

# **GENERAL AVIATION ALLIANCE** **POSITION PAPER**

## **INTRODUCTION**

The GA Alliance (GAA) is a group of organisations representing, as far as possible, all UK General Aviation (GA), and Sports and Recreational Aviation interests (S&RA). Its objective is to co-operate and consult with government departments and other relevant organisations to support and progress these interests. Its members are: British Gliding Association, British Hang Gliding and Paragliding Association, British Microlight Aircraft Association, British Parachute Association, General Aviation Safety Council, Helicopter Club of Great Britain Popular Flying Association, European Association of Instrument Rated Pilots and the Royal Aero Club of the United Kingdom. **This represents circa 38,000 individual members who might be affected by this proposal.** The individual member organisations and associations will submit their own consultation responses, with their specific interests, as well as joining GAA in this single position paper.

## **Proposal to Amend the Air Navigation Order 2005 for the Purpose of Improving the Technical Interoperability of all Aircraft in UK Airspace**

### **1. Executive summary**

The GAA welcomes the opportunity to partake in the Partial RIA however it believes that, for the reasons set out in this paper, it is not possible to make a full rational and reasoned assessment of what is being proposed. We have been told that any CAA proposals for ANO amendments generated by this Partial RIA will go straight to Ministers. Given the level of unresolved issues raised in this document and the fact that the wording of an ANO change has not specifically been consulted on, this position is simply unacceptable. Therefore the GAA seeks - further consultation, of at least National Air Traffic Management Advisory Committee (NATMAC) members, upon the actual words of any proposed Air Navigation Order (ANO) amendment, and that this consultation is not carried out until there is sufficient verifiable information available to all the potentially affected parties, including an agreed Low-Power SSR Transponder (LPST) specification. In addition the GAA believes that the execution of the Partial RIA has not complied with the Cabinet Office "Code of Practice on Consultation" in a number of significant areas.

### **2. GAA's Electronic Visibility Policy**

2.1. The GAA is not opposed to the principle of the carriage of electronic visibility equipment by GA aircraft. However that carriage must:

2.1.1. Give verifiable and sustainable safety benefits with any added risks being manageable

2.1.2. Be paid for by the beneficiaries in direct proportion to the benefits received

2.1.3. Have costs in proportion to the benefits to those paying them, and

2.1.4. Recognise the issues pertinent to the many and varied aircraft and operations being considered

- 2.1.5. Not limit existing airspace access
- 2.1.6. Increase airspace access possibilities
- 2.1.7. Have equipment that is fit for purpose for a minimum of 10 years.

### **3. Aircraft Transponder Equipment**

#### **3.1. Existing SSR Equipment**

There is adequate ICAO compliant equipment available however, bearing in mind that decisions about what work to carry out cannot be made until the detail of the legislation is finalised, what is not clear is whether there will be sufficient time/engineering resources to meet whatever deadlines are eventually set.

#### **3.2. Proposed SSR Equipment - LPST**

At the time of writing the CAA has yet to issue a specification, draft or otherwise, for the proposed Mode S capable LPST. With respect to the Partial RIA's proposals the GAA concerns over this are:

- 3.2.1. The creation of a specification which has not been consulted upon so as to ensure that it will meet the existing needs and limitations of the various aircraft and activities, e.g. size, weight, mounting, possible radiation effects upon personnel and other equipment carried (including crew's medical equipment), aerial mounting, capital and annual costs relative to existing activity costs, battery life, maintenance, ruggedness, serviceability/mean time between failures, interference from/with existing aircraft electrics, efficiency at doing what it is meant to do, linked airspace/VFR issues, etc.,  
This simple list expands out into a significant number of inter-related issues to the extent that the GAA believes that a separate consultation is required for the LPST specification. Ideally, for many reasons, the resultant specification should be also acceptable at a European level.
- 3.2.2. The proposal to mandate the carriage of something the specification of which does not currently exist,
- 3.2.3. The proposal to mandate the carriage of something that has not been tested even in prototype form and so its efficacy is not known,
- 3.2.4. That the testing that has been carried out by the CAA, using a very unrepresentative Harvard airframe and different mode C transponder technology, was very limited in actual sorties flown but still identified a number of issues it would appear have yet to be further investigated.

#### **3.3. Proposed SSR Equipment – LAST**

- 3.3.1. At the CAA SRG GACC meeting of 25<sup>th</sup> July 2006 it was stated that, "UK Policy is that aircraft that are capable of fitting the LAST [EUROCAE ED115 specification] should do so. LPST is only for equipage to aircraft that cannot fit a LAST for practical or safety reasons."  
Without knowing the details of what criteria with respect to the "practical or safety reasons" are going to be applied it isn't possible to make any assessment of this statement. More detail is required before it is possible to make a reasoned assessment.
- 3.3.2. The ED115 specification states that its applicability is for airborne vehicles operating VFR only and that such vehicles should have a MTOW below 1200kg and a maximum cruising TAS of 175kt. The CAA has not indicated whether it will

follow these requirements. If so then aircraft falling outside this criteria will have to have a fully ICAO compliant, and so probably a more expensive, fit.

