Regulatory Impact Assessment

Options for regulatory action in relation to aircraft within the scope of the European Light Aircraft group 1 process, resulting from a study of microlight aeroplane regulations in Member States
(Short title: “Microlight Study”)

Contract: EASA.2009.C53

Hawk Information Services Limited

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Regulatory Impact Assessment

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Executive summary

This RIA analyses six options for the regulation of light aircraft in what is termed the ELA 1 range from 451 to 1200kgs MTOM. ELA 1 comprises a proposal by EASA for a process of regulatory compliance for airworthiness and covers aeroplanes, gliders and balloons.

The Option 1 recommendation of the RIA is to use industry-based consensus systems, combined with manufacturers' declarations of compliance for a form of initial airworthiness certification of products, as an alternative to the current certification by EASA under DOA and POA approvals.

In addition a further recommendation is that the Option 2 proposal of using industry-based accredited (or assessment) bodies to undertake certification functions under delegated authority from either the NAAs or EASA, should be considered seriously and investigated further as an alternative to Option 1 should implementation of Option 1 not be possible.

As a sub-set of Options 1 and 2, consideration has been given under Option 3 to the urgent issue of the proposed European Light Sport Aircraft (LSA). A recommendation is made to seek a pathway to the introduction of the LSA to Europe on a more rapid timescale than is envisaged by following the current full regulatory timetable, including the anticipated changes to the Basic Regulation.

The RIA discussion and process is based on a study of microlight aeroplane (sub- 451kgs MTOM) regulations in Europe, and the LSA in the USA (sub-601kgs MTOM). Within Europe, microlights remain outside of EU Community regulation and are subject to a variety of national regulations. In the USA, the FAA regulates the LSA quite differently to the methodology applied in Europe. The study also collected accident data (primarily for fatal accidents) in both the microlight sector and also the USA LSA category, together with comparative accident data where available for Community-regulated light aeroplanes, gliders and balloons.

The purpose of studying the European microlight and US LSA experience was to see if there are benefits – safety, environmental, economic, social, technical - in the regulatory approaches for microlights and the LSA within the US, which can be used in the rule-making task for the ELA 1 sector, without materially and adversely affecting the safety record of the Community-regulated sector.

<u>Important Note regarding the structure of this document:</u>

The layout and structure of this Regulatory Impact Assessment follows the template of the standardised RIA provided by EASA.

Section 1 Process and consultation

1.1 Background to the Regulatory Impact Assessment (RIA)

EASA commissioned a study in early 2010 of the regulation of microlight aeroplanes ('microlights') in Europe (reference contract EASA.2009.C53).

The study comprises three phases:

Phase 1 A study of microlight regulations and accident rates within certain EU States and comparative accidents rates for EU regulated aircraft categories

Phase 2 Preparing a Regulatory Impact Assessment in respect of the proposed ELA 1 MTOM range of aircraft regulated at Community (EU) level

Phase 3 A final report with recommendations

Microlights are lightweight aeroplanes that are:

(a) a maximum of 450kgs MTOM (or 472.5kgs with an emergency ballistic parachute system) if two-seat; or

(b) a maximum of 300kgs MTOM (or 315kgs with an emergency ballistic parachute system) if single-seat.

Microlights are included in Annex II of EU Regulation 216/2008 and thereby excluded from the scope of EU Community regulations. The regulation of microlights remains the responsibility of EU Member States at a national level.

The purpose of the study was to review and report on the national regulations of microlights in a selection of Member States and to ascertain, where possible, the accident experience of these aeroplanes. Phase 1 of the study was also aimed at a comparison of microlight accident rates with those for aircraft between 451kgs and 1200kgs MTOM which are subject to Community regulation by reason of Regulation 216/2008. This group comprises:

(1) Aeroplanes up to 1200kgs

(2) Gliders (sailplanes) and

(3) Balloons

These three categories of aircraft, which comprise the main elements of the proposed ELA 1 range of aircraft (see below), are sometimes referred to collectively in this RIA and for its purpose as the '*light aviation sector'*. This excludes those aircraft which are outside the scope of Community regulation and rulemaking by reason of their inclusion in Annex II.

EASA agreed from the outset for the purposes of the study including this RIA, that airships, helicopters and autogyro planes are excluded from scope.

The experience in the USA of the 'Light Sport Aircraft' ('LSA'), introduced in the USA in 2005, was also studied. The US LSA category was developed by the FAA in response to the demand for an aircraft category to regenerate interest in light aviation and that also made use of alternative, potentially more cost-effective, means of achieving airworthiness acceptance.

Compared to the traditional method of type certification, with its associated design and production approvals by the regulatory authority, aircraft under the USA LSA are limited to 600kgs MTOM, and have certain other limitations in terms of design and operational criteria. The category is sub-divided into the SLSA (S = 'Special') for factory-produced LSAs and the ELSA (E = 'Experimental') for amateur / home-built aircraft.

In parallel, the FAA developed and introduced a 'Sport Pilot Licence' designed to be more appropriate for piloting the LSA category of aircraft

The study was designed to inform this RIA by utilising the microlight experience in Europe and the LSA experience in the USA.

1.2 Content of the 'Microlights' Study

The Interim Report of the study following the completion of Phase 1 sets out the methodology and processes adopted to survey the European microlight regulations and accident rates in eight countries. It also identifies the stakeholders and other parties consulted. The details of Phase 1 are not repeated in this RIA introduction, but reference to the Phase 1 report should be made where necessary, when published.

The data collected and the conclusions arrived at in the Phase 1 report are the basis of this RIA.

