           |
| AN/TPQ-7            | Shore Bombardment Beacon                    | Portable radio beacon used by shore fire control party in shore bombardment.  | C           |

\* Suggested nomenclature. Not official.

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| Peak Power Output (kw) | Frequency Range (Mc)                                       | Pulse Length ( $\mu$ sec)                                    | Pulse Rate (pps)                                 | IF Bandwidth (Mc) |
|------------------------|--|--|--|-------------------|
| —                      | 2750 - 2950  | —  | —  | —                 |
| 5                      | 2700 - 3600  | —  | —  | —                 |
| —                      | 2700 - 2950  | —  | —  | 2.5               |
| 25 - 35                | 8740 - 8890  | 0.3  | 1800 $\pm$ 10%                                   | 9                 |
| 250                    | 8500 - 9600  | 0.25   | 1320 $\pm$ 10%                                   | 9                 |
| 250                    | 8500 - 9600  | 0.25   | 1320 $\pm$ 10%                                   | 9                 |
| 250                    | 8500 - 9600  | 0.25   | 1320 $\pm$ 10%                                   | 9                 |
| 3 meg                  | 5650 $\pm$ 250   | 0.3 and 3.0  | 900 and 500                                      | 5, 0.5            |
| 35 - 70                | 8500 - 9600  | 0.25   | 2000 $\pm$ 10%                                   | 9                 |
| 50                     | 15,800 - 16,200  | 0.5  | 1500 with 400 cps modulation                     | 4.5               |
| 700                    | 2700 - 2900  | 1.0  | 350 - 850<br>576                                 | 2.2               |
| 250                    | Track: 5650 $\pm$ 250<br>Guidance & capture: 5635 $\pm$ 50 | Track: 3 and 0.3<br>Guidance & capture<br>Triple-pulse coded | 500 for search<br>900 av. for track and guidance | Track: 5, 0.5     |
| 16                     | 5635 $\pm$ 50  | Triple-pulse coded   | 900 average                                      | No receiver       |
| 1                      | Receive: 8900 - 9400<br>Transmit: 8900 - 9400              | 0.25   | —  | 9                 |
| 0.3                    | Receive: 8900 - 9400<br>Transmit: 9310                     | 0.5  | —  | 6                 |

| Acquisition Scan |                                  |                         |                       | Tracking Scan       |              |
|------------------|----------------------------------|-------------------------|-----------------------|---------------------|--------------|
| Type             | Rate                             | Horizontal Coverage (°) | Vertical Coverage (°) | Type                | Coverage (°) |
| —                | —                                | —                       | —                     | —                   | —            |
| —                | —                                | —                       | —                     | —                   | —            |
| —                | —                                | —                       | —                     | —                   | —            |
| Spiral           | 30 cps mutation and 2 cps spiral | 12                      | 12                    | Conical             | 3.6          |
| Spiral           | 30 cps mutation and 2 cps spiral | 12                      | 12                    | Conical             | 3.6          |
| Spiral           | 30 cps mutation and 2 cps spiral | 12                      | 12                    | Conical             | 2.6          |
| Spiral           | 30 cps mutation and 2 cps spiral | 12                      | 12                    | Conical             | 2.6          |
| Raster           | 4/sec<br>1/sec                   | 11                      | 1.6<br>or<br>5        | Simultaneous lobing | 1.6          |
| Spiral           | 30 cps mutation and 2 cps spiral | 12                      | 12                    | Conical             | 3.6          |
| None             | None                             | 5                       | 5                     | None                | 5            |
| —                | 24 cps                           | —                       | —                     | Conical             | 2            |
| Raster           | 4/sec<br>1/sec                   | 11                      | 1.6<br>or<br>5        | Simultaneous lobing | 1.6          |
| —                | —                                | —                       | —                     | —                   | —            |
| —                | —                                | —                       | —                     | —                   | —            |
| —                | —                                | —                       | —                     | —                   | —            |

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| Reliable Tracking Range |                   | Tracking Accuracy                    |                  |                     | Bearing              |                      |
|-------------------------|-------------------|--------------------------------------|------------------|---------------------|----------------------|----------------------|
| Surface DD (yd)         | Aircraft F6F (yd) | Range (yd)                           | Bearing (mil)    | Elevation (mil)     | Track Rate (deg/sec) | Slew (max) (deg/sec) |
| —                       | —                 | —                                    | —                | —                   | —                    | —                    |
| —                       | —                 | —                                    | —                | —                   | —                    | —                    |
| —                       | 2,600             | Must approach within 50 ft of target |                  | Boresight .25       | —                    | —                    |
| —                       | 20,000            | ±15<br>±0.1% R                       | ±0.75 reset      | ±0.75 reset         | Manual               | Manual               |
| —                       | 30,000            | ±10<br>±0.025% R                     | ±0.75 reset      | ±0.75 reset         | 30                   | 30                   |
| Horizon                 | 40,000            | ±10<br>±0.025% R                     | 0.5 RMS          | 0.5 RMS<br>above 1° | 43                   | 130                  |
| Horizon                 | 45,000            | ±10<br>±0.025% R                     | 0.5 RMS          | 0.5 RMS<br>above 1° | 30                   | 50                   |
| —                       | 200,000           | ±15<br>±0.025% R                     | ±0.2             | ±0.2                | 50                   | 100                  |
| —                       | 20,000            | ±10<br>±0.025% R                     | ±0.75 reset      | ±0.75 reset         | Manual               | Manual               |
| —                       | 8,500             | ±20<br>or 2% R                       | Not applicable   |                     | Manual               | Manual               |
| Horizon                 | 100,000           | ±15                                  | 1° at<br>10°/sec | 0.1° at<br>10°/sec  | 30                   | 36                   |
| —                       | 60,000            | ±15<br>±0.025% R                     | ±0.2 mil RMS     | ±0.2 mil RMS        | 50                   | 100                  |
| —                       | —                 | —                                    | —                | —                   | —                    | —                    |
| —                       | —                 | —                                    | —                | —                   | —                    | —                    |
| —                       | —                 | —                                    | —                | —                   | —                    | —                    |

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| Resolution |             | Range Track Rate (yd/sec) | Type of Guns Controlled    | Fire Control System or Gun Director Used With |
|------------|-------------|---------------------------|----------------------------|---|
| Range (yd) | Bearing (°) |                           |                            |   |
| —          | —           | —                         | —                          | —   |
| —          | —           | —                         | —                          | —   |
| —          | —           | —                         | —                          | —   |
| 200        | 2.2         | ±843.75 knots             | 3"/50 mounts               | GFCS MK 63 Mod 14                             |
| 80         | 2.2         | ±1115                     | 5"/54, 3"/50, 3"/70        | Gunar MK 1, 2, & 3, GFCS MK 69                |
| 80         | 1.3         | ±1115                     | 5"/54 and 3"/70            | GFCS X-1                                      |
| 80         | 1.3         | ±1115                     | 5"/54                      | GFCS MK 68                                    |
| 50         | 1.3         | 2000                      | AA Guns or Talos missile   | None  |
| 200        | 2.2         | ±1000 knots               | 3"/50 mounts               | GFCS MK 63 Mod 14                             |
| 98         | 5           | ±650 knots                | 5"/38                      | GFCS MK 7                                     |
| 150        | 2.5         | 2500                      | —                          | Lark and Skylark                              |
| 50         | 1.3         | 2000                      | AA Guns or Terrier missile | None  |
| —          | —           | —                         | Talos missile              | —   |
| —          | —           | —                         | None                       | Radars MK 25 Mods 2, 3, 4, and 5              |
| —          | —           | —                         | None                       | Radars MK 25 mods 2, 3, 4, and 5              |

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| Range (Instr) Max (miles) | Range Min (yd) | Reflector                  |           | Beamwidth |           |
|---------------------------|----------------|----------------------------|-----------|-----------|-----------|
|                           |                | Type                       | Size (ft) | Hor. (°)  | Vert. (°) |
| —                         | —              | —                          | —         | —         | —         |
| —                         | —              | —                          | —         | —         | —         |
| 200                       | 300            | paraboloid                 | 7 x 1/4   | 12        | 12        |
| 18                        | 350            | paraboloid                 | 3-1/4     | 2.2       | 2.2       |
| 20                        | 350            | paraboloid                 | 3-1/4     | 2.2       | 2.2       |
| 20                        | 350            | paraboloid                 | 5         | 1.6       | 1.6       |
| 20                        | 350            | paraboloid                 | 5         | 1.6       | 1.6       |
| 150                       | 500            | lens                       | 8 x 8     | 1.6       | 1.6       |
| 18                        | 350            | paraboloid                 | 3-1/4     | 2.2       | 2.2       |
| 5                         | 150            | paraboloid off-set section | 3/4       | 5         | 5         |
| 200                       | 300            | paraboloid                 | 8         | 3         | 3         |
| 150                       | 500            | lens                       | 8 x 8     | 1.6       | 1.6       |
| —                         | —              | paraboloid                 | 2         | 5         | 5         |
| —                         | —              | horn                       |           | 60        | 120       |
| —                         | —              | horn                       |           | 60        | 120       |

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| Type of Display                | Transmission Line |           | Power Requirements |       |                 |                 |
|--------------------------------|-------------------|-----------|--------------------|-------|-----------------|-----------------|
|                                | Type              | Number    | Volts              | Phase | Frequency (cps) | KVA             |
| —                              | —                 | —         | —                  | —     | —               | —               |
| —                              | —                 | —         | 115<br>28 dc       | 1     | 400 - 1600      | 3               |
| Auto. Control                  | Coax.             | —         | 28 dc              | —     | —               | 0.6             |
| 5" A, 2 - 2" F                 | Wave Guide        | RG - 51/U | 115                | 1     | 60              | 1.7             |
|                                |                   |           | 440                | 3     | 60              | 0.2             |
| 5" A/R, 5" B,<br>5" E, 2" F    | Wave Guide        | RG - 51/U | 115                | 1     | 60              | 4               |
|                                |                   |           | 440                | 3     | 60              | 0.2             |
| 5" A/R, 5" E,<br>5" B, 2" F    | Wave Guide        | RG - 51/U | 115                | 1     | 60              | 4               |
|                                |                   |           | 440                | 3     | 60              | 0.2             |
| 5" A/R, 5" E,<br>5" B, 2" F    | Wave Guide        | RG - 51/U | 115                | 1     | 60              | 4               |
|                                |                   |           | 440                | 3     | 60              | 0.2             |
| 5" B - 3 dim.<br>5" A, 10" PPI | Wave Guide        |           | 440                | 3     | 60              | 155             |
|                                |                   |           | 208                | 3     | 60              | 24.7            |
|                                |                   |           | 115                | 3     | 400             | M.G. set on 440 |
| 3" A/R 2 - 2" F                | Wave Guide        | RG - 51/U | 115                | 1     | 60              | 2               |
|                                |                   |           | 440                | 3     | 60              | 0.2             |
| None                           | Wave Guide        | RG - 53/U | 440                | 3     | 60              | 2               |
| R-A B-PPI                      | Wave Guide        | —         | 110                | 3     | 60              | 7               |
| 5" B-3 dim. 5" A<br>10" PPI    | Wave Guide        | —         | 440                | 3     | 60              | 58.2            |
|                                |                   |           | 208                | 3     | 60              | 24.7            |
|                                |                   |           | 115                | 3     | 400             | M.G. set on 440 |
| —                              | Wave Guide        | —         | 115                | 1     | 60              | 5               |
|                                |                   |           | 208                | 3     | 60              | 0.5             |
|                                |                   |           | 115                | 1     | 400             | 0.2             |
| —                              | Wave Guide        | RG - 51/U | 115                | 1     | 400             | 0.2             |
|                                |                   |           | or<br>24           | dc    |                 |                 |
| —                              | Wave Guide        | RG - 51/U | 115                | 1     | 400             | 0.4             |

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| Smallest Ship | Weight (lb)                              |            |         | Number in Use or Available Date | Supplier                             | MODEL            |
|---------------|--|------------|---------|---------------------------------|--------------------------------------|------------------|
|               | Topside                                  | Lower Deck | Antenna |                                 |                                      |                  |
| —             | —  | —          | —       | —                               | —                                    | AN/APN-4 (XN)    |
| —             | —  | —          | CW      | —                               | —                                    | AN/APN-62        |
| —             | 75                                       | —          | —       | Sept. 1949                      | —                                    | AN/DPN-7         |
| DE            | 175                                      | 1,810      | 175     | Avail. 1953                     | Bell Tel. Lab.,<br>Western Elec. Co. | AN/SPG-34        |
| DL            | 122                                      | 4,500      | 122     | July 1952                       | Bell Tel. Lab.,<br>Western Elec. Co. | AN/SPG-48        |
| DD            | 150                                      | 4,500      | 150     | Model avail. 1953               | Bell Tel. Lab.,<br>Western Elec. Co. | AN/SPG-48 (XN-3) |
| DD            | 150                                      | 4,500      | 150     | Model avail. 1953               | Bell Tel. Lab.,<br>Western Elec. Co. | AN/SPG-48 (XN-4) |
| DD            | 30,000                                   | 14,500     | 4,000   | Exp. model<br>Jan. 1954         | Sperry Gyroscope Co.                 | AN/SPG-49 (XN)   |
| DE            | 175                                      | 2,000      | 175     | Model avail. 1954               | Bell Tel. Lab.,<br>Western Elec. Co. | AN/SPG-50 (XN-1) |
| Aux.          | 200 (est.)                               | 750 (est.) | 2       | Model avail. 1953               | Stavid Engineering Co.               | AN/SPG-52 (XN-1) |
| AV-11         | 7,800                                    | 2,000      | 2,200   | 1 Jan. 1950                     | —                                    | AN/SPQ-2         |
| CL            | 30,000                                   | 14,500     | 4,000   | Mar. 1953                       | Sperry Gyroscope Co.                 | AN/SPQ-49 (XN)   |
| CL            | 800                                      | 1,600      | 800     | Apr. 1953                       | —                                    | AN/SPW-49 (XN)   |
| —             | Total wt. 75 lbs;<br>less transit cases  |            |         | Model avail. 1953               | Sperry and Designers for Industry    | AN/TPN-7 (XN-1)  |
| —             | Total wt. 160 lbs;<br>less transit cases |            |         | 63                              | NOP Indianapolis                     | AN/TPQ-7         |

| MODEL<br>Radar<br>Equipment | Function  | General Facts  | Sec.<br>Class. |
|-----------------------------|---|--|----------------|
| MK 7<br>MK 7 MOD 1          | Experimental<br>AA Auto. Track<br>Fire Control            | Experimental automatic tracking radar.   | R              |
| MK 8 MOD 2                  | Surface Main<br>Battery Fire<br>Control                   |  | R              |
| MK 8 MOD 3                  | Surface Main<br>Battery Fire<br>Control                   | Mk 8 Mod 2 converted from S-band to X-band.  | R              |
| MK 12 MOD 1                 | Surface and<br>AA Fire<br>Control                         | A and F spot error indicator scopes.   | R              |
| MK 13                       | Surface Main<br>Battery Fire<br>Control                   |  | U              |
| MK 22 MOD 1                 | Low Elevation<br>Angle AA Fire<br>Control                 | Used with R.E. Mk 12 to provide accurate elevation data below 10°.   | R              |
| MK 25 MOD 2                 | Surface and AA<br>Auto. Track<br>Fire Control             | Used with computer Mk 1 in GFCS Mk 37. All Mod 2 are being converted to Mod. 3's.  | C              |
| MK 25 MOD 3                 | Surface and AA<br>Auto. Track<br>Fire Control             | Used with Gun Fire Control System Mk 37. Similar to radar equipment Mk 25 Mod 2 with increased power.  | C              |
| MK 25 MOD 4                 | Surface and AA<br>Auto. Track<br>Fire Control             | R.E. Mk 25 Mod 2 adapter to GFCS 67.   | C              |
| MK 25 MOD 5                 | Surface and AA<br>Auto. Track<br>Fire Control             | R.E. Mk 25 Mod 3 adapted to GFCS 67.   | C              |
| MK 25 MOD 6                 | Missile Guidance<br>and AA Auto.<br>Track Fire<br>Control | Special purpose missile guidance radar for Terrier; ground based local oscillator for missile receiver.  | C              |
| MK 25 MOD 7                 | Missile Guidance<br>and AA Gun<br>Fire Control            | Special purpose missile guidance radar for Terrier; provides guidance and capture beams both of which are triple coded for operation with superheterodyne missile receiver only. | C              |
| MK 27 MOD 0,2               | Surface Main<br>Battery Fire<br>Control                   | 6 in/47 and 8 in/55 M. B. Turret Radar; also, in BB fire control tower.  | U              |
| MK 28 MOD 2                 | AA Fire<br>Control  | Used with GFCS Mk 63; antenna reflector mounted on gun.  | U              |
| MK 29 MOD 2                 | AA Fire<br>Control  | Interim radar for GFCS Mk 57. Replaced by R.E. Mk 39 Mod 3.  | U              |

| Peak Power Output (kw) | Frequency Range (Mc) | Pulse Length ( $\mu$ sec) | Pulse Rate (pps)                | IF Bandwidth (Mc) |
|------------------------|----------------------|---------------------------|---------------------------------|-------------------|
| 30                     | 3000<br>9000         | 0.6                       | 1800                            | 6.6               |
| 20-30                  | 3050 $\pm$ 50        | 0.4                       | 1500 $\pm$ 10%                  | 1.8               |
| 35-45                  | 8815 $\pm$ 75        | 0.3                       | 1500 $\pm$ 5%                   | 5                 |
| 90-110                 | 920 - 970            | 1.2                       | 480 $\pm$ 5%                    | 4                 |
| 25-35                  | 8815 $\pm$ 75        | 0.3                       | 1800 $\pm$ 10%                  | 9                 |
| 35                     | 9375 $\pm$ 30        | 0.5                       | 480                             | 5                 |
| 35-70                  | 8500 - 9600          | 0.25                      | 2000 $\pm$ 10%                  | 9                 |
| 250                    | 8500 - 9600          | 0.25                      | 1320 $\pm$ 10%                  | 9                 |
| 35-70                  | 8500 - 9600          | 0.25                      | 2000 $\pm$ 10%                  | 9                 |
| 250                    | 8500 - 9600          | 0.25                      | 1320 $\pm$ 10%                  | 9                 |
| 250                    | 9230 - 9404          | 0.25                      | 1350 $\pm$ 10%<br>675 $\pm$ 10% | 9                 |
| 250                    | 8500 - 9600          | 0.25 track                | 1350 $\pm$ 1%                   | 9                 |
| 20-30                  | 3071 - 3100          | 0.4                       | 1500 $\pm$ 10%                  | 4                 |
| 30                     | 2992 - 3019          | 0.5                       | 1800 $\pm$ 10%                  | 5                 |
| 25-35                  | 9345 - 9405          | 0.5                       | 1800 $\pm$ 10%                  | 2                 |

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| Acquisition Scan        |                                   |                         |                       | Tracking Scan         |              |
|-------------------------|-----------------------------------|-------------------------|-----------------------|-----------------------|--------------|
| Type                    | Rate                              | Horizontal Coverage (°) | Vertical Coverage (°) | Type                  | Coverage (°) |
| Spiral, PPI, Elliptical | 30 cps nutation at 2.5 cps spiral | 9.1                     | 9.1                   | conical               | 2.8          |
| Same as Track Scan      | 10 cps                            | 29                      |                       | linear horizontal     | 29           |
| Same as Track Scan      | 5 cps                             | 11.5                    |                       | sinusoidal horizontal | 11.5         |
| Same as Track Scan      | 60 cps                            | 15                      | 15                    | lobe switching        | 15           |
| Same as Track Scan      | 5 cps                             | 11.5                    |                       | sinusoidal horizontal | 11.5         |
| Same as Track Scan      | 1 cps                             | 4.5                     | +6<br>-7              | sinusoidal vertical   | 13           |
| Spiral                  | 30 cps nutation at 2 cps spiral   | 12                      | 12                    | conical               | 2.6          |
| Spiral                  | 30 cps nutation at 2 cps spiral   | 12                      | 12                    | conical               | 2.6          |
| Spiral                  | 30 cps nutation at 2 cps spiral   | 12                      | 12                    | conical               | 2.6          |
| Spiral                  | 30 cps nutation at 2 cps spiral   | 12                      | 12                    | conical               | 2.6          |
| Spiral                  | 30 cps nutation at 2.4 cps spiral | 6                       | 6                     | conical               | 1.7          |
| Spiral                  | 30 cps nutation at 2.4 cps spiral | 6                       | 6                     | conical               | 1.7          |
| Same as Track Scan      | 30 cps                            | 11                      |                       | lobe switching        | 11           |
| Conical and Antenna Nod | 30 cps nutation at 0.67 cps Nod   | 11.2                    | 41.2                  | conical               | 11.2         |
| Same as Track Scan      | 30 cps                            | 5                       | 5                     | conical               | 5            |

