



U.S. Department
of Transportation
**Federal Aviation
Administration**

SAFO

Safety Alert for Operators

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Flight Standards Service
Washington, DC

http://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo

A SAFO contains important safety information and may include recommended action. SAFO content should be especially valuable to air carriers in meeting their statutory duty to provide service with the highest possible degree of safety in the public interest. Besides the specific action recommended in a SAFO, an alternative action may be as effective in addressing the safety issue named in the SAFO.

Subject: Global Positioning System (GPS)/Global Navigation Satellite System (GNSS)
Navigator/Autopilot Compatibility

Purpose: This SAFO informs operators and maintenance personnel, about the continuing reports of GPS/GNSS installations or upgrades in which integration with existing autopilots has resulted in less than ideal performance in some modes or conditions. Lateral and vertical performance of particular combinations of legacy autopilots and GPS/GNSS systems may or may not have been considered by the equipment manufacturer during the original integration and certification of the GPS/GNSS.

Discussion: The problems and issues caused by coupled GPS/GNSS and autopilot systems may cause an increase in workload for the flightcrew when it comes to complying with rules of separation and navigation. The situation is typically the result of incompatibility in the interface between legacy autopilots and the new or upgraded navigation source. Of particular concern is navigation equipment originally intended for Title 14 of the Code of Federal Regulations (14 CFR) Part 23 aircraft installed on Part 25 aircraft. These alterations leverage existing Supplemental Type Certificate (STC) data for use in field approvals but neither the compatibility of the equipment/system to the particular aircraft nor compliance with the applicable airworthiness standards were adequately evaluated. The GPS/GNSS manufacturer has not, in most cases, evaluated compatibility with every autopilot or other interface that may be encountered, nor is that the FAA's expectation during the original STC approval. Instead, the GPS/GNSS manufacturer tests a limited number of combinations for integration, and lists those deemed compatible on their STC.

Recommended Action: All operators, maintenance personnel, Organization Designation Authorizations (ODA), Designated Engineering Representative (DER), and repair stations are reminded that when choosing to install or upgrade systems or equipment by means other than STC, a thorough evaluation of the alteration must still be accomplished.

The evaluation must address system compatibility where it has not been previously established. It is the responsibility of the installer to ensure that all of the considerations and applicable airworthiness standards have been addressed for installation and operation of the equipment or systems, including proper lateral and vertical coupling and in-flight performance of the autopilot.

For system combinations where incompatibility of input and output requirements result in non-functional or degraded modes of operation a solution may be to include a digital-to-analog or roll steering converter, as appropriate, in the navigator/autopilot interface. Available guidance includes the current version of Advisory Circular (AC) 20-138, Airworthiness Approval of Positioning and Navigation Systems which in turn references other ACs that address autopilot compatibility and compliance.

Operators experiencing less than ideal performance following GPS/GNSS installations or upgrades that are integrated with existing autopilots should contact the installer to ensure a proper evaluation of the integration was accomplished prior to installation. Installers must recognize further showings and FAA engineering involvement may be necessary if satisfactory installed performance of the system cannot be achieved by the installer. Operators should suspend use of coupled autopilot modes if the conditions discussed in this SAFO exist until the cause(s) are identified and remedied.

Contact: Questions or comments regarding this SAFO should be directed to the Aircraft Maintenance Division, (202) 267-1675.