REQUIREMENTS SPECIFICATION
FOR AVIONICS COMPUTER RESOURCE (ACR)

RTCA DO-255
June 20, 2000

Prepared by
SC-182

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Foreword

This report was prepared by Special Committee 182 (SC-182) and approved by the RTCA Program Management Committee (PMC) on June 20, 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 recommendations on contemporary aviation issues. RTCA's objectives include but are not limited to:

X coalescing aviation system user and provider technical requirements in a manner that helps government and industry meet their mutual objectives and responsibilities;

X analyzing and recommending solutions to the system technical issues that aviation faces as it continues to pursue increased safety, system capacity and efficiency;

X 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

X 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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1. Introduction

As the aviation industry moves to embrace implementation techniques developed for the computer industry, relationships between avionics equipment and operational function are changing. Software has become a principal medium for implementing the operational function. The airplane appliance has become a computer platform which executes the software program. Technology turnover in computer and electronic industry is short compared with the lifetime of an aircraft. Open system concepts allow the application software and the computer platform to be developed and evolve independently. During aircraft installation the software and computer platform components are integrated into a system which provides the desired operational capability.

These Requirements Specifications for the Avionics Computer Resource (ACR) are intended to facilitate certification efficiency and economy of scale of the computer platform. The functionality is that of a general purpose computing resource. As a resource for hosting application software, these parameters are a consistent set of computation services, the performance of those services, a robust partition environment, quantity and capacity of resources.

Certain attributes, valuable to a high integrity computing platform suitable for aviation application, are prescribed. However, specific values for performance, quantity, and capacity that would quickly become obsolete are left for the ACR manufacturer to specify. This specification requires the preparation of a data sheet that enumerates the relevant aspects of the resource being provided. This provides for scalability and allows this specification to be stable over time.

To comply with this Requirements Specification, the ACR manufacturer is obligated to prepare a data sheet which conveys performance, capability and capacity in a consistent manner. Qualification of the ACR design assures that the necessary attributes are implemented and that the performance declared in the data sheet over a foreseeable range of environmental conditions is achieved. Compliance with this Requirements Specification demonstrates equipment operation and performance prior to installation on an aircraft.

1.1 Purpose and Scope

This document contains the Requirements Specification for an Avionics Computer Resource (ACR). The ACR provides shared computation resources, core software and signal conditioning necessary to interface with a variety of aircraft systems. The ACR provides a highly adaptable computer environment for a variety of software applications. By complying with the requirements specified by this specification, the ACR and the software applications may be independently developed. Together the ACR and installed software applications perform one or more aircraft functions.

The aircraft functions can be hosted on multiple ACR platforms that can be provided by multiple vendors. Compliance with this Requirements Specification ensures a complete specification of the Application Programming Interface (API) provided by the ACR, its