- 3.3.3. ED115 also states that it is only for VFR flight. Effectively as drafted it would appear that the proposal will prevent all aircraft that do not have a fully ICAO compliant fit from flying in IMC, which does occur and has not been identified as a current safety issue. Some aircraft that currently fly IFR will not be capable of an ICAO compliant fit; this is something that would effectively kill gliding in the UK.
- 3.3.4. ED115 also states that it is only for flight below 15,000ft. Effectively as drafted it would appear that the proposal will prevent all gliders (“conventional” and hang/paragliders) that do not have a fully ICAO compliant fit from flying above 15,000ft, which does occur and has not been identified as a current safety issue.
- 3.3.5. ED115 also states, “A National Civil Aviation Authority may approve the use of a low RF power LAST for operation in its own country ..... In order to prevent the use of the equipment for flights in the airspace of other states, it should be clearly labelled as nationally approved only.” Unless there is pan-European agreement as to the acceptability UK LAST fitted aircraft will be limited to flight in the UK. In order not to disadvantage UK pilots and businesses there should be a pan-European agreed series of solutions, both in terms of equipment and operations.

3.4. The relevant theoretical and practical knowledge available would indicate that there are a number of significant technical issues that will have to be overcome or mitigated before there is a practical LPST/aerial combination. As the Partial RIA is written from the premise that, in addition to existing SSR aircraft equipment, some sort of LPST exists the rest of this paper will do the same. Where appropriate it will be assumed that the LPST achieves an ideal omnidirectional output with a detection range of 50 nautical miles (a figure that would appear reasonable from the QinetiQ CAA trials).

### 3.5. Maintenance/serviceability of aircraft SSR equipment

- 3.5.1. It is reasonable to assume that the majority of the currently SSR equipped aircraft are in reasonably regular radio contact with an SSR equipped ATC unit and therefore there is a regular serviceability check upon the equipment. This changes significantly with a mandatory SSR fit for all aircraft. The recent CAA GA Reviews identified the following aircraft numbers for 2005:

Aeroplanes (excluding microlights)	8,900
Microlights	4,100
Helicopters	1,310
Gyroplanes	250
Balloons & Airships	1,830
Gliders (excluding Touring Motor Glider)	2,540
Hang Gliders & Paragliders	5,960
Powered Hang Gliders & Paragliders	1,050
<b>TOTAL</b>	<b>25,940</b>

- 3.5.2. At least 50% (13,000) of these aircraft will either be flying without airband radio and/or with the pilot being insufficiently licensed to call an ATC unit. Of the

remainder there will be a significant proportion who have either no opportunity or desire to talk to an SSR equipped ATC unit. Also there are ATC units who have made it perfectly clear that they have no desire to talk to any aircraft unless it is seeking to enter the airspace that they control. Even those ATC units prepared to talk may not have the man power to be able to do so, as witnessed by the units that actively discourage and/or grant few crossing clearance requests. Therefore there will be a significant number of SSR boxes that would only be checked annually.

As far as we are aware there have been no studies into the serviceability rates, mean time between failures, failure modes, implications of failure modes, etc. of ICAO compliant SSR equipment, much less LAST or LPST. These factors will all be significant in the proposal's safety system due to the multiple single points of failure present in the aircraft fits.

- 3.5.3. It is unlikely that there are currently sufficient avionics inspection facilities for the annual checks for all these new transponders. In the light of the CAA GA Review identified short fall in engineers the situation is unlikely to get better quickly and for those owners based away from approved avionics maintenance centres it will add significant costs to the annual bill.

### 3.6. Licensing/administration of SSR equipment

- 3.6.1. ICAO 24-Bit Addressing. Questions have been raised with the CAA, and remain unanswered; with respect to the espoused sharing of aircraft SSR equipment. This is particularly relevant for aircraft with no CofA. How is it envisaged that this will work with respect to the details contained in CAP455 Airworthiness Notice No. 12 Appendix 67 is not indicated. It should be. For example it states, "Incorrect installation [of the ICAO 24-bit aircraft address], such as setting the address to all zeros or inadvertent duplication of an address, can pose a risk to flight safety. In particular, the airborne collision avoidance system (ACAS) operates on the assumption that only a single, and therefore unique 24-bit aircraft address exists per airframe. The performance of ACAS can be seriously degraded and in some cases disabled if an incorrect or duplicate address is installed on an aircraft."

How would, the UK assignment of ICAO 24-Bit Addresses work? At the moment it is stated as being "per airframe".

