

Expert Advice — eLoran, Superhero Sidekick!

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Today, GPS is the positioning, navigation and timing (PNT) superhero. The miracle of our age is that over a period of just two decades or so, GPS has become a mass-market commodity. We have massaged the physics; watched broadband mobile communications become a reality; and seen computers become smaller, faster, and much more capable. The result: GPS chips for a few dollars in mobile phones; GPS in-car navigation systems for a few hundred dollars that protect marital harmony; and new traffic signs to

warn the unwary.

Marvel Comics tells us that even Spider-Man uses GPS: “while allied with Iron Man, Spider-Man wore a new costume that was equipped with ... a short-range GPS microwave communications system (with a built-in fire, police, and emergency scanner).”

But, like the very best superheroes, GPS has its flaws. Spider-Man is neither omnipotent, nor omniscient, nor omnipresent — and he has a terrible work/life balance! This is why he works with other superheroes. Like Spider-Man, GPS provides safety nets for the unwary that we come to rely on, but it isn't always available. Indeed, there are real concerns about the level of our critical infrastructure's reliance on its weak signals; signals that my colleague, David Last, describes as perhaps the next jamming or hacking adventure playground for young, spotty youths without a girlfriend!

Sidekick. This is why enhanced Loran, eLoran, is GPS's new best friend and superhero sidekick. It is independent of GPS with dissimilar failure modes and delivers complementary levels of performance to multi-modal users. This time last year, a small and select band of international, fun-loving, radionavigation professionals met at the U.S. Coast Guard Navigation Center in Washington to agree on the baseline definition for eLoran. Over a three-day period we masticated, meditated, and mediated, and produced the International Loran Association's eLoran Definition Document. Our “elevator speech” encapsulates the definition and benefits:

- Enhanced Loran is an internationally-standardized positioning, navigation, and timing (PNT) service for use by many modes of transport and in other applications.
- eLoran meets the accuracy, availability, integrity, and continuity performance requirements for aviation non-precision instrument approaches, maritime harbor entrance and approach, land-mobile vehicle navigation, and location-based services, and is a precise source of time and frequency for, say, telecommunications.
- eLoran is an independent, dissimilar complement to GNSS. It allows GNSS users to retain the safety, security, and economic benefits of GNSS, even when their satellite services are disrupted.

So, how's eLoran going? We have made real progress worldwide during 2007.

Authoritative figures in our GPS industry are now welcoming eLoran as a way of securing our current GPS benefits as demonstrated in recent issues of *GPS World*. In March 2007, Len Jacobson said that we need eLoran “to extend and defend the global positioning and

timing grid based on GPS today and in the future based on GNSS.” In May, Jim Doherty stated that “eLoran should extend and defend GPS into GPS-challenged areas and deter those who would interfere with GPS.” Finally, Bradford Parkinson, the “Father of GPS,” is reported by the U.S. National Space Based PNT Advisory Board as saying, “The ultimate compliment to GPS is that it is taken for granted . . . A contingency augmentation, like eLoran, is essential and would act as a deterrent to terrorism.”

The Radio Technical Commission for Maritime Services (RTCM) has set up Special Committee 127 to deal with eLoran standardization. The first meeting took place in Orlando, Florida, in October and there are already meetings planned for January, May, and November 2008. Its first task is to update the existing signal-in-space standards before moving on to new eLoran data formats.

Independent, Redundant. In the maritime world, there is growing recognition of the importance of a backup to GNSS. At its e-Navigation seminar in July, the International Association of Aids to Navigation and Lighthouse Authorities concluded that “independent and fully redundant position fixing and timing systems are vital for the implementation of e-navigation” and that eLoran is capable of meeting the PNT requirements. The International Maritime Organization’s Navigation Sub-Committee agreed in July that there was “a need to provide an internationally agreed alternative system for complementing the existing satellite navigation, positioning, and timing services to support e-Navigation,” although it was premature to identify solutions before user requirements had been finalized.

In Europe, the General Lighthouse Authorities of the United Kingdom and Ireland awarded a 15-year contract to VT Communications for the provision of a state-of-the-art eLoran radionavigation service to improve the safety of mariners in the U.K. and Ireland. European Loran service providers have created the European eLoran Forum to support the successful introduction, operation, and provision of eLoran services in Europe as part of a European Radio Navigation Plan. Finally, there appears to be some positive movement towards issuing the first European Radio Navigation Plan in 2008.

Encouragement. All of us, however, eagerly await the most important eLoran development in the last decade: a positive policy decision in the United States following the Independent Assessment Team on eLoran in 2006 and the Federal Register Note on Loran at the end of 2006 and beginning of 2007. The sharp-eyed among us found encouragement in the open-source reports of various Appropriations Committees. The U.S. House of Representatives Department of Homeland Security (DHS) Appropriations Committee report states that the Independent Assessment Team “concluded that Loran C should be retained and modernized to serve as a long term back up for GPS.” The U.S. Senate DHS Appropriations Committee report states that “a group composed of officials from the departments of Homeland Security and Transportation and other federal agencies met earlier this year and unanimously agreed that the United States should maintain the Loran system.”

Even more tantalizingly, an open-source DHS letter to the U.S. Senate Authorization Committee refers to a decision on Loran by the end of 2007. A positive decision by the United States will undoubtedly cause a chain reaction worldwide and will stimulate the market for applications and services.

Finally, I have some good news for those of you who are excited about innovation, are insatiably curious, love experimenting wantonly, and want to recapture the pioneering spirit of yesteryear: there is a new and thrilling world of low-frequency radionavigation systems with high-powered transmitters and very, very large masts; an almost once-in-a-career opportunity to contribute to the development of a new radionavigation system; and perhaps even a pot of gold at the end of the rainbow!

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