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| Reliable Tracking Range |                   | Tracking Accuracy |                        |                     | Bearing              |                       |
|-------------------------|-------------------|-------------------|------------------------|---------------------|----------------------|-----------------------|
| Surface DD (yd)         | Aircraft F6F (yd) | Range (yd)        | Bearing (mil)          | Elevation (mil)     | Track Rate (deg/sec) | Slew (max.) (deg/sec) |
| —                       | 36,000            | ±15<br>+0.1% R    | 0.3                    | 0.3                 | 50                   | 50                    |
| 35,000                  | —                 | ±15<br>+0.1% R    | ±2                     | +                   | —                    | —                     |
| 40,000                  | —                 | ±15<br>+0.1% R    | ±3.62,<br>reset ±1.5   | —                   | —                    | —                     |
| —                       | 45,000            | ±20<br>±0.25% R   | ±10 ft,<br>reset ±4 ft | ±10 ft<br>above 10° | 16                   | 25                    |
| 40,000                  | —                 | ±15<br>+0.1% R    | ±3.62,<br>reset ±1.5   | —                   | —                    | —                     |
| —                       | 30,000            | —                 | 0.5°                   | ±3                  | 16                   | 25                    |
| —                       | 25,000            | ±15<br>±0.1% R    | 0.5 RMS                | 0.5 RMS<br>above 1° | 16                   | 30                    |
| —                       | 45,000            | ±12<br>±0.025% R  | 0.5 RMS                | 0.5 RMS<br>above 1° | 16                   | 30                    |
| —                       | —                 | —                 | —                      | —                   | —                    | —                     |
| —                       | —                 | —                 | —                      | —                   | —                    | —                     |
| —                       | 35,000            | ±15<br>±0.1% R    | ±0.7 RMS               | ±0.7                | 16                   | 25                    |
| —                       | —                 | —                 | —                      | —                   | —                    | —                     |
| 30,000                  | —                 | ±15<br>+0.1% R    | ±4, ±50 PPI            | —                   | —                    | —                     |
| —                       | 20,000            | ±15<br>+0.1% R    | ±2 reset               | ±2 reset            | Manual               | —                     |
| —                       | 20,000            | ±15<br>+0.1% R    | ±2 reset               | ±2 reset            | Manual               | —                     |

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| Resolution    |                | Range<br>Track Rate<br>(yd/sec) | Type of Guns<br>Controlled     | Fire Control System<br>or Gun Director<br>Used With |
|---------------|----------------|---------------------------------|--------------------------------|---|
| Range<br>(yd) | Bearing<br>(°) |                                 |                                |   |
| 60            | 1.4            | —                               | —                              | None  |
| 120           | 1.0            | —                               | Main battery                   | Mk 34, Mk 38  |
| 100           | 0.5            | —                               | Main battery                   | Mk 34, Mk 38  |
| 300           | 5.0            | 500                             | 5 in./38 cal.                  | Mk 37   |
| 100           | 15 mils        | —                               | Main battery                   | Mk 34, Mk 38, Mk 54                                 |
| 90            | 2.25           | —                               | 5 in./38 cal.                  | Radar Mk 12 or<br>G. D. Mk 37                       |
| 80            | 1.3            | 500                             | 5 in./38 cal.<br>5 in./54 cal. | Mk 37   |
| 80            | 1.3            | 1000                            | 5 in./38 cal.<br>5 in./54 cal. | Mk 37   |
| 80            | 1.3            | ±1000                           | 5 in./38 cal.<br>5 in./54 cal. | GFCS Mk 67  |
| 80            | 1.3            | +1000                           | 5 in./38 cal.<br>5 in./54 cal. | GFCS Mk 67  |
| 80            | 1.0            | 2000                            | —                              | Mk 37   |
| 80            | 1.0            | 2000                            | —                              | —   |
| 150           | 6.0            |                                 | Main battery                   | F.C. Tower<br>6 in. and 8 in. turrets               |
| 150           | 6.0            | ±350 knots<br>±843.75 knots     | 5 in./38 cal.<br>40 mm         | GFCS Mk 63  |
| 100           | 3.0            | +250,<br>-450                   | 3 in. and 5 in.<br>40 mm       | GFCS Mk 57<br>Mods 0, 1, and 2                      |

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| Range<br>(instr)<br>Max.<br>(miles) | Range<br>Min.<br>(yd) | Reflector                           |                          | Beamwidth   |              |
|-------------------------------------|-----------------------|-------------------------------------|--------------------------|-------------|--------------|
|                                     |                       | Type                                | Size<br>(ft)             | Hor.<br>(°) | Vert.<br>(°) |
| 25                                  | 250                   | paraboloid                          | 4-3/4                    | 1.6         | 1.6          |
| 30                                  | 250                   | polyrod array                       | 10-1/6 H.<br>2-5/6 V.    | 2           | 6            |
| 30                                  | 200                   | elliptical<br>paraboloid            | 8 H. x<br>2 V. x         | 0.9         | 3.6          |
| 25                                  | 400                   | double<br>cylindrical<br>paraboloid | 6 x 6                    | 10          | 10           |
| 40                                  | 350                   | elliptical<br>paraboloid            | 8 x 2                    | 0.9         | 3.6          |
| 15                                  | 250                   | section of<br>paraboloid            | 6 x 1-1/2                | 4.5         | 1.2          |
| 25                                  | 300                   | paraboloid                          | 5                        | 1.6         | 1.6          |
| 50                                  | 300                   | paraboloid                          | 5                        | 1.6         | 1.6          |
| 25                                  | 300                   | paraboloid                          | 5                        | 1.6         | 1.6          |
| 50                                  | 300                   | paraboloid                          | 5                        | 1.6         | 1.6          |
| 50<br>100                           | 500                   | lens                                | 7-1/2                    | 1           | 1            |
| 50<br>100                           | 300                   | lens                                | 7-1/2                    | 1           | 1            |
| 30                                  | 400                   | paraboloid                          | 2-1/2 H. x<br>1-1/4 V. x | 6           | 12           |
| 20                                  | 400                   | paraboloid                          | 3-3/4                    | 6.7         | 6.7          |
| 20                                  | 350                   | paraboloid                          | 2-1/2                    | 3           | 3            |

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| Type of Display                                   | Transmission Line |         | Power Requirements |       |                 |      |
|---|-------------------|---------|--------------------|-------|-----------------|------|
|   | Type              | Number  | Volts              | Phase | Frequency (cps) | KVA  |
| PPI, DI, A, B, E, C                               | Wave Guide        | —       | 480                | 3     | 60              | 15   |
| 5 in. B, 3 in. B                                  | Wave Guide        | RG-48/U | 115                | 1     | 60              | 2.2  |
|   |                   |         | 440                | 3     | 60              | 2.5  |
| 5 in. B, 3 in. B                                  | Wave Guide        | RG-51/U | 440                | 1     | 60              | 2.4  |
|   |                   |         | 440                | 3     | 60              | 0.9  |
| 4-3 in. A or F                                    | Rigid Coax        | —       | 115                | 1     | 60              | 3.1  |
| 6-3 in. B   | Wave Guide        | RG-51/U | 115                | 1     | 60              | 3    |
|   |                   |         | 440                | 3     | 60              | 0.9  |
| 2-3 in. E   | Wave Guide        | RG-52/U | 115                | 1     | 60              | 0.28 |
|   |                   |         | 440                | 3     | 60              | 2    |
| 5 in. B or E, 3 in. A or R, 5 in. E or ΔE         | Wave Guide        | RG-51/U | 115                | 1     | 60              | 2.8  |
|   |                   |         | 115                | 3     | 60              | 0.2  |
| 5 in. B or E, 3 in. A or R, 5 in. E or ΔE         | Wave Guide        | RG-51/U | 115                | 1     | 60              | 3.5  |
|   |                   |         | 115                | 3     | 60              | 0.2  |
| 5 in. B or E, 3 in. A or R, 5 in. A or R, E or ΔE | Wave Guide        | RG-51/U | 115                | 1     | 60              | 2.8  |
|   |                   |         | 115                | 3     | 60              | 0.2  |
| 5 in. B or E, 3 in. A or R, 5 in. A or R, E or ΔE | Wave Guide        | RG-51/U | 115                | 1     | 60              | 3.5  |
|   |                   |         | 115                | 3     | 60              | 0.2  |
| 5 in. B or E, 3 in. A, 5 in. E or ΔE              | Wave Guide        | RG-51/U | 115                | 1     | 60              | 6    |
|   |                   |         | 440                | 3     | 60              | 1    |
| 5 in. B or E, 3 in. A, 5 in. E or ΔE              | Wave Guide        | RG-51/U | 115                | 1     | 60              | 6    |
|   |                   |         | 440                | 3     | 60              | 1    |
| 5 in. A   | Wave Guide        | RG-48/U | 440                | 1     | 60              | 2    |
| 5 in. A, 2 in. F, 3 in. EE                        | Coax Cable        | RG-14/U | 115                | 1     | 60              | 1.7  |
| 2-2 in. F, 2 in. A, 5 in. A                       | Wave Guide        | RG-52/U | 115                | 1     | 60              | 1.4  |

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| Smallest Ship | Weight (lb) |            |                | Number in Use or Available Date               | Supplier                              | MODEL Radar Equipment |
|---------------|-------------|------------|----------------|---|---------------------------------------|-----------------------|
|               | Topside     | Lower Deck | Antenna        |   |                                       |                       |
|               | 1800        | 2200 est.  | 1800           | 2   | Bell Telephone Laboratories           | MK 7<br>MK 7 MOD 1    |
| CL            | 3209        | 1229       | 2750           | 120   | Western Elec. Co.                     | MK 8 MOD 2            |
| CL            | 1554        | 1229       | 1000           | 82  | Western Elec. Co.                     | MK 8 MOD 3            |
| DD            | 1310        | 1827       | 460            | 685   | Western Elec. Co.                     | MK 12 MOD 1           |
| CL            | 1795        | 3070       | 1000           | 107   | Western Elec. Co.                     | MK 13                 |
| DD            | 713         | 485        | 180            | 876   | Western Elec. Co.                     | MK 22 MOD 1           |
| DD            | 2000        | 5000       | 600            | 362   | Western Elec. Co.                     | MK 25 MOD 2           |
| DD            | 2200        | 5700       | 600            | 355 conversion kits<br>196 production mod 3's | Western Elec. Co.                     | MK 25 MOD 3           |
| DD            | 1400        | 5250       | 175 less mount | 1   | Western Elec. Co.<br>Stavid Eng. Co.  | MK 25 MOD 4           |
| DD            | 1600        | 5850       | 175 less mount | 5   | Western Elec. Co.<br>Stavid Eng. Co.  | MK 25 MOD 5           |
| Special       | 4000        | —          | —              | 3   | Western Elec. Co.<br>Reeves Inst. Co. | MK 25 MOD 6           |
| CL            | 4000        | 6000       | 1500           | July 1953                                     | Western Elec. Co.<br>Reeves Inst. Co. | MK 25 MOD 7           |
| CL            | 1447        | —          | 425            | 49  | Western Elec. Co.                     | MK 27 MOD 2           |
| DE            | 385         | 1500       | 135            | 239   | Western Elec. Co.                     | MK 28 MOD 2           |
| CL            | 100         | 1400       | 70             | 100 (obsolescent)                             | Western Elec. Co.                     | MK 29 MOD 2           |

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CONTROL RADARS

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| MODEL<br>Radar<br>Equipment | Function                                      | General Facts  | Sec.<br>Class |
|-----------------------------|---|--|---------------|
| MK 34<br>MOD 2, 6           | AA<br>Fire<br>Control                         | Mod 2 controls 40mm guns;<br>Mod 6 - 3 in./50 guns   | R             |
| MK 34<br>MOD 3, 4, 7-14     | AA<br>Fire<br>Control                         | Mods 13 and 14 have acquisition features the same as<br>R. E. Mk 39 Mod 2. Mods determined by type of guns<br>controlled.              | R             |
| MK 34<br>MOD 16             | AA<br>Fire<br>Control                         | Similar to Mk 34 Mod 2, 6 except wide-band IF<br>amplifier.  | R             |
| MK 35<br>MOD 2              | Surface and<br>AA Auto. Track<br>Fire Control | A unit of Mk 56 GFCS   | C             |
| MK 37                       |   | See Mk 25 Mod 2, 3   |               |
| MK 39<br>MOD 3, 4           | AA<br>Fire<br>Control                         | Mod O, 1 and 2 not installed.<br>One Mod 4 on USS MISSISSIPPI.   | R             |
| MK 44                       | Experimental<br>Submarine<br>Fire Control     | 5 in. PPI, 5 in. B or L.   | C             |
| MK 47<br>MOD 0, 1           | Auto Angle<br>Track AA<br>Fire Control        | Automatic tracking in bearing and elevation.<br>Aided tracking in range.   | C             |
| MK 50                       | Missile<br>Guidance                           | Simultaneous lobing. Angle information is obtained<br>from each individual pulse. May be used as gun<br>director and missile guidance. | C             |
| MK 56                       |   | See Mk 35  |               |
| MK 67                       |   | See Mk 25 Mod 4, 5   |               |
| SP-1 Ma                     | Missile<br>Guidance                           | For use with AN/MPS-4 (XN)   | R             |
| SP-1M<br>Lark               | Missile<br>Guidance                           | Two receivers. Now AN/MPQ-5  | U             |
| SV-1                        | Missile<br>Guidance                           | Permits tracking of KJW-Missile (Loon)<br>For submarine installation   | R             |

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SECURITY INFORMATION

| Peak Power Output (kw) | Frequency Range (Mc) | Pulse Length ( $\mu$ sec) | Pulse Rate (pps)             | IF Bandwidth (Mc) |
|------------------------|----------------------|---------------------------|------------------------------|-------------------|
| 25-35                  | 8740-8890            | 0.3                       | 1800 $\pm$ 10%               | 5                 |
| 25-35                  | 8740-8890            | 0.3                       | 1800 $\pm$ 10%               | 5                 |
| 25-35                  | 8740-8890            | 0.3                       | 1800 $\pm$ 10%               | 9                 |
| 50                     | 8500-9600            | 0.1                       | 3000 $\pm$ 5%                | 11                |
|                        |                      |                           |                              |                   |
| 25-35                  | 9000-9160            | 0.5                       | 1800 $\pm$ 10%               | 3.5               |
| 50                     | 15,800-16,200        | 0.2<br>0.8                | 3200 - 3950 or<br>900 - 1100 |                   |
| 25-35                  | 9000-9160            | 0.5                       | 1800 $\pm$ 10%               | 3.5 to 5.0        |
| 50                     | 8500-9600            | 0.25                      | 1000 - 3500                  | 11                |
|                        |                      |                           |                              |                   |
|                        |                      |                           |                              |                   |
|                        |                      |                           |                              |                   |
| 700                    | 2800                 | 1.0                       |                              | 2.2               |
| 700                    | 2700-2900            | 1.0                       | 350 - 850<br>576             | 2.2               |
|                        |                      |                           |                              |                   |



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| Reliable Tracking Range |                   | Tracking Accuracy |                               |                               | Bearing              |                     |
|-------------------------|-------------------|-------------------|-------------------------------|-------------------------------|----------------------|---------------------|
| Surface DD (yd)         | Aircraft F6F (yd) | Range (yd)        | Bearing (mil)                 | Elevation (mil)               | Track Rate (deg/sec) | Slew(Max) (deg/sec) |
|                         | 20,000            | ± 15<br>+ 0.1% R  | ± 2 reset                     | ± 2 reset                     | Manual               | Manual              |
|                         | 20,000            | ± 15<br>+ 0.1% R  | ± 2 reset                     | ± 2 reset                     | Manual               | Manual              |
|                         | 20,000            | ± 15<br>+ 0.1% R  | ± 2 reset                     | ± 2 reset                     | Manual               | Manual              |
|                         | 30,000            | 20<br>± 0.025% R  | 0.7                           | 0.7 above 1°                  |                      | 72                  |
|                         |                   |                   |                               |                               |                      |                     |
|                         | 20,000            | ± 30<br>+ 0.5% R  | ± 2 reset                     | ± 2 reset                     | Manual               | Manual              |
|                         |                   | ± 3 to<br>0.1% R  | ± 1.1                         |                               | 50                   | 150                 |
|                         | 25,000            | ± 30<br>+ 0.5% R  | ± 2 (telescope<br>Mk92-reset) | ± 2 (telescope<br>Mk92-reset) | 42                   | 42                  |
|                         | 30,000            | ± 15<br>+ 0.1%    | 0.2                           | 0.2                           | 50                   | 50                  |
|                         |                   |                   |                               |                               |                      |                     |
|                         |                   |                   |                               |                               |                      |                     |
|                         |                   |                   |                               |                               |                      |                     |
|                         |                   |                   |                               |                               |                      |                     |
| Horizon                 | 100,000           | ± 15              | 1° and 10°<br>/sec            | .1 @ 10° /sec                 | 30                   | 36                  |
|                         |                   |                   |                               |                               |                      |                     |

| Resolution |             | Range Track Rate (yd/sec) | Type of Guns Controlled                 | Fire Control System or Gun Director used with |
|------------|-------------|---------------------------|---|---|
| Range (yd) | Bearing (°) |                           |   |   |
| 200        | 3.0         | ± 843.75 Knots            | 5 in./38 Cal. 40 mm                     | GFCS Mk 63 Mod 6 and 11                       |
| 200        | 3.0         | + 250-450                 | 40 mm, 3 in./50, 5 in./38, and 6 in./47 | GFCS Mk 57 Mod 3                              |
| 200        | 3.0         | ± 843.75 Knots            | 40 mm 3 in./50 mounts                   | GFCS Mk 63 Mods 6 to 12                       |
| 35         | 1.5         | 450                       | 3 in./50, 5 in./54, and 6 in./47        | GFCS Mk 56                                    |
|            |             |                           |   |   |
| 100        | 3.0         | + 450-750                 | 40 mm, 3 in., 5 in., and 6 in.          | GFCS Mk 57 Mod 4                              |
|            | 1.5         | 250                       | Torpedo                                 | FCS Mk 101                                    |
| 100        | 2.0         | + 450-750                 | 40 mm, 6 in./47, 5 in./38, 54           | GFCS Mk 61                                    |
| 80         | 1.4         | 1500                      | None                                    | None  |
|            |             |                           |   |   |
|            |             |                           |   |   |
|            |             |                           |   |   |
|            |             |                           |   |   |
|            |             |                           |   |   |
| 150        | 2.5         | 2500                      |   | Lark and Skylark                              |
|            |             |                           |   |   |

| Range<br>(Instr)<br>Max.<br>(miles) | Range<br>Min.<br>(yd) | Reflector                |              | Beamwidth   |              |
|-------------------------------------|-----------------------|--------------------------|--------------|-------------|--------------|
|                                     |                       | Type                     | Size<br>(ft) | Hor.<br>(°) | Vert.<br>(°) |
| 18                                  | 350                   | paraboloid               | 2-1/2        | 3           | 3            |
| 20                                  | 350                   | paraboloid               | 2-1/2        | 3           | 3            |
| 18                                  | 350                   | paraboloid               | 2-1/2        | 3           | 3            |
| 15                                  | 350                   | paraboloid               | 4            | 2           | 2.1          |
|                                     |                       |                          |              |             |              |
| 15                                  | 300                   | paraboloid               | 2-1/2        | 3           | 3            |
| 30                                  | 200                   | section of<br>paraboloid | 3-1/3 x 2/3  | 1.5         | 9            |
| 15                                  | 300                   | paraboloid               | 4            | 2           | 2            |
| 25                                  | 100                   | lens                     | 6 dia.       | 1.4         | 1.4          |
|                                     |                       |                          |              |             |              |
|                                     |                       |                          |              |             |              |
|                                     |                       |                          |              |             |              |
| 50                                  | 300                   |                          |              |             |              |
| 50                                  | 300                   | paraboloid               | 8            | 3           | 3            |
|                                     |                       | SV-4                     |              |             |              |

| Type of Display                              | Transmission Line |                    | Power Requirements |              |                 |                     |
|--|-------------------|--------------------|--------------------|--------------|-----------------|---------------------|
|  | Type              | Number             | Volts              | Phase        | Frequency (cps) | KVA                 |
| 5 in. A, 2-2in. F, 3 in. EE                  | Wave Guide        | RG-51/U            | 115<br>440         | 1<br>3       | 60<br>60        | 1.5<br>0.025        |
| 5 in. A, 2 in. A, 2-2 in. F                  | Wave Guide        | RG-51/U            | 115<br>440         | 1<br>3       | 60<br>60        | 1.5<br>0.025        |
| 5 in. A, 2-2 in. F, 3 in. EE                 | Wave Guide        | RG-51/U            | 115<br>440         | 1<br>3       | 60<br>60        | 1.5<br>0.025        |
| 5 in. A/R, 5 in. B, 7 in. E                  | Wave Guide        | RG-52/U            | 115<br>440         | 1<br>3       | 60<br>60        |                     |
|  |                   |                    |                    |              |                 |                     |
| 2 in. E, 2-2 in. F, 5 in. A/R, 3 in. E or EE | Wave Guide        | RG-52/U            | 115                | 1            | 60              | 2.2                 |
| 5 in. B, 5 in. L, 5 in. PPI                  | Wave Guide        |                    | 120<br>27.5        | 1<br>DC      | 400             | 2.58<br>0.4         |
| 5 in. A/R, 2 in. F, 5 in. E or EE, 5 in. PPI | Wave Guide        | RG-52/U<br>RG-51/U | 115<br>440<br>270  | 1<br>3<br>DC | 60<br>60        | 2.75<br>0.5<br>0.11 |
| IRBEL, Spot                                  | None              |                    | 115                | 3            | 60              | 3 approx.           |
|  |                   |                    |                    |              |                 |                     |
|  |                   |                    |                    |              |                 |                     |
|  |                   |                    |                    |              |                 |                     |
|  |                   |                    |                    |              |                 |                     |
|  |                   |                    |                    |              |                 |                     |
| R-A, B-PPI                                   | Wave Guide        |                    | 110                | 3            | 60              | 7                   |
|  |                   |                    |                    |              |                 |                     |

