ANNEX D

1 RESULTS OF RESEARCH AND CONSULTATION

1.1 GENERAL AVIATION DISCUSSION FORUM

1.1.1 A discussion and consultation forum on the issues surrounding the recognition and detection of light aircraft was held on 24 January 2005. Representatives from Europe Air Sports, PPL/IR Europe, IAOPA and EUROCONTROL attended. The hazard scenarios were presented and discussed, together with the possible solutions available to reduce the risks both now and in the 2015-2020 timeframe. The impact of the solutions was also debated.

1.1.2 It was agreed that in any future airspace regimes, there would still need to be a mix of IFR and VFR flights and in both controlled and uncontrolled airspace. In particular, the UK representatives stated that IFR flight outside CAS, with and without radar cover, had been permitted in the UK since the end of the war. Moreover, they were not aware of a single accident caused by two such aircraft colliding in cloud. Furthermore, they believed that one of the safest things that a VFR pilot could do when encountering unexpected deteriorating weather conditions, if he was instrument competent, was to climb to an altitude where he could obtain a radar service. There were also occasions when it could be safer to climb through a thin cloud layer and enjoy clear air above, rather than remain below cloud in reduced visibility. In the UK, it was, therefore, considered very important that instrument competent pilots should not lose the option to fly in cloud, legally, without radar cover outside of CAS.

1.1.3 In the future, the GA community would still want to fly in uncontrolled airspace and CAS. The sporting community would predominately, but not exclusively, want to fly in uncontrolled airspace. However, it was stressed that all GA flying activities would have a continuing requirement to have VFR access to CAS. Concern was expressed during the discussions at the expansion of CAS, which tended to squeeze GA aircraft into narrow corridors of uncontrolled airspace. The Luton/Stansted area was given as an example. All delegates agreed that the main collision risk was around the edges of uncontrolled airspace, which became more acute at the boundary of controlled and uncontrolled airspace around airports; and with the greatest area of risk on the final approach. The GA community wished to continue to have the ability to cross CAS using VFR clearances.

1.1.4 When all airspace is considered, it was agreed that the collision risk is not spatially uniform. It was believed that there were 'hotspots' where the risk was routinely high. Also, alpine regions bring special problems, as many mountain peaks are or could be above the divisional level between CAS and uncontrolled airspace. The risks also vary with the time of the week, time of the year and with the weather conditions. Most sporting and recreational flying is conducted at weekends and peaks arise between June and August. Thus the risk level is dependent on location in the airspace, time and weather.

1.1.5 Although a number of problems were raised with large clusters of GA aircraft, most special events were well publicised and managed. The delegates felt that such events had been occurring for many years without major ATM issues. No specific risks were therefore identified but it was considered essential that NOTAM services across Europe be improved in terms of ease of access and use by GA pilots.

1.1.6 It was emphasised that many Light Aviation aircraft operate without the need for or provision of radios. That facility needed to be recognised in any new proposals.

1.1.7 There was some agreement that collision and ATM interoperability risks could be reduced if all aircraft were fitted with an SSR transponder or other form of aircraft recognition system. However, whilst desirable, it was not considered essential for all GA aircraft to have an SSR transponder fitted when not operating in areas of high risk. There was agreement that transponder carriage was acceptable in those places where safety is demonstrably improved.

1.1.8 Another view from the Europe Air Sports was that infringements of CAS were a disciplinary problem that should not be solved in a technical way. In looking to the 2015-2020 timeframe, it was considered possible that ADS–B would be in widespread use and also offer a potential solution. Therefore the policy on SSR transponder carriage should align itself with the EUROCONTROL Surveillance Strategy.

1.1.9 The implementation of Transponder Mandatory Zones (TMZ) was considered beneficial. These were already implemented in Germany and were being considered in The Netherlands. Such zones could be implemented only in those areas of greatest risk and possibly only at times of real risk. This could lead to the concept of Flexible TMZ's.

