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

Software Considerations in Airborne Systems and Equipment Certification

RTCA DO-178B
December 1, 1992

Prepared by: SC-167

Copies of this document may be obtained from

RTCA, Inc.

Telephone: 202-833-9339
Facsimile: 202-833-9434
Internet: www.rtca.org

Please visit the RTCA Online Store for document pricing and ordering information.

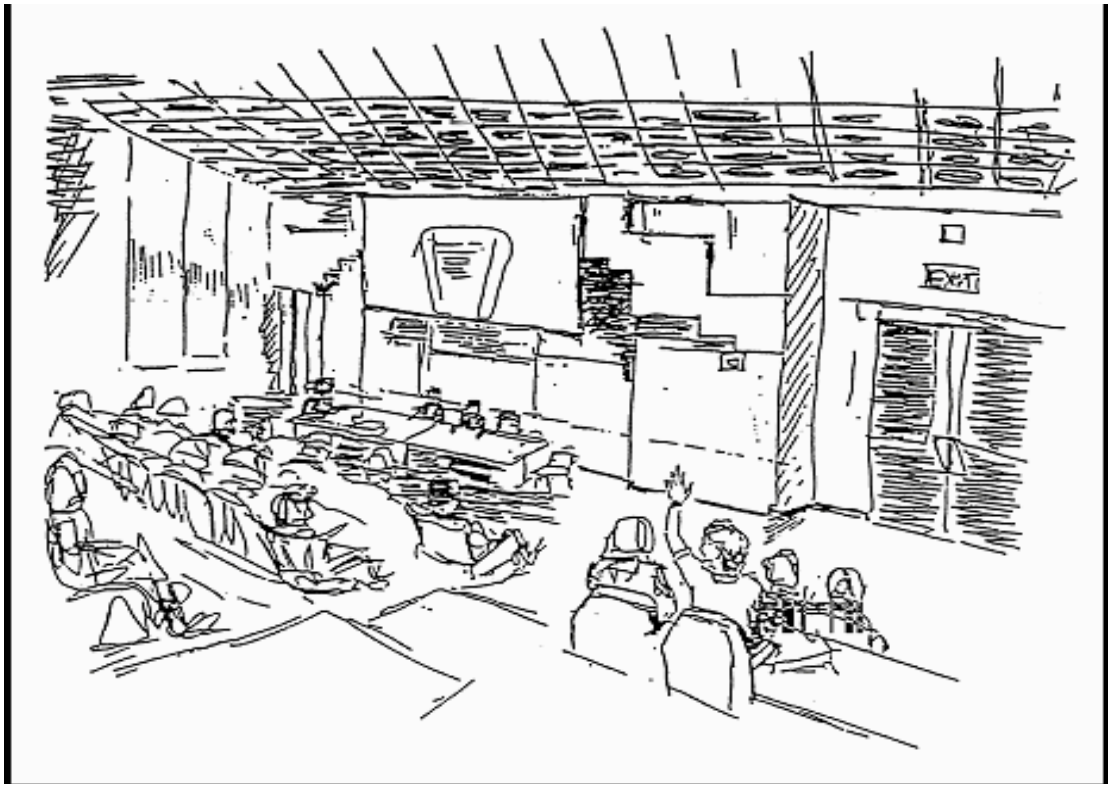
FOREWORD

This document was prepared by Special Committee 167 of RTCA, Inc. It was approved by RTCA, Inc. on December 1, 1992.

RTCA is an association of aeronautical organizations of the United States of America from both government and industry. Dedicated to the advancement of aeronautics, RTCA seeks sound technical solutions to problems involving the application of electronics and telecommunications to aeronautical operations. Its objective is the resolution of such problems by mutual agreement of its member and participating organizations.

The findings of RTCA are in the nature of recommendations to all organizations concerned. As 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 federal government organizations or agency having statutory jurisdiction over any matters to which the recommendations relate.

The development of these guidelines was jointly accomplished by RTCA SC-167 and the European Organisation for Civil Aviation Equipment (EUROCAE) WG-12 through a consensus process.



Consensus n. Collective opinion or concord; general agreement or accord. [Latin, from *consentire*, to agree]

TABLE OF CONTENTS

Page

Page

LIST OF FIGURES AND TABLES

FIGURES

TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

1 INTRODUCTION

The rapid increase in the use of software in airborne systems and equipment used on aircraft and engines in the early 1980s resulted in a need for industry-accepted guidance for satisfying airworthiness requirements. DO-178, "Software Considerations in Airborne Systems and Equipment Certification," was written to satisfy this need.

This document, now revised in the light of experience, provides the aviation community with guidance for determining, in a consistent manner and with an acceptable level of confidence, that the software aspects of airborne systems and equipment comply with airworthiness requirements. As software use increases, technology evolves and experience is gained in the application of this document, this document will be reviewed and revised. Appendix A contains a history of this document.

1.1 Purpose

The purpose of this document is to provide guidelines for the production of software for airborne systems and equipment that performs its intended function with a level of confidence in safety that complies with airworthiness requirements. These guidelines are in the form of:

- Objectives for software life cycle processes.
- Descriptions of activities and design considerations for achieving those objectives
- Descriptions of the evidence that indicate that the objectives have been satisfied.

1.2 Scope

This document discusses those aspects of airworthiness certification that pertain to the production of software for airborne systems and equipment used on aircraft or engines. In discussing those aspects, the system life cycle and its relationship with the software life cycle is described to aid in the understanding of the certification process. A complete description of the system life cycle processes, including the system safety assessment and validation processes, or aircraft and engine certification process is not intended.

Since certification issues are discussed only in relation to the software life cycle, the operational aspects of the resulting software are not discussed. For example, the certification aspects of user-modifiable data are beyond the scope of this document.

This document does not provide guidelines concerning the structure of the applicant's organization, the relationships between the applicant and its suppliers, or how the responsibilities are divided. Personnel qualification criteria are also beyond the scope of this document.

1.3 Relationship to Other Documents

In addition to the airworthiness requirements, various national and international standards for software are available. In some communities, compliance with these standards may be required. However, it is outside the scope of this document to invoke specific national or international standards, or to propose a means by which these standards might be used as an alternative or supplement to this document

Where this document uses the term "standards," it should be interpreted to mean the use of project specific standards as applied by the airborne system, airborne equipment, engine, or aircraft manufacturer. Such standards may be derived from general standards produced or adopted by the manufacturer for its activities.

1.4 How to Use This Document

These points need to be noted when using this document:

- Explanatory text is included to aid the reader in understanding the topic under discussion. For example, section 2 provides information necessary to understand the interaction