



US Air Force continues plans to modernize GPS - but..?

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Without a doubt, GPS is used in everything from farming and aviation to public safety and disaster relief and recreation, not to mention its military purpose of providing precision navigation and timing to our combat forces. And we've covered it here many times. In fact, this is the 8th column* on some facet of GPS - or GPS vulnerability. This column is about both.

Hooked...

First and foremost, GPS is a military imperative. We as tax payers benefit from its enhancements but it has to work for our armed forces - land, sea and air. And as military requirements go up, so does therefore the capabilities of GPS. In fact, the current GPS system is unable to deliver what our armed forces need - so GPS-III is being put aloft. This naturally requires an entire new ground control system. The Air Force took the next step in that process when it awarded a contract last month to Raytheon Company for the Next Generation GPS Control Segment, now referred to as OCX. Associated with awarding this \$1.5bb contract to Raytheon, in a press release issued by Schriever Air Force Base in Colorado, Lt. Col. Deanna Burt, 2nd Space Operations Squadron commander, made the following comment. "OCX is the new ground system that will replace our current Architecture Evolution Plan ground system. OCX is critical for us as we cannot fly GPS III satellites with our current ground system." The contract will include development and installation of hardware and software at GPS control stations at Schriever AFB and at Vandenberg AFB, Calif., deployment of advanced monitor stations at remote sites and initial contractor support with sustainment options for five years. The new ground system will also allow for command and control of an additional

number of satellites. "OCX is also meant to fly up to 64 satellites where our current system can only fly up to 32 satellites," said the commander. This modernization doesn't leave the "old" GPS satellites flying "blind." OCX will maintain compatibility with the current satellite constellation and enable new modernized signal capabilities. Win, win, win.

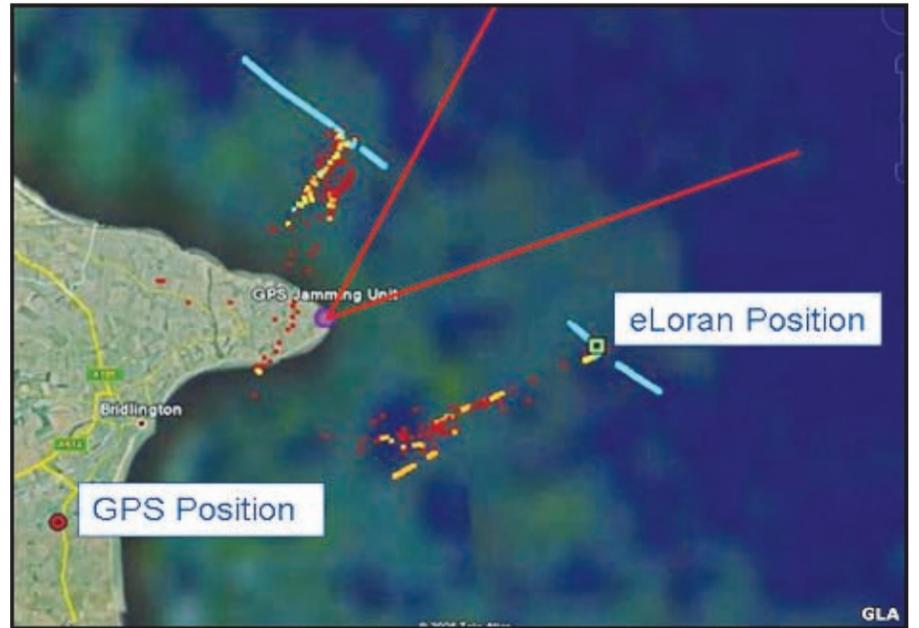
Spammers, Spoofers and Hackers

On 2/23/10, the BBC reported on a meeting at the National Physical Laboratory in Teddington, UK, focusing on the increasing vulnerability of GPS systems world-wide. (<http://news.bbc.co.uk/2/hi/science/nature/8533157.stm>) "GPS gives us transportation, distribution industry, 'just-in-time' manufacturing, emergency services operations - even mining, road building and farming, all these and a zillion more," David Last, a consultant engineer and former president of the Royal Institute of Navigation, told the conference. "But what few people outside this community recognize is the high-precision timing that GPS provides to keep our telephone networks, the internet, banking transactions and even our power grid online."

