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Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications

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FOREWORD

This guidance document was jointly prepared by Special Committee 189 (SC-189) and the European Organization for Civil Aviation Equipment (EUROCAE) Working Group 53 (WG-53) and approved by the RTCA Program Management Committee (PMC) on December 14, 2000.

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 on 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 Telecommunications 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 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.

TABLE OF CONTENTS

1 INTRODUCTION 1

1.1 Purpose 2

1.2 Scope 3

1.3 Overview of the Guidance Material and Description of Related Standards 4
1.3.1 Guidance Material 4
1.3.1.1 Document Structure 5
1.3.1.2 Additional Considerations Using the Guidance Material 6
1.3.2 Operational Services and Environment Definition (OSED) and Related Standards 7
1.3.2.1 Operational Services and Environment Definition (OSED) 7
1.3.2.2 Operational, Safety, and Performance Requirements (SPR) Standard 7
1.3.2.3 Interoperability Requirements (INTEROP) Standard 7
1.3.2.4 MOPS and MASPS 8
1.3.3 Relationships of Guidance Material to Standards and Evidence 8

2 DESCRIPTION OF PROCESSES DESCRIPTION OF PROCESSES 11

2.1 Approval Planning 11

2.2 Coordinated Requirements Determination 12
2.2.1 Operational Services and Environment Information Capture (OSEIC) 14
2.2.2 Operational Safety Assessment (OSA) 14
2.2.3 Operational Performance Assessment (OPA) 15
2.2.4 Interoperability Assessment (IA) 17
2.2.5 Evidence for Coordinated Requirements Determination 17

2.3 Development and Qualification of a System Element 17
2.3.1 Development 18
2.3.2 Qualification 19

2.4 Entry into Service 20

2.5 Operations 21

3 APPROVAL PLANNING 25

3.1 Objectives for Approval Planning 25

3.2 Evidence for Approval Planning 26

4 COORDINATED REQUIREMENTS DETERMINATION 27

4.1 Objectives for Coordinated Requirements Determination 27
4.1.1 Operational Services and Environment Information Capture (OSEIC) 27
4.1.2 Operational Safety Assessment (OSA) 28
4.1.2.1 Operational Hazard Assessment (OHA) 28
4.1.2.2 Allocating Safety Objectives and Requirements (ASOR) 31

4.1.3 Operational Performance Assessment (OPA) 32
4.1.3.1 Determination of RCP Type 32
4.1.3.2 Allocation of RCP Type 33
4.1.4 Interoperability Assessment (IA) 34

4.2 Evidence for Coordinated Requirements Determination 35

5 DEVELOPMENT AND QUALIFICATION OF A SYSTEM ELEMENT 37

5.1 Development 37
5.1.1 Objectives for Development 37
5.1.2 Evidence for Development 38

5.2 Qualification 39
5.2.1 Objectives for Qualification 39
5.2.1.1 Validation Objectives 39
5.2.1.2 Verification Objectives 40
5.2.1.3 Process Assurance Objectives 42
5.2.1.4 Configuration Management Objectives 42
5.2.2 Evidence for Qualification 42

6 ENTRY INTO SERVICE 43

6.1 Objectives for Entry into Service 43

6.2 Evidence for Entry into Service 45

7 OPERATIONS 47

7.1 Objectives for Operations 47
7.1.1 Continued Operations 47
7.1.2 Development and Qualification of Follow-on Modification 48

