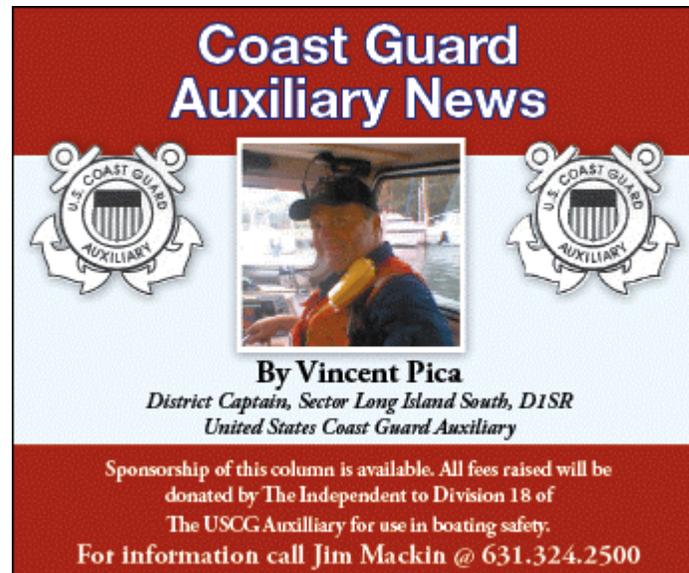


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INDEPENDENT

Coast Guard Aux NEWS ▶

January 27, 2010



The graphic features a red header with the text "Coast Guard Auxiliary News" in white. Below the header is a white section containing two circular emblems of the U.S. Coast Guard Auxiliary on the left and right, and a central photograph of a man in a blue uniform and cap. Below the photo, the text reads "By Vincent Pica" followed by "District Captain, Sector Long Island South, DISR" and "United States Coast Guard Auxiliary". A red footer contains the text: "Sponsorship of this column is available. All fees raised will be donated by The Independent to Division 18 of The USCG Auxilliary for use in boating safety. For information call Jim Mackin @ 631.324.2500".

LORAN-C Going Off The Air – Gone but Not Forgotten

Created by US engineers during World War-II, LORAN shuts down for good on the 8th of Feb 2010. At one time it had strategic importance, but by now the military has moved on to bigger and better things, satellite navigation and GPS. This column is about that.

What is LORAN?

The acronym LORAN stands for Long Range Aid to Navigation. By definition, it's a hyperbolic form of radio-navigation; a hyperbola being, as the reader may know, "a curve generated by a line so moving that the difference between the distance between two fixed points remains a constant." When I was mere swabbie, I was taught coastal navigation (see The Independent, "My GPS Broke – Oh Jeez...", 9/23/09) and, sometime in the late 70's, we got LORAN aboard Captain M. Boorstein's S/V Isis and the 20th century arrived. It was an eye-opener to see how much better the "computer" was than my hand-held compass sightings and Lines of Position. This ultimately is the undoing of any technology – the user eventually throws in the towel in doing it "like grandpa taught me" and now it is a technology race.

How Does LORAN Work?

In practice, LORAN uses that difference/distance theorem, and a "chain" consisting of one master and at least two secondary stations, each transmitting a high powered 100Khz T squared pulse, to set up a radio grid that allows mariners at sea (and aviators) to "fix" their exact position. Each secondary, with its master, forms a "baseline" (or the two fixed points in the hyperbolic theorem).

Time's the essence of LORAN, time measured in picoseconds. What is a picosecond? A picosecond is one trillionth, or one millionth of one millionth of a second, or 0.000,000 000,001 seconds. That is an almost unimaginably small amount of time. If you remember why GPS can't get you much closer than 20-30 feet of where you are on the planet, (see The Independent, "How Does GPS Work?", 7/29/09), it is because it is hard to get a series of satellites to be "in sync" within a few billionths of a second. Well, LORAN uses trillionths of a second as its yard stick. That is a 1,000 times smaller (better, LORAN aficionados would say) than GPS.

Distances between a master and secondary are measured in time, and each secondary must transmit its signal in an exact instant after it receives the master signal. By electronic triangulation, measuring the difference in the arrival time of signals from two baselines, a navigator within the coverage area can fix his position to within a few yards. And timing, extremely accurate, pin-point timing is the key to that accuracy. LORAN's watchwords, "On air and in tolerance," were just another way of saying "on time."

The Sands of Time

My father was fond of reminding his young son, "There are no free lunches, Vincent. Everything costs money." So, as sure as night follows day, as time went on and budget pressures mounted, the US Coast Guard started phasing out most of its overseas LORAN operations, which were originally maintained as part of the US strategic deterrence, by turning the stations over to foreign governments. Technology saved LORAN itself for years as new state-of-the-art equipment would ease the cost of operating and maintaining the LORAN ground stations. At one time LORAN had strategic importance, but by the 70s, the military started its inexorable move on to bigger and better things – specifically satellite navigation (GPS was still a decade in the future before it started moving out SatNav).

Thus, it was mostly commercial fishermen and private boaters who used LORAN up into the present era. For them, it had a couple of advantages. First, LORAN receivers were dirt cheap. And second, LORAN provided a constant reference, independent of inertia (as opposed to SatNav, which relied on electronic dead reckoning between periodic passes of a satellite), that would allow a navigator to consistently return to the most productive fishing grounds.

Why'd We Keep It So Long Then?

Well, aside from the cost of the receiver being so low, there were legitimate security concerns about being 100% reliant of 16 GPS satellites. Well, satellite navigation is here to stay. There are now 31 GPS satellites up there and the US Air Force keeps adding them for obvious reasons.

And, the US Government has not only turned off Selective Availability(SA) (see that How-Does-GPS-Work column) but any satellite launched by the GPS system from 2010 onward will no longer even have the ability to implement SA if the government wanted to. Secondly, there were concerns that Al Qaeda might try to disrupt the GPS satellites using missiles from hostile governments or the black market. But couldn't they also attack the Loran stations with car bombs or their exploding underwear? The locations of the Loran Stations are no longer the great secret that it was, as my kids would say, "back in the day."

So, LORAN, it is time. But we won't forget your service nor the services of the US Coast Guardians that have kept you going over these many decades.

BTW, if you are interested in being part of USCG Forces, email me at JoinUSCGAux2010@aol.com or go direct to John Blevins, who is in charge of new members matters, at FSO-PS@emcg.us and we will help you "get in this thing..."