



U.S. Coast Guard Auxiliary, Division 20

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GPS – Adding Insult to Injury!

On Saturday, 8/6/11, Reuters reported that three large explosions from the Sun over the past few days have prompted U.S. government scientists to caution users of satellite, telecommunications and electric equipment to prepare for possible disruptions over the next few days. “The magnetic storm that is soon to develop probably will be in the moderate to strong level,” said Joseph Kunches, a space weather scientist at the Space Weather Prediction Center, a division of the U.S. National Oceanic and Atmospheric Administration (NOAA). He said solar storms this week could affect communications and global positioning system (GPS) satellites. And, as if that isn’t enough, now the government is selling telecommunications “spectrum” (frequencies) so close to where GPS operates that it very well may impair it. This column is about all that.

The Sun is, in a word, Big!

We’ve written here about the effect of solar flares on satellite communications before (see GPS & The Sun – Flares Coming! 3/10/10, and GPS & The Sun – Flares Coming – Update! 2/23/11.) What is the big deal?? Well, remember – 99.86% of all the mass in the entire Solar System is the Sun – so, when something happens there, it happens big! And we are less than halfway through the Solar Maximum, when big things happen a lot. The solar cycle between Maximum and Minimum is roughly every 11 years. Did you have a GPS in your car 11 years ago? Probably not – which is why scientists are much more worried about this Solar Maximum than the last one. Now, GPS is virtually everywhere – boats, cars, integrated into EPIRBs, pocket-sized for hikers, etc. And, as the Fates would have it, we now know, based on recent studies that GPS receivers are unexpectedly vulnerable to bursts of radio noise produced by solar flares. When we were at the last peak, GPS was just much less common and the problems were thus minor in relative scope and attention. It is unlikely that we will escape without some injury, large or small.

And If That Isn't Enough...

Back in July, it was announced that, as a result of a proposal by a private company to use radio frequency bandwidth right next to the existing GPS bandwidth, the future reliability of the GPS system across the United States may be an issue. And the comment period within which US citizens and businesses would have the opportunity to study and comment on the sale of these specific frequencies was set to levels that caused concern within the boating and e.navigation community. "This is a remarkably short comment period for an issue that has such dire consequences for America's boaters and every other GPS user in the country," said BoatUS Vice President of Government Affairs Margaret Podlich, in a press release on July 13th.

At issue is an unusual conditional waiver granted in January by the Federal Communications Commission (FCC) to a broadband wireless communications provider, Light Squared, to permit the dramatic expansion of land-based use of mobile satellite spectrum. This spectrum, or frequency bandwidth, is directly adjacent to the frequencies used for Global Positioning System (GPS) communications. The company has proposed to build 40,000 ground stations. LightSquared's high-powered ground-based transmissions from these stations have shown to cause interference in hundreds of millions of GPS receivers across a wide range of uses, including aviation, marine, emergency response and industrial users such as delivery and trucking companies. A new report requested by the FCC says, "all phases of the LightSquared deployment plan will result in widespread harmful interference to GPS signals and service and that mitigation is not possible."

And recreational boaters lost their only other viable navigation system, LORAN, when the Department of Homeland Security shut the system down last year. (See LORAN – Gone But Not Forgotten! 1/27/10.)

Now, I'm all for progress, just as you are. But this seems worrisome. And what's a boater to do?