Catalina
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MAINSHEET

Catalina 470

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Latitude Adjustment, #13

The C470 list on Sailnet.com has become a very active site for discussion among owners about maintaining and equipping a Catalina 470. I encourage everyone to join the list and take a look. There is no charge for participation. Go to www.sailnet.com, and look at the site index on the left side. Click "Join E-mail List" under the Member's Center section of the index. Then click "Display All Active Lists", then click the "C470 Discussion List" and fill out the brief form to join. You will from then on receive copies of all mail sent to the list by C470 owners and will also be given instructions on how to submit mail to the list.

C470 Tech Editor Needed

We need a C470 Tech Editor to replace me. I'm finding my time is too tight to be both the association editor and the Tech Editor. Many of you are very active in the C470 Sailnet email list. Our association needs someone who has an active interest in all the various C470 equipping and maintaining issues that come up and someone who stays up on all the email on Sailnet. Please contact me at email 102136.111@compuserve.com or Glenmc470@aol.com if you can help. It only takes an hour or two each quarter to put together a Tech Notes column for the quarterly Mainsheet, if you keep up with all the Sailnet mail. *–Glen McIntosh*

Interphase Phased Array Sonar

"Verify distance to target, Vasily, one ping only". Sean Connery, commanding the Russian Submarine Red October in the icy waters of the Atlantic, used a device called SONAR for determining the distance between his vessel and a "target". As owner's of cruising sailboats we now have economical access to the same technology and,

Interphase Phase Array Sonar installed on Beckoning

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if this author's (Jim Wohlleber's) experience is an indication, the ability to detect not only shoals and sandbars but large, fast-moving underwater objects...

SONAR (Sound Navigation And Ranging) was invented in 1916 but was called ASDIC as its genesis was the Allied Anti-Submarine Detection Investigation Committee. Briefly stated, a hydrophone was hung over the side of a ship to listen for the sounds of a submerged submarine. First deployed on British destroyers in late 1941, SONAR was one of the greatest technological advances which helped to shorten WWII. It was successful but had some severe limitations. Limited range, narrow beam and the requirement to be aimed well below the surface were but a few shortcomings. In the late 20th and early 21st century, new materials, miniaturization and computers have been combined to produce equipment which can give non-military sailors a reliable, easy-to-interpret view of what is below them and, often of greater importance, what is out in front of their boats.

SONAR equipment is composed of four parts: The transmitter, transducer, receiver and display. The transmitter creates an electrical pulse; the transducer changes the electrical pulse into a sound wave and sends it into the water; the sound wave strikes an object, bounces back to the transducer where it is then converted back into an electrical signal, which is then sent to the receiver, amplified and sent to the display, which the user sees. Underwater, the speed of sound is 4800 feet per second (FPS). The equipment calculates the elapsed time from the signal leaving the transducer until the signal returns and an image is produced. This process happens many times per second resulting in a picture of the bottom and hopefully, in the case of a fish finder, icons of large and hungry fish!! Indeed, while fishing alone in Cook Inlet off the Kenai Peninsula of Alaska, I sonar-identified a large halibut approaching my bait. He took it and the battle was on. But that is another story...

Several manufacturers produce Sonar equipment with widely varying capabilities, functions, installation options and cost. Humminbird, Lowrance, Eagle, Raymarine, Furuno to name but a few produce the well-known fish-finder. Some have transducers mounted on suction cups to be placed on transoms; some have quasi-permanent mounting brackets for the transducer on the stern which allow placement/removal of the transducer much like the microphone holder on a VHF radio. There also exists now a purely hand-held depth finder/sonar, which is easily held in the hand of the user just under the surface, "pinged" and the depth read on the instrument. For the purposes of brevity and utility, the focus will be on the permanently-installed, hull-mounted, fixed display phased-array Sonar's most likely to be used by the cruising sailor to detect rocks and reefs, shoals and sandbars, floating containers and the occasional fast-moving underwater object.

There are two types of sonar arrays which can be considered: single array and phased array. Single array means that a single crystal is used to generate the underwater signal; the signal cone generated is fixed on a specific width. Single array equipment generally "looks down" in a rigid cone under the boat and the beam is not steerable (your depth finder which comes with the boat is an example). Phased array sonar utilizes several (as many as 8 in small, civilian sonars) piezoelectric ceramic elements in the underwater transducer housing, a computer chip and, reacting to variables input from the user, selects the information it needs from the underwater gear and translates it to a usable, real-time display. Phased array equipment may also combine ultrasound, computer "washing" of the signal and an almost limitless variety of user inputs. These range from a variable "sweep" beam which itself can be widened or narrowed while it looks from directly under the boat to directly ahead (and out to a max 45 degrees either side of the transducer) just under the surface. Controlling the range of the beam and how hard it "pings" the water are also, as in single array sonar, available to the user. The displays available to the user are many and varied including split screens showing bottom contours and terrain ahead, vessel track, GPS position, Zoom or just about any information the user could possibly desire. There are no mechanical moving parts. SONAR has come a long way from the WWII "pinging", manually rotated, heavy, slow equipment and, we can detect submarines with our civilian sonar.

BECKONING..., Hull #76, and crew journeyed to Maine from Annapolis in May of 2001 via the C & D Canal, Delaware river, around Cape May, NJ and offshore to New York City's East River, Long Island Sound, Block Island, thru the Cape Cod Canal and to Portland, Maine. On board was a newly installed Interphase Probe phased array sonar. It proved to be truly worth the price of acquisition and installation.

The primary Cape May canal takes one well out and around the Cape. A close look at the chart showed an inner route available, although it would be shallow, laden with reefs and very close to shore. The inner route would, however, shave hours off the trip. Using the Raymarine 10"chartplotter set to a small scale and the Probe sonar set to read the bottom (and about 30' either side of the boats' intended track) at the same distance, we navigated the inner route easily, safely and at cruising speed. Indeed, throughout the foggy summer of 2001, night, low-visibility approaches and moorings in Maine were conducted at, among others, Harraseeket harbor, Diamond Cove in Casco Bay thru a very narrow western entrance laden with rocky promontories, Boothbay harbor via the Townsend Gut and the "back door" into the harbor, and many others. BECKONING...experienced an outstanding summer of Maine sailing: steady winds and strong currents, lighthouses and lobsters and magnificent moorings. Not once did her hull touch anything but cold Maine seawater due in significant part to the reliable sonar regularly put to the test. I cannot state strongly enough that the collision avoidance information presented by phased array sonar is absolutely priceless when navigating unfamiliar waters. And you can have one installed and operating for less than $1500!!!

In the Chesapeake Bay, the sonar is relied upon to avoid the shifting sand bars and performs scans to verify the chartplotter readings when sniffing about in search of the perfect, narrow and remote anchorage.

BECKONING..., for the summer of 2003, will again journey to Maine and perhaps again in the dark of nite somewhere north of Boston, the sonar beam will be sweeping, pinging steadily showing the bottom at 700 feet then rotating up to scan the surface for floating containers. Perhaps, again, the sonar will suddenly alarm and show a large hard echo at 375 feet down moving east to west. Perhaps the helmsman will again make a quick turn to port to catch another "ping" from a large hard echo...and the crew will sleep.
–Jim Wohlleber, Beckoning, C470 #76