

# RASG-EUR SAFETY ADVISORY-06



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## **GUIDANCE MATERIAL ON MEASURES TO IMPROVE THE EFFECTIVENESS OF ENHANCED GROUND PROXIMITY WARNING SYSTEM (EGPWS)/TERRAIN AWARENESS AND WARNING SYSTEM (TAWS)**

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These guidelines are developed based on the work performed by the IE-REST in collaboration with the ICAO EUR/NET Regional Office and the European Regional Aviation Safety Group (RASG-EUR) championed by United Kingdom (Bermuda CAA) and are aimed to Improve the Effectiveness of TAWS/EGPWS.

## **Disclaimer**

This document is intended to provide guidance for civil aviation regulators and aircraft operators on actions that could be taken by stakeholders to reduce the likelihood of false GPWS warnings or, more seriously, the system's failure to provide a timely warning.

It is not intended to supersede or replace existing materials produced by the Civil Aviation Authorities (CAA) or in ICAO SARPs. The distribution or publication of this document does not prejudice the CAA's ability to enforce existing National regulations. To the extent of any inconsistency between this document and the National/International regulations, standards, recommendations or advisory publications, the content of the National/International regulations, standards, recommendations and advisory publications shall prevail.

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## **1. Background**

1.1 A controlled flight into terrain (CFIT) accident occurs when an airworthy aircraft under the control of the flight crew is flown unintentionally into terrain, obstacles or water, usually with no awareness of the impending collision on the part of the crew.

1.2 ICAO's first action in this regard can be traced to 1978, when requirements for equipping commercial air transport aircraft with GPWS were introduced into Annex 6 Part I International Commercial Air Transport - Aeroplanes. This led to a significant decrease in the number of CFIT occurrences, but not to their complete elimination. A significant advancement in technology was achieved with the development of GPWS with a forward looking terrain avoidance function, generally referred to as Enhanced Ground Proximity Warning System (EGPWS), and known also as Terrain Awareness and Warning System (TAWS).

1.3 With the advent of EGPWS/ TAWS in 1996, there has been a significant reduction in the frequency of CFIT accidents. ICAO subsequently required that aircraft be equipped with this equipment and Annex 6 Part I currently requires all turbine-engined aeroplanes of a maximum certificated take-off mass in excess of 5 700 kg or authorized to carry more than nine passengers, to be equipped with a ground proximity warning system which has a forward looking terrain avoidance function.

1.4 ICAO requires States to ensure that operators have procedures in place to ensure the integrity electronic navigation data products and that the operator continues to monitor both process and products. While EGPWS/TAWS data base would not be utilized for navigation purposes, it would be considered important to ensure that the equipment is functioning with the latest software and data base available.

1.5 There are a number of factors that can reduce the effectiveness of ground proximity warning system (GPWS) equipment. Several measures can be taken by stakeholders to reduce the likelihood of false GPWS warnings or, more seriously still, the system's failure to provide a timely warning.

## **2. Analysis**

2.1 Perhaps the most easily rectified shortcoming involves the software utilized by EGPWS/TAWS. Software updates are issued regularly, yet industry sources reveal these are not always being implemented by all operators, or are not installed in a timely manner.

2.2 Application of software updates improves the characteristics of the equipment. Such improvements are possible on the basis of operational experience, and enable earlier warnings in situations that occur closer to the runway threshold where previously it was not possible to provide such warnings. Similarly, it is important to regularly update the obstacle, runway and terrain database provided by manufactures for use with their equipment.

2.3 EGPWS/TAWS equipment was designed to function with a position update system, but not all installations are linked to Global Navigation Satellite System (GNSS) receivers. While the required position data can be acquired by using an effective ground-based navaid network, such support for area navigation systems is not available everywhere. Use of GNSS eliminates the possibility of position shift, which is another source of false warnings (or worse, the failure to provide a genuine warning).

### **3. Recommended Action**

3.1 RASG-EUR encourages States to advise air operators of factors that could reduce the effectiveness of EGPWS/TAWs warnings.

3.2 RASG-EUR recommends that States ensure air operators have procedures in place to ensure that EGPWS/TAWS software and data bases (including obstacle, runway and terrain databases) are updated to the latest available standard. Where air operators choose not to update the software and data bases to the latest standard, they should conduct a risk assessment. The risk assessment is to confirm that CFIT safety risk for their operation would not be reduced through incorporation of the latest update.

3.3 RASG-EUR recommends that States should ensure that air operators maintain and monitor the provision of most accurate positioning information to the EGPWS/TAWS system (e.g. encourage the broader use of GNSS input linked to EGPWS, etc).

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