As part of the RIA process a workshop was held in Köln on 19th October 2010. All interested parties from across the Member States were able to attend, and the audience comprised representatives from various NAAs, manufacturers, membership associations and individuals. The conclusions of the Phase 1 report and the draft RIA were presented. The issues raised and discussed during the workshop have been incorporated in the final edition of this RIA and the final report.

1.3 European Light Aircraft Group 1 process

In 2006 EASA established a working group, MDM.032, to consider options for the future regulation of light aircraft that are 'non-complex' (as defined in Regulation 216/2008 and its predecessor 1592/2002) and which are used 'non-commercially'. The work of MDM.032 extended over some 3 years resulting in a published NPA (NPA 2008-07) and a partial CRD process. The work and final output of MDM.032 is still 'work-in-progress'. The latest published proposals from EASA are contained in CRD 2008-07 Part 1 dated 15 July 2010. It is understood that a further CRD is planned, which will cover a proposed Certification Specification for the European LSA.

In summary, the proposals centre on the introduction of an alternative approach and related processes for the acceptance of initial airworthiness of non-complex aircraft used non-commercially, in the weight range of 451kgs to 1200kgs MTOM (group 1 – called 'ELA 1') and 1201kgs to 2000kgs MTOM (group 2 – called 'ELA 2'). The proposals also introduce the concept of a 'European Light Sport Aeroplane' (EuLSA) which in broad terms is equivalent to the US LSA, but with some differences in design and operational criteria and also with a different set of draft rules for airworthiness compliance.

This RIA is concerned solely with the regulation and related implementing rules for aircraft covered by the proposed ELA 1 process, but covering more than just initial airworthiness.

It is important to note that there is no intention on behalf of EASA as a result of this study and/or the RIA, to affect the current status of microlight aeroplanes within Annex II of the Basic Regulation.

1.4 Proposed European Light Sport Aeroplane (EuLSA): relationship to RIA

During the work of the MDM.032 working group, ideas were developed for the introduction of a category of a single-engine aeroplane called EuLSA, limited to two seats and with a MTOM up to 600kgs. The proposal arose mainly as a consequence of the introduction of the US LSA category in 2005, also with a MTOM of 600kgs and a maximum of two seats.

With the introduction of the LSA in the USA, European aeroplane designers and manufacturers, who had largely been involved up until then with the production of microlights and/or aeroplanes designed and produced according to the CS23 code, began designing and manufacturing LSAs for the American market. Other manufacturers also identified potential new market opportunities. However, as these LSAs were designed and manufactured to meet the new USA airworthiness requirements based on an industry consensus system and were not type-certified under either FAA or EASA rules they could not be sold in Europe. The marketing of European designed and produced LSAs is therefore focused on the USA and those other countries outside of Europe, which have subsequently adopted the LSA airworthiness process.

It was recognised that in order to meet one of the overall objectives of the EU economic agenda it was desirable for these LSAs to be capable of being marketed in Europe, providing that safety aspects could be addressed satisfactorily.

However, one of the barriers for the European and indeed non-European manufacturers to achieve EASA type certification for each new aeroplane was the need under EASA rules for them to spend significant amounts of additional manpower and financial resources on initial airworthiness regulatory compliance costs. This involves design organisation approval (DOA) and production organisation approval (POA) as well as developing an industry-wide certification code (CS) embodying the airworthiness standards for the EuLSA.

For most of these manufacturers, which are almost exclusively Small and Medium Sized Enterprises (SMEs), these additional costs relative to a small and competitive market for the product, represented a substantial and often unacceptable business risk.

The situation for many stakeholders has become a frustration; not only for the manufacturers but also the potential purchasers of these LSAs, many of whom are looking to purchase a technologically more advanced and more efficient light aeroplane than those which have populated the European GA fleet since the 1960s. The technological progress in the design and production of microlights over the last 10 to 15 years, particularly the use of ‘new’ materials such as glass and carbon fibre as well as new, non-certified (to historic airworthiness standards) engines and propellers, and modern instrumentation (“glass cockpits”) was now available for extension into the USA LSA category.

Furthermore, the traditional microlight fleet, limited to 450kgs was proving difficult to maintain with the changes in design, materials, technology and particularly the average upper weight limits of the pilot and passenger, as well as carrying adequate fuel and maybe a small amount of baggage for journeys. There is significant latent demand in the market for the proposed EuLSA category, providing that an economic solution can be found to overcome these barriers.

It is very noticeable and significant that these modern LSA designs, bred mainly from the microlight world of aviation, have developed against a background of a less restrictive set of applicable initial airworthiness rules, approvals, oversight and general environment than those applied to ‘fully’ regulated light aviation. It is perhaps a reflection of the effect of the extant initial airworthiness rules in the ‘fully’ regulated world that the evolution of traditional light aeroplanes has fallen behind the developments in microlight aeroplanes and the US LSA.

As an interim measure towards a resolution of this situation, EASA has adopted an approach of indicating, where applicable, approval of a design submitted by a manufacturer through the medium of a document called 'Flight Conditions' (EASA Form 18b). This document indicates that EASA is satisfied that the specified aeroplane is capable of safe flight under certain defined conditions. On this basis such an LSA aeroplane qualifies only for an EASA Permit to Fly (PtF), not a Type certificate (TC) and Certificate of Airworthiness (C of A). The PtF is issued by the state of registry once EASA approval is given for the type. The manufacturer provides an 'Aircraft Statement of Conformity' (EASA Form 52) with the aeroplane. This is intended to confirm conformity with the design specified by EASA in the approved 'Flight Conditions'. However, in the absence currently of a LSA standard (CS-LSA) in accordance with Part 21 this means the state of registry of the new aeroplane has to individually investigate whether the aeroplane conforms to the 'Flight Conditions'.