Some factors requiring consideration include:

- 3.6.1.1. The last minute use of "hot spare" LPST equipment so that a flight can still be made in the event of an owner's own SSR equipment being u/s. The u/s equipment could be ICAO compliant, LAST or LPST.
  - 3.6.1.2. What would the ICAO 24-Bit Address be allocated to where a pilot has multiple aircraft or "pick 'n mix" components that can be used together by him/her and/or mixed with another's equipment, e.g. one owner can have two wings, two unpowered harnesses and one powered harness thus giving 6 different aircraft that can be flown by any number of different pilots. Or one owner may wish to use one LPST in multiple aircraft owned by them.
- 3.6.2. How would WTA Licensing work? A number of questions have been raised with the CAA and await response. Some factors that need to be considered include:
    - 3.6.2.1. What or who is the License granted/applied to and what does it permit? Is it owner based, or airframe based, or...?

- 3.6.2.2. the last minute use of "hot spare" LPST equipment so that a flight can still be made in the event of an owner's own SSR equipment being u/s. That u/s equipment could be ICAO compliant, LAST or LPST, and the "hot spare" could be the property of a third party.
- 3.6.2.3. what is licensed where an owner has multiple aircraft or "pick 'n mix" components that can be used together by him/her, another pilot and/or mixed with another's equipment, e.g. one owner can have two wings, two unpowered harnesses and one powered harness thus giving 6 different aircraft that can be flown by any number of different pilots. For interest, or when looking to purchase, pilots add in components owned by others thus increasing the "pick 'n mix" element.
- 3.6.3. The very short description of monitoring and enforcement in the Partial RIA revolves around an airfield and CofA based activities. In response to a question the CAA responded, "The Section on Policing and Enforcement is not required until the Full RIA stage." Again we are not being consulted on what is a significant part of any piece of proposed legislation.

#### **4. Operational considerations**

##### **4.1. The Class F/G environment.**

- 4.1.1. Whilst the CAA has full knowledge about all activity within controlled airspace (CAS) the CAA, as highlighted in the CAA GA Reviews, has little knowledge about GA activities in Class F/G airspace. This lack of knowledge is even more marked when considering unique activities such as soaring flight. It is disappointing to note that despite many offers to assist the CAA with this sort of data the contact with the BGA and BHPA has been to say the least minimal, as is evidenced to some extent by the example exemptions from Annex F of the Partial RIA.
- 4.1.2. Similar offers of assistance have been made to NATS, again with minimal take up.
- 4.1.3. The GAA requested details of what modelling had been done. What little modelling of the possible effects of the proposal that has been done demonstrated the use of incomplete data. We consider it not possible to conduct realistic modelling without knowing the performance of the proposed LPST.
- 4.1.4. The GAA believes that it is currently not possible to conduct realistic verifiable modelling of the Class F/G environment that would result from the proposal.
- 4.1.5. Until realistic verifiable modelling can be carried out it is not possible to review the proposal for negative effects. There is even the possibility of the inadvertent introduction of reduced safety levels.
- 4.1.6. It is stated in the Partial RIA's para 3.2.3b that all airspace users will benefit and that if it doesn't happen there could be more CAS. Such a suggestion requires full analysis and a proper problem, analysis, solution consultation in its own right. Inclusion, without analysis, simply as a statement severely detracts from the quality of this partial RIA. As such CAA should withdraw this statement and it should not form part of any conclusion arising. As previously highlighted not all airspace users will benefit and CAS is established to create a known traffic environment, mere use of mandatory SSR carriage does not create a known traffic environment.

##### **4.2. Interaction with TCAS equipped aircraft**

- 4.2.1. The issues here again revolve around a lack of verifiable modelling. If relevant modelling has taken place it has not been made available to the GAA.
- 4.2.2. The GAA believes that there are a number of possible scenarios around the boundaries of CAS where the introduction of mandatory SSR carriage could result in commercial air transport aircraft (CAT) TCAS Resolution Advisories (RAs) on a GA aircraft despite both aircraft operating totally legitimately on their respective sides of the CAS boundary. Airprox data would indicate that this has happened already even though only a very small percentage of GA aircraft are currently SSR fitted. Such “false” RAs could, in a busy CAS, lead to reductions in safety. It should be remembered that the busiest CAS is also where the busiest Class F/G tends to be and where there is very little knowledge about the numbers of aircraft quite legitimately flying close to CAS boundaries. One solution to this could be the expansion of CAS to provide a bigger buffer around the CAT. It would be very sorry states of affairs were CAS to be increased purely because of the shortcomings of technology.
- 4.2.3. Whilst TCAS goes into an automatic filtering mode upon being subjected to more returns than it can handle the GAA is not convinced that this has been adequately modelled or tested as GA aircraft, particularly soaring ones, gather in considerable numbers in a relatively (in TCAS terms) small volume.
- 4.2.4. The GAA maintains that firstly modelling of the scenarios has to take place followed by flight trials so as to assess the scenarios and then where necessary devise mitigation.
- 4.2.5. Modelling and trials are also required to quantify the actual limitations of TCAS. Airprox reports have highlighted deficiencies with respect to high vertical speeds and that TCAS is designed for conflict resolution only in the vertical plane. Requests for the results of the CAA work into the high vertical speed issues have yet to be satisfied.
- 4.2.6. Eurocontrol has produced a number of “ACAS II Bulletins”, key points from which cast extreme doubt about whether the aims of the Partial RIA document can be met through the use of TCAS without also having active controlling of all aircraft to be protected. For example in the “Ten Fundamental Dos and Don’ts” number 7 is “TCAS traffic displays must not be used for self-separation”

