RTCA, Inc.
1828 L Street, NW, Suite 805
Washington, DC 20036-5133 USA

Guidelines for Communication, Navigation, Surveillance and Air Traffic Management (CNS/ATM) Systems Software Integrity Assurance

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Prepared by: SC-190

FOREWORD

This report was prepared by Special Committee 190 (SC-190) and approved by the RTCA Program Management Committee (PMC) on March 5, 2002.

RTCA, Incorporated, is a not-for-profit corporation formed to advance the art and science of aviation and aviation electronic systems for the benefit of the public. The organization functions for now as a Federal Advisory Committee and develops consensus-based recommendations on contemporary aviation issues. RTCA's objectives include but are not limited to:

- coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;
- 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.

The organization's recommendations are often used as the basis for government and private sector decisions as well as the foundation for many Federal Aviation Administration Technical Standard Orders.

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1 DO-278/ED-109INTRODUCTION

The implementation of Communication, Navigation, Surveillance, and Air Traffic Management (CNS/ATM) systems has resulted in increased interdependence of systems providing Air Traffic Services (ATS) and systems onboard aircraft. CNS/ATM systems include ground, airborne, and space-based systems. In order for these systems to perform their intended function while providing an acceptable level of safety, there is a need to define consistent and/or equivalent means of providing integrity assurance for the software in these systems.

1.1 Purpose

This document provides guidelines for the assurance of software contained in non-airborne CNS/ATM systems. DO-178B/ED-12B, *Software Considerations in Airborne Systems and Equipment Certification,* defines a set of objectives that are recommended to establish assurance that airborne software has the integrity needed for use in a safety-related application. These objectives have been reviewed, and in some cases, modified for application to non-airborne CNS/ATM systems. This document is intended to be an interpretive guide for the application of DO-178B/ED-12B guidance to non-airborne CNS/ATM systems.

1.2 Scope

This guidance applies to software contained in CNS/ATM systems used in ground or space-based applications shown by a system safety assessment process to affect the safety of aircraft occupants or airframe in its operational environment. The assurance of software resident within the airframe boundaries, including CNS/ATM-related equipment, is addressed by DO-178B/ED-12B.

A description of the safety assessment process is not included in this document. Information on such assessments is available from other industry sources and in related regulatory guidance. Likewise, a complete description of the system life cycle processes, including system validation, as well as CNS/ATM systems approval, is not intended. This guidance is not intended to be a development standard nor a process document.

It should be noted that additional objectives and evidence may be needed for certain elements of CNS/ATM systems for reasons that are beyond the scope of this document (e.g., additional requirements due to the difficulty in servicing satellite systems).

1.3 Relationship to Other Documents

This document is intended to be used in conjunction with DO-178B/ED-12B and related explanatory material found in DO-248B/ED-94B, *Final Report for Clarification of DO-178B/ED-12B 'Software Considerations in Airborne Systems and Equipment Certification'*. Using DO-178B/ED-12B as a basis for this document is intentional and is intended to produce an equivalent level of assurance for the integrity of software in both non-air-