1.1.10 Although a collision risk between light aircraft and military aircraft was accepted, no technical solution was believed to be essential. The current situation was acceptable but that procedures could be improved. It was reported that a study by the RNLAF concluded that the 'See and Avoid' principle was basically sound. In light of some air forces equipping with SSR based collision avoidance systems, transponder carriage by Light Aviation aircraft was seen as desirable rather than essential.

1.1.11 The GA representatives were adamant that it was incumbent on appropriate authorities to balance the cost of SSR transponders to the GA community with the benefits to be derived from carriage. Furthermore, ANSP's and NAA's should have a responsibility to ensure that benefits ensue. The aviation community needed to take account of the size of benefit each stakeholder would receive and an equitable balance needed to be struck between commercial and non-commercial flying interests.

1.1.12 The GA community wished to see a strategic plan and roadmap, including a validation that clearly indicated the carriage requirements and the benefits that would follow. The GA delegates made it clear that they considered that CAT should bear the costs of SSR transponder carriage around CAS; as such carriage could provide significant commercial benefit to CAT operators. Nugatory expenditure on avionics installation and maintenance in the absence of such a plan was not acceptable, both on grounds of cost and the less advantageous tax and market size leverage available to the GA community over the commercial flying companies.

1.1.13 The acceptance of a need to carry an SSR transponder under certain conditions leads to a requirement to provide a suitable technical solution for some Light Aircraft. Some aircraft will not be able to equip with an ICAO compliant SSR transponder because of mass and power considerations. This needs to be taken into account and a relaxation or modification to the current ICAO technical standards needs to be addressed for such aircraft. For example, for microlights and gliders. Furthermore, when planning the introduction of a new avionics capability on such a scale as envisaged here, the technical lead time for the introduction of such a capability must be taken into account.

1.1.14 During the discussions, the possibility of the introduction of a Traffic Information System (TIS) was raised. Such a system is operating in the USA and much of GA has, or will have, the equipment necessary to use it. For example, the Garmin GNS 430 with a Garmin GTX 330 transponder enables the TIS service to be displayed if the radar heads have the appropriate facility enabled. Furthermore, availability of the TIS data would encourage GA operators to fit the equipment because of the easily perceived real benefit. However, the sports flying community operating mostly in VFR conditions, and particularly when in 'gaggles' of gliders, would be unlikely to benefit from TIS. The conclusion was that such a TIS facility would be very welcome and receive widespread support from the motorised sector of the GA community but it was unlikely to be of benefit to the sports flying community. Concern about cockpit distractions and the adverse effect of TIS displays on 'See and Avoid' was raised by the delegates for Europe Air Sports.

1.1.15 The essence of the consensus of the meeting was that the GA community would very much welcome a simple, coherent harmonised strategy for Europe, concerning the detection and recognition of light aircraft. The aim should be to achieve enduring safety and operational benefits without restricting the GA community's freedom to fly.

1.2 EUROPEAN GLIDING UNION

1.2.1 The EGU is concerned about the potential reduction of European airspace available for cross-country flight by gliders, particularly during competitions. Although it recognises the possibilities of new technologies, it would only like to see it applied where it demonstrably increases safety and where it is acceptable both technically economically. In particular, replies to ACAS and surveillance interrogations constitute a heavy burden to the small batteries in gliders. Transponders should therefore only be applied to gliders in areas where the density of IFR traffic amongst VFR traffic makes this necessary.

1.2.2 The EGU believes that the see-and-avoid principle is still valid and that the rules for VFR flight work well. Therefore, the EGU wishes to see a sensible application of procedures and technology to allow gliding to continue to take place in almost all airspace, including CAS.