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SHIPBOARD WEAPON  
CONTROL RADARS

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| Smallest Ship | Weight (lb)                      |                          |         | Number in Use or Available Date | Supplier                           | MODEL Radar Equipment   |
|---------------|----------------------------------|--------------------------|---------|---------------------------------|------------------------------------|-------------------------|
|               | Topside                          | Lower Deck               | Antenna |                                 |                                    |                         |
| DE            | 115                              | 1700                     | 115     | Mod 2 - 278<br>Mod 6 - 328      | Bell Tel.Labs.<br>Western Elec.Co. | MK 34<br>Mod 2, 6       |
| CL            | 185                              | 1600                     | 100     | 255                             | Western Elec. Co.                  | MK 34<br>Mod 3, 4, 7-14 |
| DE            | 115                              | 1700                     | 115     | Available 1952                  | Western Elec. Co.                  | MK 34<br>Mod 16         |
| DD            | 598                              | 520                      | 265     | 165                             | G. E. Co.                          | MK 35<br>Mod 2          |
|               |                                  |                          |         |                                 |                                    | MK 37                   |
| CL            | 160                              | 1700                     | 110     | 187                             | Submarine Signal Co.               | MK 39<br>Mod 3, 4       |
| SS            | 1520                             | total                    | 550     | 1 (experimental)                | Submarine Signal Co.               | MK 44                   |
| DD            | 220                              | 2129                     | 220     | Mod 0 - 4<br>Mod 1 - 7          | Submarine Signal Co.               | MK 47<br>Mod 0, 1       |
|               | 2300<br>Inc.<br>Mount            | 50,000<br>Inc. 2<br>Vans | 100     | 1                               | NRL-BTL                            | MK 50                   |
|               |                                  |                          |         |                                 |                                    | MK 56                   |
|               |                                  |                          |         |                                 |                                    |                         |
|               |                                  |                          |         |                                 |                                    | MK 67                   |
|               |                                  |                          |         |                                 |                                    | SP-1 Ma                 |
|               | 64,000 with power including Vans |                          |         | 1 in use<br>2 Dec. 1949         |                                    | SP-1M<br>Lark           |
|               |                                  |                          |         |                                 |                                    | SV-1                    |

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| MODEL       | Function                        | General Remarks  | Sec. Class |
|-------------|---------------------------------|--|------------|
| AN/TPQ - 1  | F.C. for 60km AA Gun            |  | C          |
| AN/TPQ - 2  | F.C. Beacon                     |  | D          |
| AN/TPQ - 3  | F.C. Beacon                     |  | D          |
| AN/TPQ - 4  | F.C. Beacon                     |  | D          |
| AN/TPQ - 5  | Fire Control                    | Velocity measurements from 400 to 800 ft/sec. AN/TPQ - 5 is used for target identification.                  | C          |
| AN/TPQ - 6  | Precision locating and tracking | One precision locating and tracking system consists of one AN/TPQ - 6 and one AN/TPQ - 7 and one AN/TPQ - 8. | C          |
| AN/TPQ - 7  | Precision locating and tracking | One precision locating and tracking system consists of one AN/TPQ - 7 and one AN/TPQ - 8.                    | C          |
| AN/TPQ - 8  | Precision locating and tracking | One precision locating and tracking system consists of one AN/TPQ - 8 and one AN/TPQ - 7.                    | C          |
| AN/TPQ - 9  | Precision locating and tracking | One precision locating and tracking system consists of one AN/TPQ - 9 and one AN/TPQ - 7.                    | C          |
| AN/TPQ - 10 | Precision locating and tracking | One precision locating and tracking system consists of one AN/TPQ - 10 and one AN/TPQ - 7.                   | C          |
| ME - 1      | F.C. Beacon                     | To direct naval fire during amphibious operations. 10-50 radars gain.  | B          |
| ME - 20     | Searchlight Control             | 2 in. "A" and two 3 in. "B" radar presentation.  | R          |
| ME - 30     | Distance Radar                  | Simultaneous Lobe Comparison (SLO) may be used as Gun Director or Missile Guidance.                          | C          |
| ME - 35A    | Control and Distance            | To search, detect, and track. Mod. for control. GM Beams A-1 or Guide Beams.                                 | C          |

Section 5

Landbased Control Radars

| MODEL                     | Function                        | General Facts  | Sec. Class |
|---------------------------|---------------------------------|--|------------|
| AN/MSG - 1                | F.C. for 90mm AA Guns           |  | C          |
| AN/TPN - 6                | F.C. Beacon                     |  | C          |
| AN/TPN - 7                | F.C. Beacon                     |  | C          |
| AN/TPQ - 7                | F.C. Beacon                     | See Section 4  | C          |
| AN/TPS<br>-13<br>-13A     | Fire Control                    | Velocity measurements from 400 to 500 ft/sec. AN/TPS - 13A is mod. for indoor installation.                            | C          |
| AN/TRQ - 5                | Precision Locating and Tracking | One precision Locating and Tracking System consists of one AN/TRQ -5, 2-6 AN/TRQ -6, and mobile transmitters.          | C          |
| AN/TRQ - 6                | Precision Locating and Tracking | One precision Locating and Tracking System consists of one AN/TRQ - 5, 2-6 AN/TRQ - 6, and mobile transmitters.        | C          |
| AN/TRQ - 8                | Precision Locating and Guiding  | One precision Locating and Guiding System consists of one AN/TRQ - 9,3 or 4 AN/TRQ - 8 and any number of AN/URQ - 6's. | R          |
| AN/TRQ - 9                | Precision Locating and Guiding  | One precision Locating and Guiding System consists of one AN/TRQ -9, 3 or 4 AN/TRQ -8 and any number of AN/URQ -6's.   | R          |
| AN/URQ - 6                | Precision Locating and Guiding  | One precision Locating and Guiding System consists of one AN/TRQ - 9,3 or 4 AN/TRQ - 8 and any number of AN/URQ - 6's. | R          |
| MK - 2<br>Mod. 0 - 1 - 2  | F.C. Beacon                     | To direct naval fire during amphibious operations. 10-db antenna gain.   | R          |
| MK - 20<br>Mod. 0 - 1 - 3 | Searchlight Control             | 5 in. "A" and two 3 in. pip match presentation.  | R          |
| MK - 50                   | Guidance Radar                  | Simultaneous Lobe Comparison (BuO). May be used as Gun Director or Missile Guidance.                                   | C          |
| SCR - 584                 | Control and Guidance            | To search, detect, and track. Mod. for control G/M Hermes A-1 or guide Bumblebee.                                      | C          |
|                           |                                 |  |            |

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| Peak Power Output (kw) | Frequency Range (Mc)   | Pulse Length ( $\mu$ sec) | Pulse Rate (pps) | Resolution |          |
|------------------------|------------------------|---------------------------|------------------|------------|----------|
|                        |                        |                           |                  | Bearing    | Range    |
| 200                    | 3000                   | 0.2 or 0.8                | 1100             |            | 25 yds.  |
| 300 W                  | 8900-9400              | 0.8                       |                  |            |          |
| -                      | X-Band                 |                           |                  |            |          |
| -                      | X-Band                 |                           |                  |            |          |
|                        | 2927                   |                           |                  |            |          |
| 25 W                   | 2 - 5                  |                           |                  |            |          |
| 25 W                   | 2 - 5<br>38-42         |                           |                  |            |          |
| 100 W                  | 1.8 - 3                |                           |                  |            |          |
| 100 W                  | 1.8 - 3                |                           |                  |            |          |
|                        | 1.8 - 3                |                           |                  |            |          |
| 15 W                   | 680 - 720<br>920 - 970 | 0.75                      | 1639             |            |          |
| 100                    | 1200                   | 1.6                       | 255              | 1 mil      | 300 yds. |
| 50                     | 8500 - 9600            | 0.25                      | 1000 - 3500      | 80         | 1.4°     |
| 210                    | 2700 - 2900            | 0.8                       | 1707             |            |          |
|                        |                        |                           |                  |            |          |

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| Beamwidth |           | Bandwidth (Mc)    | Type of Presentation                        | Range        |           | Reliable Range            |               |
|-----------|-----------|-------------------|---|--------------|-----------|---------------------------|---------------|
| Hor. (°)  | Vert. (°) |                   |   | Max. (miles) | Min. (yd) | Surface (yd)              | Aircraft (yd) |
| 5         | 5         | 3.5<br>5.0<br>1.0 | 5 in. A, 7 in. PPI,<br>3 in. J, 2-2 in. PN* | 500          | 500       | 80,000 ser.<br>45,000 AT† |               |
|           |           |                   |   |              |           |                           |               |
|           |           |                   |   |              |           |                           |               |
|           |           |                   |   |              |           |                           |               |
|           |           |                   |   |              |           |                           |               |
| OMNI      |           |                   | Dial  | 15-25        |           |                           |               |
| OMNI      |           |                   | None  | 15-25        |           |                           |               |
| OMNI      |           |                   | None  | 20-30        |           |                           |               |
| OMNI      |           |                   | None  | 20-30        |           |                           |               |
| OMNI      |           |                   | Dial  |              |           |                           |               |
| 90        | 60        |                   |   |              |           |                           |               |
|           |           |                   | 1A<br>1 Pip Notch                           | 25           | 300       | 50,000                    | 50,000        |
| 1.4       | 1.4       | 11                | IRBEI, Spot                                 | 25           | 100       | 30,000                    |               |
|           |           | 2                 |   |              | 500       |                           |               |
|           |           |                   |   |              |           |                           |               |

\* PN - Pip Notch  
 † AT - Automatic Track

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| Track Scan       |           | Tracking Accuracy   |               |                 | Acquisition Scan Coverage |           |
|------------------|-----------|---|---------------|-----------------|---------------------------|-----------|
| Hor. (°)         | Vert. (°) | Range (yd)  | Bearing (mil) | Elevation (mil) | Hor. (°)                  | Vert. (°) |
| 360              | 10        | 20  | 1.5           | 1.5             |                           |           |
|                  |           |   |               |                 |                           |           |
|                  |           |   |               |                 |                           |           |
|                  |           |   |               |                 |                           |           |
|                  |           | Absolute accuracy varies between 2 and 10 ft. depending upon geometry of installation |               |                 |                           |           |
|                  |           |   | "             |                 |                           |           |
|                  |           |   | "             |                 |                           |           |
|                  |           |   | "             |                 |                           |           |
|                  |           |   | "             |                 |                           |           |
|                  |           |   |               |                 |                           |           |
|                  |           | 300   | 1             | 1               | 360                       | 90        |
| Monopulse System |           | +15<br>+ 0.1%   | 0.2           | 0.2             |                           |           |
| Helical          |           |   |               |                 | 360                       |           |
|                  |           |   |               |                 |                           |           |



| Power Source                  |       |               |     | Weight<br>(lb)                                  | No. in use<br>or Avail.<br>Date | Supplier                            | MODEL                 |
|-------------------------------|-------|---------------|-----|---|---------------------------------|-------------------------------------|-----------------------|
| Volts                         | Phase | Frequency     | KVA |   |                                 |                                     |                       |
| 115                           | 3     | 60            | 15  |   |                                 | Sperry Gyro. Co.                    | AN/MSG - 1            |
| 115<br>28                     | 1     | 400<br>-D C - | .18 |   |                                 | -                                   | AN/TPN - 6            |
|                               |       |               |     |   |                                 | -                                   | AN/TPN - 7            |
|                               |       |               |     |   |                                 | NOP<br>Indianapolis,<br>Ind.        | AN/TPQ - 7            |
| 105 -<br>125                  |       | 60            |     |   |                                 | Sperry Gyro. Co                     | AN/TPS -13<br>-13A    |
| 115                           | 1     | 60            |     |   |                                 | Hastings Instrument Co.             | AN/TRQ - 5            |
| 115<br>6 or 24                | 1     | 60<br>-D C -  |     |   |                                 | Hastings Instrument Co.             | AN/TRQ - 6            |
| 115                           | 1     | 60            |     |   |                                 | Hastings Instrument Co.             | AN/ TRQ - 8           |
| 115                           | 1     | 60            |     |   |                                 | Hastings Instrument Co.             | AN/TRQ - 9            |
| 12 or 26<br>115               |       | -D C -        |     |   |                                 | Hastings Instrument Co.             | AN/URQ - 6            |
|                               |       | 1             | 400 |   |                                 |                                     |                       |
| 6 Volt Batteries<br>5 Amperes |       |               |     | 40  |                                 |                                     | MK - 2<br>Mod. 0-1-2  |
| 115                           | 1     | 400           | 3.5 |   |                                 | Western Electric Co.                | MK - 20<br>Mod. 0-1-3 |
| 115                           | 3     | 60            | 3   | 2,300 Inc. Mount<br>50,000 Inc. Mount<br>2 Vans |                                 | NRL --<br>BTL                       | MK - 50               |
| 115                           | 3     | 60            | 12  |   |                                 | General Elec.<br>or<br>Westinghouse | SCR - 584             |
|                               |       |               |     |   |                                 |                                     |                       |













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**SECURITY INFORMATION**

**Section 6**  
**Indicators**

| MODEL     | Function                                | General Facts  | Sec. Class. |
|-----------|---|--|-------------|
| AN/APA-53 | Indicator Assembly                      | Ground stabilization and plotting system.  | R           |
| AN/SPA-4  | Repeater Range-Azimuth                  | Lightweight spraytight PPI repeater for use as a standard indicator in CIC, Captain's Pilot, and Open Bridge.  | R           |
| AN/SPA-4A | Repeater Range-Azimuth                  | Lightweight spraytight PPI repeater for use as a standard indicator in CIC, Captain's Pilot, and Open Bridge.  | R           |
| AN/SPA-7  | Range-Height Indicator                  | RHI for use to display height data from pencil beam as well as stacked beam systems.   | C           |
| AN/SPA-8  | Azimuth-Range Repeater                  | For universal use with wide variety of radars and with AN/SPA-9 in AEW system.   | R           |
| AN/SPA-8A | Azimuth-Range Indicator                 | General purpose remote indicator ship-centered AEW presentation.   | R           |
| AN/SPA-9  | Azimuth-Range Repeater                  | Similar to AN/SPA-8 and used with AN/SPA-8 in AEW system. Off-center cursor.   | R           |
| AN/SPA-10 | Aided Tracker                           | Console with long persistence orange phosphor (British W2168). DRA Input. Used everywhere, down to DE's.   | C           |
| AN/SPS-5  | Master Indicator R&B                    | Special design for SPS-5. Will accept step-by-step input. For use only with auxiliary vessel AN/SPS-5 and -5A  | C           |
| AN/SPS-16 | Console Master Indicator                | Special design for SPS-16. For DE's and smaller vessels. Console with radar controls contained.  | C           |
| AN/UPA-31 | Remote Repeater                         | Lightweight, bulkhead mounted type PPI repeater for use with standard air and surface search radar systems.  | R           |
| AN/UPA-32 | Large Direct View Plotting PPI Repeater | Large direct view plotting type PPI repeater for use as surface summary plot or air summary plot.  | R           |
| AN/UPA-33 | Large Vertical Plotted Radar Display    | Projected type display—PPI data photographed on SPA-9, projected to horiz. 30 in. plot, plotted markings photographed and projected to vertical 5 ft screen. | R           |
|           |   |  |             |
|           |   |  |             |

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| Presentation                                    | Input Data  | Pulse Rate (cycles/sec) |
|---|---|-------------------------|
| 3-12 in. scopes                                 | Radar and IFF video, APS-20 radar trigger and 1 speed bearing, API, GPI, and local scan voltages. | 300                     |
| 10 in. PPI                                      | 1 and 36 standard video and trigger.  | 57-3000                 |
| 10 in. PPI                                      | Standard video, trigger, and 1x and 36 x bearing from radar.                                      | 57-3000                 |
| 10 in. RHI                                      | Height antenna position, video, sin, and cos reference  | 57-3000                 |
| 10 in. PPI (10 KPT)                             | 1 speed bearing. AEW synchro input.   | 60-2000                 |
| 10 in. PPI                                      | 1 speed bearing. Video and trigger.   | 60-3000                 |
| 10 in. PPI (10 KPT)                             | 1 speed bearing. DRA synchro input.   | 60-2000                 |
| 12 in. PPI<br>10 in. RHI<br>5 in. expanded PPI  | Standard SPS-6 and 8 (2 speed).<br>SPS-2 stacked beam input.                                      | 60-3000                 |
| 10 in. PPI                                      | Nonstandard trigger and video.<br>1 and 36 speed.   | 683.06<br>±0.05%        |
| 7 in. PPI and<br>5 in. "A" scope                | Standard trigger and video.<br>400 cycle synchros.  | 400                     |
| 7 in. PPI                                       | Standard video, trigger, and 1 x and 36x bearing data from the radar.                             | 57-3000                 |
| 24 in. PPI                                      | Standard video, trigger, and 1 x and 36x bearing data from the radar.                             | 57-3000                 |
| 30 in. horiz. PPI<br>5 ft vertical plotted data | Same as AN/SPA-9—Standard trigger and video plus 1 speed bearing from radar.                      | 60-3000                 |
|   |   |                         |
|   |   |                         |

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| Output Data  | Range<br>(mile)                         |
|--|---|
| -  | 20, 50, 100, 200                        |
| Bearing at 1 and 36 speed.   | 1-5, 4-20, 10-50<br>and 40-200 "Rubber" |
| Target bearing—1x and 36x synchro. Target<br>range-2000 yd, 72,000 yd, and 1,296,000 yd. | 1-300<br>continuously variable          |
| Height data transmission from 1G synchro at<br>90,000 ft per revolution.                 | 20-300 mi<br>continuously variable      |
| AEW tracking, radar selection signal R&B<br>transmission.                                | 4-250                                   |
| 2 speed range transmission.<br>1 speed bearing.<br>Range and bearing buzzers.            | 4-300                                   |
| Radar selection signal.<br>Range and bearing transmission.                               | 4-250                                   |
| Eight target outputs (height with position and rate<br>from pots.)                       | 20-200<br>rubber range                  |
| Standard.<br>1 and 36 speed.   | 2-4, 4-10, 10-30,<br>30-80              |
| Bearing information (shaft geared to cursor).  | 2-160<br>rubber range                   |
| None   | 2-300<br>continuously variable          |
| 2-speed range transmission.<br>1-speed bearing   | 2-300<br>continuously variable          |
| None   | 4-300                                   |
|  |   |
|  |   |

|  | Sweep Step Down | Elevation Scan | Maximum Height (ft) |
|--|-----------------|----------------|---------------------|
|  | no              | no             | no height display   |
|  | provided        |                |                     |
|  | provided        |                |                     |
|  |                 |                | 90,000              |
|  | no              | -              | -                   |
|  | no              | -              | -                   |
|  | no              | -              | -                   |
|  | no              |                | 100,000             |
|  | no              | 0.65°          |                     |
|  | no              | -              | no                  |
|  | no              | -              |                     |
|  | no              | -              | -                   |
|  | no              | no             | no                  |
|  |                 |                |                     |
|  |                 |                |                     |

