

RTCA, Inc  
1150 18th Street NW, Suite 910  
Washington, D.C. 20036  
USA

# **Internet Protocol Suite Profiles**

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Prepared by: SC-223  
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Copies of this document may be obtained from

RTCA, Inc.

Telephone: 202-833-9339

Facsimile: 202-833-9434

Internet: [www.rtca.org](http://www.rtca.org)

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## **FOREWORD**

This document was prepared by Special Committee 223 of the RTCA, Inc and Working Group 108 of EUROCAE. It was approved by the RTCA PMC on September 12, 2019 and the EUROCAE Council on September 16, 2019.

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 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 or Advisory Circulars.

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## EXECUTIVE SUMMARY

This Internet Protocol Suite (IPS) Profiles document specifies the unique adaptations required to enable the current Internet Engineering Task Force (IETF) Request for Comment (RFC) documents to specify technical requirements for Aeronautical data communications between an aircraft system and its corresponding peer host systems on the ground. It should be noted that these Profiles may be applied to support ground-ground aeronautical communications as well as command and control communication of Remotely Piloted Aircraft Systems (RPAS) or Unmanned Aircraft Systems (UAS). Additional provisions would be required to support air-ground digital voice. Voice communication may be supported using these Profiles. However, no special provisions have been made in these Profiles for digital voice or ground-ground communications. The Profiles document was developed under collaboration between the RTCA Special Committee 223 (SC-223) and the European Organization for Civil Aviation Equipment EUROCAE Working Group-108.

The “purpose and scope” section concentrates on introducing the technology and describes the Terms of Reference (ToR) agreement for IPS profiles development. It defines the bounds of the investigation, the required cooperation between RTCA and EUROCAE and provides a clear scope prescribing guidelines for profiles development. In this section, various glossary terms used in the document are described.

The background section provides an overview of system characteristics including concept of operations and principal users of IPS. The operational concepts illustrate the different operational environments and requirements this technology is required to meet. A description of assumptions is provided in the IPS Minimum Aviation System Performance Standards (MASPS) along with verification procedures necessary to validate profile parameter selection.

The technical profiles section describes technical parameter selection required to meet aviation communication requirements. The objective of the parameter and specific requirement selection is to ensure deterministic behavior of IPS system and to ensure interoperability of various IPS sub-systems supporting safety of flight services. As IPS encompasses a variety of hosts and routers, a set of device classes has been defined for IPS and parameters are assigned to each device class to meet the operational uses for different environments supporting different aeronautical safety services.

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# 1 PURPOSE AND SCOPE

## 1.1 Introduction

This document contains the technical Profiles of the Internet Engineering Task Force (IETF) Request for Comments (RFC) series of documents addressing relevant Application, Transport, Network, Addressing and Naming, Security, Mobility, and Multi-link communication functions for the Internet Protocol Suite (IPS). These Profiles specify characteristics that should be useful to designers, installers, manufacturers, service providers and users for IPS systems intended for operational use within the United States National Airspace System (NAS) and the European Airspace. Where systems are global in nature, the system may have international applications which are taken into consideration.

Compliance with these Profiles will be mandated through the regulatory process to assure that the system and each subsystem will perform its intended function(s) satisfactorily under conditions normally encountered in routine aeronautical operations for the environments intended. The Profiles may be implemented by one or more regulatory documents and/or advisory documents (e.g., certifications, authorizations, approvals, commissioning, advisory circulars, notices, etc.) and may be implemented in part or in total. Any regulatory application of this document is the sole responsibility of appropriate governmental agencies.

Section 2.0 of this document describes the IPS and provides information needed to understand the rationale for system characteristics and requirements which are stated by IPS comprising the Transport, Network, Addressing and Naming, Security, Mobility, Multi-link, Network Management and System Interfaces. It describes typical application use cases and concept of operations, as envisioned by members of RTCA Special Committee - 223 and EUROCAE Working Group - 108 and establishes the basis for the Profiles stated in the following sections. Definitions and assumptions essential to proper understanding of this document are also provided in this section.

Section 3.0 of this document specifies the high-level functional requirements for each of the major IPS functions followed by references to Appendix A that identifies IPS profile tables by IPS Device Classes for each IETF RFC related to those functions. The IPS Device Classes are described in Table 1-2.

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Appendix D contains the complete list of RFCs mentioned in this document with hyperlinks to the IETF site to aide their use by the reader.

The word “subsystem” as used in this document includes all components that make up a major independent, necessary and essential functional part of the system so that the system can properly perform its intended function(s). If the system, including any subsystem, includes computer software, the guidelines contained in RTCA/DO-178() /EUROCAE ED-12() should be considered for airborne applications and other applicable standards for non-airborne applications.