#### 4.3. ATC unit issues

It is a major concern, fundamental to this issue, that there has been no significant NATS/GA general discussion on improving interoperability in the context of this Partial RIA. This is amplified by the lack of analysis by CAA of the traffic modes in class G airspace. This is yet another example of the inappropriate manner in which this subject has been approached, and as stated earlier not in accord with the required Cabinet Office Guidelines on better regulation. Over and above that our points are:

- 4.3.1. The GAA was denied access to sufficient details about ATC’s Short Term Conflict Alert tool (STCA) therefore we were unable to assess the possible scenarios that, like point 4.2.2 above, could cause consequential lowering of safety levels. As highlighted above NATS has minimal data on GA’s activities and so the GAA fails to see how NATS can assess the impact of the proposal for mandatory SSR carriage upon the STCA. For example: how far into Class F/G airspace does STCA “look”, how would it deal with a gaggle of aircraft, what if that gaggle is immediately adjacent to a CAS boundary, etc?

- 4.3.2. If the proposal is to provide increased safety for GA aircraft through ATC intervention then at least one of the potentially conflicting aircraft will have to be in contact with an ATC unit monitoring that portion of the sky. GA is constantly being told by some ATC units that they do not have the man power now, so how will that change in the future to benefit GA aircraft?
- 4.3.3. Similarly it is suggested that the carriage of a transponder is likely to lead to increased CAS access. This is only going to be true for those pilots that also invest in an RT Licence and a radio. Also as CAS access is currently frequently delayed or refused due to limited Controller resources it is difficult to see how this will change significantly unless someone pays for more Controllers.
- 4.3.4. One result of the proposal would be all those aircraft that are currently invisible to an ATC radar unit would no longer be so. Consequently Controllers would see many more potential Class F/G collisions (the involved aircraft could be totally aware of each other and so at no risk), what would the Controllers be expected to do?
- 4.3.5. With the LPST having limited range there will be times when a CAT has an RA and the ATC unit can see nothing. How will ATC handle that?
- 4.3.6. Coupling the LPST's sub-ICAO range with those radar units that have their SSR feeds provided from remote heads there will be locations where the ATC unit will be blind within their area of responsibility, possibly even within the CAS that they are responsible for.
- 4.3.7. Because of the lack of modelling it is far from clear as to whether or not any of the SSR radar heads, and/or other parts of the technology, would reach saturation. It would be incredibly foolish to mandate the use of something and then have to command the cessation of its use due to system limitations.
- 4.3.8. It is understood that Controllers will be able to apply filtering to render their displays useable in periods of high traffic, and that this filtering can be by SSR code and/or height but that it has to apply to the whole display. This gives rise to a number of scenarios where the controllers would, particularly where needing to join or depart aircraft from CAS, not be able to filter effectively and so have significantly degraded displays.
- 4.3.9. If ATC units were found to be consistently filtering out returns from GA aircraft it would beg the question of why GA aircraft should have the equipment in the first place.
- 4.3.10. It is noted that the CAA only started the investigation into the use of SSR in the Aerodrome Traffic Pattern on 15<sup>th</sup> May 2006, with a finish date of 11<sup>th</sup> August 2006. The results of this trial should have been available prior to this Partial RIA proposal. The actual results should be made available to GA organisations and consulted on prior to any progression of analysis from this Partial RIA
- 4.3.11. An Airprox in 2005 highlighted that it is possible for a VFR aircraft to trigger an RA on a TCAS aircraft when both are in Class D, flying perfectly safely and according to the rules. The ATC unit said that it was going to review its policies and procedures. It is easy to see how the only way to avoid RA's is to keep all SSR equipped VFR traffic away from the TCAS equipped aircraft thus limiting the capacity of that Class D airspace.

