



TRAINING ON CONTROLLED FLIGHT CONTROL INTO TERRAIN (CFIT) PREVENTION

SECTION 1 GENERAL

This Advisory Circular (AC) is provided for information and guidance purposes. It may describe an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards. This AC is issued in accordance with Vietnam Aviation Regulations.

This AC may use mandatory terms such as “must”, “shall” and “is/are required” so as to convey the intent of the regulatory requirements where applicable. The term “should” is to be understood to mean that the proposed method of compliance is strongly recommended, unless an alternative method of safety protection is implemented that would meet or exceed the intent of the recommendation.

1.1 PURPOSE

The purpose of this AC is to provide information to operators on flight crew initial and recurrent Controlled Flight into Terrain (CFIT) prevention training.

1.2 STATUS OF THIS AC

This AC has been revised to correct spelling errors. The content has not changed. It remains version.

1.3 APPLICABILITY

This document is applicable to all operators operating within the airspace of Vietnam.

1.4 RELATED REGULATIONS

Vietnam Aviation Regulation, Part 12, Appendix 1 to 12.153: Operations Manual: Part A (30)—

APPENDIX 1 TO 12.153: OPERATIONS MANUAL¹²²

- (d) An operations manual, which may be issued in separate parts corresponding to specific aspects of operations and should be organized with the following recommended structure:
- (1) General;
 - (2) Aircraft operating information;
 - (3) Routes and aerodromes; and
 - (4) Training.

A. General to include:

- (30) Instructions and training requirements for the avoidance of controlled flight into terrain and policy for the use of the ground proximity warning system (GPWS).

1.5 DEFINITIONS & ACRONYMS

1.5.1 DEFINITIONS

The following definitions apply to this advisory circular—

- 1) **Controlled Flight into Terrain (CFIT).** CFIT occurs when an airworthy aircraft is flown, under the control of a qualified pilot, into terrain (water or obstacles) with inadequate awareness on the part of the pilot of the impending collision.
- 2) **Crewed Aircraft.** In this AC, crewed aircraft refers to an aircraft or flight operation in which more than one pilot is required by aircraft certification or type of operation.
- 3) **Ground proximity warning system (GPWS):** A warning system that uses radar altimeters to alert the pilots of hazardous flight conditions.
- 4) **Loss of Control.** The term, loss of control, refers to emergency situations from which a pilot may have been able to recover but did not, such as problems with situation awareness, recovery from windshear, mishandling of an approach, and recovery from a stall.
- 5) **Operator:** means a person, organization or enterprise engaged in or offering to engage in an aircraft operation
- 6) **Situational Awareness.** As used in this AC, situational awareness means the pilot is aware of what is happening around the pilot's aircraft at all times in both the vertical and horizontal plane. This includes the ability to project the near-term status and position of the aircraft in relation to other aircraft, terrain, and other potential hazards.
- 7) **Single-Pilot Aircraft.** In this AC, single-pilot means only one pilot is required by the aircraft certification. Normally, only one pilot flies such an aircraft.
- 8) **Terrain Awareness Warning System.** A system that provides the flight crew with sufficient information and alerting to detect a potentially hazardous terrain situation and so the flight crew may take effective action to prevent a controlled flight into terrain (CFIT) event.

1.5.2 ACRONYMS & ABBREVIATIONS

The following acronyms apply to this advisory circular—

- 1) **AC** – Advisory Circular
- 2) **CANPA:** Constant Angle Non-Precision Approach
- 3) **CFIT:** Controlled Flight into Terrain
- 4) **IATA:** International Air Transport Association
- 5) **ICAO:** International Civil Aviation Organization

SECTION 2 BACKGROUND

2.1

CFIT occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown into terrain, water, or an obstacle. The pilots are generally unaware of the danger until it is too late. Although few in number (47 cases from 2008 to 2017), CFIT accidents are almost always catastrophic; 89 percent of the CFIT accidents involve fatalities to passengers or flight crew. CFIT is the second largest fatal accident category (after Loss of Control In-flight)

2.2

Most CFIT accidents occur in the approach and landing phase of flight and are often associated with non-precision approaches. IATA accident statistics record that out of 407 commercial aircraft accidents from 2011 to 2015, 267 or 65% occurred during the approach and landing phase and 31 of these involved fatalities.

2.3

Many CFIT accidents occur because of loss of situational awareness, particularly in the vertical plane, and many crash sites are on the centreline of an approach to an airfield. Lack of familiarity with the approach or misreading of the approach plate are common causal factors, particularly where the approach features steps down in altitude from the initial approach fix to the final approach fix.

2.4

The establishment of standards and rules covering the installation and utilization of GPWS and TAWS has contributed to a reduction in these events. However, the fact that not all aircraft are mandated to be TAWS equipped means that CFIT related accidents continue to occur.

2.5

In any critical review of Controlled Flight into Terrain (CFIT) incidents or accidents, it becomes evident that there many interrelated factors that contribute to the causes of CFIT accidents. All of these factors are derived from some level of decision making. However, as the purpose of this AC, the training guidance will only be focused on the flight crew, the last line of defence in preventing a CFIT accident, and that they make operational decisions that are critical to a safe flight.

