

Alaska and The MITRE Corporation Center for Advanced Aviation System Development indicates a 40 percent reduction in aircraft accidents that are instrument flight rules equipped under the Capstone program verses aircraft that are unequipped.

Relying on lessons learned during Phase I, Capstone Phase II is beginning in southeast Alaska. A more robust set of avionics, that include Global Positioning Systems/Wide Area Augmentation Systems (GPS/WAAS), is being deployed that aims at further reduction of controlled flight into terrain and mid-air collision accidents. In addition, instrument flight rules (IFR) area navigation (RNAV) procedures are being introduced that enable participants to conduct IFR operations on published routes, improving overall safety and capacity.

Area navigation (RNAV) systems used in most aircraft operations consist of a navigation computer, a coded database containing preloaded ground-based navigational aids, instrument approach procedures, standard departure procedures, and standard arrival routes to certain terminal areas. The navigation computer can also be manually loaded to input the latitude and longitude of certain fixes defining an area navigation route. RNAV systems also have the capability of processing transmitted signals from various kinds of navigation aids to continuously update the accuracy of the navigation computer in the lateral and vertical modes of operation. Unlike aircraft very high frequency omnidirectional range (VOR) navigation systems, for example, RNAV systems can be programmed to navigate directly to any geographic reference point (latitude and longitude) on the earth without having to navigate to or from ground-based VOR stations over published routes that are defined by ground-based VOR stations.

The current operating rules under the Federal Aviation Regulations in title 14 of the Code of Federal Regulations (14 CFR) do not accommodate the use of GPS/WAAS technology for IFR RNAV outside the operational service volume of ground-based navigation aids. This SFAR would allow the timely approval of approximately 200 aircraft that are being equipped under Capstone Phase II to conduct IFR RNAV operations using GPS/WAAS navigation systems. Additionally, this SFAR would provide the opportunity for air carrier and general aviation operators, other than those participating in the Capstone Program, to voluntarily equip aircraft with advanced GPS/WAAS avionics that are manufactured, certified, and approved for IFR RNAV operations.

Statement of the Problem

A significant number of mid-air collisions, controlled flight into terrain, and weather-related accidents occur in Alaska. These accidents can be significantly reduced by the use of new aircraft navigation technologies such as GPS/WAAS IFR RNAV systems. However, operating rules under the current FAA regulations do not fully accommodate the use of GPS/WAAS technology for IFR RNAV operations. While a review of national operating rules continues in order to fully accommodate RNAV operations for the National Airspace System (NAS), a timely SFAR needs to be issued because initial GPS/WAAS avionics equipage is scheduled in Alaska between December 2002 and April 2003 under the FAA Capstone Phase II Program.

NTSB Recommendation:

Recommendation A-95-121 From NTSB Safety Study

In 1995, the NTSB conducted a study (NTSB Safety Study—Aviation Safety in Alaska, NTSB/SS-95/03, November 1995) to examine “Alaska’s current aviation environment and air transportation activities, to identify the associated risk factors and safety deficiencies, and to recommend practical measures for managing the risks to safe flight operations given the reality of Alaska’s aviation environment and the potential of new technologies.” The following is a NTSB recommendation (A-95-121) from this safety study that substantiates the need for this SFAR.

Implement, by December 31, 1997, a model program in the Arctic and southeast regions of Alaska to demonstrate a low altitude instrument flight rules (IFR) system that better fulfills the needs of Alaska’s air transportation system. The model should include the following components:

(1) The use of the global positioning system (GPS) as a sole source of navigational information for en route navigation and for nonprecision instrument approaches at a representative number of airports where instrument approaches do not currently exist. (Operators participating in the program will have to be allowed to conduct these operations without the integrity monitoring functions of the wide area augmentation system (WAAS) until WAAS is fully implemented in the demonstration region.)

(2) The use of satellite-based voice communications and satellite-based, Mode S, or VHF data link (for aircraft position and altitude) between aircraft in flight and air traffic controllers.

(3) The operation of commercial, passenger-carrying flight under IFR in turbine-powered single-engine airplanes equipped with redundant sources of electrical power and gyroscopic instrument vacuum/pressure.

(4) The use of currently uncontrolled airspace for IFR departures, en route flight, and instrument approaches in the demonstration program region. (Class II, Priority Action) (A-95-121).

Reference Material: (1) Technical Standard Order (TSO) C145a, Airborne Navigation Sensors Using The Global Positioning System (GPS) Augmented By The Wide Area Augmentation System (WAAS); and (2) TSO C146a, Stand-Alone Airborne Navigation Equipment Using The Global Positioning System (GPS) Augmented By The Wide Area Augmentation System (WAAS). Copies of these TSOs may be obtained from the FAA Internet Web site at <http://www.faa.gov/certification/aircraft/TSOA.htm>.

Related Activity

The FAA is conducting a thorough review of its rules to ensure consistency between the operating rules of 14 CFR and future RNAV operations for the NAS. That rulemaking, when proposed and promulgated, should enable the use of space-based navigation aid sensors for aircraft RNAV systems through all phases of flight (departure, en route, arrival, and approach) to enhance the safety and efficiency of the NAS. The changes anticipated would result in greater flexibility in air traffic routing, instrument approach procedure design, and airspace use than is now possible with a ground-based navigation aid system structure. The improved navigation accuracy and flexibility would enhance both system capacity and overall flight safety, and would promote the “free flight” concept in the NAS by enabling the NAS to move away from reliance on ground-based NAVAIDS. This SFAR supports this activity as an early implementation effort.

Contrary Provisions of the Current Regulations

People who conduct operations in Alaska in accordance with this SFAR would be excepted from certain provisions of the FAA’s regulations. For instance:

14 CFR 71.75. Extent of Federal airways. The extent of Federal airways is currently referenced as a center line that extends from one navigational aid or intersection to another navigational aid or intersection specified for that airway. This SFAR allows the Federal airway and other routes published by the FAA to be referenced and defined by one or more fixes that are contained in an RNAV system’s electronic database that is derived from GPS satellites and used by the pilot to accurately fly the Federal airway or other published