Once a CS-LSA is established then the aeroplane type will be eligible for a Restricted CofA (RCofA).The problem with the current interim arrangement is that there is no certainty that aeroplanes already accepted on a PtF will retrospectively be able to be transferred to a RCoA. It is understood that this interim arrangement is for two years.

At the current time there are proposals for alternative initial airworthiness compliance processes and procedures for the EuLSA within the overall proposals for ELA 1. The current status quo is reflected in part in EASA CRD 2008-07 of 15th July 2010. Whether or not the content of this CRD provides a solution that would be widely accepted by designers, manufactures and potential purchasers of an EuLSA remains an open question.

The interim measure described above is not an indication of the 'norm'. The PtF is provided where no other form of certification is available. When a fully developed EuLSA category, within an overall ELA 1 process, is introduced, the interim measure will disappear.

This RIA addresses the possible options not only in respect of the wider ELA 1 definition but also the sub-set of the EuLSA.

1.5 Phase 1 Data Overview

One of the objectives of the work in Phase 1 was to collect data for a ten-year period (2000 to 2009) for each of the groups of aircraft (microlights, aeroplanes 451kgs to 1200kgs MTOM, gliders and balloons) in the eight selected European countries; in respect of:

a. Populations of aircraft and pilots
b. Numbers of fatal, serious injury and all accidents
c. Causal analyses of fatal accidents
d. Exposure data (operating hours) to determine accident rates per 100,000 hours

Overall it was found generally that comprehensive population and accident data for the above did not exist in a consistent, complete or comparable form for many countries. Each 'aircraft sector' or country had different protocols and templates for the collection of such data, and often applied different definitions to the data selection and / or criteria.

This was especially the case with aeroplanes from 451kgs to 1200kgs MTOM. The lack of application of common definitions resulted in data analysis and comparability problems particularly in relation to the MTOM thresholds for aeroplane groups.

Because the MTOM thresholds under consideration in the study are determined by EASA rulemaking considerations, they were not applicable historically over the time periods for which data was sought. This meant that the study was unable, mostly, to segregate aeroplanes up to 1200kgs MTOM from the ones with higher MTOM in the broad GA aeroplane category. Also, the inclusion or exclusion in the statistics of aeroplanes in Annex II of regulation 216/2008 such as microlights, amateur-built and historic aircraft was invariably unclear.

Overall, it was not possible to achieve an analysis of matching accidents to exposure or aeroplane population data, within the discrete parameters of -

- MTOM range of 451 to 1200kgs, and
- Community-regulated aeroplanes vs. Annex II aeroplanes, and
- Only non-complex aeroplanes, and
- Being operated non-commercially (though the commercial versus non-commercial distinction is no longer relevant for initial airworthiness categorisation of EU-regulated aeroplanes).

Some countries were only able to provide individual accident records which then had to be analysed in order to obtain a summarised annual dataset; others had limited datasets. Very few sectors or countries were able to provide causal analyses that revealed the 'real' causes of fatal accidents. Often the analyses, where available, categorised the accident according to the phase of flight, which does not generally reveal the real cause of the accident. Only in a limited but notable number of aircraft sectors or countries was there an adequate and meaningful causal analysis of fatal accidents.

However, the analyses that were obtained for microlights and aeroplanes generally gave an indication as to whether a fatal accident was attributable to airworthiness or mechanical problems or a 'pilot error'. This distinction is important when considering options in the RIA for future regulatory action in relation to initial and continuing airworthiness in comparison with, particularly, pilot continuation training or supervision and 'human factors'.

In particular, there was a widespread lack of available national exposure data (operating hours) for a given sector, which resulted in an inability to determine accident rates per 100,000 hours. This is the accepted international standard for measuring accident rates of lower mass GA aircraft.

In the absence of exposure data in the form of operating hours, accident rates were calculated per 1,000 aircraft. This has its dangers as a surrogate for operating hours, as experience shows that a significant proportion of an aircraft population may be 'dormant' or inactive. This is particularly applicable to the aeroplane and microlight fleets, and perhaps to a lesser extent with the glider fleets and balloons. The more accurate measure of accident rates, in the absence of exposure data, would be the accidents in relation to the *active* aircraft fleet.

However, there were no means by which the *active* fleet numbers could be determined historically for all countries and sectors. Despite this limitation, for the microlight category the relationship between the 'active' fleet (based on valid airworthiness status documentation at points in time) and the registered fleet was studied for two countries, Czech Republic and UK, where such information was more readily available. Using the ratios established, an estimate was made for the other countries' microlight fleets so as to arrive at accident rates for active fleet numbers.

In the gliding sector the exposure data that was generally available from the national gliding associations was the number of glider launches per annum, rather than the total hours flown. Therefore the accident rates could be calculated in relation to the number of flights. However, in order to compare the rate of gliding accidents with microlights, the gliding data was also calculated in relation to glider aircraft fleets, for which reasonably accurate data was available.

As a result of the shortcomings in raw data, the Phase 1 report contains a number of significant assumptions in arriving at accident rates and conclusions. Therefore those conclusions need to be read with those limitations in mind. Equally, the data used within this RIA carry the same caveat.

