Federal Aviation Administration

Flight Standards Service

Flight Technologies and Procedures Division

Flight Procedure Standards Branch

AFS-420

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SAFER SKIES AGENDA
Precision-Like Approach Implementation (PAI)

RAA Forum

San Antonio, Texas

May 1, 2000

SAFER SKIES

- FAA Administrator's Program to Address White House Commission on Aviation Safety and Security Recommendations:
  - 80% reduction in U.S. aviation fatal accident rate by 2007
  - Partnership between FAA, NASA, and Industry

SAFER SKIES

- Dual Emphasis
  - Analysis - data-driven based on actual accidents/incidents
  - Implementation - projects prioritized based on effectiveness and feasibility
- Commercial aviation activities addressed by Commercial Aviation Safety Team (CAST)

CAST

- Government/industry working together to identify and implement a data driven, benefit focused safety enhancement program to continuously reduce commercial transport category accidents.

CAST PARTNERS

- Industry
  - AIA Airbus ALPA APA ATA
    Boeing P&W RAA FSF IATA
- Government
  - DOD NASA ICAO JAA FAA

CAST
AREAS OF INTEREST

- Controlled Flight into Terrain
- Uncontained Engine Failure
- Approach and Landing
- Loss of Control
- Runway Excursions
- Weather

CFIT
Controlled Flight into Terrain

- Largest cause of commercial aviation accidents worldwide.
- Nonprecision approach CFIT accident rate is 5-times that of precision approach.
- Five-fold improvement is primarily attributed to vertical guidance during a precision approach.

CFIT

- Most approaches lack vertical guidance
  - In U.S., only 1,200 precision approaches and over 10,000 nonprecision approaches

- CFIT Approach Challenge - Increase availability of approach procedures with vertical guidance.

CAST CFIT
Analysis Team Results

- Enable RNAV/BVNAV equipped aircraft to utilize LNAV/VNAV in stabilized (constant angle/constant rate) approach procedures.
- Amend applicable nonprecision approach plates to incorporate stabilized constant angle/constant rate approach procedures.

CAST CFIT
Analysis Team Results

- Implement precision approach capability (glide slope guidance) for runways without an established precision approach procedure (e.g., ILS, GLS, etc.).
- Provide alternative LNAV/VNAV procedures for existing nonprecision approaches where possible.

CAST CFIT Implementation Team

- Government/industry team of experts was formed.
- Using the analysis team results as a basis, the project became known as Precision-Like Approach Implementation (PAI).
- PAI plan approved by CAST for implementation on March 16, 2000.

PAI PLAN
General

- Purpose - Identify means for providing a stabilized descent path to the runway end for instrument approach procedures, thereby reducing the possibility of a CFIT accident.
- Provide incentives for the industry to fly stabilized approaches versus current practice of “dive-and-drive” on nonprecision approach procedures.

PAI PLAN
Vertical Angles on Nonprecision Approaches

- Produce a production plan to amend all existing nonprecision approaches to include vertical angles.
  - Production priority - Part 139 airports, runways > 5,000 feet, all others.
  - Recommended vertical angle is 3° from FAF to runway + TCH. Move FAF or change FAF altitude to obtain.
  - FAA's program is well underway.

PAI PLAN
Vertical Angles on Nonprecision Approaches

- Develop crew procedures/techniques to fly stabilized approach procedures that replace "dive-and-drive" procedures.
  - Flyable by all types of aircraft; i.e., both VNAV and non-VNAV equipped.
- Example:

PAI PLAN
RNAV 3-D Instrument Approach Procedures

- Utilize the LNAV/VNAV capability of certain aircraft to fly guided vertical paths
  - VNAV based on barometric altimetry
  - Most new commercial and high-end business aircraft are so equipped.
- Produce RNAV approach procedures, which support use of LNAV/VNAV.

PAI PLAN
RNAV 3-D Instrument Approach Procedures

- Production Priority:
  - Part 139 airports
  - Runways > 5,000 feet
  - All others
- February 24, 2000 - First 3-D RNAV procedures published
- Example:

PAI PLAN
Transition to Required Navigation Performance (RNP)

- RNP - Statement of the navigation accuracy needed to operate in a certain airspace or perform a specific procedure.
  - Emphasis on navigation accuracy required not on a specified navigation aid. Provides a basis for certification and operation of multi-sensor navigation system.
  - Airbus, Boeing, and many regional aircraft manufacturers are delivering RNP/RNAV aircraft.

PAI PLAN
Transition to Required Navigation Performance (RNP)

- PAI Plan calls for the transition to RNP procedures to begin within 12 months and complete the majority of needed procedures within 7 years.
- FAA's new RNAV approach chart supports operations by RNP 0.3 equipped aircraft.

PAI PLAN
Other Recommendations

- Develop a plan and initiate implementation to install Visual Glide slope Indicator (VGSI) at each runway end used by air carriers (priority for highest risk runways).
  - Budgetary impact: PAPI - initial cost, $190,000 ($12,000/year, mx). Thousands would be needed to fulfill recommendation.

PAI PLAN
Other Recommendations

- Establish a plan to ensure installation of DME at airports where significant numbers of non-RNAV air carrier aircraft are still expected to operate.
  - Budgetary impact: DME - initial cost, $70,000 ($15,000/year, mx).

SUMMARY

- PAI Plan is a major component of the efforts to reduce the accident rate by 80% by 2007.
- More procedures with vertical guidance are coming.
- Emphasis on constant angle/constant rate approaches.
- More VGSI’s deployed.