

## GA A internal draft position statement (awaiting agreement)

### SECONDARY SURVEILLANCE RADAR (SSR) - MODE S

**1. Requirement for Mode S.** Mode S Transponders are required to be fitted per UK AIC 105/2004 of 11<sup>th</sup> November 2004. A further AIC (or clarification document) was issued on 7<sup>th</sup> July 2005 and gives more details on transition arrangements see it on the AIS website at <http://www.ais.org.uk/aes/pubs/aip/pdf/aic/4B000.PDF> . This document should be read in conjunction with AIC 105/2004.

**2. Affected airspace.** This requirement affects all aircraft using notified airspace which is currently the London TMA and to be rolled out to en-route and other major TMAs as equipped radar coverage becomes available.

**3. The first stage of Mode S.** Implementation took effect from 31 March 2005 and requires IFR GAT flights by fixed wing aircraft in excess of 5700 kgs and 250 kts Max Cruising speed in notified TMA and en-route airspace to carry and operate a Mode S Enhanced Surveillance transponder (EHS). Aircraft which fall outside the weight and speed criteria are required to fit Mode S Elementary Surveillance capable transponders (ELS) for flight in the designated airspace subject to certain exemptions (see below).

Enhanced transponders are to be fitted to mostly larger GAT aircraft and need not be further covered in this paper.

All transponders have a unique identifier which has to be registered with the authorities and hence approved equipment has to be fitted.

**4. Elementary Mode S.** Aircraft below the weight and speed limits noted in 3 above, and all rotary craft, are required to carry Elementary Mode S transponders (ELS) when operating in the notified airspace. These give the basic information required of the aircraft, including a unique identifier, to the radar controllers.

**5. Aircraft using the notified airspace.** Subject to certain exemptions such as a need for access for less than 30 hours per annum, applicable aircraft were required to have the equipment fitted by 31<sup>st</sup> March 2005 subject to transition arrangements as noted in 7 below.

**6. Other European States.** Most other EU States have adopted the same requirements although there are some slight variations in application criteria and dates. Most States near the UK have the same criteria.

**7. Transition arrangements.** The CAA published in AIC 105/2004 details as follows:

“8 Transition Arrangements

8.1 The transition period is a two-year period from 31 March 2005 to 31 March 2007 to allow operators who are experiencing genuine problems in the supply, installation and certification of Mode S transponders to equip. The transition arrangements described within this AIC represent an extension of the period permitted in which to fit Mode S, rather than a slip in the equipage mandate and should not be used as an opportunity to delay equipage.

8.2 Operators of EHS applicable aircraft flying IFR/GAT requiring access to **Mode S Airspace**, who are not able to meet the **31 March 2005** mandate for the reasons specified in Paragraph 8.1, will be allowed continued access until **31 March 2007**, by which time they must be fully EHS compliant, unless conditions of paragraph 6.4 are applicable.

8.3 Operators of ELS applicable aircraft flying IFR/GAT requiring access to Mode S **Notified Airspace**, who are not able to meet the **31 March 2005** mandate for the reasons specified in Paragraph 8.1, will be allowed continued access until **31 March 2007**, by which time they must be fully compliant. Operators should be mindful that Mode S **Notified Airspace** is likely to increase as detailed in paragraph 2

8.4 Operators of aircraft that are not subject to EHS applicability criteria should take particular note that unless an aircraft qualifies for special flight status<sup>1</sup>, or, is to be withdrawn from service<sup>2</sup>, no relaxation from the requirements of ELS for IFR/GAT flights in Mode S Notified Airspace will be permitted after 31 March 2007.“

These transitional arrangements do, in effect, defer the need for those aircraft needing EHS and ELS to complete installation until 31st March 2007. However the CAA also stated:

“There has been some speculation that this (*implementation*) date has been slipped to the right – that is not the case. All that has happened is that for those European States which introduced mandates for Elementary Surveillance for IFR/GAT flight by fixed wing aircraft in excess of 5700 kgs etc, the transition period has been extended so that it matches the 2 year transition period for Enhanced surveillance. This addresses the issue of delays in Service Bulletins being available and helps reduce costs by allowing for a single implementation.”

## **8. Proposals for Mode S for VFR aircraft – and Regulatory Impact statement**

DAP have commenced work on the initial Regulatory Impact Assessment (RIA) for proposals to implement Mode S Elementary Surveillance throughout remaining UK airspace for all VFR traffic with a declared implementation date of 31<sup>st</sup> March 2008 and a transition period to 31<sup>st</sup> March 2010. The aim was to issue the initial RIA for consultation by early summer but this is now reported as due “later this year”.

**It must be noted that Mode S equipment needs a greater degree of maintenance than current Mode C transponders. Such costs should be considered when the RIA study is undertaken.**

## **9. Applicability to light sport and recreational aircraft, gliders, microlights, balloonists, hang gliders, foot launched craft and parachutists.**

There was much debate in the early stages of the development of the Mode S proposals as to whether ALL craft would be covered by the requirement to fit Mode S for operating VFR. An obvious problem foreseen was the difficulty in fitting equipment with sufficient power output and of light enough weight to enable it to work effectively in a variety of craft that simply could not provide other than small battery power and minimal space.

In 2004 the CAA made the following statement:

“The ICAO Annex 6 requirement is that all aeroplanes and helicopters must carry a pressure altitude reporting transponder. Clearly, parachutists do not fit this definition and will not be affected by the intended Mode S

implementation. The exemption policy for other platforms has yet to be agreed. However, winch launched gliders only conducting visual circuits and un-powered hang gliders launching from cliff tops are unlikely to be included in the carriage requirements. Platforms for which the carriage of a transponder is technically infeasible are also likely to gain exemptions from the policy. However, powered gliders and hang gliders, or gliders on endurance or altitude record breaking flights and balloons will almost certainly be required to carry suitable transponders.”