7.2 Evidence during Operations 48
7.2.1 Continued Operations 48
7.2.2 Follow-on Modification 49

ANNEXES

Annex A Compliance Matrix

Annex B Acronyms, and Glossary of Terms and Definitions

Annex C OSED Guidance

Annex D SPR Guidance

Annex E OSA Guidance

Annex F OPA Guidance

Annex G INTEROP Guidance

APPENDICES

Appendix A Membership

Appendix B History and Terms of Reference of SC-189/WG-53

Appendix C Improvement Suggestion Form

TABLE OF FIGURES

Figure 1-1 ATS Supported by Data Communication Operational Environment 2
Figure 1-2 Generic Regulatory Framework for Approvals 3
Figure 1-3 Guidance Material Structure 6
Figure 1-4 Relationship of Guidance Material to Standards and Evidence 9
Figure 2-1 Process for ATS Supported by Data Communications 11
Figure 2-2 Approval Planning 12
Figure 2-3 Overview of Coordinated Requirements Determination 14
Figure 2-4 Development and Qualification of a System Element 18
Figure 2-5 RCP/ICP/ACP Development Phases 20
Figure 2-6 Entry into Service 21
Figure 2-7 Operations 23
Figure 4-1 Hazard Classification and Safety Objectives Relationship 31
Figure C-1 ATS Supported by Data Communication Operational Environment ..... An. C-1
Figure C-2 Operational Communication Process ..... An. C-3
Figure C-3 Clearance Request/Response Operational Service ..... An. C-7
Figure C-4 Achieved Transaction Distribution ..... An. C-11
Figure C-5 Single Transaction Scenario ..... An. C-12
Figure C-6 Two Overlapping Transactions Scenario ..... An. C-12
Figure C-7 Two Non-Overlapping Transactions Scenario ..... An. C-13
Figure E-1 Concept Model of Operational Environment, the Relationships Among Faults, Failures, Procedural Errors, and Airspace Characteristics, and the Risk Mitigation Strategy ..... An. E-2
Figure E-2 Hazard Classification and Safety Objectives Relationship ..... An. E-7
Figure F-1 Transaction Time ..... An. F-7

TABLE OF TABLES

Table 2-1 RCP Set of Parameters 16
Table 4-1 Operational Safety Assessment Hazard Classification Matrix 30
Table 6-1 Qualification Measures 44
Table C-1 Information Exchange Requirements ..... An. C-15
Table E-1 Operational Safety Assessment Hazard Classification Matrix ..... An. E-6
Table F-1 RCP Set of Parameters ..... An. F-3
Table F-2 Example RCP Type Values Table ..... An. F-3

1 INTRODUCTION

The International Civil Aviation Organization (ICAO) has introduced the concept of the communication, navigation, and surveillance/air traffic management system (CNS/ATM). This concept will enable improvements in ATM worldwide through the application of modern technologies to provide air traffic services (ATS). These ATS include the use of data communications between the operators and the ATS providers and will require an allocation of operational, functional, technical, and performance requirements to the different elements that comprise the CNS/ATM system. The CNS/ATM system elements will need to be qualified, separately and when integrated, for approval to ensure that the system performs as intended and is acceptably safe. Figure 1-1 at the end of this sub-section shows the CNS/ATM system in its operating environment.

For classical technologies, ICAO has standards in order to ensure worldwide interoperability between any aircraft and any ATS provider under the responsibility of the contracting States. The use of data communications between ATS providers and aircraft increases system complexity. Because of this increased complexity, ATS supported by data communications require a high degree of coordination among the stakeholders and approval authorities to ensure compatibility between operator use and ATS provision. There is a need for State/industry-accepted guidance material on the processes for coordinating implementation requirements and qualifying for different types of approvals.

This guidance material was developed considering the provision and use of ATS supported by data communications. The term "ATS" is used throughout this document to refer to "ATS supported by data communications." These include communication services such as communication management and clearances, navigation services such as flight planning, required navigation performance (RNP) monitoring and gross navigation error (GNE) prevention and detection, surveillance services such as position and intent reporting, and services that support ATM automation.

This guidance material is intended for stakeholders and approval authorities involved in the operational implementation of the provision and use of ATS supported by data communications. Stakeholders are those organizations that have a financial investment in the provision and use of ATS. Stakeholders include ATS providers, ATS equipment manufacturers, supporting service providers, such as those that provide communication and weather services, aircraft and equipment manufacturers, and operators. These stakeholders may be identified as applicants in the context of this document. Approval authorities are those organizations in control of or responsible for issuing approvals to any element of the CNS/ATM system.

This guidance material comprises criteria in clear and concise format to enable consistent results in its application throughout the world. The guidance material was developed jointly by RTCA, Inc. and the European Organization for Civil Aviation Equipment (EUROCAE) in consideration of the International Civil Aviation Organization (ICAO) activities and in cooperation with States worldwide.

