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GAO

United States
General Accounting Office
Washington, D.C. 20548

Resources, Community, and
Economic Development Division

B-254352

August 23, 1993

The Honorable David R. Hinson
Administrator, Federal Aviation Administration

Dear Mr. Hinson:

We have been conducting a review of civil applications for the Department of Defense's (DOD) Global Positioning System (GPS), including the Federal Aviation Administration's (FAA) plans for using GPS. The purpose of this correspondence is to bring to your attention observations we have about these plans as they relate to two existing navigation systems--the Very High Frequency Omnidirectional Range/Distance Measuring Equipment (VOR/DME) and LORAN-C.

On June 9, 1993, FAA approved GPS as a supplemental means of navigation for most phases of flight. The agency plans to rely eventually on a satellite-based system, including GPS, as the primary means of navigation for all airborne transportation. These plans appear to lessen to some extent the importance of VOR/DME and LORAN-C in future airborne navigation. We understand, however, that FAA is continuing with the process of implementing plans to expand these two systems. While we have not reviewed these two programs in depth, we believe that a reassessment of the need to expand the VOR/DME and LORAN-C systems presents FAA with a good opportunity to identify items of lower priority whose funds can be used for more critical purposes.

VOR/DME EXPANSION

Expansion plans for the VOR/DME system date back several years, when development of GPS for civil application was still in its infancy. Currently, the VOR/DME network consists of units in about 950 locations nationwide, with the last unit installed in 1983. In 1986, FAA developed a national network plan that called for 59 new locations. In 1989, FAA reassessed its needs and determined that 70, rather than 59, new locations were needed. In September

1990, FAA let a $29.6 million equipment contract for 70 units, but, as of July 30, 1993, FAA had not approved production of the equipment because of delays and problems in the procurement process. Other items, including construction and installation, will cost an additional $46.6 million and will not be completed until 1995 or later--about the same time GPS is expected to be declared fully operational.

In January 1993, FAA revalidated the need for the 70 new VOR/DME locations and concluded that because the expansion had been fully funded, acquisition should proceed. While we do not know the extent to which this decision to expand fully considered the impact of current GPS plans, our field work indicates that the GPS plans may not have been a major factor. As we understand it, FAA evaluated the impact of GPS on near-term nonprecision landing approaches but did not address the impact that GPS would have on the other phases of flight. Also, the evaluation focused on the need to continue the VOR/DME system rather than on the need to expand it. In addition, Northwest Mountain Region FAA officials told us that GPS was not considered in the VOR/DME site-selection process when they revalidated the needs for their region. They also said that some sites on their list for new VOR/DME locations were based on being able to fund the projects quickly because unobligated money would be reprogrammed for other uses. Because of our limited field work, we could not determine how these factors played in the site-selection process at other regions.

We understand that the VOR/DME system may eventually be phased out when the full civil potential of GPS is realized. As a result, the need to expand the current system may have diminished. Also, the existing system appears to have functioned adequately over the past 10 years, and while additional units may enhance the system, their absence may not degrade it. Although some costs may be incurred to terminate the equipment contract, its termination would eliminate the construction and installation costs.

LORAN-C EXPANSION

In 1986, FAA began developing the LORAN-C capabilities for aviation purposes by expanding the system for

mid-continent coverage. This work was completed in 1991. FAA is now certifying airports for LORAN-C, nonprecision landing approaches. However, rapid developments in GPS technology and procedures may negate the need for this expanded capability. For example, FAA has already approved GPS for some nonprecision landings as well as for supplemental use on oceanic, domestic en route, and terminal instrument flight rule operations--uses essentially duplicated by LORAN-C.

While most of FAA's expansion of LORAN-C has been completed, our review indicates that the application of these capabilities may be limited. According to FAA and industry officials contacted, no certified LORAN-C receivers are on the market for nonprecision landing approaches. The officials said that most equipment manufacturers are not actively developing LORAN-C receivers for nonprecision approaches because of technical problems and the lack of demand. Also, officials from the General Aviation Manufacturers Association told us that they expect the market for GPS aviation receivers to expand significantly in the near future, and they question whether a certified LORAN-C receiver for nonprecision approach will ever be needed or produced.

Furthermore, FAA may face significant cost increases for the expanded LORAN-C effort. According to an FAA official, FAA has certified the use of LORAN-C for nonprecision approach procedures at 92 airports and plans to continue until 500 airports are certified. More significantly, FAA may face greater operating and maintenance costs for the system. Our work indicates that FAA's operating and maintenance budget for the system could expand from about $0.8 million in fiscal year 1993 to about $4.4 million in fiscal year 1997. The major part of this cost, about $3.8 million, will be for flight inspections.

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Because our observations are based on limited fieldwork, they may not fully take into account the extent to which developing GPS plans have been considered in decisions about expanding VOR/DME and LORAN-C systems or fully explore FAA's operational considerations. However, the

information we assembled suggests that this matter be brought to your attention immediately. We believe that a reassessment may be prudent given FAA's current and future budget constraints. To be most effective, this reassessment would need to be done quickly because delivery of new VOR/DME equipment is planned to begin in September 1993.

I would welcome your response on these matters. If you have any questions about our work in this area, please contact Randy Williamson, Assistant Director, Seattle Regional Office, at (206) 287-4800.

Sincerely yours,

Kenneth M. Mead
Director, Transportation Issues

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