



## **CIVIL AVIATION ADVISORY PUBLICATION**

**CAAP 29**

**AIRBORNE COLLISION AVOIDANCE SYSTEM (ACAS)**

**EQUIPMENT**

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***INFORMATION AND POLICY REGARDING ACAS***

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## **1. PURPOSE**

The purpose of this CAAP is to provide additional requirements to the existing CAR OPS 1 concerning ACAS. It addresses requirements related to ACAS operational use and training of flight crew.

## **2. STATUS**

This is the Second edition of CAAP 29 and is dated 04<sup>th</sup> January, 2016. It will remain current until withdrawn or superseded.

## **3. APPLICABILITY**

This guidance and policy material applies to all UAE operators and Approved Training Organisations used by UAE GCAA Pilot's license holder.

## **4. GENERAL**

Airborne Collision Avoidance System (ACAS) indications shall be used by pilots in the avoidance of potential collision, the enhancement of situational awareness, and the active search for, and visual acquisition of conflicting traffic. Nothing in the procedures on "Use of ACAS indicators" in paragraph 6 below shall prevent commanders from exercising their best judgement and full authority in the choice of the best course of action to resolve a traffic conflict or avert a potential collision.

The ability of ACAS to fulfil its role of assisting pilots in the avoidance of potential collisions is dependent on the correct and timely response by pilots to ACAS indications. Operational experience has shown that the correct response by pilots is dependent on the effectiveness of the initial and recurrent training in ACAS procedures.

## **5. REGULATORY REQUIREMENTS**

### **5.1 Equipage Regulatory Requirements**

The equipage regulatory requirements on ACAS are contained in CAR OPS 1.668 or CAR-OPS 3.398.

### **5.2 Operational Procedures and Training**

An operator shall establish procedures to ensure that;

(a) When ACAS is installed and serviceable, it shall be used in flight in a mode that enables Resolution Advisories (RA) to be produced unless to do so would not be appropriate for conditions existing at the time

(b) When undue proximity to another aircraft (RA) is detected by ACAS, the commander or pilot to whom conduct of the flight has been delegated shall ensure that corrective action is initiated immediately to establish safe separation unless the intruder has been visually identified and has been determined not to be a threat.

(c) Pilots operating ACAS equipped aircraft shall be given ACAS academic and recurrent training before

operational duties and at periodic interval

## **6. USE OF ACAS INDICATORS**

The indications generated by ACAS shall be used by pilots in conformity with the following safety considerations:

- (a) Pilots shall not manoeuvre their aircraft in response to traffic advisories (TAs) only;
- (b) On receipt of a TA, pilots shall use all available information to prepare for appropriate action if an RA occurs; and
- (c) In the event of an RA, pilots shall:
  - i. Respond immediately by following the RA as indicated, unless doing so would jeopardize the safety of the aeroplane;
  - ii. Follow the RA even if there is a conflict between the RA and an air traffic control (ATC) instruction to manoeuvre;
  - iii. Not manoeuvre in the opposite sense to an RA; As soon as possible, as permitted by flight crew workload, notify the appropriate ATC unit of the RA, including the direction of any deviation from the current ATC instruction or clearance;
  - iv. Promptly comply with any modified RAs;
  - v. Limit the alterations of the flight path to the minimum extent necessary to comply with the RAs;
  - vi. Promptly return to the terms of the ATC instruction or clearance when the conflict is resolved; and
  - vii. Notify ATC when returning to the current clearance.

## **7. ACAS TRAINING GUIDELINES FOR PILOTS**

### **7.1 ACAS Training Development**

During the implementation of ACAS and the operational evaluations conducted, several operational issues were identified that were attributed to deficiencies in pilot training programmes. Operators are therefore required to develop ACAS pilot training based on ICAO Doc 8168, ICAO Annex 10 Volume 4, ICAO Doc 4444 PANS RAC Part X paragraph 3.1.2 and ICAO guidance material 'ACAS Performance-Based Training Objective' ( published under Attachment E to state letter AN 7/1.3.7.2-97/77) where the summary of training objectives are as follows:

- a) Theory of operation;
- b) Pre-flight operations;
- c) General in-flight operations;
- d) Response to traffic advisories (TAs); and
- e) Response to resolution advisories (RAs).