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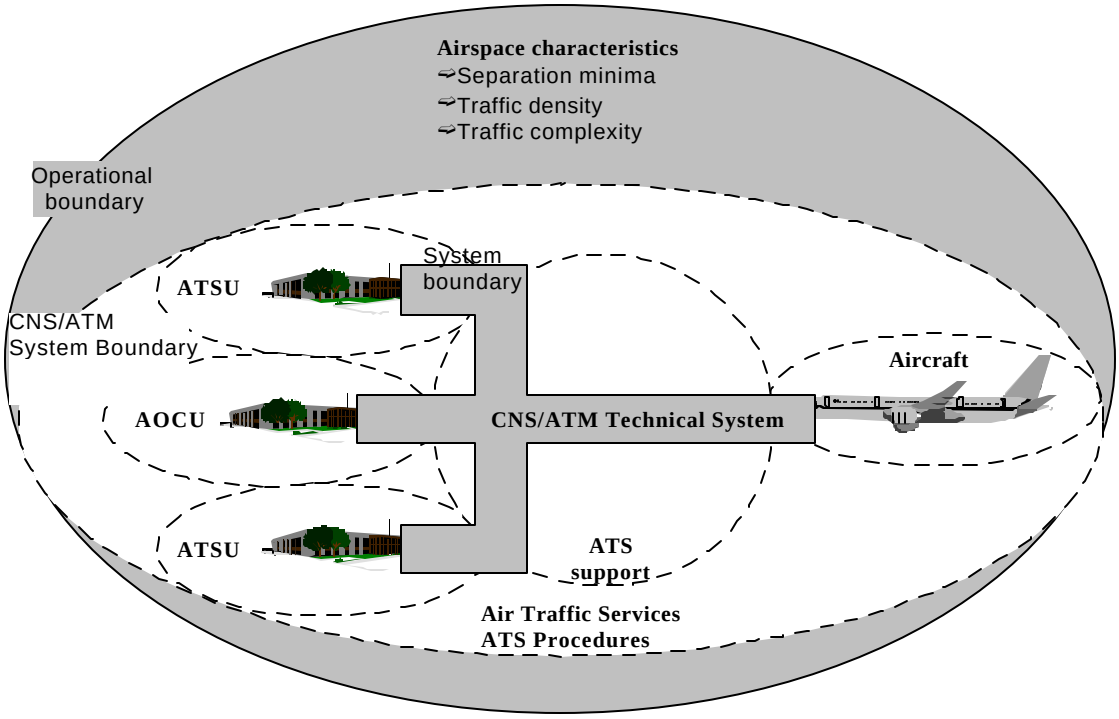


Figure 1-1 ATS Supported by Data Communication Operational Environment

1.1 Purpose

This guidance material recommends minimum acceptable criteria for approving the provision and use of an ATS supported by data communications when approvals are required to show compliance to civil regulations. The criteria are in the form of process objectives and guidance for evidence. As used throughout this document, evidence is data produced during the accomplishment of the process objectives. Applicants can use the evidence to show an approval authority that the objectives have been satisfied. For example, evidence may take the form of standards such as the SPR and INTEROP standards, or plans such as the approval plan, or results of verification activities such as test results. The formulation of related standards and the means to qualify related systems to those standards are discussed. "Approval" denotes those activities related to ATS provider operational approval, operator operational approval, and aircraft type design approval. These separate and distinct types of approvals collectively define the conceptual "CNS/ATM system approval." In cases for which there is no regulatory basis for approval of an element of the CNS/ATM system, "approval" denotes the activities that take place to establish implementation requirements and show compliance with the requirements allocated to that element. See Figure 1-2.

