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1.0 INTRODUCTION

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.

1.1 Purpose

The purpose of this AC is to inform Air Operators on the current status and implementation dates of applicable regulations for Airborne Collision Avoidance Systems (ACAS).

1.2 Applicability

- (1) This document is applicable to all Transport Canada Civil Aviation (TCCA) employees, to individuals and organizations when they are exercising privileges granted to them under an External Ministerial Delegation of Authority. This information is also available to the aviation industry for information purposes.
- (2) Transport Canada (TC) has developed regulations for the installation and operation of ACAS for commercial Aerial Work, Air Taxi, Commuter and Airline Operations (Subparts 702, 703, 704 and 705 of the *Canadian Aviation Regulations* [CARs]).

1.3 Description of Changes

Not Applicable.

2.0 REFERENCES AND REQUIREMENTS

2.1 Reference Documents

- (1) It is intended that the following reference materials be used in conjunction with this document:
 - (a) Airworthiness Manual (AWM), Chapter 537 – *Airworthiness Standards, Appliances, Subpart B - Technical Standard Orders (TSOs) 537.103 contains a list of adopted United States Standards in Canada. This may be referenced by internet at:*
<http://www.tc.gc.ca/civilaviation/RegServ/Affairs/cars/Part5/menu.htm>
 - (b) Subpart 702 of the CARs – *Aerial Work*;
 - (c) Section 702.46 of the CARs – *ACAS*;
 - (d) Subpart 703 of the CARs – *Air Taxi Operations*;
 - (e) Section 703.70 of the CARs – *ACAS*;
 - (f) Subpart 704 of the CARs – *Commuter Operations*;
 - (g) Section 704.70 of the CARs – *ACAS*;
 - (h) Subpart 705 of the CARs – *Airline Operations*;
 - (i) Section 705.83 of the CARs – *ACAS*.
- (2) TSOs referenced in this AC may be purchased from:
 - (a) Superintendent of Documents
U.S. Government Printing Office
Washington D.C. 20402
 - (b) http://www.airweb.faa.gov/Regulatory_and_Guidance_Library/rgTSO.nsf/MainFrame?OpenFrameSet

2.2 Cancelled Documents

As of the effective date of this document, the information in the following document on ACAS is updated:

- (a) Commercial and Business Aviation Advisory Circular 0236 Issue 1, dated 2005-07-29—*Regulations for Terrain Awareness Warning System and Airborne Collision Avoidance System.*

2.3 Definitions and Abbreviations

The following definitions and abbreviations are used in this document:

- (a) **ACAS** means Airborne Collision Avoidance System.
- (b) **TCAS** means Traffic Alert and Collision Avoidance System.

Note: The acronym ACAS can be used interchangeably with TCAS. ACAS is International Civil Aviation Organization (ICAO) terminology, TCAS is Federal Aviation Administration (FAA) terminology. ACAS is going to be used predominantly throughout this advisory circular because the Canadian regulations use the acronym ACAS.

- (c) **TA** means Traffic Advisory – aural and visual alerts and information on position of other aircraft in immediate vicinity.
- (d) **RA** means Resolution Advisory – aural and visual alerts and information to avoid a potential airborne collision.
- (e) **TCAS I** means TCAS providing TA only.
- (f) **TCAS II** means TCAS providing TA and RA

(TCAS II has two prevailing software standards, namely Software (SW) version 6.04a and 7.0. TCAS II with SW version 7.0 is also referred to as ACAS II.)

3.0 BACKGROUND

- (1) ACAS equipment alerts flight crews when the path of the aircraft is predicted to potentially collide with that of another aircraft and includes aural and visual alerts and cockpit displays of other traffic. The two major classes of ACAS equipment are TCAS I and TCAS II. TCAS I provides a display of other traffic and aural and visual alerts only. TCAS II, in addition to the capabilities of TCAS I, provides guidance to flight crews to avoid collision with other transponder equipped aircraft.
- (2) The TC regulations for ACAS were developed in recognition of the safety benefits of the equipment, and with the goal of having standards and/or regulations in place that are similar to ICAO and the FAA. Furthermore TC regulations were developed as an outcome of a Transportation Safety Board (TSB) recommendation for TC to analyze the benefits of ACAS for commercial passenger carrying aircraft.

