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Software Tool Qualification Considerations

RTCA DO-330
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FOREWORD

This report was prepared by RTCA Special Committee 205 (SC-205) and EUROCAE Working Group 71 (WG-71) and approved by the RTCA Program Management Committee (PMC) on December 13, 2011.

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 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.

Since the RTCA is not an official agency of the United States Government, its recommendations may not be regarded as statements of official government policy unless so enunciated by the U.S. government organization or agency having statutory jurisdiction over any matters to which the recommendations relate.

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1.0 INTRODUCTION

1.1 Purpose

The purpose of this document is to provide tool qualification guidance. Additionally, clarification material is provided in the form of Frequently Asked Questions (FAQs).

1.2 Scope

Software tools are widely used in multiple domains, to assist in developing, verifying, and controlling other software. In the context of this document a tool is a computer program or a functional part thereof, used to help develop, transform, test, analyze, produce, or modify another program, its data, or its documentation. Examples are automated code generators, compilers, test tools, and modification management tools. This document explains the process and objectives for qualifying tools.

This document was developed for the following reasons:

a. Tools are different from the software using the tools and form a unique domain; therefore, tool-specific guidance for both tool developers and tool users is needed.

b. Tools are often developed by teams other than those who use the tools to develop software. These tool development teams frequently do not have software guidance background (examples of guidance include DO-178C or DO-278A). This tool-specific document benefits tool development teams and helps them avoid confusion and misinterpretation.

c. This document provides guidance for airborne and ground-based software. It may also be used by other domains, such as automotive, space, systems, electronic hardware, aeronautical databases, and safety assessment processes.

1.3 How to Use This Document

When a domain or a project desires to use this document, the following should be considered.

a. To offer maximum applicability and flexibility, five tool qualification levels (TQLs) are defined; however, not all levels may be applicable for every domain. Each domain should determine the applicability of the TQLs for their particular needs. Please reference the appropriate domain-specific document (such as an RTCA, SAE, or EUROCAE document) to determine if, and to what level, a specific tool needs to be qualified. As an example, Appendix B shows how the DO-278A domain defines the tool qualification criteria and the applicable TQL for ground-based communication, navigation, surveillance, and air traffic management (CNS/ATM) software. However, each domain may use different criteria. For example, they may not use all TQLs; they may have different tool criteria which map to the used TQLs; or they may adapt some of the objectives of this document for their particular applicability.

b. Throughout this document terms such as “software life cycle”, “software processes”, “software plans”, and “software” are used to refer to the product life cycle, processes, plans, and domain where the tool will be used (that is, a software domain is used instead of a generic domain). For other domains the word “software” may be replaced