Application Descriptions for Initial Cockpit Display of Traffic Information (CDTI) Applications

September 13, 2000 Prepared by SC-186
RTCA DO-259

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Foreword

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1 Introduction

1.1 Purpose & scope

This document contains operational concepts for cockpit display of traffic information (CDTI) initial applications. The document will:

- Provide a preliminary description of four potential procedures utilizing a CDTI that may enhance current air traffic operations;
  1. Enhanced visual acquisition
  2. Enhanced visual approaches
  3. In-Trail (or lead) Climb and Descent in Non-Radar Airspace (Oceanic, En Route, and Remote)
  4. In-Trail (or lead) Climb and Descent to Co-Altitude in Non-Radar Airspace (Oceanic, En Route, and Remote)
- Describe the underlying pilot and controller tasks and responsibilities; and
- Derive required CDTI capabilities to enable the pilot to perform these tasks.

This document is intended for use by managers and staff at the Federal Aviation Administration (FAA), airlines, and avionics manufacturing companies involved with the planning, development, manufacturing, and certification of these capabilities and their authorization for use in the national airspace system (NAS). These application descriptions are an initial stage in the process of fully developing these applications and will need to be followed by other development and implementation activities as outlined in RTCA, 1999. As stated in that document, full participation throughout the process by all appropriate aviation organizations, including air traffic services; flight standards and aircraft certification offices; airlines, general aviation, military, and other users; avionics and airframe manufacturers; controller and pilot unions; and research and development organizations, is necessary for the accomplishment of the development and implementation process.

The intent of this document is to develop an initial definition of the procedures with sufficient detail to allow a specification of required CDTI capabilities, so that when the procedures are fully developed, tested and evaluated, and certified for use, the equipment may be capable of facilitating the implementation. The procedures described in this document would undoubtedly undergo considerably closer scrutiny and refinement prior to implementation. As of the writing of this document, the enhanced visual acquisition procedure is being coordinated and refined for operational implementation.

Potential procedural parameters (e.g., closure rate) are quoted for applications three and four. It is recognized that the magnitude of such parameters must be validated through safety analysis, which will also define surveillance system performance requirements in terms of accuracy, availability, continuity, integrity, and reliability. Where other procedures are described as background to the applications, no specific assumptions are made concerning the relative performance of existing systems supporting these procedures and the future systems to be used for CDTI applications.

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This document is accompanied by a companion document titled, "Minimum Operational Performance Standards for Cockpit Display of Traffic Information[1]," which specifies the minimum performance standards for the control and display elements for each of the applications described in this document (RTCA 2000a). The Minimum Operational Performance Standards for CDTI requirements are not only applicable to the four applications described herein, they are intended to support other applications that are not yet fully developed but are possible if the requirements are met.

Finally, avionics manufactures will need a third companion document, the Airborne Surveillance and Separation Assurance Processing Minimum Operational Performance Standards (ASSAP MOPS)[1] that will specify associated system performance requirements (RTCA, 2000b). A core objective of the ASSAP MOPS is to specify Required Surveillance Performance (RSP) needed to support aircraft-based surveillance and separation assurance applications, and to specify functional testing that assures RSP requirements are correctly implemented. Similar to the use of Required navigation Performance (RNP), RSP is a means to enable enhanced airspace procedures. Required surveillance performance includes attributes such a accuracy, integrity, availability, and continuity.

1.2 Background

The applications included in this document are a culmination of a multi-year process in the RTCA Special Committee SC-186 in describing and developing potential CDTI applications in enhanced air traffic operations.

The minimum aviation system performance standards (MASPS) for automatic dependent surveillance broadcast (ADS-B) describe nearly 80 potential applications of a CDTI based on ADS-B information for the near term as well as others more suitable for the far term (RTCA, 1998a). It includes those applications that involve only transfer of aircraft to aircraft surveillance information and others that include transfer of aircraft surveillance information to the ground-based system. A select FAA / industry group identified fourteen of these applications as candidates for development for near term implementation (see Table 1). A joint FAA / industry group prioritized this list on July 22-24, 1997. Those rankings are shown in the priority column of Table 1. The operations and implementation group (i.e., WG-1) of SC-186 used this list as the basis for further defining the initial applications.

[1] As of the writing of this document, both MOPS are under development. The CDTI MOPS and the ASSAP MOPS may not remain as two separate documents but may be combined into one master document.

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