1.3 MICROLIGHT TRAFFIC INCREASE

1.3.1 Concerns have been raised with regards to the increase in microlight activity across Europe. EASA certifying regulations have become quite stringent with respect to gliders and motorised gliders. This ultimately increases the cost of flying gliders. Therefore, EAS suspects that many pilots are searching for an alternative flying hobby. Microlights are not covered by EASA regulation (EU1592 Annex 2) and many of the modern machines fly high (up to FL130) and fast (130-140kts) making them appealing machines. They are affordable and some have a range that is better than some other GA aeroplanes. Thus, EAS perceives that many GA and glider pilots will migrate to flying microlights.

1.3.2 Microlights are nationally regulated. There is no European licensing of microlights and there is no general technical standard or maintenance control. They are an unregulated group that have no organised federation. Therefore, there is no single body which can be contacted for discussion forums.

1.3.3 The current microlight pilot is often less educated in airspace policy and rules and, therefore, they are more likely to penetrate airspace restrictions. In addition, there is no regulation to stop pilots that have failed their aviation medical from flying a microlight. As microlights are built to lower safety categories and certification standards, the situation in terms of air safety will diminish with increasing numbers being flown.

1.3.4 Notwithstanding, there is little evidence supporting the concerns raised by EAS, as many microlight pilots may be unaware of the formal AIRPROX reporting system and those pilots of other aircraft types that do come into close proximity with a microlight, may not recognise and report it as such. From a distance, it might not be clear to the reporter as to whether it is a single engine aircraft or microlight.

1.3.5 It is believed that adoption of EASA regulations for micro lights aerodynes will not improve the situation as holes in the regulations will always be sought. Rather, EAS would like to see the regulations for other light aircraft types, such as gliders, made more flexible to prevent the migration towards the microlight sector of the aviation industry

1.4 THE NETHERLANDS

1.4.1 In the Netherlands, the use of an SSR transponder with either mode A and C or Mode S is currently mandatory throughout the Amsterdam FIR for VFR flights with motorised aircraft. However, this excludes Class G airspace below 1,200 feet AMSL where it is not above the North Sea and below Schiphol TMA 1. Military flying is not permitted below 1500 feet AMSL.

1.4.2 VFR flights with non motorised aircraft are currently exempted from the requirement to carry an SSR transponder but the Ministry of Transport and the Ministry of Defence are working on an interim solution. An ICAO compliant LAST is accepted for VFR flights up to 15,000 ft and with maximum cruising speed of 175 KTAS.

1.4.3 With effect from 31 March 2008, all transponders will need to be Mode S capable.

1.5 ENTE NAZIONALE AVIAZIONE CIVILE (ENAC) ITALY

1.5.1 The current transponder equipage rules in Italian Airspace are published as follows:

a) All aeroplanes and helicopters must be equipped with a Mode C transponder as a minimum.

b) All aircraft must be equipped with a Mode C transponder as a minimum when entering airspace Classes A, B, C, D and E.

c) With effect from 1st April 2005, aircraft at Linate and Malpensa airport will require a Mode S Elementary Surveillance transponder to facilitate multilateration. This may be delayed due to a delay in fielding the multilateration system by ENAV.

1.5.2 For the future, ENAC has the following issues:

d) LAST equipment will be required for historical aircraft.

e) Italian ANSPs are asking for transponders to be carried by all aircraft in all airspace.

1.6 SLV DENMARK

1.6.1 SLV has filed a difference with ICAO, as VFR aircraft only require a Mode C transponder in Class C airspace. IFR flights require a Mode C transponder in all airspace. There is currently no foreseen need for the carriage of Mode S transponders.

1.6.2 There are significant mixes of VFR and IFR flights in airspace Classes C, D, E and G but the analysis of incident reports to date has not caused any major concern. There are also no plans to make any changes for the future.

1.7 UK CAA, NATS AND MOD

1.7.1 The CAA and NATS would like to implement a 'Known' traffic environment in all airspace outside of TSAs/TRAs through the use of SSR Mode S. However, SSR equipment would need to be designed to meet particular needs. For example, it was not considered necessary or desirable for some Light Aviation aircraft to be equipped with fully ICAO compliant 70W transponders for local flying below FL95. Transponders on these flights need only interact with ACAS II to generate contacts at about 12-14 nm and generate suitable RAs. They would also only need a performance to ensure radar detection for local ATC radars out to 40-60 nm. Moreover, they would need to capable of operating on aircraft such as microlights and para gliders.