#### 4.4. Military low flying

- 4.4.1. The GAA is unconvinced that there is any significant benefit to be gained with respect to reducing the risks presented to GA by military low flying. The reasons for this conclusion are:
- 4.4.1.1. By definition military low flying seeks to use the terrain to limit its exposure to potential enemies. Therefore the same terrain masking issues apply in reverse when a military CWS is looking for potential conflicts. For example it is for this reason that it is doubtful if a CWS would have prevented the Jaguar & Cessna accident at Carno in 1991.
  - 4.4.1.2. Until proven by modelling and testing it is unclear how effective the military CWS's will be with the LPST.
  - 4.4.1.3. Only a proportion of military fixed wing aircraft are being fitted with a CWS, excluded are airframes that will continue to be used for low flying in the UK for many years to come.
  - 4.4.1.4. None of the rotary fleet are planned to have a CWS fitted.
  - 4.4.1.5. It is unclear as to whether an unserviceable CWS will be a sortie no go item for military aircraft.
  - 4.4.1.6. Military low flying aircraft rarely talk to ATC units except at the start and end of their sorties and so would not get enroute data, warnings, etc.
- 4.4.2. The UK Government's commitment to mid-air collision avoidance is disproportionate when viewed from the perspective of which military aircraft are getting what equipment, particularly when military on military mid-air are more common than military on anything else mid-air.
- 4.4.3. Despite making requests we have not been provided with information as to the actual/proposed capabilities of military CWS's. We are concerned as to the efficacy of such systems with respect to collision avoidance with the various sorts of GA aircraft and would like to work with MoD on obtaining the maximum mutual benefit.

## 5. Costs

### 5.1. Who pays?

- 5.1.1. There is a presumption in the UK that those who gain from something should be the one to pay for it. This is usually called the "User Pays", more accurately it should be the "Beneficiary Pays".
- 5.1.2. The potential benefits of mandatory transponder carriage to the GA pilot are minimal, and in some parts of the country arguably nil, particularly for a non-radio aircraft. Therefore it is difficult to see why the GA pilot should pay for either the capital or recurring costs.
- 5.1.3. The division of cost should be in direct proportion to the benefits; the obvious beneficiaries are the airlines, the commercial airports, the Air Service Navigation Providers (ANSP) and the military, with UAV operators also being cited in the Partial RIA
- 5.1.4. Any costs left to the GA aircraft owner (both capital and annual) should be proportionate to the activity. As proposed, for example, a hang glider pilot could have to spend an amount equivalent to the value of his aircraft both in capital and annual cost terms.
- 5.1.5. With the short fall in engineers identified in the CAA GA Reviews and the need for specialist equipment to carry out checks a significant part of the periodic checks could be getting the installed equipment, the testing equipment and a



suitable qualified avionics engineer all in the same place.

## 5.2. LPST

- 5.2.1. Any capital costs with respect to the LPST can be nothing but conjecture until at least one model is actually on the market
- 5.2.2. We have been told by a number of electronics firms that they have halted their LPST development projects at the “half way to market” stage because, until there is clarity on the actual LPST specification, confirmation as to the legislation and Exemptions, and confirmation as to whether or it will be compatible across at least Europe, they are not in a position to make the necessary commercial decisions. Therefore we believe that there is insufficient time between now and March 2008 for the necessary actions to take place that will permit there to be anything like sufficient LPSTs available.
- 5.2.3. It would seem from the £1,400 estimate by the manufacturer of the only equipment (albeit only in prototype) that comes close to the possible LPST specification that the CAA estimate of £500 to £1,000 could be significantly low.
- 5.2.4. Similarly until a unit is available on the market the costs of the required checks can be nothing but conjecture.
- 5.2.5. The quoting of the costs excluding VAT is disingenuous when, as the Partial RIA admits, most of the purchasers will be private individuals and so unable to recover the VAT.

## 5.3. Other SSR aircraft equipment

- 5.3.1. The GAA will leave it to its individual member organisations to draw issue with the costs detailed in the Partial RIA. Suffice it to say that those given in the Partial RIA appear consistently low, in some cases considerably so
- 5.3.2. The quoting of the costs excluding VAT is disingenuous when, as the Partial RIA admits, most of the purchasers will be private individuals and so unable to recover the VAT.

## 5.4. CAA generated costs.

- 5.4.1. Due to the proposed equipment carriage there will be significant modification and on-going costs directly payable to the CAA. It should have been possible to give a far more detailed breakdown of these together with worked examples. Had this been done we believe it would have shown further significant errors in the figures given in the Partial RIA.
- 5.4.2. Effectively the CAA's own proposal will generate income for itself. Is this fair and reasonable?

## 6. Other details from the Partial RIA

### 6.1. Objective

- 6.1.1. In para 2.1.1 it states, “This [the objective of the proposal] will be achieved by requiring the fitment and operation of suitable avionics to all aircraft in order to substantially improve their technical interoperability with each other throughout all classes of UK airspace.” This prejudices the result and is inappropriate unless a previous paper has investigated other possible methods and discounted them, if so then it should be referenced to.