### **7.2 Training objectives**

The Training Objectives are further divided into the areas of:

- (a) ACAS academic training;
- (b) ACAS manoeuvre training;
- (c) ACAS initial evaluation; and
- (d) ACAS recurrent qualification.

### **7.2.1 ACAS academic training**

This training is typically conducted in a classroom environment. The knowledge demonstrations specified in this section may be achieved through the successful completion of written tests or providing correct responses to non-real time computer-based training (CBT) questions.

The essential items of the academic training are

- (a) Theory of operation -The pilot must demonstrate an understanding of ACAS operation and the criteria used for issuing TAs and RAs.
- (b) Operating procedures -The pilot must demonstrate the knowledge required to operate ACAS and interpret the information presented by ACAS.

### **7.2.2 ACAS manoeuvre training**

The training is intended to teach pilots to properly respond to ACAS-displayed information. The training also requires a flight simulator approved for this purpose to be used. The CRM aspects of responding to TAs and RAs should also be incorporated in this training.

Operators that do not have access to an ACAS-equipped simulator shall conduct initial ACAS evaluation on pilots by means of an interactive CBT. The CBT must be equipped with a suitably ACAS display and controls similar in appearance and operation to those in the aircraft.

The scenarios in the manoeuvre training should include initial RAs that require a change in vertical speed; initial RAs not requiring a change in vertical speed; maintain rate RAs; altitude crossing RAs; increase rate RAs; RA reversals; weakening RAs; RAs issued while the aircraft is at a maximum altitude, and multi-aircraft encounters.

### **7.2.3 ACAS initial evaluation**

The pilot's understanding of the academic training items should be assessed by means of a written test or interactive CBT that records correct and incorrect responses to questions. The pilot's understanding of the manoeuvre training items should be assessed in a flight simulator equipped with an ACAS display and controls to those in the aircraft. This assessment shall be made by TRE/SFE/TRI/SFI/FI or the GCAA inspectors.

### **7.2.4 ACAS recurrent training**

ACAS recurrent training is to ensure that pilots maintain the appropriate ACAS knowledge and skills. ACAS recurrent training should be integrated into and/or conducted in conjunction with other established recurrent training programmes. An essential item of recurrent training is the discussion of any significant issues and operational concerns that have been identified by the operator.

ACAS monitoring programmes periodically publish findings from their analyses of ACAS events. The results of these analyses typically discuss technical and operational issues related to the use and operation of ACAS. This information is available from ICAO or directly from the monitoring programmes. ACAS recurrent training programmes should address the results of monitoring programmes in both the academic and simulator portions of recurrent training.

Note. - ACAS monitoring programmes are carried out by some States and international organizations including the United States' Federal Aviation Administration (FAA) and the European Organisation for the Safety of Air Navigation (EUROCONTROL).

Recurrent training should include both academic and manoeuvre training and address any significant issues identified by line operating experience, system changes, procedural changes, or unique characteristics such as the introduction of new aircraft display systems or operations in airspace where high numbers of TAs and RAs have been reported.

Pilots should fly all scenarios once every four years. If CBT is used, pilots should complete all scenarios once every two years.

#### **7.2.4.1 Training Requirements**

In addition to the differences, formal training should be documented, the manoeuvre training should be performed at least every 12 months period using Level C or D simulator, operators equipped with Change 7.1.

#### **7.2.4.2 Alleviation**

The training on simulator that is not equipped with ACAS II Change 7.1 shall be equipped their simulator with Change 7.1, by 31 January 2015, beyond this period, the operator or ATO (Aviation Training Organisation) shall provide equivalent means of safety justification and upgrade planning.