2.6

CFIT training is a vital component in the overall safety footprint for the industry. This would naturally encompass a range of operations, aircraft types, personnel and support structures. Contemporary CFIT training continues to hinge on two key aspects: avoidance and escape. The establishment (and continued maintenance) of correct and accurate Situational Awareness by flight crews in both the horizontal and vertical planes is critical. If this is not the case, the potential for contact (impact) with terrain, water and/or obstacles increases. In situations like this an Escape Manoeuvre must be performed without delay to prevent an actual CFIT from occurring. Invoking this manoeuvre will increase the chances of escaping an CFIT.

SECTION 3 CFIT TRAINING PROGRAMME

3.1

The CFIT training programme should be integrated into existing initial/transition and recurrent training and check programmes. Its importance is reinforced and its effectiveness improved when the subject is a core element in all training and checking programmes. It can also be structured as a stand-alone programme.

3.2

The ground training programme is designed to improve awareness by increasing the flight crew's ability to recognize and avoid impending CFIT situations. The simulator training program is

designed to apply this knowledge, as well as develop proficiency in an escape manoeuvre that must be used as a last resort for survival.

3.3

Air operators should provide this training during initial/transition training and at least once every two years as part of recurrent training.

3.4

The objectives of the Training Programme are to provide pilots with the ability to:

- (a) Recognize the importance of effective Situational Awareness and its importance in identifying potential CFIT situations,
- (b) Know prevention strategies and operating practices that will mitigate CFIT threats and hazards,
- (c) Learn an escape manoeuvre and associated techniques that will avoid CFIT and enhance the possibility of survival.

3.5

Note: The most important goal for any flight crew is to maintain vertical and horizontal situational awareness in relation to the ground, water, and obstacles.

SECTION 4 INTRODUCING CFIT TRAINING INTO AN INITIAL (TYPE) ENDORSEMENT TRAINING PROGRAMME.

4.1

Strategies that address terrain awareness and the causes of CFIT events should be discussed at initial training. Continuous reinforcement and the practice of sound SOPs combined with a focus on good crew communications and situational awareness should be emphasized at all times.

- (a) Awareness of the aircraft energy state at all times – avoidance of excessive rates of descent and too low or too fast airspeeds at low levels;
- (b) Understanding the autopilot operating modes;
- (c) Intervention (including manual interventions) if the aircraft is not responding as intended
- (d) SOPs that include standard callouts that alert crew to Flight Mode Annunciator (FMA) and/or Flight Management Systems (FMS) changes;
- (e) SOP usage to highlight any undesirable aircraft energy states;
- (f) Barometric and radio altimetry issues and procedures;
- (g) Observance of stabilised approach criteria;
- (h) Criteria for descent below MSA – this should only occur when established on a published instrument procedure, under radar control or when visual with terrain;
- (i) Review the primary elements of the missed approach especially when a missed approach appears likely;
- (j) Go-around and discontinued approach awareness; and

- (k) Effective CRM and crew communications highlighting terrain issues and situational awareness.

4.2

Additionally, a programme dedicated to CFIT recovery techniques should be included in simulator training detail(s). This simulator training should include:

- (a) The type specific GPWS escape manoeuvres;
- (b) Non-precision approaches using the CANPA descent profile;
- (c) The appropriate use of automation and manual flying during an approach;
- (d) The practice of discontinuing an approach any time that the aircraft becomes unstable below stabilisation height; and
- (e) Landings that are practised with different crosswind conditions on dry, wet and contaminated (if these operations are envisaged) runways.

SECTION 5 INTRODUCING CFIT TRAINING INTO A RECURRENT TRAINING PROGRAMME

5.1

After initial CFIT training is introduced, it is imperative to keep the flight crew updated and current with procedures concerning CFIT.

5.2

It is important to reinforce, refresh and practice the concepts and manoeuvres that were covered in the initial type training programme. This can be done by the use of instructor-led discussion as well as training in an appropriate flight training device.—

5.3

Items to be discussed should include

- (a) Usage and understanding of EGPWS warnings;
- (b) Understanding the autopilot operating modes and its use;
- (c) Crew briefings that include threat and error management;
- (d) Understanding approach charts;
- (e) Effective crew resource management techniques; and
- (f) Review knowledge of en-route charts making sure that the crew have a clear understanding of the charts features and their meanings (e.g. grid MORA).

5.4

A simulator training detail should include:

- (a) Line orientated flight training (LOFT) flights departing and/or landing into airports with high terrain in the vicinity, reviewing what crew can anticipate in these situations;

- (b) Non-precision approach procedures (NDB/VOR using CANPA and circling approaches);
- (c) Practice of aircraft type specific terrain avoidance manoeuvres;
- (d) Practising visual and circling approaches, emphasising the differences between the two approaches;
- (e) Practice of go-arounds, especially during circling approaches; and
- (f) Practice of depressurisation induced emergency descents over mountainous areas, highlighting escape routes.

SECTION 6 ACTION BY OPERATOR

6.1

It is recommended that operators give high priority to incorporating CFIT training into their flight operations and training programmes.

End of Advisory Circular