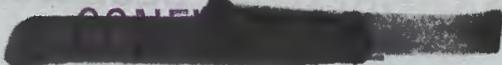
| Power Source   |        |                    |              | Size<br>H-W-D<br>(inch)                                  |
|----------------|--------|--------------------|--------------|--|
| Volts          | Phase  | Freq.              | KVA          |  |
| 115<br>120/208 | 1<br>3 | 380/420<br>550/600 | 250<br>4     | 15-1/2—16-1/4—26   |
| 115            | 1      | 60                 |              | 38—18—19-3/4   |
| 115            | 1      | 60                 |              | 38—18—19-3/4   |
| 115            | 1      | 60                 |              | 38—22—20   |
| 115            | 1      | 60                 | 1.95         | 38—25-1/2—24   |
| 115            | 1      | 60                 |              | 38—21—20   |
| 115            | 1      | 60                 | 1.95         | 38—25-1/2—24   |
| 115            | 1      | 60                 | 1            | 54—30—24   |
| 115            | 1      | 60                 | 700<br>watts | 25-1/2—24-1/4—25   |
| 208            | 1      | 400                | 1            | 54—30—24   |
| 115            | 1      | 60                 |              | Indicator<br>12-1/2—12-1/2—24<br>Power supply: 20—15—12. |
| 115            | 1      | 60                 |              | Indicator<br>40—40—38                                    |
| 115            | 1      | 60                 |              | 120 long<br>60 wide<br>42 high                           |
|                |        |                    |              |  |
|                |        |                    |              |  |

| Total System Weight (lb)                              | Number in Use or Available Date      | Supplier                   | MODEL     |
|---|--------------------------------------|----------------------------|-----------|
| 600   | 15                                   |                            | AN/APA-53 |
| 330   | 28 under construction                | G. E. Co.                  | AN/SPA-4  |
| 360   | 1716 under construction              | RCA                        | AN/SPA-4A |
| 350   | 22 under contract                    | G. E. Co.                  | AN/SPA-7  |
| Ind. - 438<br>Power Supply - 316<br>Trans. - 92 } 846 | 100 (approx.) to date                | Hazeltine Electronic Corp. | AN/SPA-8  |
| 750   | 1405 under construction              | Hazeltine Electronic Corp. | AN/SPA-8A |
| Ind. - 438<br>Power supply - 316<br>Trans. - 92 } 846 | 100 (approx.) to date                | Hazeltine Electronic Corp. | AN/SPA-9  |
|   | 1 development model<br>November 1952 | G. E. Co.                  | AN/SPA-10 |
| 240   | 403 under construction               | Raytheon Mfg. Co.          | AN/SPS-5  |
| 120   | Spring of 1953                       | Westinghouse               | AN/SPS-16 |
| Ind. - 90<br>Power supply - 120 } 210                 | 330 under construction               | Austin Co.                 | AN/UPA-31 |
| 750   | 100 not yet under contract           |                            | AN/UPA-32 |
| 2000  | 1 on contract                        | Kenyon Inst. Co.           | AN/UPA-33 |
|   |                                      |                            |           |
|   |                                      |                            |           |

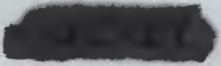
| MODEL      | Function                         | General Facts  | Sec. Class. |
|------------|----------------------------------|--|-------------|
| VC/VC-1    | PPI Repeater                     | Selector switch permits selection of any one of 5 radars.  | U           |
| VD to VD-2 | Repeater                         | Splash proof. May be used on open bridge. Portable. VD-1 has 10 mile range.  | U           |
| VE/VE-1    | Remote PPI                       | Remote PPI used with radars having pulse rates between 60 and 1,100 cycles per second. Remote repeater.                        | U           |
| VE-1A      | Remote PPI                       | Similar to VE-1 except uses 12 in. CRT instead of 7 in.  | U           |
| VF         | Precision PPI Repeater           | Surface plotting may be done directly on plotting surfaces. Mod. VF for 400 cycles. VF-1, VF-1A cancelled.                     | R           |
| VFa        | 400 cycle Precision PPI Repeater | Precision PPI repeater for use with any type search radar equipment capable of transmitting PPI information (400 cycles only.) | R           |
| VF-1       | Precision PPI Repeater           | Precision PPI repeater for use with any type search radar equipment capable of transmitting information (60 cycles only.)      | R           |
| VF-2       | Repeater                         | Increases range of VF to 100 miles.  | C           |
| VG-1A      | Projection Repeater              | To convert low intensity scan to bright PPI raster scan by graphochon techniques.  | C           |
| VG to VG-3 | Projection Repeater              | 10 to 20 mile sector of over-all range may be expanded to fill entire scope. VG-2 has ORT in place of chart table.             | C           |
| VH         | Repeater                         | East-West, North-South off-centering. Will work with a AEW or DRA. VH-A is Mod. VH for 400 cycles.                             | R           |
| VHa        | 400 cycle PPI Repeater           | Remote PPI repeater for use with any type of search radar equipment capable of transmitting 400 cycles PPI information.        | R           |
| VJ/VJa     | Repeater                         | Mod. VK. Independent instantaneous ranging strobe, electronic cursor. VJ-A is Mod. VJ for 400 cycles.                          | R           |
|            |                                  |  |             |
|            |                                  |  |             |

| Presentation  | Input Data  | Pulse Rate (pps)   |
|---|---|--|
| 7 in. remote PPI<br>12 in. modification                       | Standard video, trigger and 1 speed radar bearing. No transmission features.  |  |
| 7 in. horizontal face remote PPI                              | Radar information at 1 speed. No range or bearing transmission.   |  |
| 7 in. vertical PPI  | Standard inputs — 1 speed   | 60 to 1100   |
| 12 in. PPI. Special selective switch                          | Standard inputs — 1 speed   | 60 to 1100   |
| 2-5 in. PPI expanded B scope                                  | 1 and 36 x bearing input<br>1 and 36 x O. S. C. video and trigger   | 60 to 1000   |
| 5 in. PPI<br>5 in. B scope                                    | 1 and 36 x bearing input<br>1 and 36 x O. S. C. Radar video and trigger   | 60 to 1000   |
| 5 in. PPI<br>5 in. B scope                                    | 1 and 36 x bearing input<br>1 and 36 x O. S. C. Radar video and trigger   | 60 to 1000   |
| PPI and B scope   | 1 and 36 x bearing<br>1 and 36 x O. S. C. Radar video and trigger   | 60 to 1000   |
| RCA Graphechon tube<br>Bright trace tube                      | Trigger - 5-40 volts peak,<br>Video - 3 volts peak max. O.S.C. -<br>(Target desig. S <sub>1</sub> S <sub>2</sub> S <sub>3</sub> R <sub>1</sub> R <sub>2</sub> ) | Ranges: 4, 10, 20, 80, 200. CPS: 60-1050, 60-85, 60-325. |
| Projects on to 24 in. horizontal plotting unit. Deck mounted. | Trigger - 5-40 volts peak,<br>Video - 3 volts peak max. O.S.C. -<br>(Target desig. S <sub>1</sub> S <sub>2</sub> S <sub>3</sub> R <sub>1</sub> R <sub>2</sub> ) | Ranges: 4, 10, 20, 80, 200. CPS: 60-1050, 60-85, 60-325. |
| 5 in. lightweight remote PPI                                  | Standard video, trigger, and 1 speed radar bearing. No range of bearing transmission.   | Range: 20, 80, 200. CPS: 57-1000, 57-820, 57-300.        |
| 5 in. PPI   | Radar trigger pulses, video pulses, 1 x synchro bearing and relative bearing warning light.   | Range: 20, 80, 200. CPS: 57-1000, 57-820, 57-300.        |
| 12 in. PPI<br>Added delay unit                                | Trigger - 5-40 volts. Video - 3 volts peak. 1 x synchro bearing and relative bearing.   | 57 to 1000 cps   |
|   |   |  |
|   |   |  |

| Output Data  | Range  |
|--|--|
| Target range and bearing   | 7, 5, 20, 75, 200,<br>4, 20, 80, 200           |
| Target range and bearing   | 4, 20, 80, 200                                 |
| —  | 4, 20, 80, 200                                 |
| —  | —  |
| —  | 4, 20, 80, 200                                 |
| Range at 2,000 and 72,000 yds/1 Rev.<br>Bearing at 1 and 36 speed. | Fixed scales<br>4, 20, 80, 200                 |
| Range at 2,000 and 72,000 yds/1 Rev.<br>Bearing at 1 and 36 speed. | Fixed scales<br>4, 20, 80, 200                 |
| Target range and bearing   | 2,000 yds, 72,000 yds.<br>1,296,000 yds.       |
| None   | 4, 10, 20, 80, 200                             |
| None   | 4, 10, 20, 80, 200                             |
| —  | 2, 4, 10, 20, 80, 200                          |
| None   | Fixed range scales of<br>2, 4, 10, 20, 80, 200 |
| Range - 5G - 2,000 yds<br>5G - 72,000 yds<br>Bearing-5G - 1x       | 2, 4, 10, 20, 80, 200                          |
|  |  |
|  |  |



| Sweep Step Down   | Elevation Scan | Maximum Height (ft) |
|-------------------|----------------|---------------------|
| —                 | —              | —                   |
| —                 | —              | —                   |
| —                 | —              | —                   |
| —                 | —              | —                   |
| —                 | —              | —                   |
| No                | —              | —                   |
| No                | —              | —                   |
| No                | —              | —                   |
| No                | No             | No                  |
| No                | No             | No                  |
| —                 | —              | —                   |
| No                | No             | No                  |
| Has delay feature | No             | No                  |
|                   |                |                     |
|                   |                |                     |



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| Volts | Power Source |       |                            | Size<br>H - W - D<br>(inch)  |
|-------|--------------|-------|----------------------------|--|
|       | Phase        | Freq. | KVA                        |  |
| 115   | 1            | 60    | .275                       | 40-24-20   |
| 115   | 1            | 60    | .175                       | 36-16-20   |
| 115   | 1            | 60    | .220                       | 30-14-28   |
| 115   | 1            | 60    |                            | 30-14-34   |
| 115   | 1            | 60    | 1.3 operate<br>0.5 standby | 43-32-24   |
| 115   | 1            | 400   | 2.6 amps                   | 43-32-24   |
| 115   | 1            | 60    | 2.6 amps                   | 43-32-24   |
| --    | --           | --    | --                         | --   |
| 115   | 1            | 60    |                            | 38-89-40<br>plus rack  |
| 115   | 1            | 60    | 1.765<br>1.5               | 35-32-59<br>38-42-89   |
| 115   | 1            | 60    | 0.45                       | 20-8-10  |
| 115   | 1            | 60    | 4.31 amps                  | Indicator: 11.5-8.25-22.25<br>Driver: 37-19.5-14.625<br>Line Reg.: 13.625-9.75-8.5 |
| 115   | 1            | 60    | .66                        | 32-20-21-1/2   |
|       |              |       |                            |  |
|       |              |       |                            |  |

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| Total System Weight (lb)                         | Number in Use or Available Date                           | Supplier          | MODEL      |
|--|---|-------------------|------------|
| 400  | 1280<br>445   | --                | VC/VC-1    |
| 330  | 225<br>2571   | --                | VD to VD-2 |
| 180  | 850<br>130  | --                | VE/VE-1    |
| --   | 66  | --                | VE-1A      |
| 1410   | 1250  | --                | VF         |
| Ind. - 989<br>Volt reg. - 430<br>Selectors - 100 | 1 model installed on USS TIMMERMAN<br>for evaluation (60) | Raytheon Mfg. Co. | VFa        |
| 1519   |   | Raytheon Mfg. Co. | VF-1       |
| Ind. - 989<br>Volt reg. - 430<br>Selectors - 100 | 1519  | --                | VF-2       |
| 1780   | 2 purchased being evaluated                               | RCA               | VG-1A      |
| 1280<br>2650                                     | 739, 100,<br>107  | G. E. Co.         | VG to VG-3 |
| 437  | 100   | Raytheon Mfg. Co. | VH         |
| 117<br>281<br>59                                 | 1   | Raytheon Mfg. Co. | VHa        |
| 457  |   | Raytheon Mfg. Co. | VJ/VJa     |
| 815  | 600   | Raytheon Mfg. Co. |            |
|  |   |                   |            |
|  |   |                   |            |

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| MODEL | Function                     | General Facts  | Sec. Class. |
|-------|------------------------------|--|-------------|
| VK    | Repeater                     | Deck mounted. Has provision for manual off-centering, and will accept tracking from DRA or AEW.                            | C           |
| VK-2  | Repeater                     | Mechanically redesigned VK. Will work with AEW. Off-centering, 40 miles on 4 to 80 mile scale.                             | C           |
| VK-3  | Repeater                     | Electronic cursor. Auto. off-centering. Separate power supply.   | R           |
| VK-4  | Repeater                     | Used as standard repeater, off-center PPI repeater or as expanded off-center PPI; shipboard, sub. or shore use.            | R           |
| VK-5  | Repeater                     | Same as VK-4 except built-in wandering cursor and rubber range scale. (VK-4 will have field change for this.)              | R           |
| VL    | Repeater<br>Remote RHI       | Height indicator. 5 to 1 vertical expansion.   | C           |
| VL-1  | Range-<br>Height<br>Repeater | Standard RHI repeater for any standard shipboard radar system supplying range height indication.                           | R           |
| VM    | Repeater                     | Uses 2 different color PPI displays optically superimposed. IFF or RKL.  | C           |
| VN    | Repeater                     | Similar to VK, off-centering to 200 miles. 2 video channels for use with Mk-5 IFF. Rubber range scales.                    | C           |
| VP    | Photographic<br>Repeater     | Permits continuous presentation on a 5 ft vertical screen at a distance of 7 ft within 6 seconds. Photographs VH repeater. | C           |
| VPR   | Virtual PPI<br>Reflectoscope | Used with AN/SPA-4 as navigational aid.  | C           |
|       |                              |  |             |
|       |                              |  |             |
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| Presentation                                | Input Data   | Pulse Rate (pps) |
|---|--|------------------|
| 12 in. delayed off-centered PPI             | Standard inputs  | 57-3000 cps      |
| 12 in. delayed off-centered PPI             | Same as VK-3   | 57-3000 cps      |
| 10 in.                                      | 1 SP bearing trigger video<br>1 FF trigger video , AEW DRA off-center.   | 57-3000          |
| 10 in. PPI (10 KP7)                         | 1 and 36 speed bearing video and trigger   | 57-3000          |
| Flat Face<br>10 in. PPI (10 KP7)            | 1 and 36 speed bearing video and trigger   | 57-3000          |
| 12 in. delayed presentation from 0-180 mile | Range height information from SX or modified SP radar.   | 60-3000          |
| 12 in. JA 12 DP7 P-7 screen                 | 1 speed bearing; video and trigger from VK: range line, sector position. DC UTG (cosine and sine from antenna) | 60-3000          |
| 12 in. PPI                                  | Standard inputs plus IFF or MTI information - Trigger - 5 to 50 volts video - positive $2 \pm 0.5$ volts.      | 50-2000          |
| 20 in. off-centered                         | Video - 1 to 2-1/2 volts pos.<br>Trigger - 5 to 50 volts pos.  | 57-3000          |
|   |  |                  |
| 5 ft PPI screen                             | Standard video, trigger, and 1 speed radar bearing   |                  |
|   |  |                  |
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| Output Data  | Range                                       |
|--|---|
| True bearing transmission at 1 speed and range transmission at 72,000 yd/rev.                          | 4, 10, 20, 40, 80, 200                      |
|  | 4, 10, 20, 40, 80, 200                      |
| Outgoing signals: radar selector, remote range, on-target buzzer, remote bearing, range mark.          | 4 - 200                                     |
| Range marker transmission at 72,000 yd/rev. and 1,296,000 yd/rev. 1 speed bearing cursor transmission. | 4 - 300                                     |
| Range marker transmission at 2 speed bearing cursor transmission.                                      | 4 - 300                                     |
|  | 20, 40, 80, 200                             |
| Transmission of elevation angle from synchro from -2° to +88°  | 20 - 200                                    |
| Range 6G 72,000 yd<br>5G 1,296,000 yd<br>Bearing 6G 1 X  | Continuously variable between 4 and 300 mi. |
| Range 6G 72,000 yd<br>6G 1,296,000 yd<br>Bearing 6G 1 X  | 4-40, 10-100, 20-200. (variable between)    |
|  |   |
| None   | Same as VH                                  |
|  |   |
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| Sweep Step Down   | Elevation Scan | Maximum Height (ft) |
|---|----------------|---------------------|
|   |                |                     |
| No  |                |                     |
| 1:1 or 1:2  |                |                     |
| No  | -              | -                   |
| No  | -              | -                   |
| Yes   | -2 to 88°      |                     |
| Auto-C.D. When PRF exceed 100 $\mu$ s $\pm$ 25 Rec.time | +88°<br>-2°    | 100,000             |
| No  | No             | No                  |
| No  | No             | No                  |
|   |                |                     |
| No  | No             | No                  |
|   |                |                     |
|   |                |                     |
|   |                |                     |
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| Power Source |       |           |              | Size<br>H-W-D<br>(in.) |
|--------------|-------|-----------|--------------|------------------------|
| Volts        | Phase | Frequency | KVA          |                        |
| 115          | 1     | 60        | 1.84<br>1.69 | 37-1/2—18-5/16—16-5/8  |
| 115          | 1     | 60        | 0.8          | 17—19—32<br>12—20—24   |
| 115          | 1     | 60        |              | 40—18—24               |
| 115          | 1     | 60        |              | 40—18—22               |
| 115          | 1     | 60        |              | 40—18—22               |
| 115          | 1     | 60        |              | 32—17—19               |
| 115          | 1     | 60        |              | 32—17—19               |
| 115          | 1     | 60        |              | 47—51—24               |
| 115          | 1     | 60        | 1 (approx)   | 34—30—25-1/2           |
|              |       |           |              |                        |
| 115          | 1     | 60        |              | 48—20—14               |
|              |       |           |              |                        |
|              |       |           |              |                        |
|              |       |           |              |                        |
|              |       |           |              |                        |

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| Total System Weight (lb) | Number in Use or Available Date | Supplier          | MODEL |
|--------------------------|---------------------------------|-------------------|-------|
| 450                      | 150                             |                   | VK    |
| 400                      | 150                             |                   | VK-2  |
| 445                      | 136                             | G. E. Co.         | VK-3  |
|                          | 428 under const.<br>50 shipped  | Westinghouse      | VK-4  |
|                          | 400 under contract              | Westinghouse      | VK-5  |
| 400                      | 36                              |                   | VL    |
|                          | 400 under contract              | G. E. Co.         | VL-1  |
| 750                      | 2                               | Raytheon Mfg. Co. | VM    |
| 300 PS<br>400            | 3                               | G. E. Co.         | VN    |
|                          |                                 |                   |       |
| 450                      | 4                               | Eastman Kodak Co. | VP    |
|                          |                                 |                   | VPR   |
|                          |                                 |                   |       |
|                          |                                 |                   |       |
|                          |                                 |                   |       |

**Section 7**  
**Target Designation**

TYPES OF TARGET DESIGNATION SYSTEMS

Considerable confusion now exists concerning the terms "Target Designation System Mark 2" and "Target Designation System Mark 3." Properly, Target Designation System Mark 2 Mod 0 is the designation of the prototype of a particular manual target designation system. It utilizes color television techniques to provide a three-coordinate display of target designation information, and it is being developed by the Radio Corporation of America. Target Designation System Mark 3 Mod 0 is the designation tentatively assigned to the prototype of the particular semi-automatic target designation system being developed by the Bell Telephone Laboratories. These equipments will be installed in the USS NORTHAMPTON (CLC-1) for simultaneous evaluation.

In the early development stages of these systems, a tendency developed to use the term "Target Designation System Mark 2" for all such equipment developed by the Radio Corporation of America and "Target Designation System Mark 3" for all designation equipment resulting from the project at the Bell Telephone Laboratories.

However, in view of the various classes of ships in which target designation systems will be used, and considering the fact that methods of generating synthetic displays other than the television techniques used in the Radio Corporation of America gear may be utilized it is apparent that all types of manual systems for use with different radars cannot be sufficiently similar in design to be called modifications of Target Designation System Mark 2. Similarly, the various complex designs of more automatic systems for use in a number of classes of ships, with different radars and for different weapon systems, can hardly be considered as modifications of one basic Target Designation System Mark 3.

In order to clarify and simplify this situation, four types of target designation systems 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 Mark 11, PD Panels and dial indicators. Included is the Target Designation System Mark 1.

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. The Target Designation System Mark 2 is of this type.

Type C - Target designation systems that are essentially automatic in operation and which utilize data from either two- or three-coordinate search radars. Automatic track-while-scan channels with automatic evaluation and assignment of targets to directors will be employed. Where the associated gun or guided missile installation warrants the complexity, automatic switching of guns (or guided missile launchers) to directors will be provided. The Target Designation System Mark 3 is of this type.

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. The lightweight systems being developed by the Radio Corporation of America and by the Raytheon Manufacturing Company for destroyers, and the two-coordinate RCA system planned for carriers are of this type.

It should be observed that the order in which type letters have been assigned is arbitrary and does not indicate relative effectiveness of the systems.