- 6.1.2. Options 2, 2(a), 3 and 3(a) are all written from the point of view stated in para 5.2.2.4 against option 2, "...all sectors and groups would benefit from improved safety [from fitting SSR] as traffic levels and airspace complexity continue to rise." This is not true as, with the proposals as written, there are significant groups of pilots and aircraft whose actual risk level change will be so negligible as to effectively make it zero, e.g. all paraglider pilots, GA pilots who operate in the remoter parts of the UK, other aircraft operated under an Exemption. Indeed an over reliance upon the technology by those pilots with some form of CWS fit would actually increase the risk to Exempted aircraft.
- 6.1.3. As far as the majority of GA is concerned CAS is largely closed to it either through clearances effectively being unavailable, or through it also overlying congested areas. Coupling this with the multiple safety systems associated with CAS then the principle area of concern for the CAA with respect to interoperability is Class F/G airspace, as stated in para 2.1.3. Therefore the data should all be targeted at this area, quotes that European traffic levels could nearly double from 2002 to 2022 are irrelevant as the vast majority of that traffic will remain within CAS.
- 6.1.4. The citing of Airprox 092/05 as an example of why SSR carriage should be mandatory is interesting as the UKAB Cause is actually given as, "The PA28 pilot did not comply with clear instructions from ATC and flew into conflict with the C560 on ILS approach." The two Contributory Factors given are, "The PA28 was not squawking Mode C" and "Insufficient use of the ATM by the Biggin Hill APP/ADC". So what appears to be promoted is that one significant human factors failure and a second less significant human factors failure are not worthy of comment, just a less significant failure by the PA28 pilot not to have Mode C operating.
- 6.1.5. The Issues paragraph 2.2 and sub-paragraphs are both too simplistic and go too far:
- 6.1.5.1. it should be just a list of readily identifiable individual fully quantified issues, e.g. not combining unrelated ones such as ICAO compliance and European SES, and in Issue 8 speculating about the loss of sufficient frequencies for primary radar at some unstated future time.
- 6.1.5.2. it should confine itself to issues and not include possible solutions.

## 6.2. The need for Mode S as opposed to Mode C

- 6.2.1. The need for Mode S over Mode C for GA aircraft is not fully explored. For example:
- 6.2.1.1. Would a Mode C LPST be cheaper than a Mode S one?
- 6.2.1.2. With CAT having moved to Mode S doesn't that remove the issue over the lack of Mode A codes?
- 6.2.1.3. Why not allow GA aircraft currently fitted with Mode C to retain it?
- 6.2.1.4. TCAS works with Mode C
- 6.2.1.5. Very few GA aircraft will have the ability and desire to use the full Mode S capabilities
- 6.2.1.6. There is no ICAO requirement for Mode S
- 6.2.2. The CAA's aim of having "future-proof" equipage requirements is laudable, but only where sustainable. The speed of technology change means that trying to guess ahead 5 years, much less the 14 years to 2020 mentioned, is almost immaterial for GA aircraft. Demanding an operational ADS-B aircraft capability by

Oct 08 when the requirement is not defined and the necessary ground environment does not exist is not credible. Better to advise owners that an ADSB requirement is likely in the future and they should consider making provision for it. If they choose not to do so that is their choice. The aims of the consultation do not require it.

### 6.3. Exemptions.

The following is based upon what is said in Annex F.

- 6.3.1. “The final detail of any exemptions will be developed once a recommended option has been determined from the public consultation process.”  
Without knowing full details who or what is going to be exempt from doing what where it is not possible to measure the efficacy of the various proposals as a whole. For example the more exempted aircraft that there are the more devalued a particular proposal becomes, and this could be to the extent that it becomes untenable to insist upon the remainder having to equip with specific equipment.
- 6.3.2. Without knowing the details of the Exemption process it isn't possible to comment upon whether it is acceptable or not. Matters that need to be known before comment can be made include for example:
  - 6.3.2.1. what criteria will be applied to the granting and revoking of Exemptions?
  - 6.3.2.2. who will decide what Exemptions there are to be?
  - 6.3.2.3. will that decision be based upon a consultation?
  - 6.3.2.4. how can that decision be contested?
- 6.3.3. Annex F considers Exemptions based upon activity “within the bounds of known and suitably promulgated sites”.
  - 6.3.3.1. GAA does not believe that this is a workable Exemption and would urge the CAA to consider using the expertise of the BGA and BHPA before proceeding much further down this road.
- 6.3.4. Annex F considers Exemptions based upon definitions
  - 6.3.4.1. GAA does not believe that this is a workable Exemption and would urge the CAA to consider using the expertise of the BHPA before proceeding much further down this road
  - 6.3.4.2. With new definition there is always the risk of clashes. For example there is the potential for clashes between the existing ANO definition of a self-propelled hang-glider and any proposals that differentiate between powered and unpowered aircraft.
- 6.3.5. Annex F considers Exemptions for “Pre-planned and suitably promulgated competitions and other known gatherings involving large numbers of aircraft operating within a small volume of airspace.”  
It is not clear what sort of activity this is considering. If it is meant to be pertinent to BGA or BHPA competitions it displays a lack of understanding of the nature of the tasks set during such competitions.
- 6.3.6. Annex F considers Exemptions for “Para Gliding and parachuting activity where the lack of a suitable rigid structure would prevent the suitable installation of the required equipment.” The lack of a suitable rigid structure also affects a considerable number of other GA aircraft.
  - 6.3.6.1. Without knowing the exact wording of the proposed Exemptions, and also for the above reasons, the GAA believes that it currently isn't possible to comment upon the Exemptions meaningfully.