The CAA carried out trials on a light aircraft Mode S transponder (LAST) but the initial results were not encouraging for a unit that would meet the criteria for fitting to very light aircraft/microlights. They state that work on developing a Mode S Elementary capable LAST continues and it is hoped to have a Mode S technology demonstrator version for flight trials by early summer; the intention is to progress further concurrently with the RIA as the two are closely inter-related.

There is available a Mode S unit by Filser, at a cost of c£2k, but it can only be fitted to craft up to 2000Kgs and is of a weight and power requirement that it is not suitable for very light aircraft/microlights.

However in relation to Mode S for VFR traffic there are a number of differing requirements being considered by other States. It will be important to keep in mind those other developments and ensure a common approach across States if at all possible to avoid difficulties of flight between States.

**10. Issues for ultra and very light aircraft (ULA and VLA).** There are many issues arising relative to very light aircraft and microlights gliders and others in addition to that of weight / power output. These include requirements for certification of equipment, overloading of radar returns for controllers (would they filter out the returns thus negating the benefits?), could the need for the equipment be limited to areas close to TMA airspace or use above certain heights, will the CAA offer to fit TIS (Traffic Information Service) to the radar heads to offer pilots an incentive to fit the equipment (could it be used by a LAST unit?) and most importantly, is there a clear need and benefit to be gained by mandating all VFR users to fit Mode S?

In addition there are aspects to consider regarding the need to fit Mode S to craft that do not exceed say 1,000ft. Military aircraft operate in such airspace in some areas, and at very high speeds. Not all military aircraft have nor will be fitted with Mode S. Should circuit training aircraft be required to fit Mode S; on the other hand those aircraft will presumably need to venture further afield? How practical and realistic is it to require hang gliders and paragliders to fit Mode S?

**11. Further action.** Until the CAA makes a further announcement on their position regarding requirements for Mode S for VFR airspace and its application to other than powered light aircraft, it is not possible to consider further what action to take **and it is suggested a watching brief be kept on the position with contact being made with the CAA department dealing to check progress from time to time.**

**12. Eurocontrol.** It is also worth mentioning the study carried out by Eurocontrol via consultants (STASYS) into the issue of “Detection and recognition of light aviation” a Forum which AOPA and PPL/IR supporting GA Alliance attended in January 2005. The objective was to determine the current and future operational requirements for the recognition and detection of individual light aviation aircraft by ATM systems and

ACAS and to assess the feasibility of equipping airframes to meet such requirements.

The final report concluded:

“It was generally agreed that these risks could be reduced if all aircraft were fitted with a transponder or other form of aircraft recognition system but, whilst desirable, it was not considered essential for all GA aircraft to have one if not operating in areas of high risk. In looking to the 2015/2020 timeframe it may be possible that ADS – B would be in widespread use and also offer a potential solution. Therefore the policy on transponder carriage should align itself with the EUROCONTROL Surveillance Strategy. The ICAO Annex 6 and Annex 10 SARPS on the mandatory carriage of transponders needed to be taken into account.

However, in reaching this conclusion it is incumbent on appropriate authorities/fora to consider the cost to the GA community and of the benefits to be derived. ANSP's and NAA's have a responsibility to ensure that benefits ensue. Also the aviation community needs to take account of the size of benefit each stakeholder receives and a balance between commercial and non-commercial flying interests needs to be struck.....

However, due to the differences in opinions and perceived levels of risks across Europe, it should be left to individual States to decide how and where to implement a 'Known' air traffic environment in their airspace. Some States with vast expanses of open FIR, in which VFR flying is mainly conducted, may only need to employ Transponder Mandatory Zones in areas of highest risk. Others, such as the UK, may find it more practical to implement a 'Known' environment throughout the FIRs. However, an acceptable environment first needs to be created through the development of suitable equipment and international standards to help States make the choice on implementation. Moreover, in some States any increase in transponder carriage in dense airspace could only be facilitated through the implementation of Mode S technology, both on the ground and in the air. Suitable transitional arrangements and a realistic 'targeting' of transponder carriage to meet the 'need' would have to be developed.....

SSR transponders should be seen as an insurance box for the Light Aviation community against collisions or mistakes with airspace infringement. They also permit light aircraft to interact safely with any adjacent ATC activity, even when non-radio equipped or when not participating with that ATC activity. Transponder carriage issues are, therefore, not necessarily linked to the need for radios; although, an increased use of radio to enhance situational awareness in uncontrolled airspace is worthy of further consideration. It is also likely that light aircraft providing SSR data are more likely to receive an ATS when requested, as they have less impact on controller workload than 'non-squawking' aircraft.....

It should be left to individual European States to determine the appropriate regulatory approach for SSR carriage to meet their particular airspace needs. However, EUROCONTROL should facilitate the development of a common basis for legislation to facilitate any national implementation strategies under a framework policy.....

EC funding lines should be investigated to subsidise the carriage of SSR transponders on GA aircraft.....”

It can therefore be seen that there is much debate to continue on the issue of recognition of light aircraft.

### **13 Lobbying Activity**

GAA members will need to discuss consider how best to lobby to ensure that the proposals when issued are not excessive or are amended as appropriate; key lobby points will need to be developed.

It is also important that any further potential Eurocontrol sponsored activity on detection and recognition of light aviation is taken into account and there is neither duplication nor an excessive response to either; in the overall SES context it is surely important that an inclusive solution is found that can be fairly applied in all States.

PRD  
20<sup>th</sup> July 2005  
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