Type A systems may be found in all classes of ships. Type B systems are suitable for ships with three-coordinate search radars but with weapon batteries (gun or guided missile) not sufficiently complicated to warrant the use of automatic evaluation equipment. The Type C systems are for use in larger ships with a greater number of directors and weapons in which the complexity of the evaluation problem justifies the use of automatic tracking and evaluation equipment. Type D systems are for use in ships with two-coordinate target designation search radars where either the limited size of the weapon installation or space and weight considerations preclude the installation of more automatic equipment. Particularly, it is expected that Type D systems will be suitable for use in modernizing various classes of existing ships in which weight and space limitations are critical.

Marks and Modifications will be assigned for specific systems developed for particular classes of ships. It is intended that this Mark and Mod assignment will be made only after the basic design of a system has been established.

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TARGET  
DESIGNATION

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| MODEL              | Type*                             | General Facts   | Sec. Class. |
|--------------------|-----------------------------------|---|-------------|
| (1)<br>TDS/MK 1    | A                                 | Manual tracking systems using standard PPI's and control circuitry for assignment of targets to directors. Six (6) models developed for use on DDE's, DH's, and CV's.                     | R           |
| TDS/MK 2           | B                                 | High speed manual track TDS - 3 coordinate TD display and elevation indicated in color. Converts PPI and IFF display and to TV scan by use of graphecon storage techniques.               | C           |
| TDS/MK 3           | C                                 | Manual lay on-auto-track while scan coordinate display. elevation on RH indicator. Assigns targets and guns to directors in automatic or manual modes.                                    | C           |
| TDS/MK 3<br>MOD 2  | Bearing<br>and Range<br>Indicator | Provides remote PPI and TDT in director. Slave to TDT Mk-11 or VJ. PD panel combination.  | U           |
| TDS/MK 4           | D                                 | Lightweight destroyer and auxiliaries TDS. 2 coordinate display. Manual track. Converts PPI and IFF display to TV scan by use of graphecon storage techniques.                            | R           |
| TDS/MK 5           | D                                 | Lightweight destroyer and auxiliaries TDS. 2 coordinate display utilizing time sharing techniques for introducing designation and repeat-back symbols.                                    | R           |
| TDS/MK 6           | D                                 | High speed manual track TDS-Z coordinate monochrome system. Elevation may be introduced. Converts PPI and IFF display to TV scan by graphecon techniques. Provision for remote repeaters. | R           |
| TDT/MK 11<br>MOD 1 | A                                 | Remote PPI indicator. Incorporates six switching positions to select proper director. (12 in use)   | R           |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |
|                    |                                   |   |             |

\*See previous page. (1) target designation system.

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| Accuracy            |                  | Power Supply      |             |                |               | Supplier                                |
|---------------------|------------------|-------------------|-------------|----------------|---------------|---|
| Range               | Bearing          | Volts             | Phase       | Freq. (cps)    | KVA           |   |
| —                   | —                | —                 | —           | —              | —             | Navy Ship Yd, N.Y.<br>Abrendt Inst. Co. |
| —                   | —                | 450<br>120        | 1           | 400            | 10            | *RCA                                    |
| —                   | —                | 450<br>120        | 1           | 400            | 25            | *BTL                                    |
| —                   | —                | 6<br>115          | 1           |                | 0.012<br>0.24 | —                                       |
| —                   | —                | 115               | 1           | 60             | 6.47          | *RCA                                    |
| —                   | —                | 115               | 3           | 60             | 4.102         | *Raytheon Mfg. Co.                      |
| —                   | —                | 115<br>115<br>440 | 1<br>3<br>3 | 60<br>60<br>60 | 14.102        | *RCA                                    |
| ±160 yd<br>over-all | ±2.3<br>over-all | 115               | 1           | 60             | 1.897         | Westinghouse                            |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |
|                     |                  |                   |             |                |               |   |

\*Major supplier does not furnish all the equipment.

| Input Data  |
|---|
| 1. Search radar video and trigger to standard PPI. 2. Antenna bearing and relative bearing warning. 3. Own ship course. Director repeat back synchro signals.   |
| 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. |
| Same as Mk 2 but in addition system receives gun orders and gun status for evaluation and assignment of gun mounts to directors.  |
| Search radar video and trigger, antenna bearing, ships heading, director train and range from director.   |
| 1. Search radar video and trigger. 2. Antenna bearing and relative bearing warning. 3. Own ship course. 4. Director repeat back signals (synchro) of train and range and director status.   |
| 1. Search radar video and trigger. 2. Antenna bearing and relative bearing warning. 3. Own ship course. 4. Director repeat back signals(synchro) of train and range and director status.  |
| 1. Search radar video and trigger. 2. Antenna bearing (1 x synchro). 3. Ships heading (1 x synchro). 4. Director train from four directors (1 x synchro).   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |

| Output Data  | MODEL              |
|--|--------------------|
| Target coordinates: bearing, range, and elevation; synchro signals.  | TDS/MK 1           |
| Target coordinates: bearing, range and elevation; synchro signals.   | TDS/MK 2           |
| Target coordinates: bearing, range, and elevation; synchro signals.  | TDS/MK 3           |
| Target bearing (1 x synchro.)<br>Target range (synchro - 72,000 yd/rev.)   | TDS/MK 3<br>MOD 2  |
| Same as for Mk 2 except elevation supplied as a fixed signal.  | TDS/MK 4           |
| Same as for Mk 2 except elevation supplied as a fixed signal. Employs four joy sticks permitting four operators to designate to four directors simultaneously. | TDS/MK 5           |
| Same as for Mk 2 except elevation supplied as a fixed signal. Employs four joy sticks permitting four operators to designate to four directors simultaneously. | TDS/MK 6           |
|  | TDT/MK 11<br>MOD 1 |
|  |                    |
|  |                    |
|  |                    |
|  |                    |
|  |                    |
|  |                    |
|  |                    |
|  |                    |

**SECRET**  
**SECURITY INFORMATION**

**Section 8**  
**Altimeters**









| Spec. Class | General Parts  | Trainers  | MODEL              |
|-------------|--|---|--------------------|
| U           |  | Lower Trainer   | AN/SP-14           |
| U           |  | L. A. B. Trainer  | AN/SP-8-71A        |
| U           |  | Airborne Search<br>Director                                   | AN/SP-17-73        |
| R           | Specifications in preparation for<br>Bulging approval.   | Spot Group<br>Operator Trainer                                | AN/SP-71           |
| R           | Two targets and one ship measured by<br>3 sets of problem cards with characteristic<br>sounds.   | IT Trainer  | AN/SP-71<br>(20-1) |
| R           | Completely portable with target sounds<br>and keyboard.  | IT<br>Trainer   | AN/SP-72<br>(20-1) |
| R           | Similar to AN/SP-71 with 3M-41/SP-71 in<br>place of keyboard and 3M-41/SP-71 in<br>place of target sounds.                                   | Submarine<br>Trainer  | AN/SP-72           |
| R           | 3 sets controlled problems with 2 moving ships<br>and target sounds.   | WCA Trainer   | AN/SP-71           |
| R           | 3 realistic problems with moving ships and<br>sounds. Students using real sounds.  | WEA Trainer   | AN/SP-72<br>(20-1) |
| R           | Basic training and depth determining signals<br>provided. Equipment relationship shown in<br>illustrated diagrams.                           | WCA<br>Trainer  | AN/SP-72<br>(20-1) |
| U           | Now installed at ONVTC, San Diego, Calif.  | CM Team Training<br>in Under Navigation<br>and Store Boarding | AN/SP-71<br>(20-1) |
| C           | From magnetic tape similar to AN/SP-72<br>parameters of target, own ship and sound, copy<br>transmits simulator feeding up to 10 AN/SP-71's. | Group Attack<br>Trainer                                       | AN/SP-71           |
| R           | Installed, and in use at F-2, San Diego, Calif.  | Miss Defense<br>and Navigation                                | AN/SP-71           |

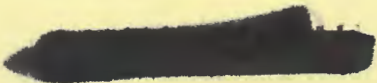
Section 9  
Trainers

| MODEL            | Function  | General Facts   | Sec. Class. |
|------------------|---|---|-------------|
| AN/APN-T4        | Loran Trainer   |   | U           |
| AN/APQ-5-T1A     | L. A. B. Trainer  |   | U           |
| AN/APS-T1-T3     | Airborne Search Ultrasonic                                  |   | U           |
| AN/BQG-T1        | Sonar Group Operator Trainer                                | Specifications in preparation for BuShips approval.   | R           |
| AN/BQR-T1 (XG-1) | JT Trainer  | Two targets and own ship maneuvered by 3 sets of problem cams with characteristic sounds.   | R           |
| AN/BQR-T2 (XG-1) | JT Demonstrator   | Completely operable with target sounds and movements provided.  | R           |
| AN/BQR-T3        | Submarine Listening Trainer                                 | Simple cam operated problem generator and bearing gate operates with SM-41/UQQ-T to feed JT sonar aboard submarines.                            | R           |
| AN/BQS-T1        | WCA Trainer   | 3 cam controlled problems with 3 moving ships and appropriate sounds.   | R           |
| AN/BQS-T2 (XG-1) | WFA Trainer   | 3 realistic problems with moving ships and sounds. Students using real sonars.  | R           |
| AN/BQS-T3 (XG-1) | WCA Demonstrator  | Echo-ranging and depth-determining signals provided. Equipment relationship shown by illuminated channels.                                      | R           |
| AN/SPN-T1 (XG-1) | CIC Team Training in Radar Navigation and Shore Bombardment | Now installed at CIC/TTC, San Diego, Calif.   | R           |
| AN/SQA-T1        | Group Attack Plotter Trainer                                | From magnetic tape, similar to AN/UQS-T2, parameters of target, own ship and assist, ship regulate simulators feeding up to 10 Attack Plotters. | C           |
| AN/SQS-T1        | Mine Detection and Navigation                               | Installed, and in use at FSS, San Diego, Calif.   | R           |
|                  |   |   |             |
|                  |   |   |             |

| Number of Operators that Are Trained | Maneuvering Simulator   |               |                         |               |                           |
|--------------------------------------|-------------------------|---------------|-------------------------|---------------|---------------------------|
|                                      | Target                  |               | Own Ship                |               | Max. Vert. Speed (ft/min) |
|                                      | Turn Rate (deg/sec)     | Speed (knots) | Turn Rate (deg/sec)     | Speed (knots) |                           |
|                                      |                         |               |                         |               |                           |
|                                      | Manual                  | 0-20          | 9                       | 80-400        | 2000                      |
|                                      |                         |               |                         |               |                           |
| Sub. Approach/Attack Team            | 0.25 to 6               | 0-25 or 0-50  | 0.25 to 6               | 0-25 or 0-50  | 600                       |
| Ten (10)                             | Variable Cam Controlled |               | Variable Cam Controlled |               |                           |
| Large Class of Seated Students       | Variable                | Variable      | Adjustable              | 4             |                           |
| Operator and Limited Team            | Cam Operated            |               | Cam Operated            |               |                           |
| Ten (10)                             | Variable Cam Controlled |               | Variable Cam Controlled |               |                           |
| Ten (10)                             | Variable Cam Controlled |               | Variable Cam Controlled |               |                           |
| Large Class of Seated Students       | Hand Operated           |               | None                    |               |                           |
| 1 Complete CIC Team (6 to 14 men)    | 0 to 10                 | 0 to 50       | 0 to 10                 | 0 to 50       |                           |
| Ten (10)                             | 0.25 to 6               | 0-25 or 0-50  | 0.25 to 6               | 0-25 or 0-50  | 600                       |
| Operator/Team 5/4                    | Fixed Mine Fields       |               | 0 to 5 Approx.          | 0 to 25       |                           |
|                                      |                         |               |                         |               |                           |
|                                      |                         |               |                         |               |                           |



| Signal Simulator   |                                 |                                  |  | Output  |
|--------------------|---------------------------------|----------------------------------|--|---|
| Rep. Rate<br>(cps) | Pulse<br>Length<br>( $\mu$ sec) | Beam-<br>width<br>( $^{\circ}$ ) | Types  |   |
|                    |                                 |                                  | A. Target B. Sea Return<br>C. Altitude Line.E. Noise<br>D. Range Attenuation I. IFF<br>F. Fading G. Jamming H. Land Mass |   |
|                    |                                 |                                  |  | A. 30-60 Mc I.F.<br>B. Video<br>C. Trigger<br>D. 1x Sync. Ant.        |
|                    |                                 |                                  |  |   |
|                    |                                 |                                  |  |   |
| 2-20               |                                 | 1-60<br>with<br>range            | A, D, screw sounds   | Gated Audio   |
| —                  | 0.03                            | 1.0                              | A, B, D, E, and voice  | 24-30 kc  |
| —                  | 0.03                            | 1.0                              | A, E, and voice  | 24-30 kc  |
| 2-20               |                                 | 1-60<br>with<br>range            | A, D, screw sounds   | Gated Audio   |
| —                  | 0.03                            | 15                               | A, B, D, E, and voice  | 24-30 kc  |
| —                  | 0.03                            | 15                               | A, B, D, E, and voice  | 24-30 kc  |
| —                  | 0.03                            | —                                | A  | 24-30 kc  |
| 200 to<br>1 kc     | 1                               | 2<br>to<br>20                    | A. 0.3 surface and 2 escorts,<br>E, D, H   | A. 30 Mc<br>B. positive<br>C. neg. or pos.<br>30 V 2 $\mu$ sec. D. 1x |
| Variable           | 7, 35,<br>80                    |                                  | A, B, E, D, audio and scope<br>presentation  | Audio<br>B, C   |
| 60                 | 300                             | 2<br>approx.                     | A. mine, B, D, E, H  | Output-300 $\mu$ s<br>pulses on a 60<br>cps time base                 |
|                    |                                 |                                  |  |   |
|                    |                                 |                                  |  |   |



| Space Simulator                |                      | Service Equipment   |                          |
|--------------------------------|----------------------|---|--------------------------|
| Problem Area (sq. miles)       | Number of Targets    | Outputs Required<br>A. Trigger B. 1x Synchro Azimuth<br>C. Voltage Prop to Azimuth and El<br>D. L. O. Tuning Voltage<br>E. 1x 360° Potentiometer Ant. Az. | Radar                    |
|                                |                      |   |                          |
|                                |                      |   |                          |
|                                |                      |   |                          |
| Similar to AN/SQS-T3           | 1                    | B, C, E   | JT and AN/BQR-3 (sonar)  |
| 36                             | 3                    | -   | JT sonar                 |
|                                | 3                    | -   | JT sonar                 |
| Limited by Ranges of 10,000 yd | 1                    | B, E  | JT and AN/BQR-3 (sonar)  |
| 36                             | 3                    | -   | WCA sonar                |
| 36                             | 3                    | -   | WFA sonar                |
| -                              | 1                    | -   | WCA sonar                |
| 50                             | 5                    | A, B, D, E  | SG1b radar               |
|                                | 1 Target<br>1 Assist | A, B, C   | AP Mark 1 and 13 (sonar) |
| 1                              | Variable             | A, B  | QLA sonar                |
|                                |                      |   |                          |
|                                |                      |   |                          |



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|  | Number of Equipments Produced | Available Date                      | Supplier | MODEL               |
|--|-------------------------------|-------------------------------------|----------|---------------------|
|  |                               |                                     |          | AN/APN-T4           |
|  |                               |                                     |          | AN/APQ-5-T1A        |
|  |                               |                                     |          | AN/APS-T1-T3        |
|  | —                             | 1954                                | NEL      | AN/BQG-T1           |
|  | 1 (FSS, SD)<br>1 (FSS, KW)    | Inst. June 1945<br>Inst. Sept. 1946 | NEL      | AN/BQR-T1<br>(XG-1) |
|  | 1 (FSS, SD)<br>1 (FSS, KW)    | Inst. July 1950<br>Inst. Sept. 1950 | NEL      | AN/BQR-T2<br>(XG-1) |
|  | 9                             | 1952                                | TDC      | AN/BQR-T3           |
|  | 1 (FSS, SD)<br>1 (FSS, KW)    | Inst. June 1945<br>Inst. Sept. 1946 | NEL      | AN/BQS-T1           |
|  | 1 (FSS, SD)<br>1 (FSS, KW)    | Inst. June 1950<br>Inst. Feb. 1948  | NEL      | AN/BQS-T2<br>(XG-1) |
|  | 1 (FSS, SD)                   | Inst. 1946                          | NEL      | AN/BQS-T3<br>(XG-1) |
|  | 1                             | Del. July 1949                      | NEL      | AN/SPN-T1<br>(XG-1) |
|  | 5                             | Early 1953                          | TDC      | AN/SQA-T1           |
|  | 1                             | Del. Oct. 1949                      | NEL      | AN/SQS-T1           |
|  |                               |                                     |          |                     |
|  |                               |                                     |          |                     |

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SECURITY INFORMATION

| MODEL                      | Function                                      | General Facts  | Sec. Class. |
|----------------------------|---|--|-------------|
| AN/SQS-T3                  | Shipboard scanning Sonar Trainer              | Shipboard trainer for QHB, etc., injects audio and video echo with automatic doppler, aspect, etc.                               | R           |
| AN/SSQ-T2 (XG-1)           | CIC Team Trainer                              | Now installed at CIC/TTC San Diego, California.  | R           |
| AN/SSQ-T2 (XW-1)           | Tactical Trainer                              | For CIC personnel DRT will be from indicators.   | R           |
| AN/UFA-3 (XG-1)            | Interim Video Recognition                     | Projects 35mm photos of QHB, etc., scope traces with automatic frame change at ping time. Uses audio from SRGT.                  | R           |
| AN/ULT-T1                  | Rad CM Trainer                                | Known as "Modified Rug," also RRL-F-3800   | R           |
| AN/UPT-T4                  |   |  | R           |
| AN/UQA-T1                  | Video recognition attachment to SRGT          | Using "flying spot" technique, reproduces scanning sonar or radar scope presentation from 35mm strip film. Uses audio from SRGT. | R           |
| AN/UQR-T1                  | Sonar, etc., audio recognition training       | Five produced from NEL specifications by Melpar, Inc.  | U           |
| AN/UQS-T2                  | Sonar group Operator Trainer                  | Parameters of own ship and 2 targets recorded on magnetic tape, later reproduced at trainer into computer simulators and sonar.  | C           |
| AN/UQS-T3                  | UQS-1 Mine locating Trainer                   | Simulates mine detecting sonar for azimuth and depth.  | C           |
| Amphibious Assault Teacher | Amphibious Assault Teacher                    | Demonstrates exact timing and coordination required by ships, landing craft, aerial and gunfire support for amphib. landing.     | U           |
| Army Target Simulator      | Experimental Model for Engineering Evaluation | The Simulator was set up at SECL, later moved to Glenn L. Martin's plant in Baltimore, Maryland.                                 | C           |
| GOT-I                      | Searchlight Sonar Group Trainer               | Two experimental models built by NEL in 1944 still in use.   |             |
|                            |   |  |             |
|                            |   |  |             |

