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

Safety, Performance and Interoperability Requirements Document for ATSA-SURF Application

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Prepared by: SC-186
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1 INTRODUCTION

This document provides the minimum operational, safety, and performance requirements (SPR) and interoperability requirements (INTEROP) for the implementation of enhanced Airborne Traffic Situational Awareness (ATSA) for Surface (SURF) Operations. The ATSA-SURF application is fully defined in the Operational Services and Environment Definition (OSED) found in Annex A.

All material in this document was developed jointly by EUROCAE Working Group 51 and RTCA Special Committee 186, within the group commonly referred to as the "ADS-B Requirements Focus Group" (RFG).

This document was developed based on the criteria for SPR and INTEROP documents set forth in RTCA DO-264/EUROCAE ED-78A, "Guidelines for Approval of the Provision and Use of Air Traffic Services Supported by Data Communications.[25]. It provides the minimum ATSA-SURF requirements - and allocations thereof - based on the results of a coordinated requirements determination process.

The requirements specified in this document are necessary to provide adequate assurance that the appropriate aspects of the relevant Communication Navigation Surveillance and Air Traffic Management (CNS/ATM) system, when operating together, will perform their intended function in an acceptably safe manner for the operations defined in the OSED. The system here includes airborne and, optionally, ground elements.

Whilst all detailed SPR related assessments are found in Annexes to this document, Chapter 3 presents the outcome of the reconciliation process of all of these results into a single set of underlying safety and performance requirements. This process retains the most stringent requirement for those attributes or parameters commonly treated by both the safety and performance assessments. Traceability of those requirements is provided back to the corresponding assessment(s).

1.1 Purpose of This Document

This document defines and allocates the set of minimum requirements for the end-to-end operational, safety, performance, and interoperability aspects for implementations of the ATSA-SURF application. Allocation of these requirements is done by this SPR/INTEROP to the necessary domains of the CNS/ATM system, i.e., at aircraft and Ground Domain level.

These requirements can be used for approval processes including aircraft type design approval, aircraft operator operational approval, and (should they be provided) Air Traffic Services (ATS) provider operational approval. Section 1.1.2 below provides more information on the use of this document for approvals.

In addition, this document also provides guidance to determine the levels of design assurance and performance that are needed for each element (aircraft, opera-

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tor, and, if applicable, ANSP—Air Navigation Service Provider) to support the ATSA-SURF application.

The ATSA-SURF SPR and INTEROP are also envisaged to be used along with those from other surveillance applications, based on Automatic Dependent Surveillance Broadcast (ADS-B), to develop minimum standards for avionic systems to assure that all subsystems perform their intended functions adequately for these applications.

1.1.1 ATSA-SURF Overview

The primary goal of the ATSA-SURF application is to reduce the potential for errors, runway and taxiway incursions, and collisions by providing enhanced situational awareness to the flight crew operating an aircraft on the airport surface, and including final approach, landing and takeoff operations in the vicinity of the airport surface.[1]

Note: This document defines the basic requirements for ATSA-SURF, a traffic situation awareness application. It is envisioned that the application may be seamlessly integrated with future applications including ATSA-SURF IA, ATSA-AIRB, data link clearances, and taxi path display. However, this document only addresses the traffic situational awareness element in order to support standalone versions of the application.

Note: While the ATSA-SURF Traffic Display also provides the additional awareness of Ownship position and navigation, this SPR only addresses the Traffic Situational Awareness elements. Ownship positioning and navigation uses of the Display are addressed in other standards, e.g., RTCA DO-257A and DO-272B/ED-99B. For example, DO-257A, Section 2.3.1, requires that the display provide "an indication if the accuracy implied by the display is better than the level supported by the total system accuracy," a requirement essential to the navigation function that is not included in this SPR as it is not required for situational awareness.

The ATSA-SURF application does not change the responsibilities of either pilots or controllers. The flight crew continues to be responsible for the operation of the aircraft and for complying with the provided clearance, and the controller continues to be responsible for assuring safe surface operations through appropriate issuance of clearances throughout the ATSA-SURF application.

The full OSED for ATSA-SURF on which all analyses in this SPR/INTEROP is based is contained in Annex A of this document.

1.1.2 Use of Document for Approvals

This document is intended to support the approval of all elements of the CNS-ATM system that relate to the application of ATSA-SURF.

[1] All vehicles and aircraft active on the airport surface and in the air in the vicinity of the airport as described in the notes of ASSUMP-OSED.4.

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The corresponding safety, performance, and interoperability assessments are based on the detailed specification of the OSED. States or regions implementing an application different to that specified in the OSED must take into account those differences in the operations or environment in supporting analysis.

The assessments and specifications in this document are not intended to be a sole basis for operational and airworthiness approval. However, this material can be used as an important component for establishing minimum design and system performance standards for ANSP, aircraft operator, and aircraft certification approvals for the ATSA-SURF application.

1.1.3 Relationship to Other Applications

This document considers the requirements of ATSA-SURF as an isolated application. Consequently, it defines the basic display of traffic superimposed on a moving map display. In practice, it is envisioned that ATSA-SURF will be implemented together with other Package 1 applications (see section below) as well as with other applications which may provide additional information on the same display. While it is recognized that the seamless integration of these applications along with appropriate user interfaces for the multi-function display are critical design issues that must be considered by implementers and in lower level minimum operational performance specifications, such aspects are outside the scope of the requirements specified in this document.

In developing the ATSA-SURF application, aircraft and avionics system designers should consider any additional specifications that ensure compatibility and enhanced performance with current and future, more demanding Airborne Surveillance Applications (ASA). For aircraft equipped with both ATSA-SURF and ATSA-AIRB [38], the transition between these applications is determined by the depiction or removal of the airport map on the Traffic Display as the aircraft operates within the ATSA-SURF region of operation. If the airport map is not displayed, the aircraft operates using ATSA-AIRB. Annex A describes the relationship between surface operations applications defined in DO-317 [36] and ATSA-SURF. In addition, enhancements to ATSA-SURF may be considered by other applications, e.g., ATSA-SURF IA [40] through the issuance of indications and alerts relative to some types of traffic maneuvers and encounters.

1.2 Scope of the Document

This document includes the definition of the services and the environmental conditions relevant to the implementation of the ATSA-SURF application, and the operational, safety, performance and interoperability requirements for using the application.

Note: Requirements that provide for protection against intentional behavior causing harm or sabotage are beyond the scope of this document.

Note: Requirements related to the recording of ADS-B data for accident or incident investigation purposes are beyond the scope of this document.

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