

4.0 Recommendations

As a result of this accident, Aeronautica Civil issues the following recommendations to the Federal Aviation Administration:

1. Develop and implement standards for the portrayal of terminal environment information on FMS/EFIS displays that match, as closely as possible, the portrayal of that information on approach charts.
2. Evaluate all FMS-equipped aircraft and, where necessary, require manufacturers to modify the FMS logic to retain those fixes between the airplane's position and one the airplane is proceeding towards, following the execution of a command to the FMS to proceed direct to a fix.
3. Require airlines to provide pilots through CRM and flight training with the tools to recognize when the FMC becomes an obstacle to the proper conduct of the flight and correctly evaluate when to discontinue the use of the FMC and revert to basic radio navigation.
4. Require that all approach and navigation charts used in aviation graphically portray the presence of terrain that are located near airports, or flight paths.
5. Require pilots operating FMS equipped aircraft to have open and easily accessible the navigation charts applicable to each phase of flight before each phase is reached.
6. Encourage manufacturers to develop and validate methods to present accurate terrain information on flight displays as part of a system of early ground proximity warning. (Enhanced GPWS)
7. Require Jeppesen-Sanderson Company to inform airlines operating FMS-equipped aircraft of the presence of each difference in the naming or portrayal of navigation information on FMS-generated and approach chart information, and require airlines to inform their pilots of these differences, as well as the logic and priorities employed in the display of electronic FMS navigation information.

8. Evaluate the curricula and flight check requirements used to train and certificate pilots to operate FMS equipped aircraft, and revise the curricula and flight check requirements to assure that pilots are fully knowledgeable in the logic underlying the FMS or similar aircraft computer system before being granted airman certification to operate the aircraft.

9. Perform en route inspections of US carriers operating into Latin America in compliance with standards according to the provisions of ICAO document 8335 part 9.4 and 9.6.33.

10. Evaluate the Boeing procedure for guarding the speedbrake handle during periods of deployment, and require airlines to implement the procedure if it increases the speed of stowage or decreases the likelihood of forgetting to stow the speed brakes in an emergency situation.

11. Evaluate the dynamic and operational effects of automatically stowing the speedbrakes when high power is commanded and determine the desirability of incorporating on existing airplanes automatic speedbrake retraction that would operate during windshear and GPWS escape maneuvers, or other situations demanding maximum thrust and climb capability.

12. Require that newly certified transport category airplanes include automatic speedbrake retraction during windshear and GPWS escape maneuvers, or other situations demanding maximum thrust and climb capability.

13. Develop a mandatory CFIT training program that includes realistic simulator exercises that are comparable to the successful windshear and rejected takeoff training programs.

14. Evaluate the CFIT escape procedures of air carriers operating transport category aircraft to ensure that the procedures provide for the extraction of maximum escape performance and ensure that those procedures are placed in operating sections of the approved operations manuals.

15. Alert pilots of FMS equipped airplanes to the hazard of commonly identified navigation stations when operating outside of the United States.

16. Review the pilot training record keeping systems of airlines operated under FAR Parts 121 and 135 to determine the quality of the information contained therein, and require the airlines to maintain appropriate information on the quality of pilot performance in training and checking programs.

17. Evaluate the possibility of requiring that flight crew generated inputs to the FMC be recorded as parameters in the FDR in order to permit investigators to reconstruct pilot - FMS interaction.

The following recommendations are issued to the International Civil Aviation Organization:

1. Urge the members states to encourage its pilots and air traffic controllers to strictly adhere to ICAO standards phraseology and terminology in all radio telecommunications between pilots and controllers.

2. Evaluate and consider the adoption of the recommendations produced by the CFIT Task Force that has been created under the initiative of the Flight Safety Foundation. Establish a single standard worldwide that provides an unified criteria for the providers of electronic navigational databases used in Flight Management Systems.

The following recommendations are issued to American Airlines:

1. Review the guidelines for ensuring that the flight crew preparation rendered by the training given at the Flight Training Academy is maintained throughout the different operational pilot bases by the standardizing the evaluation criteria of the check pilots.

2. Address the analysis of flight crew performance in flight crew training records in order to reinforce CRM and the individual aspects of flight training programs.