

Memorandum

U.S. Department
of Transportation

**Federal Aviation
Administration**

Subject: **INFORMATION:** Policy Statement with respect to Part
25 Transport Category Airplanes Utilizing Displays with
Geometric Altitude Labeled as Mean Sea Level (MSL).

Date: DRAFT

From: Manager, Transport Airplane Directorate, Aircraft
Certification Service, ANM-100

Reply to
Attn. Of: ANM-02-111-05

To: See Distribution

Regulatory
Reference: § 25.1301(b)

This memorandum clarifies Federal Aviation Administration (FAA) certification policy with respect to installations that label Global Positioning System (GPS) derived geometric altitude as Mean Sea Level (MSL) altitude. The issue in question is specifically directed at Terrain Awareness and Warning Systems (TAWS), Global Navigation Systems (GNS), and any other installation in which GPS derived altitude is presented as MSL altitude.

Current Regulatory and Advisory Material

Title 14 Code of Federal Regulations (14 CFR) part 25.1301(b), requires that equipment “be labeled as to its identification, function, or operating limitations, or any applicable combination of these factors.”

Definitions

MSL is the average height of the surface of the sea for all stages of the tide and is used as a reference for elevations as well as the basis for barometric altitude in the aircraft and the National Airspace System (NAS) as a whole.

MSL altitude is defined by the Aeronautical Information Manual as altitude expressed in feet measured from mean sea level.

GPS derived geometric altitude: This altitude utilizes the GPS and may use other aircraft sensors to derive the vertical position of the aircraft. This geometric altitude is the height above MSL derived from the GPS and typically filtered by the vertical figure of merit from the GPS, which is a calculation that indicates the best accuracy achievable from the satellites being tracked.

Relevant Past Practice

The purpose of displaying geometric altitude on a display such as TAWS is to identify a common altitude reference for the aircraft and the terrain and/or obstacle database, and an accurate TAWS altitude to overcome altitude errors. These altitude errors may be due to

non-standard atmospheric conditions, altimeter mis-sets, or the use of altimeter settings that are corrected for actual height above sea level and local pressure variations (QFE settings). Twenty-five percent of Controlled Flight Into Terrain (CFIT) accidents have been attributed to altimeter errors, further identifying the need for accurate altitude readings when utilizing a function such as TAWS.

Regardless of the higher altitude accuracy that can be derived from GPS data, barometric altitude referenced to MSL remains the present standard used in the US and internationally for vertical navigation. In today's National Airspace System (NAS), the Air Traffic Control system manages a number of aircraft in any particular sector by having all aircraft within that sector navigate utilizing the same reference for altitude, which is barometric altitude referenced to MSL. Even though there may be altitude errors as defined in the previous paragraph while using barometric altitude, all aircraft within a particular sector are navigating (in principle) with the same error. Since there is a potential for large differences between barometric altitude and GPS derived altitude, labeling both as MSL may result in confusion and improper vertical navigation during high flightcrew workloads. On a non-standard atmospheric day, there may be as much as 2,000 feet difference due to barometric altitude errors.

Policy

As of the date of this memorandum, all new type certificates (TC), amended type certificates, supplemental type certificates (STC), or amended supplemental type certificates that are approved utilizing a GPS derived altitude displayed as MSL, should have either the GPS derived altitude labeled appropriately with a nomenclature other than MSL, or should have the feature deactivated.

Effect of Policy

The general policy stated in this document does not constitute a new regulation or create what the courts refer to as a "binding norm." The office that implements policy should follow this policy when applicable to the specified project. Whenever an applicant's proposed method of compliance is outside this established policy, it must be coordinated with the policy issuing office, e.g., through the issue paper process or equivalent.

Applicants should expect that the certificating officials will consider this information when making findings of compliance relevant to new certificate actions. Also, as with all advisory material, this policy statement identifies one means, but not the only means, of compliance.

Questions regarding this memorandum should be directed to Mr. Ken Schroer of the Airplane and Flight Crew Interface Branch, ANM-111. Mr. Schroer's telephone number is (425) 227-1154 and his e-mail address is Kenneth.Schroer@faa.gov.