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Coast Guard Aux NEWS

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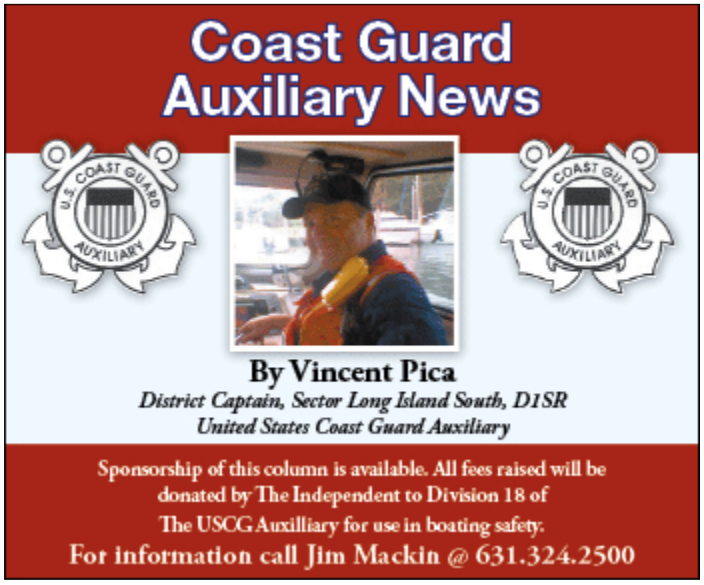

Satellite Gives Up The Ghost – Marine Forecasts Degraded

A few weeks ago, 500 miles above the Earth, a NASA satellite that was expected to last 2 years and worked flawlessly for 10 finally stopped transmitting data about the winds at sea. The "QuikScat" satellite's antenna froze and with that meteorologists lost a real insight into what was actually happening at sea. This column is about that.

What Did QuikScat Do?

As you can imagine, the world's oceans are vast and empty – of weather stations, buoys and the like. Many of us are aware that NOAA maintains a chain of weather and sea-state buoys but they are all "coastal." There is no chain of weather buoys dotting the world's vast ocean spaces. So, back in 1999, NASA created a technology – a kind of "look-down" radar – that painted broad swaths of the world's oceans and thus could transmit wind data to Earth. Called radar scatterometry, it works like this: the satellite paints a 1,000 mile wide swath at a pass and, the greater the signal return, the greater the winds must be. Anybody who has used radar on their vessel has experienced it in some degree. As the wind creates higher and higher waves, the radar signal is blocked, or scattered, by the increasingly higher waves. The boater is then forced to adjust the "gain" of the radar in order to eliminate that "scatter" (see SSP, "More Radar – What's Blinding You?", 12/31/08.) Well, QuikScat didn't need to adjust any gain. The "scatter" was exactly what it was looking for. And the more "scatter", the higher the winds. QuikScat covered 90% of the Earth's oceans every day.

NASA's JPL has tried to re-activate the antenna but, after these many weeks, they have thrown in the towel. The risks now are just too great to try anything "heroic."

QuikScat's Successes

While QuikScat wasn't perfect (high winds and high rain were problematic), QuikScat was noted for one particular success over the past ten years. Scientists never thought that many hurricane-force storms were born outside the tropical zones. In fact, QuikScat proved that many more hurricane-force winds than thought were active in the "extratropical zone" (storms that got their start in the mid-latitudes rather than in the tropics such as hurricanes and tropical storms.) This enabled seafarers to get warnings of hurricane-force winds that otherwise they were never aware of – until they hit. In fact, scientists now know that they are out there, particularly in winter months and more frequently in the southern oceans. (I personally wonder if this explains in some large part how giant, "rogue" waves get created… I think I'll email somebody at NOAA!)

OK, Now What?

Well, QuikScat provided an invaluable service and it is impossibly expensive to dot the world's oceans with weather buoys (can you imagine the maintenance costs alone?) So forecasters are learning how to adjust and adapt. But they are the first to admit that their abilities to forecast winds at sea are greatly reduced. And, despite the longer than expected life, NASA didn't have a back-up nor does it have plan to launch one. So US forecasters are now getting data from other nations. As you may have guessed by now, no one's satellite is quite as good as QuikScat. The European "MetOp-A" satellite does have radar scatterometer aboard (called ASCAT) but it just doesn't have as fine a resolution as QuikScat and it doesn't cover as much area. NOAA has been talking to the Indian space research agency (ISRO) but their scatterometer satellite, called Oceansat-2, does download QuikScat quality data – but only when it is over India. It saves it until then. So, ISRO has to be convinced to re-program Oceansat-2…

Let's Get Geeky

For those that want to break out their radar manuals or college physics books, here is what made QuikScat work. The QuikScat instrument used a 110-watt, pulsed, Ku-band radar signal at 13.4 GHz. The satellite had a 3.25' rotating antenna that produced two spot beams that swept the surface in a circular pattern. This is what stopped working – the moving radar antenna. Frozen in the cold expanse of outer space…

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…"