Technical Pull-Out

Q&A FOR YOUR CATALINA THAT'S BEEN FACTORY APPROVED

Catalina 470

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"Radar Contact"...

Those were welcome words heard in the cockpit when exiting the North Atlantic over Newfoundland in my Boeing 767 on the return from Rome. They can be equally as welcome and comforting in the cockpits or at the nav stations of our C470's. Radar (formerly known as Radio Direction Finding) stands for Radio Detection and Ranging. It came into existence in 1904 and the first radar set capable of both azimuth and range was built in 1936. As the saying goes. We've come a long way!!

A radar antenna sends radio waves out and detects their return. This information is then computed and the "blip", or better stated, the target, shows on the radar screen. How we can enhance our target acquisition, what we can do with it (and what we can't) plus debunking some myths associated with small-boat radars is the subject we are about to explore.

There are three things which enhance radar: Power, altitude and antenna stability. We take as a given that the modern cockpit displays are excellent, in color and can be adjusted to suit conditions. Power refers to the amount of radiated energy from the antenna. Modern antennas are called slotted waveguides in that the energy radiates from slots in the antenna. The average beam width is about 4 degrees, the average beam height is about 25 degrees and most antennas rotate at about 24rpm. Radiated power ranges from 2kw to 50kw for very large, non-military radars. The difference between 2kw and 4kw (4kw being the most utilized and productive size for our applications) is remarkable. More power means that targets are more easily seen...one can liken it to a handheld flashlight versus a hi-candlepower spotlight with obvious results. The 4kw radar will, on approaches into crab or lobster-pot infested anchorages and with mimumum range selected, show most, if not all obstacles to an easy evening on the hook. The primary radar control used here is the GAIN control which, after reading the Owner's Manual and practicing, will allow you to manually tune the radar for small, close-in targets. As with all our electronic aids, practice in good weather greatly enhances results and safety in bad weather.

Large target acquisition, such as tracking freighters entering and leaving harbors, is best done in the Auto mode of our category and class of radars. Most, if not all, current generation radar/chartplotter combinations also have "overlay" capability. This means that the radar images can be superimposed on the chartplotter screen. This gives very real-time information for collision avoidance and, when coupled with MARPA (mini automatic radar plotting aid), presents course, speed and CPA/time to CPA (Closest point of approach). The establishment of radar GUARD ZONES around the boat ensures that no targets will encroach the safety margins desired by the Owner without an alarm being sounded. Guard Zones are easily and quickly drawn using the software in the equipment.

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Small-boat radars can distinguish rain and snow and the gradients of rainfall intensity in thunderstorm areas. Rain Clutter, Fast Time Constraint controls and the like can affect when the radar sees concentrations of precipitation. It is also possible to reduce or eliminate close-in rain echoes in favor of hard targets like big ships. Using these features is incumbent upon the radar owner to master!

Ground mapping with our radars is also an invaluable tool when approaching land masses at night or in reduced visibility. The previously described overlay option will further aid in recognizing and verifying the terrain; using the radar alone allows one to verify that the shape of the land mass being approached coincides with what the chart plotter is showing and that the boat truly is where the chartplotter is representing it to be. This is a seldom-used tool but invaluable if there is the slightest concern as to one's position.

The height of the radar antenna above the water and its stability are crucial to radar operation. One myth about radar usage is that it generally occurs in foggy, but calm seas. Nothing could be further from the truth. The advantage of a radar-stabilizing mounting system for the antenna is that as the boat rolls and pitches that the radar antenna itself remains parallel with the water. This greatly reduces the tilting of the radar beam and the subsequent false echoes. All commercial airline radars are stabilized for better performance and this capability is available to Owner's by using a stabilizing mounting system.

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The height of the radar antenna above the water determines how far the radar can see. If the antenna is 30 feet above the water, it will "see" 7.6 miles. The same antenna will see a 30ft tall target at over 15 miles!!! If a large freighter is closing at 22 knots with our boat speed being 8 knots for a combined closure of 30 knots a detection of the freighter at 15 miles gives us just 30 minutes to maneuver. Combine this with the restricted maneuverability of a large ship in a busy shipping channel, weather, shallow water, other traffic, seas and reduced visibility and you can see that the earlier the target is detected the more options are presented to the small-boat skipper. Radar is all about collision avoidance with other ships, weather or terrain. The power, mounting and stability of the radar equipment are all vitally important...but not as important as good weather practice to build confidence and skill in radar usage for that dark and stormy night.