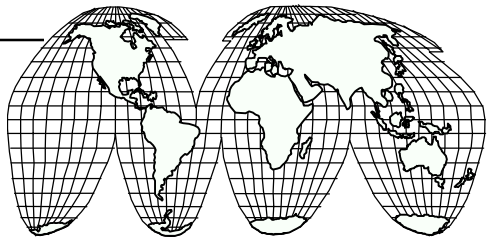
RTCA

Government/Industry Operational Concept for the Evolution of Free Flight

Addendum 3:
SURVEILLANCE

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

Surveillance provides a view of operations within the National Airspace System (NAS). Safety and efficiency are the essentials of this system. As the demands of capacity and efficiency grow, so must our ability to assess the immediate and evolving operations within the NAS. Safety and efficiency can improve when a common understanding of system participant needs and desires are known, and appropriate procedures and technologies applied. Surveillance plays an integral role in the NAS in separation assurance, traffic flow management, flight planning, fleet management, collaborative decision making, and collision avoidance. This document discusses those needs and our opportunities to advance system performance as they have evolved since RTCA published the *Government/Industry Operational Concept for the Evolution of Free Flight* in December 1997. Fundamental to this concept is the recognition that safety is the keystone to future enhancements. The path to enhanced safety also provides an opportunity to increase both efficiency and capacity. Improving the dissemination availability and quality of surveillance information represents one fundamental means by which safety, efficiency, and capacity will be enhanced.

In this document, **surveillance** is defined as the detection, tracking, characterization, and observation of aircraft, other vehicles, and weather phenomena for the purpose of conducting flight operations in a safe and efficient manner. The primary purposes of surveillance are to control the flow of aircraft, to provide situation awareness to pilots and controllers, and to separate aircraft. Methods of surveillance include voice reports, visual acquisition, radar (both primary and secondary), and other new technologies such as automatic dependent surveillance. Surveillance information (including position, velocity vector, identification, and intent) can be used either in a ground facility or in the cockpit. In addition, surveillance may be used to support functions such as fleet monitoring and management, traffic flow management, and search and rescue operations. The quality of aircraft surveillance can be described in terms such as the target update rate, position accuracy, velocity vector accuracy, integrity, reliability, and availability.

This surveillance concept of operations is intended to document one of the essential elements of Free Flight. It is part of an overall government/industry activity to look at the evolution of surveillance services and of the surveillance architecture. A companion document describes the surveillance technology, architecture, and a roadmap needed to achieve the operational concept described herein. Along the way, evaluation of procedures, technologies, advances in Human Computer Interface (HCI), and domestic and international policies will shape the final outcome. In addition, there are other efforts currently underway in international fora, such as Eurocontrol and International Civil Aviation Organization (ICAO), to promote a global airspace, which provides increased capacity, efficiency, cost effectiveness, and safety across international boundaries.

The approach described herein transitions from the current radar/interrogator baseline of surveillance information to a digital information environment that encompasses air and ground operations. This approach focuses on providing shared real-time surveillance