1.6 Scope of the RIA

The scope of the RIA is to consider a range of options for the future regulatory framework, including if necessary changes to the Basic Regulation EC 216/2008, of aircraft covered by the proposed ELA1 process. Such aircraft are those that are currently subject to regulation at Community level, (aeroplanes above 450kgs MTOM (472.5kgs with ballistic parachute systems), gliders and balloons). By agreement with EASA helicopters and airships are excluded from consideration in the RIA. Other regulatory topics are covered, not just initial airworthiness, which has been the primary driver in the development of proposals of the ELA 1 process.

As a sub-set of the above objectives, particular focus is also given to the proposed EuLSA category in the light of interest from various parties and stakeholders and the content of the work of MDM.032.

Section 2 Issue analysis and risk assessment

No pre-RIA was prepared, as agreed with EASA.

2.1 The issue and who is affected

The issue centres on whether an alternative regulatory framework to that which is currently applicable would be more appropriate for aircraft in the proposed ELA 1.

The preceding study of microlight regulations in Europe and of the LSA in the USA was conducted in order to ascertain whether features of those regulatory frameworks can be adopted or adapted for the EU-regulated light aviation sector. One sub-set of the ELA 1 MTOM range is the proposed EuLSA category, but that is not the only category of aircraft under consideration.

Fundamental to the RIA is the accident experience of microlighting in Europe compared to that of the EU-regulated light aviation sector, and the more recent US LSA experience. In trying to establish the respective accident records the intention is to draw comparisons and try and establish whether there is any identifiable and proven correlation between the respective regulatory frameworks and accident rates.

Underlying the purpose of the RIA is a general background theme that can be summed up as follows:

> is the regulatory framework established in Regulation EC 216/2008 (and its preceding EC 1592/2002), and the supporting Implementing Rules, the most appropriate for light aviation and does it reflect a proportionate approach commensurate with the overall safety objective? In so far as the study and this RIA is able to determine, the outcome is expressed in terms of recommendations on one or more options, to be taken forward to a future EASA working group (BR.010) which will address, inter alia, future changes to EC 216/2008.

A key driver in many of the considerations is the issue of financial and human resources required for compliance with regulations, as this affects all stakeholders in the light aviation sector.

2.2 Features from the Microlight aviation sector

2.2.1 Accessibility

The perceived success of microlight aviation across Europe is fundamentally a result of its accessibility. A large number of participants can access the activity due to the relatively low costs of aircraft purchase and operation, the large choice of aircraft, and the low costs and convenience of small local pilot training establishments.

2.2.2 Lower Cost of acquisition and ownership

This relies upon lower manufacturing overheads allowing many manufacturers to become established in the first instance and then to flourish. Simplified pilot training requirements allow many training establishments to exist. Low regulatory overheads have allowed the establishment of many small businesses, which form the foundation for the activity, and have not restricted innovation and further development of ideas and products.

2.2.3 Personal Responsibility

The microlight aviation sector in most countries operates at a lower level of regulatory prescription and oversight than heavier aircraft. The responsibility for initial airworthiness and often continuing airworthiness rests more directly with the manufacturers and owners, avoiding the costs and constraints of 'heavy' regulation.

The responsibility lies with those who have specialist knowledge of their products, rather than expecting external organisations to retain the additional expertise to approve, and so take responsibility for, a product. Where external knowledge is required to oversee manufacturers it is often provided by national organisations associated with the microlight community and delegated by the NAA to oversee microlight activities. These can retain specialist microlight staff rather than expecting NAAs to engage and retain staff with microlight expertise in addition to their responsibilities for wider GA and commercial air transport.

2.2.4 National Training Systems

Training systems are often controlled through national organisations such as the national aero club or the national microlight organisation. 'Best practice' involves well-defined training syllabi and regular oversight of instructor standards.

2.2.5 Safety Information Culture

The owner-pilot and club environment is very important to microlight aviation. This provides support and information to owners, including piloting skills, maintenance knowledge and safety feedback. Dissemination of information occurs at a club level by word-of-mouth, by regular publications from national aero clubs, and increasingly by internet-based groups. This was apparent in a number of the Member States studied and in some there was a very active agenda for the improvement of safety through training initiatives and improvements.

2.2.6 Minimal Medical Requirements

Medical requirements are also simplified compared to heavier aircraft, ranging from no medical requirements through self-declaration of fitness, medical examination to driving standards up to, in a few countries, ICAO Class 2 requirements. The simpler requirements have proved to be important to those who would otherwise be denied the opportunity to fly. For example, older people are often those with both the time and funds to engage in the sport and this adds considerably to the number of pilots and the knowledge base.

2.2.7 Social Outcomes

A considerable number of people have obtained their microlight pilot's licence across Europe, estimated to be around 50,000 over the last 10 years. Many will have pursued their activity within local clubs and some will have extended their flying range right through to international journeys. This represents a substantial body of people with a background in aviation, some of who will have moved on to work in the European commercial aviation industry.

2.2.8 Economic Outcomes

A large number of small businesses across Europe depend upon the microlight sector and form its foundation. This is particularly noticeable in a country such as France that has light regulation and a large participant population supporting commercial enterprise.

2.2.9 Technology Outcomes

The microlight sector has developed aeroplanes with performance in terms of speed, efficiency and payload fraction beyond that of many light aeroplanes. In particular the use of composite materials and the development of modern efficient lightweight engines has transformed the microlight constructional technology, unrestricted by adherence to certified materials and processes.

2.2.10 Microlight accident data

Data acquisition.

Comprehensive, complete, consistent, comparable, accurate and reliable microlight accident and activity databases across Europe do not exist, although mention should be made of the efforts of the European Microlight Federation (EMF) to create such a database.