#### 6.4. Proposed equipment pooling

The Partial RIA talks about using shared SSR equipment. This has been tried many times over the years in many branches of GA and has so far invariably failed. There is nothing in this proposal that changes the basic issue that a serviceable piece of equipment would not be available on every occasion when it was needed.

#### 6.5. Airprox analysis

6.5.1. The BHPA has had a brief look at the Airprox analysis in the Partial RIA Annex D and has been given some, but not all, of the working documents. The BHPA feels that the analysis represents a significantly over simplified picture that, just for example:

6.5.1.1. does not draw attention to those Airproxes that occurred with ATC/pilot failures as a significant feature even with SSR and TCAS fully fitted aircraft.

6.5.1.2. does not look at the human factors associated with the proposal that could lead to lower safety through things like an inappropriate over reliance upon technology and increased “head in cockpit” time.

6.5.2. As the analysis was too superficial the BHPA does not support the statement in Annex D, “The results of this analysis support the CAA proposals to widen the carriage and operation of SSR transponders on all aircraft in order to increase safety levels in the UK Flight Information Region.”

#### 6.6. Risk Analyses

6.6.1. It would appear that Airprox data has been used as a replacement for risk analyses. By the very nature of what it takes for there to be an Airprox raised in is statistically flawed to use them as a measure of safety. So whilst it is acceptable to use an individual Airprox to illustrate certain specific points it is untenable to use them for anything else.

6.6.2. The apparent lack of Risk Analyses by CAA SRG as part of the RIA is puzzling. There are a number of issues that would probably be highlighted including the extent to which it is advisable to so heavily rely upon a system for safety that has so many single points of failure, both technical and operational ones.

6.6.3. Part of any RIA should be measurable outcomes that can then be revisited to check for achievement. In this case there is naturally a great emphasis upon reducing the risk of a collision. However there is no quantitative analysis of the actual risks and there is no mention that when dealing with risk levels, be it for mid-air collision or any other hazard, there are three key numbers; the actual risk, the maximum acceptable risk, and the target risk. Similarly it does not address the fact that GA, Military and CAT all have different maximum acceptable risk levels.

6.6.4. The Partial RIA appears to make no differentiation between the risks pertaining to CAS’s known traffic environment and Class F/G. If it did so it could also have highlighted that it can be a commercial decision by the airlines as to which airport they use; a cheaper regional airport with no CAS, or a Class D protected one that it will cost more to operate in and out of.

6.6.5. A risk analysis into mid-air collisions would no doubt show that certain factors would remain totally unaltered by any of the proposals, e.g. bird strikes. It should also be able to quantify the effect upon the risk(s) of the various Exemptions and the use of the LPST and LAST as opposed to an ICAO compliant SSR.

## 6.7. Foreign Aircraft

The following answered questions have been put to the CAA:

- 6.7.1. Other than by inference that they must comply with whatever is put in place the Partial RIA does not appear to address the following the case of foreign registered but UK based GA aircraft, what are the intentions?
- 6.7.2. Other than by inference that they must comply with whatever is put in place the Partial RIA does not appear to address the following the case of foreign GA aircraft, both registered and not registered, wishing to visit the UK, what are the intentions?
- 6.7.3. The imposition of requirements upon foreign aircraft over and above their own country's requirements would severely limit the UK's ability to hold any form of international event.

## 6.8. Data protection

- 6.8.1. Through the combination of various databases and radar track data it will be possible for a considerable amount of personal data to be collected. Therefore there needs to be statements as to what data will be held for how long and for what purpose it may be used.

