

Safety Assessment under EU Common Requirements Including GNSS Supported Approach Procedures

1 Introduction

- 1.1 When implementing new services it is necessary for an Air Traffic Service (ATS) Provider to make a safety assessment taking into account various factors that may impact the safety of that service. Not all of the relevant factors that support the service may be within the direct control of the service provider but the provider must be aware of the influence they may have on the service. GPS is one such system where the supporting infrastructure is outwith the control of the service provider yet its performance needs to be considered in making an assessment of the safety of the service provided.

2 SES Common Requirements

- 2.1 An Instrument Approach Procedure (IAP) offered by an ATS Provider is considered to be a service in accordance with Commission Implementing Regulation (EU) No 1035/2011 of 17 October 2011 laying down common requirements for the provision of air navigation services
- 2.2 The safety assessment of changes to services including initial provision of a service are addressed in Annex II Specific Requirements for the Provision of Air Traffic Services Section 3.2 and are reproduced here:

3.2. Safety requirements for risk assessment and mitigation with regard to changes

3.2.1. Section 1

Within the operation of the SMS, a provider of air traffic services shall ensure that hazard identification as well as risk assessment and mitigation are systematically conducted for any changes to those parts of the ATM functional system and supporting arrangements within his managerial control, in a manner which addresses:

(a) the complete life cycle of the constituent part of the ATM functional system under consideration, from initial planning and definition to post-implementation operations, maintenance and de-commissioning;

(b) the airborne, ground and, if appropriate, spatial components of the ATM functional system, through cooperation with responsible parties; and

(c) the equipment, procedures and human resources of the ATM functional system, the interactions between these elements and the interactions between the constituent part under consideration and the remainder of the ATM functional System.

3 Discussion

- 3.1 In conducting an assessment of a new or modified IAP the ATS Provider would need to consider such things as the design of the procedure, the ability of any navigation infrastructure to support the procedure, the ability of aircraft to fly the procedure and the role of ATC or other personnel in delivering the service.
- 3.2 Some of these areas may be overseen by other bodies and it is permissible in such cases to acknowledge this in the safety assessment documentation and conduct no further examination into those aspects. Common examples are aircraft equipment that is certified by EASA and the aircraft's operation authorised by the CAA. Similarly the procedure design will be undertaken in accordance with ICAO guidance and authorised by CAA Directorate of Airspace Policy (DAP). Any such areas may be explicitly scoped out within the ATS Provider's safety documentation.
- 3.3 The requirements placed on the infrastructure to provide the required signal in space (SiS) will be derived from the hazard analysis carried out in accordance with the above but also will be determined by applicable ICAO standards contained in Annex 10 volume 1. The SiS standards are defined in terms of Accuracy, Availability, Integrity and Continuity of Service. Some ICAO standards are defined as a range of values and it is necessary for the ATS Provider to determine the applicable level depending on conditions that prevail at the point of service provision.
- 3.4 The infrastructure must have the capability to support the application by meeting all the necessary requirements placed upon it, whether these are from SARPs, derived as a result of analysis by the ATS Provider or from any other source.
- 3.5 The infrastructure must have the required performance irrespective of the ownership of the equipment. For example an ILS used to support an instrument approach service offered by an ATS Provider may be owned by the airport operator. Where infrastructure equipment has been provided by a manufacturer to a service provider or an associated organisation (e.g. an airport owner) then the manufacturer should be able to provide documentary evidence of performance in the form of theoretical calculation using knowledge of the design and predicted component life, as well as data gained from equipment on test or examples of the same equipment already deployed. There are occasions where it is not possible to obtain evidence from a manufacturer or supplier and in these cases data may be gathered from direct or third party monitoring of performance.

4 IAPs Supported by GPS

- 4.1 In the case of IAPs supported by GPS no manufacturer SiS performance information is available so the only source of information is through third party monitoring. The CAA has employed third parties to provide this information to allow ATS Providers to develop safety documentation for utilisation of the GPS SiS in support of services provided based on GPS.

- 4.2 Conventional infrastructure such as an ILS has inbuilt integrity monitoring employing monitors to detect when the SiS is outside preset limits and shutdown the affected transmitter. The integrity risk of the system can then be calculated from a knowledge of the performance of the transmitter and the capability of the monitor to detect errors and take the according action. GPS however has no such real time monitoring relying instead on the use of augmentations such as Receiver Autonomous Integrity Monitoring (RAIM) in the users receiver to provide the integrity mechanism for the service. As a result to determine the integrity of the GPS service the capability of the RAIM enabled aircraft receiver as well as the performance of the GPS SiS itself needs to be understood.

5 Summary

- 5.1 It is incumbent on an ATS Provider to assess the safety requirements of any systems used in support of any services they offer to aviation. The safety requirements will come from a combination of hazard analysis and industry standards and apply irrespective of ownership of equipment. Satisfaction of the requirements may be obtained from manufacturers design and theoretical data, empirical data or a combination of these. The safety requirements and their satisfaction shall be presented in the safety assurance documentation.

6 Queries

Any queries or further guidance required should be addressed to:

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