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| Number of Operators that Are Trained | Maneuvering Simulator                     |                 |                         |               |                           |
|--------------------------------------|---|-----------------|-------------------------|---------------|---------------------------|
|                                      | Target Own Ship                           |                 |                         |               | Max. Vert. Speed (ft/min) |
|                                      | Turn Rate (deg/sec)                       | Speed (knots)   | Turn Rate (deg/sec)     | Speed (knots) |                           |
| One operator or sonar team           | .3 to 3°/sec                              | 0-25 or 0-50    | .3 to 3°/sec            | 0-25 or 0-50  | Manual                    |
| CIC Team                             | 0-6°/sec                                  | 0-500 or 0-5000 | 0-6°/sec                | 0-50          |                           |
|                                      |   |                 |                         | 1500          |                           |
| Twenty                               |   |                 |                         |               |                           |
| Unlimited                            | This is primarily a UHF signal generator. |                 |                         |               |                           |
|                                      |   |                 |                         |               |                           |
| Twenty                               |   |                 |                         |               |                           |
| Twenty                               |   |                 |                         |               |                           |
| Ten                                  | .25 to 6°/sec                             | 0-25 or 0-50    | .25 to 6°/sec           | 0-25 or 0-50  | 600                       |
| Operator or mine detection team      |   |                 | (Similar to AN/UQS-T2.) |               |                           |
| Classroom                            | All ship model variable 0-24              |                 | moving chains           |               |                           |
| For evaluation only                  | 0° to 12°/sec                             | 50 to 1000 MPH  | Fixed Radar Location    |               | 1500                      |
| Ten                                  | Cams                                      | 6               | Cams                    | 10            | Manual                    |
|                                      |   |                 |                         |               |                           |
|                                      |   |                 |                         |               |                           |

| Signal Simulator  |                           |                  |  |  |   |
|---|---------------------------|------------------|--|--|---|
| Rep Rate (cps)  | Pulse Length ( $\mu$ sec) | Beam-width (deg) | Types  |  | Output  |
|   |                           |                  | A. Target<br>B. Sea Return<br>C. Altitude Line<br>D. Range Attenuation<br>E. Noise | F. Fading<br>G. Jamming<br>H. Landmass<br>I. IFF | A. 30-60 Mc I. F.<br>B. Video<br>C. Trigger<br>D. 1x Sync. Ant.         |
| Variable  | 35-90 ms                  | 5-20             | A,C,D,E,F  |  | Audio, B, C, Gyro<br>R, $\theta$ , $\phi$                               |
| 60-2000   | 0 - 5                     | 0-360            | A. Ship, aircraft, missile, D,E,F,I  |  | A. 11 Mc, 15 Mc, 30 Mc<br>B. Positive<br>C. Pos. and Neg.<br>D. 1x, 36x |
| 60 to 2000  | 4, 1, 1/2                 |                  |  |  | A, B, D   |
| Projected Scope Image   |                           |                  |  |  |   |
| 20 to 3000  | 1 to 10                   | Var.             | Radar Transmitter  |  | 2700-3100 Mc  |
| Reproduces dynamic scope images from 35 mm strip film using "flying spot"   |                           |                  |  |  | B, C, to 20 Student Scopes  |
| Audio recordings reproduced through phones and speakers. Response-choice of each of 20 students printed at console. |                           |                  |  |  |   |
| Variable  | 7, 35, 80 ms              | 5-20             | A,B,C,D,E,F,G,H  |  | Audio, B, C   |
| 1.25 sec<br>.62 sec<br>.25 sec  | 1 ms                      | 20 H<br>10 V     | A,B,C,D,E,F  |  | Audio, B, C, D,   |
| 190 to 1 kc   | 1                         | 2-30             | A. 1 aircraft<br>D. Adjustable<br>F. Adjustable                                    |  | A. -30 -60 Mc<br>B. Positive<br>C. $\pm 70$ v, $2\mu$ sec<br>D. 1x      |
|   | 35-80 ms                  | 5-20             | A,B,E,D,G  |  | 20 kc to sonar equipments   |
|   |                           |                  |  |  |   |
|   |                           |                  |  |  |   |

| Space Simulator   |                   | Service Equipment   |  |
|---|-------------------|---|--|
| Problem Area (sq. miles)  | Number of Targets | Outputs Required  | Radar                                  |
|   |                   | A. Trigger B. 1x Synchro Azimuth<br>C. Voltage Prop to Azimuth and EL<br>D. L. O. Tuning Voltage<br>E. 1x 360° Potentiometer Ant. Az. |  |
| Limited by range of 8000 yd   | 1                 | A, B, C, audio and video echo etc.  | Simulated echo on QHB sonar            |
| 1600 (40 x 40)<br>160,000 (400 x 400)   | 3                 | A, B  | SG 1b<br>SR/SRA (radar)                |
| 36 or 360   | 6                 |   | SG, SV, SR, SS, SP-1                   |
|   |                   | None  | QHB, etc. (sonar)<br>Scope photographs |
|   |                   |   | Radar<br>Counter measures<br>Equipment |
|   |                   |   |  |
|   |                   | None  | QHB Sonar scope simulated              |
|   |                   | None  | Audio Recordings (sonar)               |
| 40  | 2                 | A, B, C, course, speed, aspect  | AN/SQS-10 (sonar)                      |
|   | Several Mines     | A, B, C, E  | AN/UQS-1 (sonar)                       |
| One amphibious lane from rendezvous area to beach approx. 1000 yards wide by 18,000 yards long. |                   |   | None                                   |
| 300   | 1                 | A, B, C, (for 584)<br>None (for CPS-4 and CPS-5)  | SCR-584<br>AN/CPS-4 and CPS-5          |
| Relative 5  | 1                 | A, B, RF Signals  | QGB, QGA sonar                         |
|   |                   |   |  |
|   |                   |   |  |

~~CONFIDENTIAL~~  
~~SECRET~~  
~~SECURITY INFORMATION~~

**DECLASSIFIED**

| Size<br>L-W-H   | Weight<br>(lb)                | Power Source      |       |          |                 |
|---|-------------------------------|-------------------|-------|----------|-----------------|
|   |                               | Volts             | Phase | Freq.    | K.V.A.          |
| 27in. x 27in. x 27in.   | 420                           | 115               | 1     | 60       | 1               |
| 8 units<br>see (3) below  | see(3)<br>below               | 115/230<br>3 wire | 1     | 60       | 16              |
|   |                               | 115               | 1     | 60       |                 |
| 24in. x 16in. x 47in.   | 100                           | 115               | 1     | 60       | 0.2             |
| 25in. x 17in. x 44in.<br>18in. x 18in. x 21in.  | 175<br>40                     | 115<br>24         | 1DC   | 400-1500 | 0.850<br>0.075  |
|   |                               |                   |       |          |                 |
| 1 Console and<br>20 remote<br>scopes  | Data<br>Unknown               | 115               | 1     | 60       | 5 or more       |
| 56in. x 32in. x 48-3/8in.   | 465                           | 115               | 1     | 60       | 0.2             |
| 18 cabinets<br>23in. x 19in. x 52in.<br>each  | Data<br>Unknown               | 115               | 1     | 60       | Data<br>Unknown |
| Data<br>Unknown   | Data<br>Unknown               | 115               | 1     | 60       | Data<br>Unknown |
| Approx.<br>6ft x 45ft incl.<br>table  | Data<br>Unknown               | 115               | 1     | 60       | Data<br>Unknown |
| 4 units<br>22in. x 17in. x 48in.<br>unit-22in. x 17in. x 60in.  | 1200                          | 115               | 1     | 60       | 4               |
| 60in. x 34in. x 42in.   | 1200 plus<br>10 QGB<br>stacks | 115               | 1     | 60       | 5               |
| <p>(3) Pwr. Distr. Rack-36in. x 24in. x 76in. (500 lb)   A Target Control Rack (24-1/2in. x 31in. x 72-1/2in./wt 700 lb)</p> <p>Console-102in. x 54in. x 3/8in. x 51in. (2000 lb)   B Target Control Rack (24-1/4in. x 31in. x 72-1/2in./wt 700 lb)</p> <p>Helm-23in. x 24in. x 56-3/8in. (500 lb)   C Projector Rack (47-1/2in. x 24-3/4in. x 70-3/4in./wt 400 lb)</p> <p>Pwr. Supply Rack-24-1/4in. x 31in. x 72-1/2 in. (1000 lb) Radar Control Rack - 24-1/4in x 31in. x 72-1/2in. (700 lb)</p> |                               |                   |       |          |                 |

| Number of Equipments Produced           | Available Date                           | Supplier        | MODEL                      |
|---|--|-----------------|----------------------------|
| 1                                       | 1952                                     | TDC             | AN/SQS-T3                  |
| 1                                       | Del. June 1951                           | Gilfallen Bros. | AN/SSQ-T2 (XG-1)           |
|   |  |                 | AN/SSQ-T2 (XW-1)           |
| 6                                       | 1951                                     | NEL             | AN/UFA-3 (XG-1)            |
| 1                                       | Under Evaluation                         |                 | AN/ULT-T1                  |
|   |  |                 | AN/UPT-T4                  |
| 1                                       | Early 1953                               | Melpar          | AN/UQA-T1                  |
| 5                                       | 1950                                     | Melpar          | AN/UQR-T1                  |
| 2                                       | November 1952                            | TDS             | AN/UQS-T2                  |
| 1 for evaluation. Production not known. | July 1952<br>1953-1954                   |                 | AN/UQS-T3                  |
| 1                                       | 1950                                     | NEL             | Amphibious Assault Teacher |
| 1                                       | Del. July 1950                           | NEL             | Army Target Simulator      |
| 1 (FSS, SD)<br>1 (FSS, KW)              | Inst. January 1947<br>Inst. October 1948 | NEL             | GOT-I                      |
|   |  |                 |                            |
|   |  |                 |                            |

| MODEL               | Function                              | General Facts   | Sec. Class. |
|---------------------|---------------------------------------|---|-------------|
| TR/MK 2             | Radar Trainer                         | Permanent information by tape recording meters.   | R           |
| TR/MK 8             | AA Gunnery Trainer                    | For GFCS Mk 57 or 63.   | U           |
| TR/MK 10            | Radar Trainer                         | Three independent moving targets. (3 coordinates.) All problems recorded on film.   | C           |
| TR/MK               | AA Target Simulator                   |   | C           |
| OAC                 | Radar Trainer                         |   | U           |
| OBJ-a               | Emergency Ship-Handling Trainer       | Two OBJ-a trainers constructed by NEL by extensively modifying OBJ equipment.   | R           |
| OCJ                 | Air Search Radar Trainer              | Targets are controlled in range, bearing, and intensity by means of cams. Program may have length of one hour or $\frac{1}{2}$ hour. Range: 1000 yd to 150 miles. Use of frequency conv. CV-95/U permits operation with remote repeaters. | R           |
| OCJ-1               | Air Search Radar Trainer              | See OCJ. OCJ-1 is a modified OCJ. (See text for changes.)   | R           |
| OCZ                 | Air Search Radar Trainer              | Incorporates a component integrator to compute range bearing information from course and speed inputs, which can be varied at will. No limit to program length. Rad. pattern simulated by photo plate.*                                   | R           |
| OCZ-1               | Air Search Radar Trainer              | See OCZ. OCZ-1 is a modified OCZ. (See text for changes.)   | R           |
| QFN                 | Pro-Sub Listening Trainer             | Advanced listening teacher. Three built by NEL in 1944. Fifty produced by RCA in 1945-46.   | R           |
| SM-41 /UQQ-T        | Propeller Noise Simulator             | Simulates screw sounds with adjustable speed, accent, etc. for classroom demonstration.   | R           |
| SM-47 (XG-1) /UQQ-T | Sonar Signal Simulator                | Simulates reverberations and echoes. Controls for pulse length, TVG, decay, speed, aspect, ambient noise, etc. Affect sounds heard from speaker.  | R           |
| SRGT                | Sonar, etc. Audio Recognition Trainer | Three experimental models built by NEL in 1944-45 are still in use.   | U           |
|                     |                                       |   |             |

\* Range: 170 miles. Use of frequency conv. CV-95/U permits operation with remote reactors.



| Number of Operators that Are Trained     | Maneuvering Simulator |               |                     |               |                           |
|--|-----------------------|---------------|---------------------|---------------|---------------------------|
|  | Target                |               | Own Ship            |               | Max. Vert. Speed (ft/min) |
|  | Turn Rate (deg/sec)   | Speed (knots) | Turn Rate (deg/sec) | Speed (knots) |                           |
| Complete Crew (3)                        | —                     | 0 - 500       | —                   | —             | —                         |
| One                                      | —                     | —             | —                   | —             | —                         |
| Crew for Mk 25 or 35                     | 0 - 35                | 0 - 2000      | —                   | —             | —                         |
| —  | —                     | V2 speeds     | —                   | —             | —                         |
| —  | —                     | —             | —                   | —             | —                         |
| —  | 1                     | 40            | 1                   | 40            | —                         |
| Dependent upon Number of Indicators used | 24                    | 150 - 430*    | 2.4 Max.            | —             | —                         |
| —  | 24                    | 150 - 430*    | 2.4 Max.            | —             | —                         |
| Dependent Upon Number of Indicators Used | 0 - 24                | 0 - 1700      | 10.5                | —             | 5,000 dive = 40,000       |
| See OCZ                                  | 0 - 24                | 0 - 1700      | 10.5                | —             | 5,000 dive = 40,000       |
| One                                      | Unlimited             | 0 - 25        | Unlimited           | 0 - 25        | —                         |
| From one to Classroom                    |                       |               |                     |               |                           |
| From one to Classroom                    |                       |               |                     |               |                           |
| Twenty                                   |                       |               |                     |               |                           |
|  |                       |               |                     |               |                           |

\* With cams supplied with trainer



| DECLASSIFIED  |                                 |                                       | Signal Simulator   | Output   |  |
|---|---------------------------------|---------------------------------------|--|--|--|
| Rep Rate<br>(cps)   | Pulse<br>Length<br>( $\mu$ sec) | Beam-<br>width<br>(deg)               | Types  |  | A. 30-60 Mc IF<br>B. Video<br>C. Trigger<br>D. 1x<br>Sync. Ant.  |
|   |                                 |                                       | A. Target<br>B. Sea Return<br>C. Altitude Line<br>D. Range Attenuation<br>E. Noise                                 | F. Fading<br>G. Jamming<br>H. Landmass<br>I. IFF |  |
| Same as<br>Radar  | —                               | —                                     | A, E, F, G   |  | B  |
| —   | —                               | —                                     | —  |  | —  |
| 2000  | .1                              | 1.6 to<br>2                           | A, B, D, E, F, G   |  | A, 60 Mc   |
| —   | —                               | —                                     | —  |  | —  |
| —   | —                               | —                                     | —  |  | —  |
| 400   | 1                               | 6 - 8                                 | A, D   |  | B  |
| 60 or<br>200  | 1 or 4                          | 4 to<br>25                            | A, D, E, F, G, wildcatting,* lobing<br>effect in vertical plane simu-<br>lated by variation of intensity<br>(cam). |  | 15, 30 Mc IF, C,<br>1x & 36x true,<br>1x relative                |
| 60, 150,<br>200, 300,<br>400 or 600   | 1, 2<br>or 4                    | 4 to<br>25                            | See OCJ  |  | 15, 30 or 60 Mc<br>IF, C, 1x & 36x<br>true, 1x & 36x<br>relative |
| 60 or<br>200  | 1 or 4                          | Can<br>Simulate<br>any beam-<br>width | A, D, E, F, lobing effect in vertical<br>plane accurately simulated<br>(photographic plate).                       |  | 15, 30 Mc IF, C,<br>1x & 36x true,<br>1x relative<br>bearing     |
| 60, 150,<br>200, 300,<br>400 or 600   | 1, 2<br>or 4                    | See<br>OCZ                            | see OCZ  |  | 15, 30, 60 Mc IF,<br>C, 1x & 36x rela-<br>tive & true            |
| Adjustable prop<br>sounds   |                                 | 2 - 20                                | A, B, D, E, F  |  | Audio  |
| 2 to 20   | .                               |                                       | A, E, screw sounds   |  | Audio to<br>speaker or<br>sonar gate                             |
| Variable  | 1-90 ms                         |                                       | A, B, E demonstrator   |  | Audio to<br>speaker or<br>TRR                                    |
| Audio recordings reproduced through phones and speaker.<br>Response choice of each of 20 students printed at console. |                                 |                                       |  |  |  |
|   |                                 |                                       |  |  |  |

\* Wildcatting = interference from other radars.

| Space Simulator          |                   | Service Equipment  |  |
|--------------------------|-------------------|--|--|
|                          |                   | Outputs Required   | Radar  |
| Problem Area (sq. miles) | Number of Targets | A. Trigger B. 1x synchro Azimuth<br>C. Voltage Prop to Azimuth and EL<br>D. L.O. Tuning Voltage<br>E. 1x 360° Potentiometer Ant. Az. |  |
| 50,000 yard radius       | —                 | —  | Mk 12 in Mk 37                                       |
| 1 min run                | —                 | —  | Mk 28, 29, 34  |
| 50,000 yard radius       | —                 | —  | Mk 25 or 35  |
| —                        | —                 | —  | Mk 65  |
| 60 or 200                | —                 | —  | Mk 3, 4  |
| —                        | —                 | —  | —  |
| —                        | 6                 | A. 1x bearing info.(rel. and true), ship's heading marker  | Series SA, SC, SK, SR<br>Air Search Radars           |
| —                        | 6                 | A. 1x and 36x bearing info.(rel. and true), ship's heading marker  | Series SA, SC, SK, SR, AN/SPS-6<br>Air Search Radars |
| 57,600                   | 3                 | A. 1x bearing info. (rel. and true), ship's heading marker   | Series SA, SC, SK, SR<br>Air Search Radars           |
| 57,600                   | 3                 | A. 1x and 36x bearing info. (rel. and true), ship's heading marker   | Series SA, SC, SK, SR, AN/SPS-6<br>Air Search Radars |
| 4                        | 2                 | A, B, C, E   | Listening Sonar Simulated                            |
|                          | 1                 | None   | Listening Sonar Screw Sounds                         |
|                          | 1                 | None   | Audio Reverberations and Echoes (Sonar)              |
|                          |                   | None   | Audio Recordings (Sonar)                             |
|                          |                   |  |  |

[REDACTED]

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**SECURITY INFORMATION**

| Size<br>L - W - H   | Weight<br>(lb)                 | Power Source                                      |       |       |       |
|---|--------------------------------|---|-------|-------|-------|
|   |                                | Volts   | Phase | Freq. | KVA   |
| 20' - 14'   | 4753                           | 115   | 1     | 60    | 3     |
| 6½' H - 2' W  | 1200 with<br>Mk 51<br>Director | 115   | 1     | 60    |       |
| —   | —                              | —   | —     | —     | 10    |
| —   | —                              | —   | —     | —     | —     |
| —   | —                              | —   | —     | —     | —     |
| 57" - 26" - 20"   | 415                            | 110   | 1     | 60    | 3     |
| 57" - 43" - 20"   | 835                            |   |       |       |       |
| 36" - 20" - 37" ①<br>63" - 55" - 24" ②                      | 1537                           | 115   | 1     | 60    | 1.345 |
| 36" - 20" - 37" ①<br>63" - 55" - 24" ②<br>12" - 12" - 27" ③ | 1635                           | 115   | 1     | 60    | 1.433 |
| 27" - 60" - 21" ④<br>18" - 25" - 57" ⑤                      | 1645                           | 115   | 1     | 60    | 1.585 |
| 27" - 60" - 21" ④<br>18" - 25" - 57" ⑤                      | 1645                           | 115   | 1     | 60    | 1.585 |
| 18" - 24" - 60"   | 700                            | 115   | 1     | 60    | 0.35  |
| 16½" - 9" - 9"  | 35                             | 115   | 1     | 60    | 0.07  |
| 16½" - 9" - 9"  | 39                             | 115   | 1     | 60    | 0.1   |
| 56" - 32" - 48"   | 400                            | 115   | 1     | 60    | 0.33  |
| ① Target simulator  |                                | ④ Simulator assembly (less lightshield and frame) |       |       |       |
| ② Radar signal simulator                                    |                                | ⑤ Signal generator assembly                       |       |       |       |
| ③ Electronic control amplifier                              |                                |   |       |       |       |

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|  | Number of Equipments Produced | Available Date                     | Supplier                              | MODEL                  |
|--|-------------------------------|------------------------------------|---------------------------------------|------------------------|
|  | 11                            | —                                  | —                                     | TR/MK 2                |
|  | 200                           | 1 Jan. 1950                        | —                                     | TR/MK 8                |
|  | 7                             | Est. July 1950                     | —                                     | TR/MK 10               |
|  | —                             | —                                  | —                                     | TR/MK                  |
|  | —                             | —                                  | —                                     | OAC                    |
|  | 1 (FSS, SD)<br>1 (FSS, KW)    | Inst. Jan. 1947<br>Inst. Oct. 1948 | NEL                                   | OBJ - a                |
|  | 30                            | In use since 1947                  | Raytheon                              | OCJ                    |
|  | 25                            | In use since 1950                  | Raytheon                              | OCJ - 1                |
|  | 35                            | In use since 1947                  | Airplane and Marine Instruments, Inc. | OCZ                    |
|  | 25                            | In use since 1950                  | Airplane and Marine Instruments, Inc. | OCZ - 1                |
|  | 50                            | 1946                               | RCA                                   | QFN                    |
|  | 75                            | June 1952                          | TDC                                   | SM - 41<br>/UQQ-T      |
|  | Contract not let              |                                    | NEL                                   | SM-47 (XG-1)<br>/UQQ-T |
|  | 3                             | 1945 - 1946                        | NEL                                   | SRGT                   |
|  |                               |                                    |                                       |                        |