## 6.9. The Partial RIA consultation process

- 6.9.1. It was identified that a number of people gained the impression from CAA staff that they did not need to respond to the Partial RIA. The CAA has accepted that this may have influenced people's decision on whether to respond, something that they regret.
- 6.9.2. In addition the GAA believes that the execution of the Partial RIA has not complied with the Cabinet Office "Code of Practice on Consultation" in a number of significant areas including:
  - 6.9.2.1. The objective is constructed along the lines of the "bad objective" in the Cabinet Office RIA Guidance, starting with the proposed solution rather than developing it through the: problem – discussion – solution process. In particular some options are ruled out without proper analysis (Criterion 2.3). A properly constructed RIA would see risk analyses, a fundamental tool of aviation safety management, being used to develop and rank the full range of options.
  - 6.9.2.2. The exclusion of an executive summary (Criterion 3,2)
  - 6.9.2.3. Inadequacy of time allowed relative to holiday period consultations (Criterion 1.6).
  - 6.9.2.4. Unintended consequences are not considered or requested (Criterion 6.4)
  - 6.9.2.5. Consultation methodology could reasonably be expected to involve NATS and GA facilitated discussions, this has not occurred (see section 4.3 of this paper).
  - 6.9.2.6. We have also been made aware of apparent refusals by the CAA to accept responses not in their approved format, arguably this contravenes Cabinet Office Guidelines criteria 2.1.
  - 6.9.2.7. The Partial RIA is misleading in respect of section 2.2.7 International Obligations and Co-operation. This section implies there is an obligation to introduce Mode S into all airspace. There is not. It states the proposals are complementary to foreseen Single European Sky Proposals though states

that is against an embryonic programme. In fact CAA are inappropriately leading in this respect. Such misleading comments invalidate the Partial RIA. Specifically they mislead respondents who might accept the implications as fact and consequently not respond or respond inappropriately. Such statements also bring into question other parts of the document.

## 7. Summary

In summary, the GAA:

- 7.1. understands the desirability of improved collision avoidance measures.
- 7.2. believes that this Partial RIA is asking for comments upon:
  - 7.2.1. something that does not exist even as a specification (the LPST)
  - 7.2.2. a new ATC environment that does not exist anywhere and yet has not been fully modelled for the UK,
  - 7.2.3. promised benefits to GA that are at best optimistic, and probably unattainable due to other restrictions outwith the Partial RIA's scope.
- 7.3. believes that, in addition to the Partial RIA and Response Form combination being confusing to the majority of GA pilots, there is insufficient accurate substantive information within them upon which to make any meaningful rational decisions. Experience says that with all legislation "the devil is in the detail", therefore that detail is needed.
- 7.4. believes that in order to be able to comment upon the proposals at least the following is needed:
  - 7.4.1. full risk analyses for the status quo and all the proposals
  - 7.4.2. the methodology and results of verifiable modelling of the effects upon the UK's ATC systems of the proposals, selective flight trials may also be required
  - 7.4.3. the methodology and results of verifiable modelling of the other individual issues posed, selective flight trials may also be required
  - 7.4.4. firm proposals for the wording of any proposed ANO amendments
  - 7.4.5. firm proposals for the wording of all initial Exemptions/Derogations together with examples of how they are expected to work and associated processes and procedures
  - 7.4.6. verifiable explicit details of how non-radio GA will benefit from the fitting of transponders
  - 7.4.7. verifiable explicit details of how radio equipped GA will benefit from the fitting of transponders
  - 7.4.8. full details of all proposed flight limitations for LAST equipped aircraft if not covered in any ANO amendment proposals
  - 7.4.9. full details of all proposed flight limitations for LPST equipped aircraft if not covered in any ANO amendment proposals
  - 7.4.10. a consultation upon the LPST specification
  - 7.4.11. full details of all relevant CAA processes and charges with respect to airworthiness and licensing processes
  - 7.4.12. full details of how monitoring and enforcement would be carried out
- 7.5. believes that, in the light of the issues identified in this paper, even if it was decided to go ahead with the mandatory carriage proposals there is insufficient time between now and March 2008 to bring in a sustainable, practical system of regulation complete with all the necessary administration, enforcement procedures, etc.

- 7.6. believes that even if it was decided to go ahead with the mandatory carriage proposals there is insufficient time between now and March 2008 for industry to bring to market a suitable LPST in sufficient quantities.
- 7.7. has sympathy with the hypothesis that new technologies might be able to offer valuable improvements in aviation safety, but only through thorough consultations, investigations and assessments prior to adopting and implementing new policies/legislation. For example has any work been done on utilising radar reflective cloth in aircraft to enhance primary radar effectiveness?
- 7.8. believes that there are ways that the GAA's members can work with the CAA to mitigate some of the issues of concern to the CAA outwith the contents of the Partial RIA, e.g. through the provision of GPS ready airspace data files
- 7.9. has concerns at the validity of this partial RIA relative to the Cabinet Office "Code of Practice on Consultation".

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for GA Alliance  
29<sup>th</sup> August 2006