Navigating using Radar

Introduction

In December we hear the words "Do you see what I see?" and "Do you know what I know?" These questions could apply rather well to the objectives of the mini-course you are about to challenge.

Radar is a bit of an enigma. It looks easy. After all, if "it" is there you will see it, and if "it" is not, you won't. Right? Well that is where the "Do you see what I see?" comes in. Two people looking at a radar screen might be looking at the same picture, but one could be "seeing" much more than the other. That is where the "Do you know what I know?" comes in.

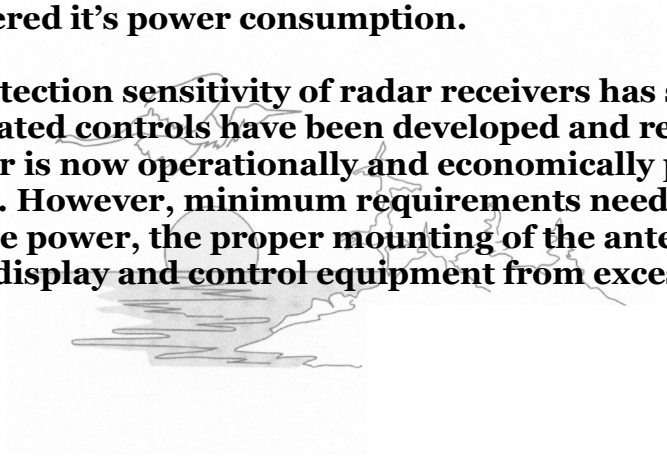
There are incredible radar sets in the world today, so detailed that they almost look like a picture of the area on which they are focused. When these images appear in the press or are shown on TV, people are lead to believe that that is what *all* radar looks like. However, the small marine radar that we are about to investigate is a far cry in complexity, power consumption, cost, and capability than these super radars in space or in specialized roles.

So we are left with the need to learn how to "see what I see" by "knowing what I know", so to speak. Understanding the basics of how a radar set produces the picture for you to interpret, and some of the physical and atmospheric variables that can confuse the result, can greatly enhance the usefulness and safety to navigation provided by a properly installed and maintained radar set.

In the Beginning.....

The principles of radar have been recognized since 1915, but it was the urgencies of the impending World War II which were the driving forces behind its first practical development and use. Since that time, advancements in technology, including the dramatic miniaturization of electronic components and control circuitry, have greatly reduced the weight and bulk of radar equipment. These, in turn, have dramatically dropped the internal operating temperatures of a typical radar and considerably lowered it's power consumption.

The echo detection sensitivity of radar receivers has steadily improved; automated controls have been developed and refined to the point that modern radar is now operationally and economically possible for small recreational craft. However, minimum requirements need to be met for the supply of adequate power, the proper mounting of the antenna, and the protection of the display and control equipment from excessive exposure to the elements.



Radar is an *echolocation* device similar to a depth sounder. Rather than transmitting pulses of sound energy through water, radar transmits pulses of radio energy through the ether. In both devices the distance to an object is determined by measuring the time lapse between a pulse being transmitted and its echo reflected back to the receiver. With radar, the direction of the object is determined by the bearing to which the antenna is pointing.

In this book we will look at the basic functions which make a radar work; the advantages and limitations of a small craft radar; and, how you can learn to use your radar equipment as a reliable and dependable navigation aid in the worst of navigating conditions. However, radar data must be interpreted by an able operator if it is going to achieve these noble goals. When you finish this mini-course you will have the knowledge needed. Acquiring skill, confidence and, above all, comfort in its use, will take a little more time.

For many years Canadian Power Squadrons [CPS] has conformed to the "old" celestial navigators' convention of using the initial "M" to indicate nautical miles. In the world of electronic navigation this leads to confusion as modern electronic systems invariably offer the user the option to input, calculate and display in Metric, Nautical mile or Statute mile units. These systems use "M" to indicate statute miles; "NM" to indicate nautical miles; and, "KM" to indicate kilometers. In this "Navigating Using Radar" mini-course "NM" will be used. This convention is the common usage in air navigation and many other marine applications.