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Bad news: He wasted four hours on it again yesterday.



U.K. launches procurement for GPS backup

BY [Bob Brewin](#)

Published on Dec. 19, 2006 A United Kingdom-based agency plans to buy a navigation system to serve as a backup for satellite-based technology, such as the Global Positioning System, putting pressure on the United States to follow suit, according to navigation industry consultants and vendors.

Trinity House, a U.K. organization that provides marine aides to navigation in England, Wales, the Channel Islands and Gibraltar, issued a request for proposals last week for an enhanced long-range navigation (eLoran) system. Loran provides highly accurate location information without depending on satellite signals, which are subject to jamming or disruption.

The agency asked interested bidders to submit proposals by Jan. 6, 2007, for continuation of ongoing eLoran tests with plans to transition that test system into the U.K. component of an operational European eLoran service.

The United States needs a similar backup system to provide an alternative to GPS for air and marine navigation and for communications networks that rely on GPS timing signals, these vendors and consultants said.

A Transportation Department spokesman said officials from DOT and the Homeland Security Department are working on a backup system for GPS, which includes eLoran and a final decision is due soon but declined to provide a time frame. Navigation industry executives expect an eLoran decision from DOT and DHS by the end of this year.

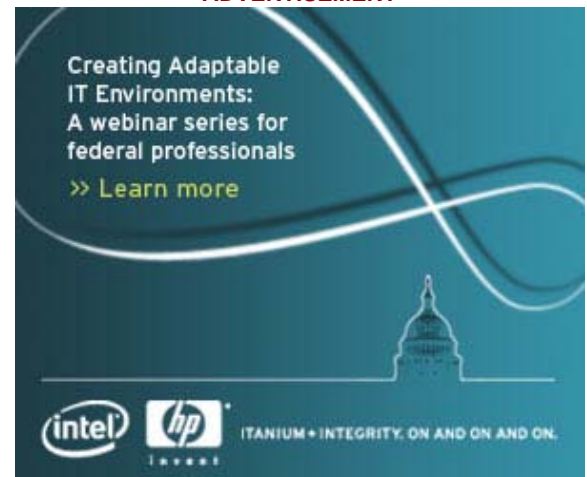
Loran stations house two low-frequency transmitters, which send time difference signals. Receivers determine their location based on the time difference of the signals received from the two transmitters. The U.S. Loran system covers all coastal waters in the lower 48 states and parts of Alaska. The United Kingdom has one Loran station and there are seven others in Europe.

eLoran systems gain enhanced accuracy through the use of differential correction systems well-established in GPS and the ability of receivers to tap into signals from multiple stations, which also improves accuracy and timing information.

Mike Harrison, a consultant in the Washington, D.C., area who helped write a white paper by Aviation Management Associates for the Federal Aviation Administration on GPS backup systems said the U.K. decision to go ahead with an eLoran backup as "sends a very strong signal to the U.S to go ahead" with its own eLoran system, which Aviation Management urged in its FAA report.

Zachariah Conover, president of CrossRate Technology, a startup company developing eLoran receivers, said the U.K. decision to forge ahead with eLoran would have an effect on DOT officials as they finalize GPS backup policies and systems in the United States.

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Harrison added that in his view eLoran provides a better backup than what he called a "gerrymandered set" of alternative GPS backups, such as distance measuring equipment (DME), very high frequency omnidirectional range stations (VOR) and runway instrument landing systems (ILS), which would require the FAA to retain infrastructure subject to degradation.

Harrison said a backup to global navigation satellite systems (GNSS), which besides GPS include the planned European Union Galileo system and the existing Russian Glonass system, is essential in case of jamming or attack.

The paper Harrison helped write for the FAA said two terrorism suspects arrested in Atlanta earlier this year planned attacks against GPS. The paper also quoted a June CNN news report in which Lt. Gen. Robert Kehler, deputy commander of the U.S. Strategic Command, said that he was concerned by attacks by insurgents in Iraq against U.S. satellite navigation systems, which "mark the emergence of a new threat."

Harrison said deployment of eLoran in the United States would be the equivalent of buying insurance against an attack on the GPS system as well as the FAA's GPS-based Wide Area Augmentation System and the Coast Guard's Differential GPS (DGPS) system.

DOT has recognized GPS' vulnerability to jamming and attack since Sept. 10, 2001, when the Volpe National Transportation Systems Center research arm assessed the GPS vulnerabilities and urged development of a backup system. The Volpe report said that as GPS penetrates into the civil infrastructure, "it becomes a tempting target that could be exploited by individuals, groups or countries hostile to the United States."

The General Lighthouse Authorities of the U.K. and Ireland, which along with Trinity House manage aides to navigation in the U.K., including Loran and DGPS systems, said in a report on eLoran released May that they agreed the threat to GNSS from terrorism or criminal jamming is "credible, real and likely to have significant economic and financial costs."

The GLA eLoran report said that GNSS is also subject to unintentional interference, including amplified television antennas. In 2001, the GLA report said, an amplified TV antenna operating near Moss Landing Harbor, Calif., 60 miles south of San Francisco, jammed GPS signals in that area for more than a month, disabling GPS navigation and timing signals.

eLoran can provide an excellent back up to GNSS because it transmits high power signals less susceptible to jamming than GPS or Galileo signals, the GLA report said.

Conover, who during his service as a Coast Guard officer worked on the Loran modernization program, said developing backup for timing systems could be more important than providing backup for navigational signals.

Conover said timing is essential to the operation of the Internet and cellular telephone systems, which need precise timing signals to function. Harrison said that if GPS time signals were disabled, users would see degradation in their time signals in a matter of days.

The United States cannot afford a shutdown of GPS-based critical infrastructure systems, Conover said, and the Aviation Management report on eLoran for the FAA stated that the eLoran could be deployed for between \$24 million and \$27 million, thanks to the \$160 million investment in Loran modernization since 1997.

Any deployment of eLoran would require upgrades of systems in Alaska, which the Aviation Management report estimated at between \$75 million and \$140 million. This contrasts with ILS upgrades estimated at \$117.5 million, VOR upgrades costing \$47.2 million and DME upgrades pegged at \$25.5 million, the Aviation Management report stated.

The FAA eLoran paper Harrison helped write stated that eLoran is the least expensive national technology that can provide a full backup for GPS and urged policy-makers to "continue Loran, complete modernization and get standards in place for eLoran."

The GLA report said that eLoran provides the ideal second input to any



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e-navigation system by removing vulnerabilities to jamming attack or unintentional interference associated with satellite navigation systems. "In fact, there is no realistic alternative to eLoran in doing this," the eLoran report concluded.



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