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Recommendations Regarding the Concept of Equipage and Mandated versus Voluntary Considerations

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Foreword

This report was approved by the RTCA Free Flight Steering Committee on August 21, 2002.

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 system technical issues that face aviation 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 (ICAO) 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 (FAA) 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

The Federal Aviation Administration's (FAA) Operational Evolution Plan (OEP) is intended to provide a framework for a milestone driven implementation of capabilities, which increase the capacity and efficiency of the National Airspace System (NAS). The OEP focuses on four major problem areas including en route severe weather, en route congestion, arrival/departure rate, and airport weather conditions. It is a living plan with a goal to achieve an estimated 30% NAS capacity improvement by 2010 and is intended to adjust to new priorities and new technologies as they emerge and mature.

The RTCA Free Flight Steering Committee has accepted the role of facilitator and coordinator of industry commitment to the OEP. This committee at the request of the FAA Director, OEP, formed the Concept of Equipage (CoE) and the Mandated vs. Voluntary Equipage (MvV) Recommendations working groups to promote community participation.

Concept of Equipage Working Group (CoE)

The CoE objective was to develop a recommended process and milestones for preparing a Concept of Equipage. The Select Committee's recommendations(s) were to consider industry's on-going equipage related initiatives and include time lines as well as other issues including those attendant with all segments of the fleet. As the CoE Working Group proceeded in it's tasking, it conducted a detailed analysis of the OEP initiatives that had aircraft equipage implications. It was found that there were essentially four broad categorizations of capabilities that may require aircraft equipage: DRVSM, RNAV, CPDLC (ATN) and FANS-1/A. As the group's work continued, it was realized that a "Concept of Equipage" was not able to be completely defined at this time. This is due to the need for additional detail of capabilities requiring aircraft equipage in the current version of the OEP. The recommendations identified reflect the need for further work and information to satisfy the original objectives.

Concept of Equipage Recommendations

The following recommendations were developed by the Concept of Equipage group and, if adopted, will provide the needed information to develop more specific future Concept of Equipage guidelines for users.

1. Clearly define and provide more detail for those OEP capabilities that result in aircraft equipage requirements. This is necessary to refine avionics equipage to determine specific costing and installation timelines.
2. Determine the costs and benefits associated with various levels of incremental equipage (e.g., can 80% of the airspace capacity enhancement be realized from 20% equipage? or can significant benefits be realized from regional or hub implementations?).
3. Identify user ground infrastructure required by some OEP solutions (e.g., flight planning software, simulators, surface management systems, etc.).

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4. Prioritize capability implementation timelines based on industry near and far term requirements.

Mandated vs. Voluntary Working Group (MvV)

The Free Flight Steering Committee's MvV working group objective was to develop recommended guidelines and criteria for use when the FAA is considering voluntary vs. mandated equipage as a basis for implementing new operational capabilities in the NAS. The group was charged with the following tasks:

- Reach user community consensus on basic definitions of terms such as Mandated and voluntary when applied to categorization of equipage.
- Identify each OEP functional capability/system requiring new or modified avionics, along with attendant milestones and interdependencies.
- Develop specific suggested criteria that could be applied to OEP technologies, on a function-by-function basis, when attempting to categorize as Mandated or voluntary.
- Recommend procedures and/or potential incentives that would encourage early voluntary equipage.

Mandated vs. Voluntary Recommendations

The following recommendations that are abbreviated from those in the final report, if implemented, will contribute to a further refinement of the Mandated/voluntary decision making process.

1. The OEP should remain consistent with the National Airspace System (NAS) Concept of Operations. Since the OEP is a living document, the FAA should standardize the equipment performance requirements needed to meet OEP initiatives.
2. The FAA should include in the OEP a greater level of detail concerning the expected benefits.
3. The FAA and industry should consider very small implementation steps, such as location specific peak-demand and/or specific operational hours requiring a level of equipage in order to operate at an airport. This will drive a minimum level of capability needed to meet demand over a given period of time without impacting large airspace areas, or aircraft operations in the vicinity of FAA identified pacing airports.
4. The FAA and industry should complete a comprehensive OEP simulation that analyzes the resulting data to validate assumptions and possibly identify additional incentives for voluntary equipage.
5. The FAA should recognize that for General Aviation, the decision to equip with a new capability is serial rather than parallel. The FAA must produce the capability (infrastructure, service, authorizations, etc), then the avionics manufacturers will measure level of interest and make a business decision on whether or not to develop the avionics. Finally, the end owner/operator decides to equip with it (or not).

