



AVIONICS REQUIREMENTS UNDER THE SINGLE EUROPEAN SKY



ERA's summary and advice to members on aircraft avionic equipage requirements for forward fit and retrofit as of February 2017

This document provides a summary of the regulatory framework on current and envisaged aircraft avionics fitment required for aircraft operating in European airspace.

SUMMARY AND BACKGROUND

The European Commission (EC), in pursuit of a common airspace infrastructure across Europe, the 'Single European Sky' (SES), has mandated a number of technological enablers through SESAR – the Single European Sky ATM Research project, which will require EU air operators to equip aircraft with new avionics hardware to allow them to continue flying in European airspace.

In some cases, the systems have been found not to be sufficiently technologically mature and extremely expensive for some members, who in most cases, are forced to retrofit aircraft that were not designed to accommodate significant adjustments to their electronics and avionics architecture.

Surveillance and Automatic Dependent Surveillance – Broadcast (ADS-B)

Regulation EU1028/2014 states the required systems to provide surveillance data to ensure the harmonisation of performance, interoperability and efficiency of those systems within the European Air Traffic Management Network. All aircraft operating Instrument Flight Rules (IFR) in Europe must be compliant with Mode S Elementary Surveillance, while Commercial Air Transport types must be compliant with both Mode S Enhanced Surveillance and ADS-B 'OUT' requirements.

Aircraft equipped with ADS-B broadcast their position periodically, as well as providing additional parameters such as flight identification, heading, altitude, speed and a number of other useful parameters to interrogating ground stations.

The requirement for Elementary Mode S transponders described in Regulation EU1028/2014 has, in large part,

been met. However, the upgrade to enhanced Mode S and ADS-B 'OUT' is significantly more difficult for many regional aircraft operators due to the electronics architecture of the aircraft and for many operators, there are no clear cost benefits for the adoption of enhanced Mode S – few operators will meet the current 2018 mandate in time and ERA is actively supporting a delay until 2020.

VHF Datalink

A requirement for a replacement for VHF voice communications in European airspace has been considered necessary due to saturated radio frequency spectrum.

Controller Pilot Datalink Communication (CPDLC) enables direct data communication with Air Traffic Control and is considered an enabler of SES. Regulation EU29/2009 initially mandated such datalink equipment for Commercial Air Transport (CAT) operations by 05 February 2015, however this has been delayed until 05 February 2020 due to technical obstacles encountered during the research and development phase.

The European Commission tasked the SESAR Joint Undertaking to prepare a study to find a solution to the technical issues observed during the trials. The report, published in July 2016, described how certain performance issues were observed concerning ground infrastructure. These included the impact of Airline Operational Control (AOC) communications, the level of Radio Frequency (RF) interference for the core European area, management of hot spots, the concurrent management of AOC and Aeronautical Telecommunications Network (ATN) data traffic, the management of air/ground communication service provision (distributed versus centralised) and avionics/ground end systems as the use of CPDLC became more widespread.



The proposed scheduling of these recommendations is described in the report, however the exact implementation will have to be elaborated in a second, yet to be decided, step.

Regulation EU2015/310 of 26 February 2015 amending Regulation EU29/2009 describes the data link compliance requirements within the SES. The original regulation was amended due to implementation and deployment issues in addition to ongoing service performance issues. The significant amendments are:

- the date of implementation affecting aircraft with an individual Certificate of Airworthiness (CoA) first issued before 01 January 2014 has been delayed from 05 February 2015 to 05 February 2020,
- aircraft first issued an individual CoA before 31 December 2003 that will cease operating before 31 December 2022 need not be equipped (previously 01 January 1998 by 31 December 2017),
- new State aircraft certified after 01 January 2019 shall be equipped; and
- Article 15, entry into force and application has been delayed from 05 February 2013 to 05 February 2018.

Aircraft Tracking

On 16 December 2015, the EC adopted new rules for flight recorders, underwater locating devices and aircraft tracking systems, addressing the issues raised by the accident of AF447 and the disappearance of MH370.

These rules followed an Opinion from EASA intending to address four specific areas of focus, each of them addressed by a dedicated Regulatory Impact Assessment (RIA):

1. the unreliability of obsolete recording technologies such as magnetic tape, magnetic wire and frequency modulation;
2. frequent cases of the Cockpit Voice Recorder (CVR) overwriting the recording after an accident or a serious incident;
3. insufficient transmission time of Underwater Locating Devices (ULD) fitted to flight recorders. In several cases, the signal of the flight recorder ULD faded out before it could be located; and
4. when insufficient information on the accident location is available, and when, in addition, the seafloor is so deep that the signal of a flight recorder ULD cannot be detected from the sea surface, locating the wreckage can be extremely challenging.

All four issues translate into essential recorded information or pieces of evidence being lost or recovered with very significant delay which hinder or hold up significantly the reconstruction of the sequence of events that led to an



occurrence. The specific objectives of this proposal are to address the issues of:

- (a) obsolete recording technologies for flight recorders installed on board aeroplanes required to carry a Flight Data Recorder (FDR) or a CVR;
- (b) CVR overruns for CVRs installed on board aeroplanes and helicopters required to carry a CVR;
- (c) transmission time of flight recorder ULDs; and
- (d) safety benefits of an additional ULD with a much higher detection range for wreckage localisation in oceanic areas.