Generally the data for the number of fatal accidents and fatalities has been available and is assessed as being largely complete. Some difficulty was experienced in segregating autogyro fatal accidents where these were included in the microlight data. In some countries paramotors are classified as microlights whereas in others they are treated as hang gliders; therefore some assumptions had to be made in determining the numbers of fatal accidents in 3 axis and weight-shift microlights. .

The data for the total number of reportable accidents was available in most countries studied. Where it was available it was not always clear whether the ICAO definitions of 'accidents' had been followed in the categorisation of data. Equally, the organisations collecting the accident data cannot always be sure that all reportable accidents are actually reported and captured in the databases.

Exposure in the form of total annual microlight operating hours in each country was not available in many cases. Where it was available it was unclear whether the ICAO definitions had been followed in the categorisation of data.

Therefore, on the advice of the EASA project team, the study resorted to identifying accident rates in relation to the microlight aeroplane populations rather than in relation to exposure represented by operating hours. This is the only sensible basis upon which comparison with accident rates for light aeroplanes, gliders and balloons can be attempted. Using the microlight aeroplane population numbers as the denominator however gave rise to further complications. The relevant measure would be the number of 'active' microlight aeroplanes through each year. Most countries were able to supply the number of registered microlights at a point in time each year, but from other data it is obvious that the active fleet in all countries, at any point in time, is considerably lower than the registered fleet.

This is probably due to a variety of factors including aircraft remaining on a register when out of service, undergoing long term repair or maintenance, or simply laid up and no longer in use.

Therefore this study has estimated the 10 year average active number of microlight aeroplanes for each country, based on the relationship between active and registered in two of the selected countries where the data on the active fleet was available in a reasonably reliable form based on valid certificates of airworthiness in various forms.

The resultant accident rates for 'active' aircraft populations should only be viewed as indicative.

2.2.11 Safety outcomes: microlight accident data and rates

Table 1: Fatal accident rates for (a) registered (b) 'active' microlight aeroplanes 2000-2009

Microlight Accidents Combined 3-axis & flex-wing	CZ	F	D	I	NL	N	S	UK	Total
No. of Fatal Accidents (10 year total)	34	147	67	115	2	2	5	20	392
Total No. of reported accidents (10 year total)	282	856	585	203	25	151	104	456	2,662
Total registered aircraft population (10 yr average)	2,490	8,200	3,500	8,032	365	193	345	4,011	27,136
Estimated total 'active' aircraft population (10 yr average)	1,358	6,182	2,489	6,000	280	160	270	2,292	19,031
Fatal accidents per year per 1000 registered aircraft	1.4	1.8	1.9	1.4	0.5	1.0	1.4	0.5	1.4
Fatal accidents per year per 1000 *estimated* 'active' aircraft	2.5	2.4	2.7	1.9	0.7	1.2	1.8	0.9	2.1
Total accidents per year per 1000 registered aircraft	11.3	10.4	16.7	2.5	6.8	78.2	30.1	11.4	9.8
Total accidents per year per 1000 *estimated* 'active' aircraft	20.8	13.8	23.5	3.4	8.9	94.4	38.5	19.9	14.0

The above table includes the small microlight aeroplane populations and the small number of fatal accidents in The Netherlands, Norway and Sweden, and are therefore subject to the effects of statistical randomness.

Fatal accident rates in the significant microlighting population countries are all reasonably comparable (1.4 to 1.9 per 1,000 registered aircraft) except for the UK which shows a significantly lower rate of 0.5. Similar comparisons are shown for the fatal accident rate per 1,000 'active' aircraft.

Generally, those Member States (MS) with a high degree of microlight regulation have the smallest microlight populations but have better data records with regard to accidents, activity levels and accident causal analyses. Many MS do not involve their accident investigation agencies in microlight events, even for fatalities. Some have delegated the responsibility for accident investigation to the local police and judiciary for the purposes of determining liabilities rather than causes of accidents; access to this data was not possible.

In accident data that was obtained, causal analyses were either very limited or non-existent. In most cases the analysis that was available against individual accidents was generally very brief. The Czech Air Accidents Investigation Authority's accident reports included a statement attributing most accidents to human factors. No accidents were attributed to airworthiness failures.

If the accident rates are generally attributable to pilot errors / human factors then the differences in pilot training and continuation education and oversight, operating environments and cultures are of interest. Of the countries studied, the French training system is probably the least controlled. However it does not appear to adversely affect the fatal accident rate to a major degree, though the rate is at the higher end of the spectrum.

In contrast, the Czech and Italian training systems are quite well defined, and the fatal accident rates are lower than France. Again, however, caution must be exercised over interpretation because of uncertainties over the data, particularly microlight aeroplane population numbers for Italy.

The German system is also well defined, but current concerns at the BFU and LBA are addressing the effect on pilot judgement where microlights have the compulsory carriage of ballistic rescue systems, which may affect the accident rate.

For the UK it is apparent that the training system is very well defined and controlled; however, it remains a subjective judgement whether the standard is higher than the other countries, even though the fatal accident rate is lower.

Initial pilot training through to a licence is not necessarily the most important factor; the operational environment and development of skills are probably at least as important. In the UK for example there is a very strong safety culture, actively promoted by the CAA, BMAA, LAA and other safety-oriented bodies through their monthly publications, meetings and other channels. The operating environment, with considerable volumes of controlled airspace and often difficult weather conditions, also demand a high standard of airmanship.