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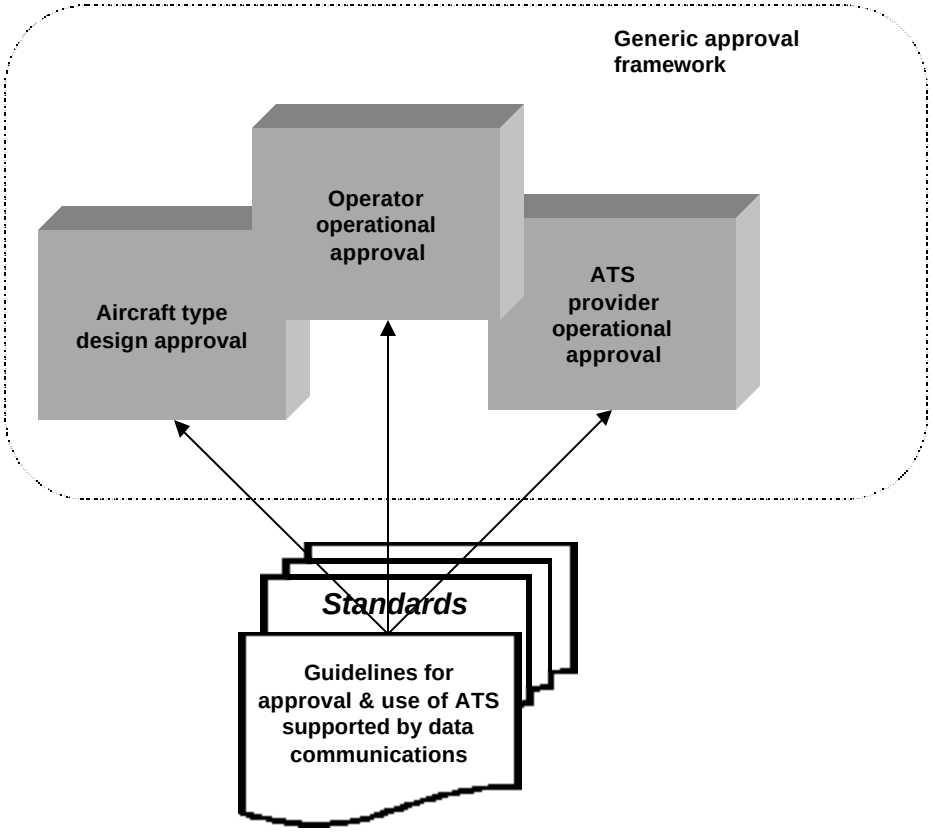


Figure 1-2 Generic Regulatory Framework for Approvals

- Operator operational approval is the authorization granted to an operator to use the ATS, aircraft equipage, communication services procured by the operator, and related inter-networks with the ATS provider's communication services. It is supported by information provided by the aircraft type design approval and ATS provider operational approval.

- Aircraft type design approval is the approval granted to an aircraft manufacturer or modifier to indicate that the type design of the aircraft equipage complies with applicable airworthiness requirements. It includes information to support operator operational approval.

- ATS provider operational approval is granted to an ATS provider for the provision of ATS within an airspace and includes information to support the operator operational approval. It includes approval of the technical system and the communication services procured by the ATS provider.

1.2 Scope

This document provides means to establish the operational, safety, performance, and interoperability requirements for ATS supported by data communications, to assess their validity, and to qualify the related CNS/ATM system. It is a single source document that provides guidance for approval of the CNS/ATM system and its operation where coordination is necessary across organizations. The guidance material considers the allocations of the operational, safety, performance, and interoperability requirements to the elements of the CNS/ATM system. These

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include ground-based elements, operational procedures, including the human, and aircraft equipage.

Some ATS supported by data communications provide surveillance functions. The performance associated with these functions may be characterized by required surveillance performance (RSP). During the preparation of this document the definition of RSP and methods for asserting RSP were considered. The conclusion reached, however, was that the specification of RSP is not currently defined to the level required for this purpose. Hence, this document does not provide guidance for RSP.

Other RTCA special committees and EUROCAE working groups may provide guidance material related to human performance, development assurance, and security. This document is intended to support such future guidance material.

Assessments that are *not* within the scope of this document include the following examples:

- safety assessments related to the disposal of hazardous materials used in test and evaluation, or in technical system development;
- performance assessments related to establishing requirements for optimizing efficiency for ATM;
- interoperability assessments related to data communications between two ATS units (ATSU) or between ATSUs and aircraft operational control (AOC) units; and
- occupational health and safety assessments for ATS facility workers.

However, States and organizations that perform such assessments can conduct them in concert with the activities related to the operational assessments to which this guidance material relates.

1.3 Overview of the Guidance Material and Description of Related Standards

This sub-section provides an overview of the guidance material, and a description of standards and other evidence for approval of the provision and use of operational implementations of ATS and aircraft equipage. The guidance material and standards are intended for use by the aviation community when ATS providers, operators or aircraft manufacturers/modifiers intend to:

- provide or use new or modified ATS supported by data communications;
- use an existing ATS supported by data communications differently from its original intent; or
- add new functions or technologies, or modify existing functions or technologies to support an existing ATS.

1.3.1 Guidance Material

The guidance material minimizes references to specific national regulations and procedures; instead, generic terms are used. The guidance material is not mandated by law, but represents a consensus of the aviation community. It also recognizes that alternative means may be available to the applicant to obtain approval. To aid the use of alternative means, the guidance material uses the word “should”. However, if an applicant declares this guidance material as means of compliance for one of the approval types and the approval authority accepts it, then the

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