3.1 ACAS

3.1.1 Regulations

- (1) Regulations were adopted for ACAS equipment for aeroplanes operating under Subparts 702, 703, 704 and 705 of the CARs.
- (2) TCAS I is the minimum acceptable collision avoidance system for large aeroplanes (Maximum Certificated Take-off Weight (MCTOW) greater than 12,500 lb/5,700kg) operating under Subpart 703 of the CARs - Air Taxi Operations, Subpart 704 of the CARs - Commuter Operations and Subpart 705, non-turbine - Airline Operations.
- (3) TCAS II (SW version 6.04a) and a mode S transponder, is the minimum acceptable collision avoidance system for turbine-powered aeroplanes operating under Subpart 705 of the CARs,

Airline operations, and for turbine-powered aeroplanes with a MCTOW exceeding 33,000 lb/15,000 kg operating under and Subpart 704 of the CARs. For turbine-powered aeroplanes with a MCTOW exceeding 33,000 lb/15,000 kg operating under Subpart 702 of the CARs (turbine powered land aeroplanes only) may operate without an operative ACAS only if it engaged in or configured for fire-fighting, aerial spray application, or survey operations and operates only in low level airspace.

- (4) TCAS II (ACAS II SW version 7.0) and a mode S transponder is the minimum acceptable collision avoidance system for all aeroplanes, operating under Subparts 702, 703, 704 and 705 of the CARs requiring ACAS equipment, when operations are conducted in Reduced Vertical Separation Minima (RVSM) airspace.
- (5) The regulations provide conditions under which it is permissible to operate an aeroplane without a serviceable ACAS unit, for example, when the air operator does not have a Minimum Equipment List (MEL) or it is necessary for the Pilot-in-Command to deactivate the ACAS unit.
- (6) Appendix A summarizes all of the above information on ACAS including the applicable TSO references and Appendix B contains a link to the regulations as published in Canada Gazette Part 2.

4.0 IMPLEMENTATION DATES

The new ACAS regulations are effective for newly manufactured aeroplanes on the date the regulations were promulgated, namely, July 1, 2007. All aeroplanes will have to be in compliance two years after the date the regulations were promulgated, namely, July 1, 2009.

4.1 Future Disposition

- (1) Transport Canada is committed to maintaining a viable civil aviation transportation system, while not compromising safety. This AC will remain in effect for information purposes until further notice.
- (2) This AC brings to the attention of air operators the current status and promulgation dates of applicable regulations for ACAS.

5.0 CONTACT OFFICE

For more information please contact:

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Suggestions for amendment to this document are invited and should be submitted via the Transport Canada Civil Aviation Issues Reporting System (CAIRS) at the following Internet address:

<http://www.tc.gc.ca/CivilAviation/QualityAssurance/QA/cairs.htm>

or by e-mail at: CAIRS_NCR@tc.gc.ca

Original signed by Brian Whitehead on September 13, 2007
for

D.B. Sherritt
Director, Standards

APPENDIX A –AEROPLANE ACAS REQUIREMENTS

Operating Regulation	TCAS I Equivalent to TSO C-118	TCAS II TSO C-119 (SW 6.04a or 7.0) & Mode S transponder meeting TSO C-112
Subpart 702 of the CARs	Not required	Required for turbine-powered aeroplanes of MCTOW exceeding 33,000 lb. (Note 1 and 2)
Subpart 703 of the CARs	Minimum Required for aeroplanes of MCTOW exceeding 12,500 lb. (Note 1)	Not Required by applicability of Subpart 703 of the CARs
Subpart 704 of the CARs	Minimum Required for aeroplanes of MCTOW exceeding 12,500 lb. (Note 1)	Required for turbine-powered aeroplanes of MCTOW exceeding 33,000 lb. (Note 1)
Subpart 705 of the CARs	Minimum Required (Note 1)	Required for Turbine powered aeroplanes (Note 1)

Notes:

1. TCAS II, SW version 7.0 and Mode S required for RVSM airspace.
2. Not required when engaged in or configured for firefighting, aerial spray application, or survey operations and operates only in low level airspace.

APPENDIX B – REGULATIONS AMENDING THE *CANADIAN AVIATION REGULATIONS*
(PARTS 1 AND VII)

Please view and/or print from the Canada Gazette Website at the following address:

<http://canadagazette.gc.ca/partII/2007/20070627/html/sor133-e.html#top>