The UK system also maintains comprehensive control over continued airworthiness. Owners are permitted to maintain their aircraft, but are required to source components from approved suppliers, and to keep records of all maintenance and parts in an aircraft logbook. Annual inspections help to ensure that these requirements are adhered to. With well-defined maintenance requirements carried out or overseen by interested parties (the owner is generally also the pilot) the possibility of human-factor related failures in maintenance should be reduced. The likelihood of human-factor related failures during in-flight emergencies caused by maintenance failures is also reduced.

It is proposed that the combination of these factors, namely well-structured pilot training, a strong and active safety culture, and well-defined owner-maintenance requirements is the most likely explanation for the lower fatal accident rate in the UK.

Other factors may also influence the accident rates, but are even more difficult to assess. In particular microlight aircraft operate from a wide variety of airfields ranging from totally unprepared fields through to commercial aerodromes. Clearly the hazards associated with the former are considerably greater than with the latter. In addition, microlight aeroplanes are more affected by the weather and a pilot's judgement of its suitability compared to heavier aeroplanes. The low energy nature of microlight aeroplanes does allow easier precautionary landings if necessary but these also carry increased risk themselves.

Despite these statistical constraints some observations and conclusions can be made but again with the caveat that they depend on the completeness, accuracy and reliability of the data. In particular the assumptions that underpin the population and activity data are very important and due allowance should be made for gaps and / or inaccuracies in this data.

It should be noted that the aeroplane population figures are 10 year arithmetic averages and disguise the growth in general of the microlight aeroplane population during this period.

Caution is required interpreting the total accident rates per aircraft population, as the basis of accident reporting varies country to country. Furthermore, countries with a small microlight aeroplane population are subject to statistical randomness in accidents unduly influencing the resultant accident rates.

In terms of state regulatory control, the Netherlands is probably the highest, followed by the UK. The fatal accident rates of 0.5 per 1,000 registered microlight aeroplanes seem to suggest there is correlation. However, in the case of the Netherlands there were just two fatal accidents in 10 years. Because of the population size, the UK data can be regarded as statistically significant.

Sweden and Norway have a degree of state oversight but with substantial delegation of day-to-day control to the national microlight organisation, but again the populations and accidents are small in number. The accident rates are subject to large variability with a very small absolute change in the fatal accident numbers. The total accident rates for Sweden and Norway may well reflect a more comprehensive accident reporting system than some other countries.

France and Italy have the largest populations, combined with the highest absolute number of fatal accidents. Both countries have a 'light' regulatory framework in which there is minimal control by the State over airworthiness, and in the case of France, a totally devolved pilot training regime. France has the second highest fatal accident rate, whilst Italy compares with the Czech Republic where there is a comprehensive delegated regulatory framework managed by the Czech LAA.

The fatal accident rate for Germany needs to be interpreted with caution because of some uncertainties over the microlight aeroplane population numbers.

2.2.12 Summary

Lower costs depend on reduced regulatory overheads permitting smaller businesses to flourish leading to competition, product innovation, choice of aeroplanes, and widespread availability of pilot training. Microlight aeroplanes operate within a recreational, largely club-based environment which is supported by active national aeroclubs, encouraging dissemination of knowledge and promotion of awareness of safety issues.

The safety outcome appears primarily dependent upon pilot training and subsequent continuation training & education within a supportive environment. With such measures in place the safety outcome is comparable to other sectors of recreational aviation such as gliding.

Therefore the success factors are considered to be:

1. low regulatory overheads
2. manufacturer and owner responsibility for initial and continuing airworthiness of products
3. well-defined training systems
4. supportive club and national aero club environment and culture
5. simplified medical requirements

2.3 The principal issue(s)

This RIA aims to address the issues, and provide options for the resolution of the issues, for the regulation of aircraft in the light aviation sector; i.e. those covered by the ELA 1 process. The issues centre primarily on the following facets, which are perceived by stakeholders as creating barriers to participation and the economic development of this sector:

- Initial airworthiness: the degree of oversight, regulatory costs, timescales and administrative processes required to achieve type certification and modification to aircraft, as embodied in Part 21. The need for an alternative approach to reduce effort, costs, timescales and 'bureaucracy' without adversely affecting the acceptable level of safety
- Continuing airworthiness including maintenance: the effects of the implementation of Part M in 2008 and the increased cost burden compared with the previous national arrangements, increased administrative and other processes, separation of responsibilities, introduction of CAMO environment, with no apparent safety gains.
- Licensing and training of pilots: some of the proposed implementing rules for FCL embodied in EASA Opinion 4/2010 and Implementing Rules dated 26th August 2010, particularly those for the LAPL.
- Pilot medical standards and means of demonstrating compliance: the current proposals in the CRD to NPA 2008-17c, particularly those related to the LAPL, but not exclusively.
- Pilot training organisations (Organisation Requirements and Authority Requirements): the proposals in NPA 2008-22 for 'small' organisations in particular and their possible impact (prior to publication by EASA of any revised proposals expected in a CRD in the autumn of 2010).
- Aircraft engineer licensing: the proposals in NPA 2010-05.
- Operations: the proposals in NPA 2009-2 (prior to publication by EASA of any revised proposals in a CRD expected in the autumn of 2010).
- Commercial versus non-commercial aspects.

It is noted that the thrust of the work of MDM.032 was driven primarily by considerations of initial airworthiness for light aircraft. The resulting NPAs and CRD reflect this. However, the issues that are addressed in this RIA are not solely related to initial airworthiness, important though this is. The range of topics addressed reflects the importance of considering the total regulatory environment on the light aviation sector. This is because of the close inter-relationships between the different regulatory topics in the private recreational and leisure environment in which these aircraft operate, and the impact on economic and social factors in particular.

