Guidance for Initial Implementation of Cockpit Display of Traffic Information

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Foreword

This report was prepared by Special Committee 186 (SC-186) and approved by the RTCA Program Management Committee (PMC) on February 19, 1998.

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- analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;

- developing consensus on the application of pertinent technology to fulfill user and provider requirements, including development of minimum operational performance standards for electronic systems and equipment that support aviation; and

- assisting in developing the appropriate technical material upon which positions for the International Civil Aviation Organization and the International Telecommunication Union and other appropriate international organizations can be based.

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1. Purpose and Scope

1.1 Introduction

Cockpit Display of Traffic Information (CDTI) is the function of presenting surveillance information about the surrounding traffic to the flight crew. The information presented includes the relative position of other aircraft in the vicinity with respect to own aircraft. Traffic information for the CDTI may be obtained from one or more sources, including, but not limited to, broadcast automatic dependent surveillance (ADS-B), traffic information service (TIS), and traffic alert and collision avoidance system (TCAS). To display traffic information, the CDTI may use a dedicated display device or a shared multi-function display (MFD) device. Even though a visual, graphical presentation of the traffic on a heads-down display will be most common in the near term, other types of presentation (e.g., aural, graphical head-up) are also possible, as long as information is conveyed effectively. The specific information presented may vary based on the intended operational use of the information.

Note: While general guidance is given herein concerning the format and content of the information to be presented on cockpit displays, specific requirements concerning placement, presentation and integration of CDTI data on multifunction displays are not addressed. In addition to this document, implementers are encouraged to use the display guidance and practices recommended by the Society of Automotive Engineers (SAE) Group 10 (GP-10) (See references, Appendix B.)

In the near term, the traffic display implemented as part of the present TCAS system may be enhanced by providing additional data, including identification of other aircraft. Aircraft that are not equipped with TCAS may be equipped with CDTI using ADS-B and/or TIS data.

Appendix A contains acronyms and the Bibliography is provided in Appendix B. Appendix C contains an evaluation summary for CDTI enhanced visual approaches. The definitions of terms used throughout this document conform to the definitions provided in the ADS-B MASPS.

1.2 Purpose and Scope

To implement CDTI features, manufacturers need an authoritative reference document. The CDTI MOPS, when completed, will fulfill this need. The CDTI MOPS is not expected to be developed and approved in time to satisfy near-term manufacturer needs in the design and development process. This document provides manufacturers a set of guidelines in the design and development of an initial set of CDTI features. This Guidance Document is advisory in nature and its contents are expected to be a subset of the final CDTI MOPS. More complete requirements for CDTI functions will be provided in the CDTI MOPS, and that MOPS, when published, will replace this document.

In order to comply with certification standards, manufacturers will be required to demonstrate that 1) CDTI meets it intended functions, and 2) CDTI does not interfere with any other aircraft systems. This interim guidance provides a description of the intended functions of CDTI and as such may aid the certification process.

The ADS-B MASPS defines a broad range of CDTI operational uses, applicable to all domains. Due to the variety of their complexity, applications may be developed at different times. This document provides guidance for the implementation of features for a limited set of early applications. It provides examples of potential display formats and provides high-level guidance on the integration of surveillance inputs from multiple sources for use by a CDTI. Future displays

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may add features to accommodate later applications. The evolution of CDTI is beyond the scope of this document.

The specification, transmission, and receipt of surveillance data (TIS, ADS-B, TIS-B, etc.) are critical to the implementation of CDTI. However, specific issues such as TIS-B definition and spectrum management issues relating to the transmission of surveillance data are outside the scope of this document.

Note: Any party that uses this document as guidance material in developing a CDTI implementation assumes responsibility for any risk that the guidance material contained herein may change. The official MOPS document that is being produced by RTCA SC 186, WG3 may or may not agree with this Guidance Document.

1.3 Operational Goals

The operational goals of the CDTI are to improve the safety and efficiency of flight operations through an enhanced surveillance capability coupled with new operational procedures. Early applications of CDTI include the following objectives and applications:

1) Improve traffic situational awareness.

2) Improve the probability of visual acquisition of traffic compared with unaided visual search.

3a) Improve the routine conduct and safety of visual approaches.

3b) Delay the imposition of capacity restrictions that occur as meteorological conditions change from those allowing visual approach operations to those requiring IFR operations.

4) Allow aircraft to obtain more efficient altitudes and tracks in oceanic/remote airspace. Reduce separation/altitude restrictions between equipped pairs through enhanced oceanic/remote procedures such as enhanced in-trail climb/descent (ITC/ITD).

Early benefits can be obtained before all proximate aircraft are visible via the CDTI, through the use of CTDI in pair wise applications. While some early benefits can be achieved without any changes in procedures or separation responsibilities, other CDTI operational benefits will require changes in procedures and possibly changes in separation responsibility. Such operational benefits will be required to justify investment.

1.4 Assumptions

Specific CDTI requirements will depend on the operational needs of particular applications.

Depending on the intended use, the CDTI may be configured to display different types of traffic information. Additional configuration control information may be provided.

Multiple sources of surveillance data will be used, when available, to provide the pilot with the best available information.

The CDTI function may be standalone or part of a MFD.

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