



WORKING PAPER

ASSEMBLY — 41ST SESSION

TECHNICAL COMMISSION

Agenda Item 31: Aviation Safety and Air Navigation Standardization

REVIEW OF THE PERIODICITY OF IN-FLIGHT INSPECTIONS OF AERONAUTICAL SURVEILLANCE RADAR SYSTEMS

(Presented by Argentina with the support of 20 LACAC Member States: Aruba (Kingdom of the Netherlands), Belize, Bolivia (Plurinational State of), Brazil, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Uruguay and Venezuela (Bolivarian Republic of))

EXECUTIVE SUMMARY

This working paper presents the proposed revision of Volume III – *Testing of Surveillance Radar Systems* of the *Manual on Testing of Radio Navigation Aids* (Doc 8071) to update the provisions concerning the periodicity of in-flight checks. This update aims to simplify and reduce the cost of maintenance of surveillance radars and the fuel used for flight inspection activities.

Action: The Assembly is invited to:

- a) take note of this working paper; and
- b) request that the Council consider the advisability of conducting the necessary technical analysis within the framework of the Expert Group on Aeronautical surveillance systems for the revision of the *Manual on Testing of Radio Navigation Aids* (Doc 8071), Volume III – *Testing of Surveillance Radar Systems*.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objectives - Aviation safety - Air navigation capacity and efficiency - Environmental protection
<i>Financial implications:</i>	This proposal implies a reduction in the maintenance costs of radar systems, mainly due to savings in the fuel used for in-flight inspection activities, with a consequent reduction in carbon emissions.
<i>References:</i>	Doc 8071, <i>Manual on Testing of Radio Navigation Aids</i> , Volume III – <i>Testing of Surveillance Radar Systems</i>

¹ Spanish version provided by Argentina.

1. INTRODUCTION

1.1 This working paper proposes an amendment to *Volume III – Testing of Surveillance Radar Systems* of the *Manual on Testing of Radio Navigation Aids* (Doc 8071) with the objective of simplifying the maintenance procedures for radar systems, while maintaining the level of operational safety. Derived benefits include reduced maintenance costs and associated fuel consumption.

1.2 In that regard, the present proposal consists of a review and the necessary amendments to resolve the inconsistencies in the provisions concerning the periodicity of in-flight checks for radio aids contained in the Appendices to Volume III.

1.3 It is also proposed that in-flight inspections for radar systems should be reserved for commissioning, major modifications and special cases, taking into account the technical systems for continuous monitoring.

1.4 This initiative includes the proposal to apply an operational safety risk assessment to the maintenance procedures of existing radar systems.

2. ANALYSIS

2.1 The *Manual on Testing of Radio Navigation Aids* (Doc 8071), as mentioned in the Foreword, is intended to “provide general guidance on the extent of testing and inspection normally carried out to ensure that radio navigation systems meet the Standards and Recommended Practices (SARPs) in Annex 10”. It describes the ground and flight tests to be carried out for specific radio navigation aids and provides information relevant to the resources required to carry out the inspections.

2.2 Volume III of Doc 8071 in its chapters specific to surveillance systems, together with its Appendices, contains provisions for the testing of surveillance radar systems (primary and secondary radar), describing, as indicated in paragraph 1.4.4 Scope of the document: “... methods for the evaluation and testing of the technical and operational performance of surveillance sensor systems. Automatic monitoring and testing of modern equipment by means of built-in test equipment (BITE) has greatly reduced the need for extensive ground testing and allows economies to be made in this activity. The periodical check and maintenance actions necessary (and their frequency) for the good functioning of the radar system are very equipment and system specific.” Section 1.5 Principles for monitoring and evaluation of surveillance systems, of the operation plans (OPLAN), details various methods for monitoring the performance of surveillance systems provided in Appendix D – Examples of radar analysis systems.

2.3 In particular, paragraph 2.8 of Appendix A – Flight testing methods (Doc 8071, Vol. III) states under the section on Periodic inspection: “2.8 Civil ATC PSR and SSR facilities, after being commissioned and set into operational service, do not require a periodic flight inspection. Instead, the radar performance parameters described in this manual shall be re-assessed at regular intervals by RTQC or by preventive/ corrective maintenance. Only in cases of specific problem investigation should it thus be necessary to perform measurement campaigns including flight checks.” The conditions for special inspections are described in paragraphs 2.9 and 2.10.

2.4 In contrast, paragraph 2.5 of Appendix B – Secondary surveillance radar (SSR) sets out recommendations for the conduct of periodic inspections, stating: “Routine flight inspections are conducted to determine that the facility performance continues to meet specifications and satisfies operational requirements. The recommended frequency for routine flight inspection is 120-day intervals, plus or minus

30 days, from the initial or annual inspection. In cases where there is a satisfactory record of performance of an equipment, an administration may extend the interval up to as much as 365 days. On the other hand, routine inspections at lesser intervals than 120 days may be needed if there are doubts about equipment performance at a given site.”

3. CONCLUSION

3.1 In view of the discrepancy noted between Appendices A and B of Volume III of the *Manual on Testing of Radio Navigation Aids* (Doc 8071), and as an opportunity for improving the present text of the guidance widely used by States, a revision of Volume III of Doc 8071 is deemed necessary. It is considered more appropriate to apply the provisions of Appendix A, which reserve in-flight inspections for commissioning and for the cases defined in 2.9 to 2.10.

3.2 Furthermore, the technical systems for continuous monitoring and the possibility of applying a safety risk assessment to the maintenance procedures of existing radar systems would result in a reduction of the costs associated with periodic in-flight checks as part of the maintenance of aeronautical surveillance radar systems.

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