"The Achilles heel of GPS is the extremely weak signals that reach the receiver."

Each satellite in a sat-nav constellation is putting out less power than a car headlight, illuminating more than a third of the Earth's surface at a distance of more than 20,000 km." This is what makes it possible, if not easy, to jam GPS signals. In fact, our military does it to suppress enemy abilities in this area, as they try to do to us.

Of a more serious nature, GPS receivers can be "spoofed" - not simply blinded by a strong, noisy signal, but fooled into thinking their location or the time is different because of fraudulent broadcast GPS signals. Someone



with mal-intent can now buy a simulator, link it to Google Earth, put on a route and it will simulate that route to the GPS. "A GPS receiver overcome by it will behave as if you're travelling along that route", said Professor Last. Admittedly, this isn't easy but terrorists are determined agents.

In the UK trial, GPS in the jamming zone (red triangle) reported positions tens of km away from the true (eLoran) position - courtesy, BBC

The immediate solution to the problem is not clear, since the existing US GPS and Russian Glonass systems, and the forthcoming European sat-nav effort Galileo, are equally susceptible. So, I sent an email to the GPS Controllers at Schriever AFB.

Dear Sirs:

Recent BBC articles continue to note that GPS is, essentially by design, highly vulnerable. <http://news.bbc.co.uk/2/hi/science/nature/8533157.stm>

I read with interest the OCX announcement but it speaks more to control than vulnerability fixes... Is there any-

thing that can be said about these concerns?

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Serve - Contribute - Grow
Look for their reply in future columns...

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..."

* If you'd like copies of any of these GPS columns, just email me.

Gee, How Does GPS Do It?!, 1/2/08
The Hole in the GPS Sky, 4/29/09
My GPS is Broke - Now What?
9/23/09

ALL Electronics Fried - NOW
What? (3 part series), 2/03-10-17/10
GPS and the Sun -Flares Coming,
3/10/10

Coast Guard Safe Boating Reminder

It is going to be a warm, sunny weekend and a fine opportunity to take your boat out on the water for recreation. Don't spoil it by being unsafe.

The Coast Guard offers these tips and reminders for the safety of operators and passengers.

Make sure your boat is mechanically sound and watertight. It has probably been months since you last had your boat in the water and having a mechanical failure in the middle of the harbor or Long Island Sound is not the place to find out that there's a problem.

Be sure you have enough fuel, water and food to get you where you want to go and back with a margin for safety.

Carry enough life vests for every person aboard and children younger than 12 should wear their life vests at all times.

The air temperature will be in the 70s and that sounds plenty warm. But, the water will be a lot colder and hypothermia is a real danger for anyone who spends time in the water. Have warm, dry clothes with you.

You need to be able to call for help in an emergency and you have to know where you're going. Part of your standard equipment every time you get into your boat should be a VHF marine radio, a cell phone a GPS unit and updated charts readily to hand. Just because the day starts out bright and sunny, it doesn't mean that fog could not roll in without warning.

Make sure your lights are working. After dark or in the fog, those lights can save you from a nasty collision.

And, keep clear of the shipping channels. These are clearly marked. They are used by large ocean going vessels that simply cannot maneuver rapidly in order to avoid small pleasure craft. Coast Guard patrols

will be out this weekend enforcing Operation Clear Channel, designed to keep the shipping channels clear for large commercial ships.

The rules are clear and simple and are designed so that your recreational boating experience is a safe one. Fishing boats, all sailboats and all small boats (any that are less than 20 meters in length) may not impede the passage of



a larger ship that can only safely navigate within the channel.

Additional Safe Boating Information can be found at <http://WWW.uscgboating.org>

The Coast Guard will be on the water, as we are every hour of every day. We'll be there to render help if needed and to help keep you safe by keeping the shipping channels clear of pleasure boats. Please cooperate with us. We're doing it for you and your passengers.

Have a great weekend on the water but make it a safe weekend.