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6. The FAA should specifically and succinctly indicate the levels of capability, and dates they will be introduced. The OEP does not currently have sufficient detail (infrastructure, procedures, authorizations, certification, etc.) for an aircraft owner/user to decide whether to equip, and when.
7. Since the mission of the DoD is to win our nation's wars and that military aircraft are merely tools to achieve that end, funding demands that don't directly support that mission are difficult to justify to senior leaders balancing numerous and costly requirements. DoD's 15,000+ fleet with multiple roles and airframes, generates difficult equipage considerations that may dictate a slower equipage rate than the commercial sector. The FAA should allow partial fleet equipage or extended time to equip for military fleets where equipage for military aircraft is considered essential.

Summary

At the conclusion of both groups work scope both groups generally observed the need for the FAA and industry to continue working together to determine the proper information to allow decisions on a Concept of Equipage or to determine Mandated vs. Voluntary equipage. All stakeholders are trying to balance current cash flow and capital resources to meet NAS modernization needs, which is sometimes in direct conflict with the operational needs of the aircraft owner/operator. The FAA is also balancing a multi-billion dollar spend with the OEP implementation. It should be noted that the recommended need for further definition of OEP specified capabilities that may require aircraft equipage and the need to determine if partial levels of equipage would be beneficial, are common to the two working groups and were concluded independently, emphasizing their importance.

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Recommendations Regarding the Concept of Equipage and Mandated vs. Voluntary Considerations

1 Introduction

Created in December 2001, the Federal Aviation Administration's (FAA) Operational Evolution Plan (OEP) provides a framework for increasing the capacity and efficiency of the National Airspace System (NAS). The OEP was established, focusing on a milestone driven implementation of capabilities, to increase capacity and efficiency in the NAS. The OEP focuses on four major problem areas that include en route severe weather, en route congestion, arrival/departure rate, and airport weather conditions. The goal of the OEP is to achieve an estimated 30% NAS capacity improvement by 2010 with 12.5% of the OEP benefit linked to new runways. This plan will focus on operational changes that enhance efficiency while aligning with other FAA strategic efforts (i.e., NAS architecture).

The OEP is a living plan intended to adjust to new priorities and new technologies as they emerge and mature. The OEP is outcome driven with clear lines of accountability within and between FAA organizations that have aligned activities, budgets and schedules to achieve OEP objectives. The RTCA Free Flight Steering Committee has accepted the role of facilitator and coordinator of industry commitment to the OEP. This committee formed the Concept of Equipage (CoE) and the Mandated vs. Voluntary Equipage (MvV) Recommendations working groups to promote community participation.

> OEP updates and revisions will be coordinated through the Free Flight Steering Committee. This process will enable the OEP to evolve as we progress to increase capacity and efficiency in the NAS.

Steering Committee initiated the CoE working group at the request of the FAA Director, OEP, with guidance from the RTCA Policy Board. The CoE objective is to develop a recommended process and milestones for preparing a CoE. The Select Committee's recommendations(s) are to consider industry's on-going equipage related initiatives and include time lines as well as other issues including those attendant with all segments of the aviation user community. Specific issues and tasks to be addressed in the CoE include:

- A list of the equipment needed to appropriately configure the aircraft.
- The availability of the equipment for installation. If equipment is not readily available, identify the appropriate actions and responsible organizations required to achieve that objective.
- Recommend the grouping and sequencing of avionics.
- If aircraft modifications are required, recommend milestones and supporting rationale

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The Free Flight Steering Committee's MvV working group objective is to develop recommended guidelines and criteria for use when the FAA is considering voluntary vs. mandated equipage as a basis for implementing new operational capabilities in the NAS. The group was charged with the following tasks:

- Reach user community consensus on basic definitions of terms such as mandated and voluntary when applied to categorization of equipage.
- Identify each OEP functional capability/system requiring new or modified avionics, along with attendant milestones and interdependencies.
- Develop specific suggested criteria that could be applied to OEP technologies, on a function-by-function basis, when attempting to categorize as Mandated or voluntary.
- Recommend procedures and/or potential incentives that would encourage early voluntary equipage.

  Note: Use of the criteria contained in this document must consider human factors associated with new/additional technology, as well as the impact of mixed equipage on controllers and flight crews.

Fully achieving the desired capabilities and resulting capacity improvements required by the OEP will, in many cases, require the use of new or modified technology. As installation of new avionics is often expensive, and retrofitting existing aircraft may be a lengthy process, the questions of what to implement, when to implement and whether it should be mandated or voluntary is particularly sensitive. The work of the CoE and MvV groups will aid this technology transition.

Each working group was guided by the Terms of Reference (TOR) established by the Free Flight Select Committee. Copies of the TORs are contained in Appendix A.

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