UNIVERSITY OF RHODE ISLAND
Department of
Fisheries and Marine Technology

SELECTING A RADAR SET FOR A FISHING VESSEL

by Geoffrey A. Motte

The two main considerations involved in purchasing a radar set are, of course, expense and performance. The performance aspect is a direct function of several factors, including transmitter power, receiver type, antenna size and pulse length.

Unfortunately, most of these features are governed by cost, which is usually about 90% responsible for the skipper's decision to purchase a particular set. Once the financial side of the purchase is put within the limits of the skipper's pocket, most manufacturers rely on glossy catalog displays, listing impressive specifications in a language totally foreign to most fishermen, to clinch the deal.

Perhaps the most reliable way to select a radar set is to benefit from the experience of others. It doesn't take long to obtain the opinions of about a dozen good skippers on the reliability, performance and maintenance costs over about two years, for their particular sets. This information is especially valuable if reports from a number of skippers for each individual make of set concerned are obtained. Obviously, the opinion of a man who is known to apply a hefty boot rather than a small screwdriver should be discounted.

The main drawback to this method of selecting a set is that new models, and thus latest developments and improvements, are sometimes bypassed. It is therefore suggested that the following points be examined by the skipper and checked out, not from a catalog but rather by actual operation of that set. Most reliable companies will welcome the chance to demonstrate their equipment on a trial run, especially if two or three skippers are involved.

Power — Differences in peak power figures for sets of similar specifications produced by different manufacturers are usually due to varying receiver arrangements or antenna size and shape. This peak power factor, of course, bears little relationship to the power requirements from the ship's supply, but may result in a difference in the size of the component parts of the installation, which is often a factor to consider.

A set with a large power output improves not only its maximum distance capability but also its ability to define intermediate small targets, such as buoys and wooden boats, at a greater range. While maximum distance is important for navigational purposes, the intermediate range feature is equally important for anti-collision reasons.

People often decry the 24 and 48 mile range sets as of no use to a fisherman, that "10 miles is plenty." However, maximum range is by no means the only performance criterion. Long range is merely a bonus of the extra power used in obtaining a better defined and more distinct presentation at shorter ranges.

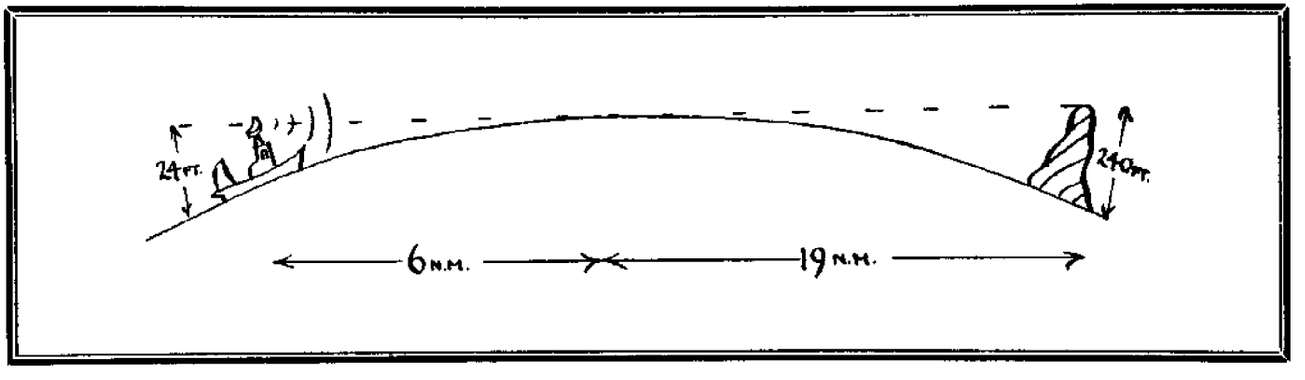
The more powerful sets are generally much more robust and stand up far better to the everyday use of commercial vessels than do the lower powered sets, which are often more suited to pleasure craft. A good intermediate range test for a set is that a buoy echo seen at 3 miles should still be clearly visible at less than a mile without any adjustment to the set. The same echo should be clearly separated from the transmission mark down to a range of about 100 feet after further adjustment.

Once more the cost bug raises its ugly head and it is true that the bigger sets cost more. A number of companies turn out sets requiring 600-800 watts power supply for a peak power of 10-25 k.w., costing $5,000-$6,000, and usually also have a lesser grade set requiring as little as 200 watts power supply for a peak power of 3 k.w., costing $3,000-$4,000. However, the additional money invested should be more than justified for commercial vessels by the increase in performance, reliability and consequent savings in repair and maintenance, and also the longer life span of such sets.

Range — It is a popular misconception that the range of a radar set is determined only by the height of the antenna above sea level. In actual fact, the height of the target has far more effect than the height of the antenna. This is illustrated in the following example based on information from the "Distance in Nautical Miles to the Radar Horizon Table."

Height in Feet	Distance to Radar Horizon in Naut. Miles
24	6
32	7
42	8
54	9
66	10
80	11
95	12
111	13
130	14
150	15
170	16
190	17
215	18
240	19
265	20

e.g. If the land is 240 ft. high and the antenna is 24 ft. high, the echo should be spotted at (19 + 6) = **25 nautical miles**
If the antenna is 54 ft. high, the echo should be seen at (19 + 9) = **28 nautical miles**
An increase of only 3 n.m. is obtained from a more than doubled antenna height.



Note that irregular atmospheric conditions and the reflecting characteristics of the target can greatly affect the range. For instance, the echo strength from an iceberg is often only about 1/50 that received from a steel ship of similar size.

Discrimination — It is important to a fishing skipper to be able to maintain a check on maybe a dozen different targets when fishing with a number of other vessels in reduced visibility. Vessels close together may appear as one echo, and this can be highly misleading and at times dangerous. To determine the ability of a set to discriminate between adjacent targets, the following test can be made. Steam into a position where two buoys about fifty yards apart are in transit. The echoes from the buoys should be separate and distinct at a range of about one mile with the set on the most open scale appropriate.

Discrimination is directly related to pulse length, which is the length of time (in millionths of a second or microseconds) taken for each burst of outgoing signals from the radar transmitter. In general, the smaller the pulse length, the better the discrimination and the closer to the center of the scope a target can be observed: for example, in theory, a pulse length of 1 microsecond gives a closest echo of about 500 feet, while a .05, or 1/20, of a microsecond pulse length allows an echo to be observed as close as 25 feet. Most sets, however, automatically alter their pulse length with change in range setting.

Finally, modern developments in electronics make it possible for almost any power supply to provide "the necessary juice" for some kind of a radar set. However, the blame for poor performance can often be traced to an irregular power supply, and for this reason it may be wise to invest $500 to ensure an efficient power source before laying out $5,000 for a radar set that would perhaps be operating well below its capability.

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