



**Thirty Seventh Regional Aviation Safety Group — Pan America Executive Steering Committee
Meeting
(ESC/37)**

Mexico City, Mexico, 25 to 26 May 2022

Agenda Item 1: Safety management process within RASG-PA

IATA/ICAO Controlled Flight into Terrain (CFIT) Detailed Implementation Plan

(Presented by the Secretariat and IATA)

EXECUTIVE SUMMARY	
<p>IATA with collaboration of ICAO NACC and SAM Regional Offices calls on States and industry stakeholders to ensure updated terrain databases and systems. To achieve this, continued monitoring and implementation of Detailed Implementation Plan (DIP) is needed by all aviation stakeholders to address Controlled Flight into Terrain (CFIT). The present Working Paper presents the actions corresponding to the Preliminary Phase (Phase I) of the mentioned DIP.</p>	
Action:	<p>The Meeting is invited to:</p> <ul style="list-style-type: none"> a) Take note on the information provided on this working paper; b) Endorse the proposed conclusion
<i>Strategic Objectives:</i>	<ul style="list-style-type: none"> • Safety
<i>References:</i>	

1. Introduction

1.1 Analysing data in the last five years (2017-2021) and according to IATA Global Aviation Data Management (GADM) Accident Data Exchange (ADX), CFIT is marked as the second cause of fatal accidents, resulting in 117 fatalities. Today, accident data shows that CFIT accidents are much lower than a decade ago, and the number of aircraft that have landed safely after Enhanced Ground Proximity System (EGPWS) warning is growing every year. Dedication and commitment from leadership and everyone, establishing a positive safety culture, effective monitoring, compliance to Standard Operating Procedures (SOPs) and technological advances, such as Ground Proximity Warning System (GPWS), amongst other mitigation strategies have played a role in the reduction of CFIT accidents. Nevertheless, CFIT accident continues to occur.

1.2 To address this risk, different industry stakeholders have coordinated multiple actions, one of these is the *“Guidance on performance assessment of pilot compliance to Enhanced Ground Proximity System (EGPWS) produced by IATA and Honeywell in 2019.*

1.3 Another important effort is the one led by ICAO via the World Geodetic System – 1984 (WGS-84) Manual [Doc. 9674]. Discrepancies in the radar tracks were found to be the result of incompatible coordinates. The proposed solution to this problem was to adopt WGS-84 as a common geodetic reference frame for civil aviation.

1.4 The International Organizations, States, and industry stakeholders are aware that the mandate of EGPWS and the immediate response to EGPWS warnings has been proven to be a great barrier to prevent CFIT accidents when used as intended. Evidence shows that, in order to obtain the greatest safety benefit from EGPWS and to ensure that the system remains effective, a call for action by the operators is needed to ensure they keep update their systems.

2. Discussion

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. Analysis

3.1 Based on IATA Global Aviation Data Management (GADM) Flight Data Exchange (FDX) program, in 2021 the Global average CFIT rate was 3.44 per a thousand flights excluding LATAM/CAR. In the LATAM/CAR Region, the rate was 4.99 per a thousand flights.

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

3.3 In addition to equipping airplanes with the necessary EGPWS equipment, it is essential for flight crew to respond in a timely and appropriate manner to EGPWS warnings. This can result in significantly reducing the risk of a CFIT accident. To achieve this objective, the pilot should demonstrate taking the correct action and perform appropriate recovery maneuvers needed in response to a caution and warning.

3.4 Furthermore, it is essential that operators have in place a training program to ensure flight crew can respond effectively to EGPWS warnings; are aware of factors that can reduce effectiveness of EGPWS and are trained to mitigate the effects of EGPWS degradation. Furthermore, operators should also have procedures in place to ensure that EGPWS software/databases are current and EGPWS equipment remains serviceable at all times.

3.3 The 2019 version of the joint IATA / Honeywell guidance on Performance assessment of pilot response to EGPWS highlights the importance of keeping the terrain/obstacle/runway database up to date. It also makes several recommendations that may result in significantly reducing CFIT risks. In support of the guidance document, IATA has developed a CFIT Detailed Implementation Plan (DIP) and is working with airlines, OEMs, international organizations and other relevant stakeholders to see they are applied.