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| MODEL | Function                       | General Facts  | Sec. Class. |
|-------|--------------------------------|--|-------------|
| 15AE2 | Optical PPI trainer            | Classroom optical PPI trainer.   | R           |
| 15AM1 | Cadillac Evaluation System     | Airborne CIC   | C           |
| 15G2  | MAD Trainer                    | Permits complete tactical submarine search.                                    | C           |
| 15J1C | Search Radar Trainer           |  | C           |
| 15J2B | Primary PPI Plotting Trainer   | Displayed on large C. R. T.  | C           |
| 15M8  | Submarine Attack Teacher       |  | C           |
| 15V4  | AN/APS-6 Night Fighter Trainer |  | C           |
| 15V5  | Night Fighter Trainer          |  | C           |
| 15W1  | GCA Trainer                    | CCA operations trainer.  | C           |
| 15Z3  | Airborne Search Radar Trainer  |  | C           |
|       | Target Simulator               |  | C           |
|       | Radar Trainer                  | To provide 24 echos. Height finder.  | C           |
|       | Tactical Trainer               | Gunfire and torpedo tracks shown at 2000 ft/sec at range of 2000 to 16,000 yd. | C           |
| None  | Controlled Intercept Trainer   | A one-target laboratory model was developed and constructed at NEL (NE051313). | R           |
|       |                                |  |             |

| Number of Operators that Are Trained | Maneuvering Simulator   |                        |                     |                 | Max. Vert. Speed (ft/min) |
|--------------------------------------|-------------------------|------------------------|---------------------|-----------------|---------------------------|
|                                      | Target                  |                        | Own Ship            |                 |                           |
|                                      | Turn Rate (deg/sec)     | Speed (knot)           | Turn Rate (deg/sec) | Speed (knot)    |                           |
| Twenty                               | Land mass               | —                      | 6                   | 75-300          | None                      |
| Cadillac crew                        | Manual                  | 100-600<br>5-30        | Manual              | 100-600         | Manual                    |
| One                                  | Manual                  | 4-24                   | Manual              | 100-600         | None                      |
| Unlimited                            | Manual                  | 100-600<br>5-30        | Fixed               | Station         | None                      |
| Six                                  | Manual                  | 100-600<br>5-30        | Manual              | 100-600<br>5-30 | None                      |
| —                                    | Slaved to device 21-A-7 |                        |                     | —               | —                         |
| Two                                  | 27                      | 5-450                  | —                   | —               | 5,000                     |
| Three                                | 27                      | 100-900                | —                   | —               | 10,000                    |
| Four                                 | —                       | —                      | None                | None            | —                         |
| One                                  | Manual                  | 100-600                | Manual              | 100-600         | 1000                      |
| —                                    | —                       | —                      | —                   | —               | —                         |
| —                                    | —                       | —                      | —                   | —               | —                         |
| —                                    | —                       | —                      | —                   | —               | —                         |
| CIC Team                             | 12                      | 50 to<br>1000,<br>5000 | 12                  | 50              | 60,000                    |
|                                      |                         |                        |                     |                 |                           |

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|                                   |                      |                  | Signal Simulator   |  | Output  |
|-----------------------------------|----------------------|------------------|--|--|---|
| Rep Rate (cps)                    | Pulse Length (μsec)  | Beam-width (deg) | Type   |  | A. 30-60 Mc I. F.<br>B. Video C. Trigger<br>D. 1 x Sync. Ant. |
|                                   |                      |                  | A. Target<br>B. Sea Return<br>C. Altitude Line<br>D. Range Attenuation<br>E. Noise | F. Fading<br>G. Jamming<br>H. Landmass<br>I. IFF |   |
| —                                 | —                    | —                | —  | —  | —   |
| Ext.                              | —                    | Var.             | A, D, F, I   |  | B   |
| MAD comparator used with recorder |                      |                  |  |  | —   |
| 200 and slave                     | 2                    | Var.             | A, D, F, I   |  | B   |
| Sequence Scan                     |                      |                  | A  |  | —   |
| Slaved to SS Radar                |                      |                  | —  |  | —   |
| Same as AN/ARS-19                 |                      |                  | A, B, C, D, E, I   |  | A   |
| Same as AN/APZ-35                 |                      |                  | A, B, C, D, E, I   |  | A   |
| Same as AN/MPN-1                  |                      |                  | A, D, E, F,  |  | A   |
| 200                               | —                    | —                | A, B, C, D, H  |  | B, C  |
| —                                 | —                    | —                | —  |  | —   |
| —                                 | —                    | —                | —  |  | —   |
| —                                 | —                    | —                | —  |  | —   |
| 390<br>1170                       | 0.3 to 7<br>0.3 to 7 | 1 to 4<br>1 to 4 | A, D, E  |  | 30 Mc   |
| —                                 | —                    | —                | —  |  | —   |

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| Space Simulator          |                   | Service Equipment   |                           |
|--------------------------|-------------------|---|---------------------------|
| Problem Area (sq. miles) | Number of Targets | Outputs Required  |                           |
|                          |                   | A. Trigger B. 1 x synchro azimuth C. Voltage prop to azimuth and EL D. L.O. tuning voltage E. 1 x 360° potentiometer Ant. Az. | Radar                     |
| 400 x 400                | —                 | A, C, D   | AN/APQ-35                 |
| 200 x 200                | 30                | A, B  | AN/APS-20<br>AN/APA-56,57 |
| 25                       | 1                 | —   | —                         |
| 200 x 200                | 6                 | A, B  | All Air Search PPI's      |
| 100 x 100 or 2500        | —                 | —   | —                         |
| 2500                     | 5                 | A, E  | SS                        |
| 200 x 200                | —                 | A, C, D   | AN/APS-19                 |
| 400 x 400                | —                 | A, C, D   | AN/APQ-35                 |
| 100 x 100                | —                 | A, C  | AN/MPN-1                  |
| 400 x 600 Landmass       | —                 | B   | AN/APS-20, 31, 33         |
| —                        | 24                | —   | —                         |
| —                        | —                 | —   | —                         |
| 36 or 360                | —                 | —   | —                         |
| 300                      | 1                 | A, B, C   | SX Radar                  |
| —                        | —                 | —   | —                         |

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| Size<br>L - W - H<br>(ft)       | Weight<br>(lb)  | Power Source                          |        |          |                 |
|---------------------------------|-----------------|---------------------------------------|--------|----------|-----------------|
|                                 |                 | Volts                                 | Phase  | Freq.    | KVA             |
| 2-2-5                           | 70              | 115                                   | 1      | 60       | 375             |
| Consists of<br>15J1C units      | 5               | 105 - 125                             | 1      | 60       |                 |
| 4-4-4<br>Estimated              | 500             | 115                                   | 1      | 60       | 1               |
| 2-2-2<br>(3 units)              | 550             | 105-125                               | 1      | 60       | 1.3             |
| 1-5/12-1-2/3-4<br>1-1/3-1-5/6-3 | 460<br>960      | 105-125                               | 1      | 60       | 2               |
| 1-1/3-1-7/12-4                  | —               | 115                                   | 1      | 60       | 2               |
| 20-1-7                          | 6650            | 230<br>115                            | 3<br>1 | 60<br>60 | 20<br>2.5       |
| Will be mounted in trailer      |                 | Not determined - approx. same as 15V4 |        |          |                 |
| 12-4-7                          | 3500            | 230                                   | 3      | 60       | 5               |
| 8-4-5                           | —               | —                                     | —      | —        | —               |
| —                               | —               | —                                     | —      | —        | —               |
| —                               | —               | —                                     | —      | —        | —               |
| —                               | —               | —                                     | —      | —        | —               |
| 12 Relay<br>Rack                | Data<br>Unknown | 220                                   | 3      | 60       | Data<br>Unknown |
|                                 |                 |                                       |        |          |                 |

| Number of Equipments Produced        | Available Date            | Supplier                      | MODEL |
|--------------------------------------|---------------------------|-------------------------------|-------|
| 40                                   | In stock                  | Special Devices Center, L. I. | 15AE2 |
| Under Development                    | Contemplate 11/49         | Special Devices Center, L. I. | 15AM1 |
| 1                                    | Devel. 12/49              | Special Devices Center, L. I. | 15G2  |
| 16                                   | October 1949              | Special Devices Center, L. I. | 15J1C |
| 4                                    | All allocated             | Special Devices Center, L. I. | 15J2B |
|                                      |                           | Special Devices Center, L. I. | 15M8  |
| 6                                    | In stock                  | Special Devices Center, L. I. | 15V4  |
| Under Development                    | Prototype                 | Special Devices Center, L. I. | 15V5  |
| 1                                    | In use<br>Olathe, Kansas  | Special Devices Center, L. I. | 15W1  |
| Under Development                    | Prototype 8/49            | Special Devices Center, L. I. | 15Z3  |
|                                      |                           |                               |       |
|                                      |                           |                               |       |
|                                      |                           |                               |       |
| A single one-target laboratory model | Completed<br>October 1951 | NEL                           | None  |
|                                      |                           |                               |       |

SECRET  
SECURITY INFORMATION

BEACONS AND  
TRAFFIC CONTROL

| MODEL     | Function            | General Notes   | Sec. Class. |
|-----------|---------------------|---|-------------|
| AN/SPN-12 | Air Speed Indicator | Alerts air speed measurement from carrier on approach for landing or carrier. | C           |
| AN/SPN-11 | Air Speed Indicator | Alerts air speed measurement from carrier on approach for landing or carrier. | C           |
| AN/SPN-10 | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-9  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-8  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-7  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-6  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-5  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-4  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-3  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-2  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-1  | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |
| AN/SPN-01 | Carrier Approach    | Approach of carrier to carrier under minimum condition of visibility.         | B           |

Section 10  
Beacons and Traffic Control

| MODEL     | Function  | General Facts  | Sec. Class. |
|-----------|---|--|-------------|
| AN/APN-63 | GCA Assist  | Beacon   | R           |
| AN/BPN-1  | Missile Guidance                                  | One of two submarine pickets required to establish a hyperbolic navigation grid.             | C           |
| AN/CPN-6  | Air Navigational Aid Beacon                       | Beacon used with Airborne X-band radars  | C           |
| AN/CPN-8  | Air Navigational Aid Beacon                       | Beacon used with Airborne S-band radars  | C           |
| AN/CPN-17 | Air Navigational Aid Beacon                       | Replacement for AN/CPN-8. No production procurement.   | C           |
| AN/FPN-1A | Air Traffic Control Final Approach Height Finding | Fixed installation of GCA with indicators in airport control tower and rf equipment removed. | R           |
| AN/FPN-10 | Air Navigational Aid Beacon                       | High traffic capacity beacon. Developed to replace AN/CPN-6. No production procurement.      | R           |
| AN/GPN-2  | Air Traffic and Approach Control                  | Airport surveillance portion of GCA equipment.   | R           |
| AN/GPN-6  | Air Traffic and Approach Control                  | Airport surveillance portion of GCA equipment, and for use in seaplane approach and landing. | R           |
| AN/MPN-1B | Ground Controlled Approach                        | Approach of aircraft under minimum conditions of visibility.                                 | C           |
| AN/MPN-5  | Ground Controlled Approach                        | Approach of aircraft under minimum conditions of visibility.                                 | R           |
| AN/SPN-2  | CCA Air Speed Indicator                           | Aircraft air speed measurement from carrier on approach for landing on carrier.              | R           |
| AN/SPN-3  | Carrier Controlled Approach                       | Approach of aircraft to carrier under minimum condition of visibility.                       | R           |
| AN/SPN-8  | Carrier Controlled Approach                       | Approach of aircraft to carrier under minimum condition of visibility.                       | R           |
| AN/SPN-12 | Air Speed Indicator                               | Aircraft air speed measurement from carrier on approach for landing on carrier.              | C           |

| Peak Power Output (kw) | Pulse Length ( $\mu$ sec) | Frequency (Mc)             | Pulse Rate (pps) | Beamwidth           |                                      |
|------------------------|---------------------------|----------------------------|------------------|---------------------|--------------------------------------|
|                        |                           |                            |                  | Hor. ( $^{\circ}$ ) | Vert. ( $^{\circ}$ )                 |
| 0.04                   | 7 to 10                   | R 2700-2900<br>T 968       | 4000 Max.        | OMNI                | 90                                   |
| 35                     | 0.2                       | R 2900-3950<br>T 2900-3950 | 250              | 25                  | 10                                   |
| 15                     | 0.5                       | R 9320-9430<br>T 9310      | 4000 Max.        | OMNI                | Shore - 5<br>Ship - 30               |
| 4                      | 0.5                       | R 3267-3333<br>T 3256      | 4000 Max.        | OMNI                | 8                                    |
| 15                     | 0.5                       | R 3267-3333<br>T 3256      | 6000             | OMNI                | 35                                   |
| 200                    | 0.5                       | 2860-2900                  | 2000             | 5                   | CSC <sup>2</sup> 3 - 10              |
| 0.15                   | 0.5                       | 9010-9040                  | 2000             | 1.2                 | 0.6                                  |
| 0.15                   | 0.5                       | 9150                       | 2000             | 3.6                 | 0.6                                  |
| 5                      | 0.5 to 4.0                | R 9320-9430<br>T 9310      | 150,000          | OMNI                | 7.5                                  |
| 200                    | 0.5                       | 2860-2900                  | 2000             | 5                   | CSC <sup>2</sup><br>3 - 10           |
| 470                    | 0.9                       | 2700-2900                  | 1000             | 2                   | 5.7 @ 3db<br>CSC <sup>2</sup> 4 - 29 |
| 85                     | 0.5                       | 2780-2820                  | 2000             | 5                   | CSC <sup>2</sup> 3 - 10              |
| 25                     | 0.5                       | 9000-9180                  | 2000             | 1.2                 | 0.6                                  |
| 350                    | 0.8                       | 2740-2900                  | 1200             | 2.5                 | 30 CSC <sup>2</sup> $\theta$         |
| 15                     | 0.5                       | 9000-9180                  | 2400             | 0.95                | 0.95                                 |
| 1.5                    | CW                        | 1500                       | Unmodulated      | 17                  | 12                                   |
| 50                     | 3/8                       | 9335-9415                  | 1200             | 0.4                 | 20                                   |
| 35                     | 25                        | 9000-9180                  | 4000 Max.        | 1.5                 | 6                                    |
| 0.03                   | CW                        | 10,000-10,250              | FM<br>CW         | 4                   | 4                                    |

| Maximum Reliable Range (miles) |                                      | Scan Coverage         |  | Scan Rate (rpm)       |                       | Range Resolution                                       |   |
|--------------------------------|--------------------------------------|-----------------------|--|-----------------------|-----------------------|--|---|
|                                |                                      | Hor. (°)              | Vert. (°)                                    | Hor. (°)              | Vert. (°)             |  |   |
| 2200 T DD                      | 2.0 m <sup>2</sup> Aircraft B/S = .5 |                       |  |                       |                       |  |   |
| 25 miles with ASR- 1/2/3       |                                      | Fixed Antenna         |  |                       |                       | Not Objective  |   |
| 250 miles G/M system           |                                      | 360 Fixed             |  | Hand Slewing          | None                  | 0.2 mile over-all                                      |   |
| Over 100 nautical miles        |                                      | Fixed Antenna         |  |                       |                       |  |   |
| Over 100 nautical miles        |                                      | Fixed Antenna         |  |                       |                       |  |   |
| Over 100 nautical miles        |                                      | Fixed Antenna         |  |                       |                       |  |   |
| 25 naut. miles on SNB          | 10 naut. miles on SNB                | 20 naut. miles on SNB | 360 cont. 20                                 | Servo 2-10 7          | 30 rpm 0.2/sec Manual | 1.5/sec 2/sec 2/sec                                    | Same as GPN-2<br>Same as MPN-1B<br>Same as MPN-1B |
| Over 100 nautical miles        |                                      | Fixed Antenna         |  |                       |                       |  |   |
| 25 nautical miles SNB          |                                      | 360 cont.             | Servo Adj. tilt. 2 to 10                     | 30 rpm                | 1.5/sec Approx.       | 500 ft or 1% of range, whichever greater               |   |
| 26 nautical miles on F9F       |                                      | 360 cont.             | Servo Adj. tilt: 10 above horizon to 2 below | 15 & 30 rpm           | 0.276/sec             | 500 ft on fastest sweeps                               |   |
| 30 miles on SNB                | 10 miles on SNB                      | 360 cont. 20          | Manual 2 - 10 7                              | 30 rpm 4 and 1        | None per sec          | 1% of sweep range                                      |   |
| 31 miles on SNB                | 10 miles on SNB                      | 360 cont. 20          | Servo 2 - 10 7                               | 15 & 30 rpm 2 per sec | 0.276/sec 2 per sec   | 1% of sweep range or 650 ft, whichever greater. 400 ft |   |
| -                              | 1                                    | 17                    | 12   | -                     | -                     |  |   |
| -                              | 5                                    | 30                    | 20   | 300/sec               | -                     | 1% of sweep range or 400 ft whichever is greater       |   |
| 6 miles                        |                                      | 100                   | Fixed  | 300/sec               | -                     | 1% of sweep range or 300 ft whichever is greater       |   |
| 3 miles                        |                                      | Manual 120            | Scan +30 to -15                              | -                     | -                     | None   |   |

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SECURITY INFORMATION

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| Major Lobe DB Gain   | Minor Lobe DB Down                                     | Reflector  |  | Ant. Weight (lb)    | Total System Weight (lb) | 90 Knot Wind (lb)      |
|----------------------|--|--|--|---------------------|--------------------------|------------------------|
|                      |  | Type   | Size   |                     |                          |                        |
| 0                    | -  | None   |  | 0.5                 | 20                       |                        |
|                      |  |  |  | 325                 | 1300                     |                        |
| Ship 5<br>Shore 12.5 | Omnidirectional in horiz. plane gain in vertical plane | None   |  | Ship 21<br>Shore 30 | 1500                     |                        |
| 10                   |  | None   |  | 50                  | 1500                     |                        |
| 4                    |  | None   |  | 35                  | 1500                     |                        |
| 31<br>40<br>40       | 15<br>20<br>20   | Truncated parabola<br>parabolic cylinder         | 8ftH-5ftW<br>Az.-3ftH x 8ftW<br>El.-14ftH x 2ftW   |                     |                          | 1500 Approx.<br>Radome |
| 11                   | Omnidirectional in horiz. plane gain in vertical plane | None   |  | 30                  | 4000                     |                        |
| 31                   | 15   | Truncated parabola                               | 8ftH - 5ftW  |                     | 8180                     | 1500 Approx.           |
| 34                   | 20   | Divergent, doubly curved                         | 8ftH - 12ftW                                       | 635                 | 13,120                   | 1740 @ 100 knots       |
| 31<br>40             | 15<br>18   | Truncated parabola<br>2 parabolic cylinders      | 8ftH - 5ftW<br>Az.-3ftH - 8ftW<br>El.-14ftH - 2ftW | 700<br>150          | 21,800                   | 1500 Approx.<br>Radome |
| 33<br>40             | 20<br>20   | Con. shaped full dish. 2 con. shaped half dishes | 9ft-9ft<br>Az.-37in. H-8ftW<br>El.-11ftH-37in.W    | 610<br>35           | 24,000                   | 2500<br>Radome         |
| -                    | -  | parabola   | 48in. x 48in. x 14in.                              | 50                  |                          |                        |
| 38                   | 13   | parabolic cylinder                               | 3ftH - 18ftW                                       | -                   |                          | -                      |
| 40                   | 13   | parabolic cylinder                               | 5ftW-1-1/2ft H                                     | 375                 | 3200                     | Radome                 |
| -                    | -  | parabola   | 30 in. diam.                                       | 160                 | 1388                     | -                      |

SECRET

CONFIDENTIAL

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**DECLASSIFIED**

~~SECRET~~  
~~SECURITY INFORMATION~~

| Transmission Line |                               |                                 |                       | Power Requirements |               |            |
|-------------------|-------------------------------|---------------------------------|-----------------------|--------------------|---------------|------------|
| Type              | Number                        | Size (in.)                      | 1 Way Loss (db/ft)    | Volts              | Phase Freq.   | KVA        |
| One each → of     | R-RG-58/U<br>T-RG-8/U         | 0.3<br>0.5                      | 0.16<br>0.175         | 28                 | DC            | 2.5 A      |
| RG-128/U          | One                           |                                 |                       | 120                | 1 60          | 3          |
| Wave Guide        |                               | 1/2 x 1                         | 0.044                 | 107-123            | 1 50-70       | 2.5 min    |
| Wave Guide        |                               | 1-1/2 x 3                       | 0.012                 | 115/230            | 1 50-70       | 0.8        |
| Wave Guide        |                               | 1-1/2 x 3                       | 0.012                 | 107-123            | 1 50-7        | 2.5 min    |
| Wave Guide        | RG-48/U<br>RG-52/U<br>RG-52/U | 1-1/2 x 3<br>1 x 0.5<br>1 x 0.5 | 0.013<br>0.07<br>0.07 | 115                | 1 60          | 18.2       |
|                   | RG-51/U                       | 1/2 x 1                         | 0.044                 | 115/230            | 1 60          |            |
| Wave Guide        | RG-48/U                       | 1-1/2 x 3                       | 0.013                 | 115                | 1 60          | 9.7        |
| Wave Guide        | RG-75/U                       | 1-1/2 x 3                       | 0.008                 | 120/208            | 3 60          | 16.8       |
| Wave Guide        | RG-48/U<br>RG-52/U            | 1-1/2 x 3<br>1 x 0.5            | 0.013<br>0.07         | 110/220            | 1 50/60       | 15         |
| Wave Guide        | RG-48/U<br>RG-52/U            | 1-1/2 x 3<br>1 x 0.5            | 0.003<br>0.017        | 120/208            | 3 60          | 33         |
|                   | RG-9/U                        | 0.42                            | 0.1                   | 28                 | DC            | 1.6        |
| Wave Guide        | RG-51/U                       | 5/8 x 1-1/4                     | 0.044                 | 440                | 3 60          | 10         |
| Wave Guide        | RG-52/U                       | 5/8 x 1-1/4                     | 0.044                 | 115                | 1 60<br>3 400 | 1.5<br>7.5 |
| Wave Guide        |                               |                                 |                       | 115                | 1 60          | 2.4        |

