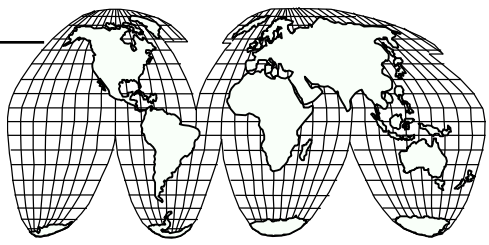
RTCA

Government/Industry Operational Concept for the Evolution of Free Flight

Addendum 3.1:
SURVEILLANCE
Roadmap for Surveillance Modernization

Approved by the RTCA Free Flight Steering Committee
August 16, 2000



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Foreword

This report was approved the RTCA Free Flight Steering Committee on August 16, 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:

- 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.

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.

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Executive Summary

This roadmap presents a consensus for the evolutionary modernization of surveillance capabilities in the National Airspace System (NAS). This roadmap is based on the operational objectives identified in the RTCA document, *Addendum 3: Surveillance, Government/Industry Operational Concept for the Evolution of Free Flight.* Both documents are driven by the ubiquitous need to improve aviation safety, capacity and efficiency. While many near term improvements are defined, the transition period for fully implementing new technologies will extend to the year 2020.

The modernized surveillance system must combine new operational procedures, improved automation and decision support tools, and new sensor technologies for both air and ground users to achieve the needed benefits. This must be accomplished within FAA budget constraints, and with aircraft systems that are affordable to all users.

This roadmap transforms the Concept of Operation into a set of target architecture characteristics. Fundamental characteristics of the desired target state include delivery of a common surveillance "picture" to ATC service providers, flight crews, and airport/airline operational personnel, the utilization of "enriched" surveillance data for decision support tools, and reliance on ADS-B as the "cornerstone" of the future surveillance architecture. Key characteristics of the target architecture and the evolutionary steps include the following:

- Use of cooperative surveillance will become the system's cornerstone, where cooperative surveillance is defined as a method of surveillance requiring participating aircraft to carry some form of cooperating electronic equipment. With cooperative surveillance, the system depends to some extent on data supplied/derived via positive exchange of surveillance data.
- NAS Surveillance is based on dual independent surveillance coverage; e.g., today it is Primary & SSR.
  - Protects against operational capability failures under single failure events
  - Retains operational fall back to procedural airspace under multiple failure conditions
- Surveillance is performance-based, in harmony with the Performance-based NAS.
  - Supports Required Surveillance Performance (RSP) based operations, procedures and automation.
- Consistent, relevant information is distributed to all users
  - Decision support tools and automation uses new and expanded information.
- The architecture provides cost-effective, performance-based surveillance NAS
  - Provides greatly expanded surveillance coverage
  - Information exchange coverage couples airborne capabilities and new operational concepts

This document also identifies key business case considerations and activities that will appropriately justify both FAA and industry investment commitments. Addressing these considerations is critical to validating the envisioned architecture and anticipated operational benefits.