Among the most important ones to share within the RASG PA members are:

- a) Ensure EGPWS Software and Terrain/Obstacle/Runway database are kept up to date;
- b) Ensure GPS is used as a position source for the EGPWS;
- c) Ensure a policy is in place that at least one pilot selects terrain display during critical phases of flight (such as climb and descent below MSA) for additional situational awareness. If weather is not a threat, then both pilots could decide to select terrain display;
- d) Establish a training program to ensure flight crew are trained to respond to EGPWS alert effectively;
- f) Recommend airlines to have procedures to ensure that EGPWS equipment always remains activated and serviceable; and
- g) Pilots and operators should promptly notify the respective authorities of the interference location and the relevant ATC if they experience GPS anomalies.

3. Action required by IATA and ICAO

3.1 In order to allow an effective implementation of the DIP, the following actions by IATA and ICAO are to be completed by the deadlines mentioned in 3.5:

3.2 Actions to be completed by IATA:

- a) Encourage airline Technical Operations dept. (Engineering & Maintenance) and highlight to them the safety benefit that can be obtained by keeping the EGPWS software / terrain database up to date;
- b) Promote the use of GNSS/GPS to the airline Technical Operations departments;
- c) Engage airline Flight Operational departments through our regional offices to adopt this recommendation;
- d) Encourage operators to consult with EGPWS training guidance available from IATA, EASA, FAA, ICAO, OEMs, and others;
- e) Encourage operators to use FOQA data to monitor proper responses by flight crew to EGPWS events;
- f) Encourage Pilots and Operators to promptly notify the respective Authorities of the interference location and the relevant ATC if they experience GPS anomalies.
- g) Promote the IATA/Honeywell Performance assessment of pilot response guidance material and recommendations

3.3 Actions to be completed by ICAO NACC and SAM Regional Offices:

- a) Ensure the navigation references are updated in accordance with WGS-84;
- b) Check, in collaboration with regulators, if the airlines keep the database and software up to date;

- c) Check if regulators require the use of GNSS/GPS as a position source to EGPWS;
- d) Ensure that regulators are checking if the Terrain display SOPs are implemented; and
- e) Ensure that regulators are checking if the Terrain display SOPs are implemented.

3.4 Phases of the Detailed Implementation Plan

- a) Phase I – Determining baseline values

For each action detailed in 3.2 (a) through (g), and 3.3 (a) to (e), IATA and ICAO will determine baseline values by the end of 2022, for example:

- (i) Percentage of airline Technical Operations departments using of GNSS/GPS...
- (ii) Percentage of regulators that check if the Terrain display SOPs are implemented as part of their surveillance activities

- b) Phase II – Regional action plan

Based on the information obtained during Phase I, IATA and ICAO will develop a regional action plan with specific objectives, targets, timeline and deadlines to reduce the LATAM/CAR CFIT year average. Percentage of reduction and target dates will depend on the size of the gap determine during Phase I.

3.5 Additionally, the result will be shared with the PA-RAST so it can be included on its Working Plan for 2023 and beyond.

4. Suggested Actions

4.1. The Meeting is invited to:

- a) Take note on the information provided on this working paper;
- b) Endorse the proposed conclusion:

CONCLUSION		CFIT Detailed Implementation Plan	
RASG-PA ESC/37/XX			
What: <ul style="list-style-type: none"> • That IATA and ICAO complete de baseline measurement described on Phase I of this Working Paper by the end of 2022 <hr/> How much: <ul style="list-style-type: none"> • No resources needed from RASG-PA for Phase I 		Expected impact: <ul style="list-style-type: none"> <input type="checkbox"/> Political/Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Operational/Tech. 	
Why: To allow for the development of a regional action plan with specific objectives, targets, timeline and deadlines to reduce the LATAM/CAR CFIT year average.			
When: By the end of 2022		Status: Valid	
Who: <ul style="list-style-type: none"> <input type="checkbox"/> States <input checked="" type="checkbox"/> IATA <input checked="" type="checkbox"/> ICAO SAM and NACC Offices (Secretariat) <input type="checkbox"/> Other (Specify) 		Responsible: ICAO Secretariat (Javier Puente & Sereya Schotborg) Responsible: IATA (Fernando Rojas)	