1.7.2 If Class G airspace in the UK was to remain 'Unknown', there was a strong view in NATS that the amount and size of CAS would have to increase significantly to protect increasing levels of CAT. This would, however, have a negative effect on the collision risk for military and GA aircraft and they would have to operate in smaller geographical areas.

1.7.3 Providing mitigation against the safety consequences of infringements of CAS was a major requirement for the UK CAA and NATS. NATS believes that extensive prosecution for airspace infringements does not support safety, as it encourages people not to call up on the radio for help if they are lost. Safety is significantly improved in these circumstances if aircraft can be seen and pilots are in communication with ATC. The UK feels that SSR transponders would help to prevent accidents through enabling safety systems when these infringements occur. These include ATC instructions, collision avoidance systems and conflict alert tools. Airspace infringements would be easier to manage with SSR, as it presents the opportunity to provide more information for all participants.

1.7.4 As ACAS II mandates are not airspace dependent, the UK CAA believes that the benefits or carriage are not currently maximised in Class G airspace. Moreover, there is now a greater frequency of direct routings through UK Class G airspace for CAT traffic that is equipped with ACAS II. This trend is expected to continue with the increased use of regional airports and the growth of low cost airlines.

1.7.5 With reference to ‘See and Avoid’, the MoD representative stated that a view persists that it remains difficult to see certain quadrants through canopy arches on military jets. More importantly, if Class G reduces with the growth of CAS, the intensity of Class G will continue to increase thus making ‘See and Avoid’ even more difficult, especially at speeds in excess of 250 kt. Therefore, the MoD is developing a Collision Warning System for fast jet aircraft, which will probably be SSR based. MoD is concerned that the effectiveness of CWS will not be maximised in Class G airspace if SSR carriage in that airspace is not widespread, especially at low level. Notwithstanding, there is a concern that military CWS could be swamped by SSR returns in certain airspace or produce many false alerts. However, these issues will need to be addressed in the design stages and it was considered that ACAS II style RAs would not be required and that the CWS should be based on Mode S technology. Voluntary equipage with TCAS I is also becoming widespread in the UK as is equipage on aircraft conducting Aerial Work.

1.7.6 In line with the views expressed at the GA discussion forum, the UK believes that managed activity such as ‘fly-ins’ or competitions, which are correctly organised and notified, present less of a risk than the day-to-day unmanaged activity. However, there was general agreement between the CAA, NATS and MoD that that there was a higher risk of collision close to CAS in areas with a high mix of day-to-day IFR and VFR traffic. The risk in the wider open FIR, with mainly VFR traffic, was more difficult to quantify and justify. Many incidents may not be noticed or reported by pilots. In any case, UK AIRPROX data might not necessarily provide a good indication of risk, as it depends more on the number of flights in a piece of airspace and the mix of IFR/VFR traffic. The collision risk in Class G airspace above FL 100 in the UK was also of less concern due to the ‘Known’ traffic environment from the current SSR transponder carriage requirements.

1.7.7 The proliferation of renewable energy wind turbine sites was causing considerable difficulty for the UK aviation industry and, particularly, for ANSPs. The primary radar clutter caused by these developments was significant, with the resultant increase in collision risk in these areas. On many occasions, the only means of providing mitigation against proposed developments would be to redirect flights or reduce flow capacity. Therefore, frequent objections were being raised by UK ANSPs during the planning process for proposed wind turbine sites. However, a ‘Known’ traffic environment, through the widespread carriage of SSR, would provide mitigation for these collision risks without affecting capacity. Indeed, the UK CAA considered that SSR was the only possible mitigation in the near future for the primary radar clutter issues surrounding wind turbines.