Looking at the issues to be addressed from a different angle, they can be summarised as:

- Considering what safety level is appropriate and 'acceptable' for the light aviation sector, having in mind that flying has inherent risks and accidents will never be totally avoided or eliminated.
- Consideration of risk differentiation between risks to pilots and others on board the aircraft ('involved' third parties) and risks to 'uninvolved' third parties on the ground or in the air.

- Having regulations and rules that are proportionate to the activity being regulated, having in mind different levels of 'acceptable' safety compared with other sectors of aviation.
- Trying to achieve the right balance between essential (legally binding) regulation that minimises safety risks, and self-responsibility in various forms.
- Considering the role of stakeholder groups or associations in delivering a healthy and responsive safety environment complementary to or in place of prescriptive and legally binding rules.
- Minimising the essential costs of regulation that impact aircraft designers, manufacturers, service support organisations, individuals, aircraft owners, pilots and flying clubs.
- Having a rational and pragmatic interpretation in Member States of the definition of 'commercial operations' as applied to the light aviation sector.

2.4 The EU regulatory framework and its effects

The regulation of light aircraft in the described range was subject to national control by Member States until 2003. The initial Basic Regulation (1592/2002) and the creation of EASA in 2002 started the process of transferring the regulation of these aircraft – and essentially all civil aircraft above the MTOM limit in the scope of this RIA - to a central EU competence.

The first stage of this transition was in respect of initial airworthiness, which governs the design and production of aircraft. In 2008 the regulation of continuing airworthiness including maintenance, was implemented at the EU level. The regulation of pilot training and licensing, licensing of aircraft engineers / mechanics, training organisations, operations and other related topics are currently in various stages of drafting or adoption with the target of implementation commencing in April 2012.

During this transition from national regulation and rules to pan-European regulations and rules it has been recognised in the last three years by the European Commission, the European Parliament and EASA that a common 'vertical' template approach to aviation safety regulation and rulemaking across the Community may not be the most appropriate. By 'vertical' is meant the complete range of aircraft from airliners to privately operated aeroplanes > 450kgs MTOM, gliders and balloons as well as small helicopters and autogyros. This common approach risks not distinguishing the differences in 'acceptable' risk levels or the significant differences in both the nature and purpose of the flights as well as the very different operating conditions and environment.

One key distinguishing feature of light aviation is 'proximity'; the aircraft owner or operator is invariably the pilot. In CAT and corporate aviation that is not the case.

A considerable body of stakeholder opinion is of the view that a 'proportionate' approach should be taken in relation to risk and the regulation and rules for light aviation. One way of interpreting this is to say that the Regulation and Implementing Rules designed to address safety of CAT should not be replicated in structure, form and content for light general aviation. The Commission's 'communication' on 'An agenda for a sustainable future in general and business aviation' (reference COM (2007) 869) dated 11th January 2008 and endorsed overwhelmingly by the Parliament (reference 2008/2134(INI)) on 3rd February 2009 recognised this issue and set out a goal of proportionality in rulemaking.

Whilst the objective of proportionality was viewed by many stakeholders as admirable, no risk level parameters were established and the subsequent execution of the objective appears to some to have been constrained by the current legally binding framework of the Basic Regulation. This in turn has probably led to constraints in process and thinking within the rulemaking activities at EASA.

To overcome this barrier a fresh approach is required and one which will probably require revisions to the Basic Regulation for the light aviation sector. Hence, in part, this study to understand the national regulatory frameworks of the microlight sector and its safety outcomes in terms of accidents, how these compare with the EU regulated light aviation sector and whether aspects of the microlight sector experience can be usefully adopted in the EU regulated light aviation sector.

The study has made use of a variety of stakeholder inputs over the last few years and which are available in the public domain (such as responses to EASA NPAs and CRDs), as well as opinions provided through the various European and national light aviation organisations that represent the views of their members, whether pilots, aircraft owners, designers or manufacturers etc. The content of this RIA takes these inputs and opinions into account where relevant to the debate.

2.5 Nature of the light aviation sector (ELA 1 range)

This is sub-divided into the three categories of aircraft

2.5.1 Aeroplanes from 451 to 1200kgs MTOM

Throughout Europe aeroplanes within these parameters are owned and flown primarily for private, non-commercial purposes. Such flying is characterised as ‘leisure, pleasure, recreational or air sports’. Some aeroplanes are used for business purposes of the owner’s business. Other aeroplanes are owned by and used in flying schools for pilot training and hire activities which in some countries are classified as commercial. Other owners are flying clubs, which in some countries provide pilot training on a non-commercial basis for club members. The aeroplanes are generally limited to single engine, non-turboprop, and a maximum of 4 seats including the pilot seat.

The aeroplanes have ether type certificates with an associated C of A or, in certain countries, a RCoA or a permanent PtF. Their pilots hold licences which currently are national licences either under the JAA licensing or national (such as NPPL) arrangements. These licences will require transition to the proposed European licences embodied in the EASA FCL proposals for those pilots wishing to continue to fly aircraft within the scope of EU rules.

In addition, under current scope of Regulation 216/2008 the proposed EuLSA would be in this category of aeroplane.

This fleet of aeroplanes in the EU also includes Foreign Registered Aircraft (FRA), particularly many registered in the USA (N registered) and extending into higher MTOM ranges beyond ELA 1. For the ELA 1 range the current position in relation to possible EU rules on pilot licensing and operation creates significant doubts as to their future when owned or operated by EU resident citizen. This topic is not dealt with in this RIA.