The new rules concern aircraft tracking systems, underwater locating devices and flight recorders. The main elements include:

- Operators of large aeroplanes must establish, as part of the system for exercising operational control over the flight, an aircraft tracking system.
- Newly manufactured large aeroplanes are to be equipped 'with robust and automatic means' to accurately locate the end point of flight following an accident in which the aeroplane is severely damaged.
- The technology of flight recorders must be enhanced, and the recording length of the CVR will be extended from two hours to 25 hours. The protection of CVR recordings will be reinforced, in particular during their maintenance.
- Finally, flight recorders must be equipped with locating devices with an extended transmission time so as to facilitate their location.

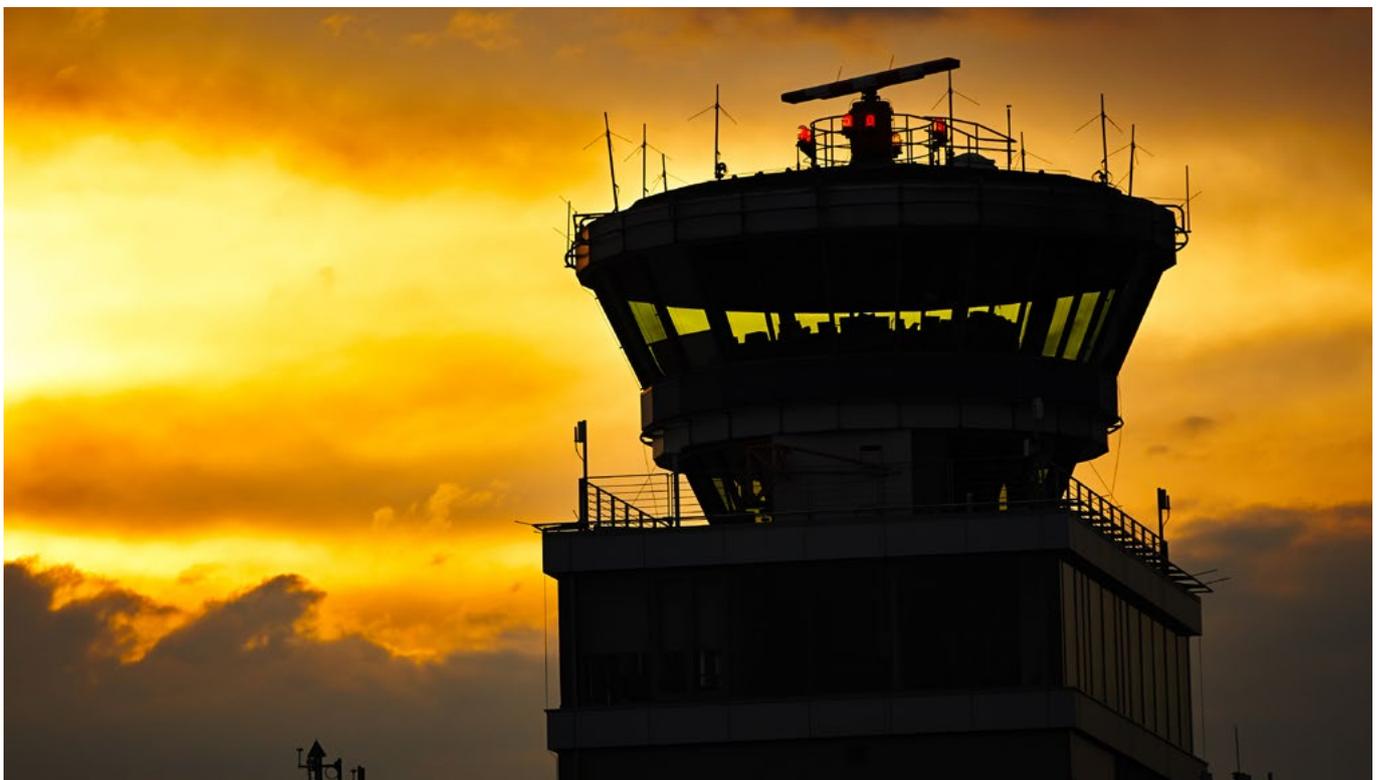
ERA'S ACTIVITIES, ACTIONS AND FURTHER INFORMATION

ERA participates in relevant EASA rule-making task groups, as well as the SPI Impact Assessment Group to ensure that members' interests are represented and that members are not burdened by disproportionate regulation with regard to surveillance.

The ongoing work in the field of VHF Datalink provision and the recent nomination of the SESAR Deployment Manager as Datalink Implementation

Manager have been areas of specific focus for ERA. Datalink remains a hot topic for the various industry and rule-making groups where ERA is represented. ERA's membership of the SESAR Deployment Manager Stakeholder Consultation Platform additionally gives members an opportunity to voice their comments and concerns.

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European Regions Airline Association Limited is registered in England & Wales.

Company No: 8766102



February 2017

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