**DECLASSIFIED**

| Type           | Stabilization |            |             | Smallest Ship                                       | No. in Use or Tentative Available Date | Supplier                         | MODEL     |
|----------------|---------------|------------|-------------|---|--|----------------------------------|-----------|
|                | Accuracy      | Roll Limit | Pitch Limit |   |  |                                  |           |
| None           |               |            |             | Aircraft  | 20                                     | Melpar                           | AN/APN-63 |
| None           |               |            |             | SSR   | Aug. 1954                              | Bendix                           | AN/BPN-1  |
| None           |               |            |             | SSR   | 200                                    | Galvin                           | AN/CPN-6  |
| None           |               |            |             | SSR   | 20                                     | Galvin                           | AN/CPN-8  |
| None           |               |            |             | SSR   | 0                                      | Galvin<br>Motorola               | AN/CPN-17 |
| None           |               |            |             | Air Station<br>Fixed<br>Installation                | 1                                      | Bendix                           | AN/FPN-1A |
| None           |               |            |             | Land  | 0                                      | Raytheon                         | AN/FPN-10 |
| None           |               |            |             | Transportable<br>Truck<br>Mounted                   | 10                                     | Bendix                           | AN/GPN-2  |
| None           |               |            |             | Trailer Mounted<br>22ft 1in.L x 8ft W<br>2 Vehicles | May 1953                               | Laboratory<br>for<br>Electronics | AN/GPN-6  |
| None           |               |            |             | 4 Wheel<br>Trailer Mounted<br>3 Vehicles            | 50                                     | Bendix                           | AN/MPN-1B |
| None           |               |            |             | Semi-Trailer<br>Mounted<br>4 Vehicles               | Jan. 1953                              | Bendix                           | AN/MPN-5  |
| None           |               |            |             | CV  | Obsolete                               | RCA                              | AN/SPN-2  |
| None           |               |            |             | CV  | Obsolete                               | NRL                              | AN/SPN-3  |
| Stable<br>Base | ± 1/2°        | 15°        | 10°         | CVE   | Feb. 1953                              | Bendix                           | AN/SPN-8  |
| None           |               |            |             | CVE   | 8                                      | Raytheon                         | AN/SPN-12 |













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APPENDIX A  
Electronic Equipment Subject Classification

I. Radar

- A. Altimeters
- B. Indicators
- C. Search Radar
  - 1. Shipboard
  - 2. Airborne
  - 3. Landbased
- D. Target Designation
- E. Trainers
- F. Weapon Control
  - 1. Shipboard
  - 2. Airborne
  - 3. Landbased
- G. Beacons and Traffic Control

II. Communication

- A. Voice and Code
  - 1. Radio
    - a. Receivers
    - b. Transmitters
    - c. Transmitter Receiver Sets
  - 2. Wire
    - a. Intercommunication Systems
    - b. Announcing Systems
    - c. Telephone Systems
    - d. Telegraph Sets
  - 3. Infrared
    - a. Receivers
    - b. Transmitters
- B. Terminal Equipments
  - 1. Teletype
  - 2. Teletype
    - a. Frequency Shift Keyers
    - b. Frequency Shift Converters
    - c. Printers
    - d. Miscellaneous Accessories
  - 3. Speech Security
  - 4. Television
    - a. Receivers
    - b. Transmitters
- C. Miscellaneous
  - 1. Ships Consoles
  - 2. Signal Lamps
  - 3. Telautograph
  - 4. Antennas

III. Data Transmission

- A. Continuous
- B. Digital

IV. Countermeasures

- A. Intercept and Analysis
  - 1. Direction Finders
  - 2. Indicators
  - 3. Receivers
  - 4. Recorders
  - 5. Trainers

B. Deception

- 1. Active
- 2. Passive

C. Jammers

- 1. Transmitters
- 2. Search and Jam Systems
- 3. Trainers

V. Navigation

- A. Direction Finders
- B. Buoys
- C. Homing Systems
- D. Landing Systems
- E. Long Range Navigation

VI. Radio Control

- A. Aircraft
  - 1. Automatic Pilot
  - 2. Bombsight
  - 3. Remote Control
- B. Guided Missiles
  - 1. Proximity Fuses
  - 2. Remote Control
  - 3. Target Seeking
- C. Remote Operations

VII. Identification and Recognition

VIII. Sound

- A. Echo Ranging and Listening
  - 1. Sonar
  - 2. Listening Devices
  - 3. Fathometer
  - 4. Sound Location
- B. Recording Devices
- C. Sono Buoys
- D. Training Devices

IX. Radiac

- A. Computers
- B. Detectors
  - 1. Fixed
  - 2. Portable Survey
  - 3. Dosimeters
- C. Trainers

X. Infrared Detection

XI. Magnetic Detection

XII. Computation

- A. Analog
- B. Digital
- C. Stable Elements

XIII. Measurement and Test

# SUMMARY OF JOINT NOMENCLATURE SYSTEM ("AN" SY

## TABLE OF COMPONENT INDICATORS

| COMP.<br>IND. | FAMILY NAME                            | EXAMPLES OF USE<br>(Not to be construed as limiting the application of the component indicator) |
|---------------|--|---|
| AB            | Supports, Antenna                      | Antenna mounts, mast bases, mast sections, towers, etc.   |
| AM            | Amplifiers                             | Power, audio, interphone, radio frequency, video, electronic control, etc.                      |
| AS            | Antennae, Complex                      | Arrays, parabolic type, masthead, etc.  |
| AT            | Antennae, Simple                       | Whip or telescopic, loop, dipole, reflector, etc.   |
| BA            | Battery, primary type                  | B batteries, battery packs, etc.  |
| BB            | Battery, secondary type                | Storage batteries, battery packs, etc.  |
| BZ            | Signal Devices, Audible                | Buzzers, gongs, horns, etc.   |
| C             | Controls                               | Control box, remote tuning control, etc.  |
| CA            | Commutator Assemblies, Sonar           | Peculiar to Sonar equipment.  |
| CB            | Capacitor Bank                         | Used as a power supply.   |
| CG            | Cable Assemblies, R. F.                | R. F. cables, wave guides, transmission lines, etc., with terminals.                            |
| CK            | Crystal Kits                           | A kit of crystals with holders.   |
| CM            | Comparators                            | Compares two or more input signals.   |
| CN            | Compensators                           | Electrical and/or mechanical compensating, regulating or attenuating apparatus.                 |
| CP            | Computers                              | A mechanical and/or electronic mathematical calculating device.                                 |
| CR            | Crystals                               | Crystal in crystal holder.  |
| CU            | Couplers                               | Impedance coupling devices, directional couplers, etc.  |
| CV            | Converters (electronic)                | Electronic apparatus for changing the phase, frequency, or from one medium to another.          |
| CW            | Covers                                 | Cover, bag, roll, cap, radome, nacelle, etc.  |
| CX            | Cable Assemblies, Non-R. F.            | Non-R. F. cables with terminals, test leads, also composite cables of R. F. and non-R. F. condu |
| CY            | Cases and Cabinets                     | Rigid and semirigid structure for enclosing or carrying equipment.                              |
| D             | Dispensers                             | Chaff dispensers.   |
| DA            | Load, Dummy                            | R. F. and non-R. F. test loads.   |
| DT            | Detecting Heads                        | Magnetic pick-up device, search coil, hydrophone, etc.  |
| DY            | Dynamotors                             | Dynamotor power supply.   |
| E             | Hoists                                 | Sonar hoist assembly, etc.  |
| F             | Filters                                | Band-pass, noise, telephone, wave traps, etc.   |
| FN            | Furniture                              | Chairs, desks, tables, etc.   |
| FR            | Frequency Measuring Devices            | Frequency meters, tuned cavity, etc.  |
| G             | Generators, Power                      | Electrical power generators without prime movers. (See PU & PD.)                                |
| GO            | Goniometers                            | Goniometers of all types.   |
| GP            | Ground Rods                            | Ground rods, stakes, etc.   |
| H             | Head, Hand, and Chest Sets             | Includes earphone.  |
| HC            | Crystal Holder                         | Crystal holder less crystal.  |
| HD            | Air Conditioning Apparatus             | Heating, cooling, dehumidifying, pressure, vacuum devices, etc.                                 |
| ID            | Indicators, Non-Cathode-Ray Tube       | Calibrated dials and meters, indicating lights, etc. (See IP.)                                  |
| IL            | Insulators                             | Strain, stand-off, feed-through, etc.   |
| IM            | Intensity Measuring Devices            | Includes SWR gear, field intensity and noise meters, slotted lines, etc.                        |
| IP            | Indicators, Cathode Ray Tube           | Azimuth, elevation, panoramic, etc.   |
| J             | Junction Devices                       | Junction, jack and terminal boxes, etc.   |
| KY            | Keying Devices                         | Mechanical, electrical and electronic keyers, coders, interrupters, etc.                        |
| LC            | Tools, Line Construction               | Includes special apparatus such as cable plows, etc.  |
| LS            | Loudspeakers                           | Separately housed loudspeakers, intercommunication station.                                     |
| M             | Microphones                            | Radio, telephone, throat, hand, etc.  |
| MA            | Magazines                              | Magnetic tape or wire, etc.   |
| MD            | Modulators                             | Device for varying amplitude, frequency or phase.   |
| ME            | Meters, Portable                       | Multimeters, volt-ohm-milliammeters, vacuum tube voltmeters, power meters, etc.                 |
| MF            | Magnets or Magnetic Field Generators   | Magnetic tape or wire eraser, electro-magnet, permanent magnet, etc.                            |
| MK            | Miscellaneous Kits                     | Maintenance, modification, etc., except tool and crystal. (See CK, TK.)                         |
| ML            | Meteorological Devices                 | Barometer, hygrometer, thermometer, scales, etc.  |
| MT            | Mountings                              | Mountings, racks, frames, stands, etc.  |
| MX            | Miscellaneous                          | Equipment not otherwise classified. Do not use if better indicator is available.                |
| O             | Oscillators                            | Master frequency, blocking, multivibrators, etc. (For test oscillators, see SG.)                |
| OA            | Operating Assemblies                   | Assembly of operating units not otherwise covered.  |
| OC            | Oceanographic Devices                  | Bathythermographs, etc.   |
| OS            | Oscilloscope, Test                     | Test Oscilloscopes for general test purposes.   |
| PD            | Prime Drivers                          | Gasoline engines, electric motors, Diesel motors, etc.  |
| PF            | Fittings, Pole                         | Cable hangar, clamp, protectors, etc.   |
| PG            | Pigeon Articles                        | Container, loft, vest, etc.   |
| PH            | Photographic Articles                  | Camera, projector, sensitometer, etc.   |
| PP            | Power Supplies                         | Nonrotating machine type such as vibrator pack, rectifier, thermoelectric, etc.                 |
| PT            | Plotting Equipments                    | Except meteorological. Boards, maps, plotting table, etc.                                       |
| PU            | Power Equipments                       | Rotating power equipment except dynamotors. Motor-generator, etc.                               |
| R             | Receivers                              | Receivers, all types except telephone.  |
| RC            | Reels                                  | Reel, cable. (See RL.)  |
| RD            | Recorder-Reproducers                   | Sound, graphic, tape, wire, film, disc, facsimile, magnetic, mechanical, etc.                   |
| RE            | Relay Assemblies                       | Electrical, electronic, etc.  |
| RF            | Radio Frequency Component              | Composite component of R. F. circuits. Do not use if better indicator is available.             |
| RG            | Cables, R. F., Bulk                    | R. F. cable, wave guides, transmission lines, etc., without terminals.                          |
| RL            | Reeling Machines                       | Mechanisms for dispensing and rewinding antenna or field wire, recording wire or tape, etc.     |
| RO            | Recorders                              | Sound, graphic, tape, wire, film, disc, facsimile, magnetic, mechanical, etc.                   |
| RP            | Reproducers                            | Sound, graphic, tape, wire, film, disc, facsimile, magnetic, mechanical, etc.                   |
| RR            | Reflectors                             | Target, confusion, etc. Except antenna reflectors. (See AT.)                                    |
| RT            | Receiver and Transmitter               | Radio and radar transceivers, composite transmitter and receiver, etc.                          |
| S             | Shelters                               | House, tent, protective shelter, etc.   |
| SA            | Switching Devices                      | Manual, impact, motor driven, pressure operated, etc.   |
| SB            | Switchboards                           | Telephone, fire control, power, panel, etc.   |
| SG            | Generators, Signal                     | Test oscillators, noise generators, etc. (See O.)   |
| SM            | Simulators                             | Flight, aircraft, target, signal, etc.  |
| SN            | Synchronizers                          | Equipment to coordinate two or more functions.  |
| ST            | Straps                                 | Harness, straps, etc.   |
| T             | Transmitters                           | Transmitters, all types except telephone.   |
| TA            | Telephone Apparatus                    | Miscellaneous telephone equipment.  |
| TD            | Timing Devices                         | Mechanical and electronic timing devices, range device, multiplexers, electronic gates, etc.    |
| TF            | Transformers                           | Transformers when used as separate items.   |
| TG            | Positioning Devices                    | Tilt and/or Train Assemblies.   |
| TH            | Telegraph Apparatus                    | Miscellaneous telegraph apparatus.  |
| TK            | Tool Kits                              | Miscellaneous tool assemblies.  |
| TL            | Tools                                  | All types except line construction. (See LC.)   |
| TN            | Tuning Units                           | Receiver, transmitter, antenna, tuning units, etc.  |
| TR            | Transducers                            | Magnetic heads, phono pickups, sonar transducers, vibration pickups, etc. (See H, LS, and M.)   |
| TS            | Test Items                             | Test and measuring equipment not otherwise included; boresighting and alignment equipment.      |
| TT            | Teletypewriter and Facsimile Apparatus | Miscellaneous tape, teletype, facsimile equipment, etc.   |
| TV            | Tester, Tube                           | Electronic tube tester.   |
| TW            | Tapes and Recording Wires              | Recording tape and wire, splicing, electrical insulating tape, etc.                             |
| U             | Connectors, Audio and Power            | Unions, plugs, sockets, adapters, etc.  |
| UG            | Connectors, R. F.                      | Unions, plugs, sockets, choke couplings, adapters, elbows, flanges, etc.                        |
| V             | Vehicles                               | Carts, dollies, trucks, trailers, etc.  |
| VS            | Signaling Equipment, Visual            | Flag sets, aerial panels, signal lamp equipment, etc.   |
| WD            | Cables, Two Conductor                  | Non-R. F. wire, cable and cordage in bulk. (See RG.)  |
| WF            | Cables, Four Conductor                 | Non-R. F. wire, cable and cordage in bulk. (See RG.)  |
| WM            | Cables, Multiple Conductor             | Non-R. F. wire, cable and cordage in bulk. (See RG.)  |
| WS            | Cables, Single Conductor               | Non-R. F. wire, cable and cordage in bulk. (See RG.)  |
| WT            | Cables, Three Conductor                | Non-R. F. wire, cable and cordage in bulk. (See RG.)  |
| ZM            | Impedance Measuring Devices            | Used for measuring Q, C, L, R or PF, etc.   |

**DISTRIBUTION:**

*Active Army:*

GSUSA (5); Tech Svc (10) except 11 (600); OS Maj Comd (10); MDW (10); A(CONUS)  
(10); Sch (2) except 11 (50).

*NG & Army Reserve:* None.

For explanation of distribution formula, see SR 310-90-1.

**Approved and  
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JOINT COMMUNICATIONS  
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# SYSTEM FOR COMMUNICATION-ELECTRONIC EQUIPMENT

## TABLE OF SET OR EQUIPMENT INDICATOR LETTERS

| INSTALLATION  | TYPE OF EQUIPMENT   | PURPOSE  |
|---|---|--|
| —Airborne (installed and operated in aircraft)  | A—Invisible light, heat radiation                         | A—Auxiliary assemblies (not complete operating sets)   |
| 1—Underwater mobile, submarine  | B—Pigeon  | B—Bombing  |
| 2—Air transportable (inactivated, do not use)   | C—Carrier   | C—Communications (receiving and transmitting)  |
| 3—Plotless carrier  | D—Radiator  | D—Direction finder   |
| 4—Fixed   | E—Nupac   | E—Ejection and/or release  |
| 5—Ground, general ground use (includes two or more ground installations)  | F—Photographic  | G—Fire control or searchlight directing  |
| K—Amphibious  | G—Telegraph or teletype                                   | H—Recording and/or reproducing (graphic meteorological and sound)  |
| M—Ground, mobile (installed as operating unit in a vehicle which has no function other than transporting the equipment)         | I—Interphone and public address                           | L—Searchlight control (inactivated, use "G")   |
| P—Pack or portable (animal or man)  | J—Electro-mechanical (not otherwise covered)              | M—Maintenance and test assemblies (including tools)  |
| S—Water surface craft   | K—Telemetering  | N—Navigational aids (including altimeters, beacons, compasses, racons, depth sounding, approach and landing) |
| T—Ground, transportable   | L—Countermeasures   | P—Reproducing (inactivated, do not use)  |
| U—General utility (includes two or more general installation classes, airborne, shipboard, and ground)                          | M—Meteorological  | Q—Special, or combination of purposes  |
| V—Ground, vehicular (installed in vehicle designed for functions other than carrying electronic equipment, etc., such as tanks) | N—Sound in air  | R—Receiving, passive detecting   |
| W—Water surface and underwater  | P—Radar   | S—Detecting and/or range and bearing   |
|   | Q—Sonar and underwater 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                                 |  |

### EXAMPLES OF "AN" TYPE NUMBERS

| TYPE NUMBER     | INDICATES  |
|-----------------|--|
| AN/SRC-3( )     | General reference set nomenclature for water surface craft radio communication set No. 3.                                    |
| AN/SRC-3        | Original procurement set nomenclature applied against AN/SRC-3( ).   |
| AN/SRC-3A       | Modification set nomenclature applied against AN/SRC-3.  |
| AN/APQ-13-T1( ) | General reference training set nomenclature for the AN/APQ-13 set.   |
| AN/APQ-13-T1    | Original procurement training set nomenclature applied against AN/APQ-13-T1( ).  |
| AN/APQ-13-T1A   | Modification training set nomenclature applied against AN/APQ-13-T1.   |
| AN/UPT-T3( )    | General reference training set nomenclature for general utility radar transmitting training set No. 3.                       |
| AN/UPT-T3       | Original procurement training set nomenclature applied against AN/UPT-T3( ).   |
| AN/UPT-T3A      | Modification training set nomenclature applied against AN/UPT-T3.  |
| T-51( )/ARQ-8   | General reference component nomenclature for transmitter No. 51, part of or used with airborne radio special set No. 8.      |
| T-51/ARQ-8      | Original procurement component nomenclature applied against T-51( )/ARQ-8.   |
| T-51A/ARQ-8     | Modification component nomenclature applied against T-51/ARQ-8.  |
| RD-31( )/U      | General reference component nomenclature for recorder-reproducer No. 31 for general utility use, not part of a specific set. |
| RD-31/U         | Original procurement component nomenclature applied against RD-31( )/U.  |
| RD-31A/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 system indicator "AN" does not mean that the Army, Navy and Air Force use the equipment but simply that the type number was assigned in the "AN" system.
- In the "AN" nomenclature system, nomenclature consists of a name followed by a type number. The type number will consist of indicator letters shown on this chart and an assigned number.
- The type number of an independent major unit not part of or used with a specific set will consist of a component indicator, a number, the slant and such of the set or equipment indicator letters as apply. Example: SB-5/PT would be the type number of a portable telephone switchboard for independent use.
- Requests for nomenclature assignments will be submitted to the Department of Defense Form DD-61 and prepared in accordance with the item names and description patterns promulgated by the Defense Supply Management Agency, Office of Cataloging.

## 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—Weapons Components Division, WADC, Dayton, Ohio (also see X8 & XY).
- XB—Naval Research Laboratory, Washington, D. C.
- XC—Coles Signal Laboratory, Fort Monmouth, N. J.
- XE—Evans Signal Laboratory, Fort Monmouth, N. J.
- XF—Frankford Arsenal, Philadelphia, Pa.
- XG—U. S. N. Electronic Laboratory, San Diego, Calif.
- XJ—Naval Air Development Center, Johnsville, Pa.
- 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—Components and Systems 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/GRC-5( ), AM-6( )/GRC-5, SB-9( )/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-9(XE-3)/GG.

## NOMENCLATURE POLICY

(See JANAP 196 for Statement of Policies)

- 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.**

APPENDIX C  
Master Index

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| 2. Landbased Search                   | 7. Target Designation           |
| 3. Airborne Search and Weapon Control | 8. Altimeters                   |
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SECURITY INFORMATION

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