### **8. ACAS II Change 7.1**

#### **8.1 Safety issues with ACAS II Change 7.0**

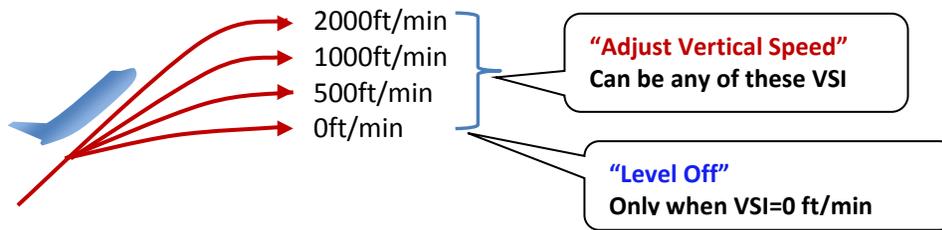
Safety issues with Change 7.0 were identified as follows:

- Unintentional opposite pilot response to an "adjust vertical speed, adjust (AVSA)" RA where the pilot increased the rate of change rather than reducing it;
- Level busts following AVSA RAs whereby the increased rate of level change contributed to a level bust which may otherwise not have occurred; and
- Flaws in the reversal logic,

#### **8.2 Safety issues addressed in ACAS II Change 7.1**

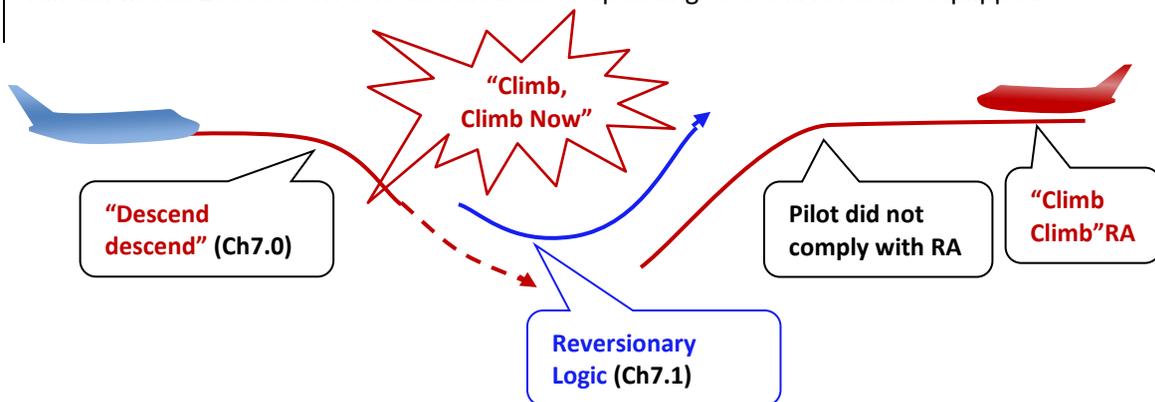
ACAS II Change 7.1 addresses these safety issues by:

- a) Replacing confusing “Adjust Vertical Speed” with “Level Off “(Change 7.1)



- b) Improving the reversal logic

Change 7.1’s improved reversal logic recognizes situations when two converging aircraft is remain within 100 feet OR One aircraft is not responding to the RA or is not equipped



### 8.3 Organisation Responsibility

Organisations certified under CAR-OPS 1, CAR-OPS 3 or CAR-ORA should ensure :

- that personnel such as flight crews, instructors or examiners are trained on ACAS II Change 7.1 and the differences with ACAS II Change 7.0;
- Compliance with Change 7.1 for its fleet of aircraft and FSTD; and
- Required documentations and training are in place.

### 8.4. Reporting to GCAA when not compliant with Change 7.1

Non-compliance with ACAS II Change 7.1 shall be notified to the GCAA at [fops@gcaa.ae](mailto:fops@gcaa.ae). As per CAR PART III Chapter 9 Section GEN.015 the GCAA may grant waiver when the applicant provides the GCAA with safety case and proposed implementation plan.