U.S. Department
of Transportation

**Federal Aviation Administration**

# Memorandum

Subject: **INFORMATION:** Guidance Regarding Latent Failures of Altimeters (Correction of Memorandum dated 2/11/00)

Date: February 22, 2000

From: Manager, Standards Office
Small Airplane Directorate, ACE-110

To: See Distribution List

The National Transportation Safety Board (NTSB) recently gave a presentation to the Small Airplane Directorate about an approach phase, Controlled Flight Into Terrain (CFIT) accident in which the preliminary investigation found the primary, encoding altimeter read several thousand feet higher than actual. The secondary, non-encoding altimeter read the actual altitude. This flight was an instrument rated, single pilot, Part 91 operation in an airplane that was properly equipped for Instrument Flight Rules (IFR) operation.

The pilot of the accident airplane had no warning indication that his primary altimeter had failed, and the Air Traffic controllers were unable to issue a warning since they had the same incorrect altitude information as the pilot. The pilot did fail to cross check his primary and secondary instruments, which should have prevented the accident. While there were no reports of conflicts with other airplanes from this accident, it should be recognized that incorrect altitude reports could cause unneeded Traffic and Resolution Advisories and could prevent needed Traffic and Resolution Advisories in Traffic and Collision Avoidance System (TCAS) airplanes.

Though "pilot error" seems likely as a primary cause in this accident, we recognize that CFIT accidents are unfortunately common and this type of failure could impact other airplanes. Rulemaking to require monitoring of an encoding altimeter to activate a warning means for a failure is possible. Whether this is economically justified will have to be determined. The Regulations and Policy Branch is initiating a rulemaking project on this issue.

The following options would be useful in a single pilot, high workload situation such as a descent in Instrument Meteorological Conditions. The Small Airplane Directorate recommends that applicants do one of the following when installing an altitude encoding altimeter:

1. Install a monitor between another altitude source and the primary, encoded altimeter. If installed, a Global Positioning System (GPS) source would be best. Another altimeter would also be acceptable. A warning would indicate a discrepancy and permit troubleshooting to determine which altitude source is failed, or

2. Install a non-encoding altimeter as primary with the encoding altimeter as secondary. This would allow for warnings from Air Traffic controllers about terrain clearance when primary system failures were undetected by cross checks, or

3. Install a Terrain Awareness Warning System (TAWS).

We reiterate that there is no existing rule in place at this time. However, there is a rulemaking project for Item 3, installation of TAWS in turbine engine powered airplanes with six or more passenger capacity, and we plan to initiate a rulemaking project for Item 1.

If you have any questions or need additional information, please contact Mr. Les Taylor, Regulations and Policy Branch, at 816-329-4134.

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