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User Requirements for Navigation Data

RTCA DO-201C
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FOREWORD

This document was prepared by Special Committee 217 (SC-217) and EUROCAE Working Group 44 (WG-44). RTCA DO-201C and EUROCAE ED-77B are technically equivalent documents. It was approved by the RTCA Program Management Committee (PMC) September 25, 2025 and the EUROCAE Council on September 23, 2025.

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- 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.

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EXECUTIVE SUMMARY

This document provides industry requirements for navigation databases for aeronautical use by identified applications. The expectation is that navigation data originators, navigation data providers, and application integrators use this document when providing data to system designers and/or users. This document provides industry based Data Quality Requirements (DQRs) to facilitate end user development in support of an intended function.

This revision harmonizes this standard with RTCA DO-200C/EUROCAE ED-76B (especially the introduction and use of Data Integrity Level 2B - Basic), adds additional data elements to the data catalog based on recent ARINC 424 supplements, updates DQRs, and updates guidance on procedure design and coding. It addresses applications and related data needs that have emerged since the last revision, and removes Data Driven Charting (DDC) as a considered application in Appendix A. Definitions were also reviewed and updated throughout the document to maintain compatibility with other database and data processing standards. The numbering style for requirements and design objectives was modified, and a new appendix collecting the requirements and recommendations in tables was added. To accommodate the new identification style, a number of requirements and design objectives were reworded. Many recommendations in Section 5 were modified to plain text since they are guidance for procedure designers and not within the scope of user requirements. Data elements related to Microwave Landing System (MLS) were deprecated and references to MLS were removed. The content of Appendix E was removed since it has been superseded by the Fifth Edition of ICAO Doc 9613, PBN Manual. This revision also includes updates to reference documents, editorial updates, semantic clarifications, and corrections of errata from the prior revision.

RTCA DO-201C/EUROCAE ED-77B, User Requirements for Navigation Data, is organized as follows:

Chapter 1 Purpose and Scope explains the purpose of the document and summarizes its expected uses.

Chapter 2 Navigation Data Considerations provides overviews of reference datums and PBN concepts.

Chapter 3 General Requirements and Standards provides considerations for data calculation, naming, and distribution, and relationships to other aeronautical data standards.

Chapter 4 Specific Requirements provides specific requirements for Navigation Database content, relationships, and quality characteristics.

Chapter 5 Procedure Design Considerations provides procedure design and coding considerations for creating terminal procedures and Air Traffic Service (ATS) routes that are continuous and repeatable.

Chapter 6 Membership List lists the active committee members who developed this document.

Appendix A is to familiarize and provide examples of different applications that use navigation data.

Appendix B is a glossary of terms used in the document.

Appendix C provides abbreviations and acronyms used in the document.

Appendix D discusses best practices pertaining to the provision of information, including application of NOTAMs, and the effect on downstream users.

Appendix E is reserved (its content was deleted in this revision).

Appendix F provides tables of the requirements and recommendations in the document.

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1 PURPOSE AND SCOPE

1.1 Introduction

The information in this document has been compiled for the purpose of stating navigation and related operational data requirements of the aviation industry with emphasis on Performance Based Navigation (PBN) operations. The Unmanned Aircraft Systems (UAS) community may also be able to use the standards defined within this document, however, there is no evaluation of its applicability.

The requirements and associated standards presented are not all inclusive but represent those of immediate concern to PBN operations. Information in this document may also be of importance to Area Navigation (RNAV) and non-RNAV operations. Participants in the navigation data chain are urged to use information in this document while planning, organizing, developing, coordinating, and implementing PBN operations and other navigation concepts.

This document focuses on the importance of quality navigation data and the fact that:

- The evolution of computer navigation technology, including the development of Global Navigation Satellite System (GNSS) technology and the Required Navigation Performance (RNP) concept, necessitates a greater dependency on the accuracy, reliability, integrity, and timely availability of navigation reference data than ever before;
- There is a greater need for standardization in Aeronautical Information Management practices; and
- There is a greater need for clear and effective guidance in the development of navigation data than ever before.

Aeronautical information issues of importance to the aviation industry were first addressed in RTCA DO-201, "User Recommendations for Aeronautical Information" dated November 1988.

The objective of this standard is to reflect the current state of the art in the navigation domain in general and in particular the Performance Based Navigation principles. This version considers the latest requirements of the new Air Traffic Management (ATM) applications, with inputs from Single European Sky ATM Research (SESAR) and Next Generation Air Transportation System (NextGen) (e.g., 4D trajectory, Advanced PBN, SWIM, etc.), as well as changes suggested by industry and derived from authorities experience feedback. The standard aims at ensuring consistency with ICAO, ARINC and other related RTCA/EUROCAE standards related to data processing, in particular data quality (RTCA DO-200C/EUROCAE ED-76B "Standards for Processing Aeronautical Data"). The ICAO material on Navigation and Aeronautical Information (e.g., Annex 15, PANS-OPS, PANS-AIM, and PBN Manual) and the ARINC 424 standards were considered and leveraged as appropriate.

1.2 Scope

This document provides the minimum requirements and reference material applicable to the content, origination, publication, and updating of navigation data and related operational data. The objective of this document is to support the creation of the data quality requirements for navigation databases by end users and application integrators in accordance with DO-200C/ED-76B provisions. Navigation data originators and providers can benefit from using this document when developing data for their users. It is also

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intended to provide procedure designers and developers of procedure design criteria a basic understanding of the coded navigation data.

Navigation data is information needed for the position and path definition of an aircraft. This includes, but is not limited to: waypoints, airports and runways, routes and procedures, navaids, and landing system infrastructure. It excludes terrain, obstacle, and cultural data (e.g., geopolitical borders, water features, etc.).

Operational data is data that is not required for navigation but used for navigation operations. It includes, but is not limited to, airspace, communication, and aerodrome data.

The data requirements included in this standard have been compiled in order to support the functions and applications listed in Appendix A; however, this document does not define requirements for the applications themselves. This standard does not consider and is not intended to apply to data driven charting (DDC) functions.

1.3 Definition of Terms and Conventions

The following conventions have been adopted:

- The term “shall” is used to identify requirements within this standard.
- The term “should” is used to identify recommendations within this standard.

Requirements are uniquely numbered to support requirements traceability procedures. Requirements (“**shall**” statements) are enumerated with identifiers in the format **NAV-RXXX**, where XXX is an identifier (ID) unique across all requirements in the document. The letter ‘R’ specifies this as a requirement.

Recommendations (“**should**” statements) are enumerated with an ID formatted as **NAV-DXXX**, where XXX is an ID unique across all recommendations in the document. The letter ‘D’ specifies this as a recommendation (design objective).

Each ID is specific to the version of the document in which it appears. However, an ID number associated with a requirement or recommendation does not change from one version to another unless the intent of the requirement changes. Requirement IDs do not change due to editorial or clarification modifications, or due to moving requirements to a different place in the document.

If the intent of a requirement or recommendation changes, the ID used in the previous version is eliminated and never reused. A new ID is assigned for the new document version.

For example, if the requirement, “The user shall assure that the bicycle requirements are attained” were modified to state, “The user shall assure that the bicycle requirements are accomplished”, the requirement ID would not be changed, since the intent of the requirement is still to ensure that the bicycle requirements are satisfied. However, if it were modified to state, “The user shall assure that the bicycle requirements are attained and recorded,” the requirement ID would change, since the scope of the requirement expanded to include recording the requirements, as opposed to just satisfying them.

Requirements that are deleted or deprecated never have their identifiers reused.

Graphic illustrations appearing in different Sections and Appendices of this document are conceptual and were developed strictly to support textual discussions. They are not intended to be used for developing cartographic charting criteria or standards. The equivalent graphic symbols to be used by States are specified in ICAO Annex 4.

A glossary of terms used in this document is provided in Appendix B.

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