2.5.2 Gliders (Sailplanes)

Gliding is an air sport exclusively for recreational, leisure, pleasure and sporting purposes. Throughout Europe gliding is principally conducted through clubs that provide launching facilities. Because gliding is an activity conducted through the medium of members’ clubs it is not classified as a commercial activity. Pilot training is undertaken within the club environment by qualified instructors.

Modern gliders can achieve cross-country distances in a day in excess of 1,000km when the weather is suitable. Distances of 500km are now commonplace. Gliders also operate to considerable heights above the earth's surface; heights above 30,000ft are not unknown, although the usual limit of 19,500ft is more common due to airspace restrictions. In Europe there are approximately 85,000 qualified glider pilots in over a thousand clubs, operating some 22,000 gliders (a small proportion of which are Annex II gliders). The sport has been governed in most European countries for many years through the national gliding associations which are either divisions of a National Aero Club (NAC) or stand-alone organisations but members of the NAC. In most cases these organisations operate with relatively little direct involvement of the NAAs. In this respect there are similarities with the microlight sector and environment.

2.5.3 Balloons

Ballooning is the oldest form of aviation and it is also the safest form of light aviation in terms of the fatal accident record; it is entirely dependent upon benign weather conditions. Whilst ballooning is primarily a private, non-commercial aviation activity it has also developed a commercial aspect in many countries. Balloons are used for advertising with sponsors and conduct 'leisure flights' for the public in return for a fee.

2.6 The statistics for the light aviation sector (ELA 1 MTOM range)

The following are ***estimates*** of the relevant population and activity statistics, based partly on the results of phase 1 of the study in which a sample of countries were studied, and also on other available information in order to extrapolate the data to a pan-EU basis.

Table 2: Estimated EU Member States data

Estimated numbers in all EU Member States + 4 associated states				
	Microlights	Aeroplanes 451-1200kgs	Gliders	Balloons
Aircraft population (Annex II)	40,000	8,000*	1,500	NA
Aircraft population (non-Annex II)	NA	90,000*	20,500	4,000
Pilot population	70,000	150,000*	85,000	8,000
Annual operating hours	2,100,000	9,000,000*	2,000,000	240,000
Annual flights	2,300,000	11,000,000*	2,800,000	200,000

* These numbers are very rough estimates, as no separate registers exist for GA aircraft in this MTOM range.

2.7 Current regulatory status of ELA 1 range of aircraft

Table 3: current regulatory status of aircraft within the ELA 1 range:

	European (EuLSA)	Aeroplanes 451-1200kgs MTOM - other than EuLSA	Sailplanes (Gliders)	Balloons
Initial Airworthiness	EASA CRD Part 1 (ELA) proposals	EASA Part 21 (law)	EASA Part 21 (law)	EASA Part 21 (law)
Continuing Airworthiness	EASA CRD Part 1 (ELA)	EASA Part M (law)	EASA Part M (law)	EASA Part M (law)
Pilot Training & Licensing	No separate EASA proposals yet	EASA Opinion 4/2010 & IRs	EASA Opinion 4/2010 & IRs	EASA Opinion 4/2010 & IRs
Pilot medicals	No separate EASA proposals yet	EASA CRD 2008-17c	EASA CRD 2008-17c	EASA CRD 2008-17c
Operations	No separate EASA proposals yet	EASA NPA 2009-02	EASA NPA 2009-02	EASA NPA 2009-02
Organisation Requirements (Training)	No separate EASA proposals yet	EASA CRD 2008-22 (4/10/10)	EASA CRD 2008-22 (4/10/10)	EASA CRD 2008-22 (4/10/10)
Engineers' licensing	EASA CRD 2008-03 (L licence)	EASA CRD 2008-03 (L licence)	EASA CRD 2008-03 (L licence)	EASA CRD 2008-03 (L licence)
Airfields	National unless within scope of Regulation 1108/2009	National unless within scope of Regulation 1108/2009	National unless within scope of Regulation 1108/2009	National rules – mainly non-airfield operations
ATM	National rules	National rules	National rules	National rules

2.8 High level comparison of regulatory frameworks: Microlights, USA LSA and EU regulated light aviation

The study of EU microlight regulations and those of the US LSA category has revealed various features that can be compared and contrasted with the Community regulated light aviation sector. The comments on microlights that may be found in the Phase 1 and Final reports are a distillation of a wide range of approaches in the eight EU countries studied.

A table of comparisons is shown as Attachment A.

2.9 Accident data and comparisons

The accident data is presented in the Phase 1 report of the study. Brief extracts of key findings are given below.

2.9.1 Accident and related data

2.9.1.1 Microlights

Details of accidents in microlighting are set out in section 2.2.11

(b) Aeroplanes' accident data

Of the aviation sectors for which data was sought, the study team had the greatest difficulty in data collection for aeroplanes from 450kgs up to 1,200kg MTOM (the currently proposed upper limit for ELA1 process).

In all EU countries studied, any available national database, usually under the control of the NAA or accident investigation agency, whilst having individual records of accidents in a database, was not in a form that enabled a data selection to be made by the required MTOM range.

Often the records were grouped in an MTOM range up 2,250 or 5,700kgs and in a form that did not provide the study team with the ability to search the database against the relevant MTOM parameter, even if the MTOM of aircraft in the individual records was recorded. However, in some cases (e.g. the UK database) the study team was able to analyse a significant number of records over the selected 10 years (2000 to 2009) to extract the relevant records and data.

A further limitation in trying to establish a valid data set of accidents involving aeroplanes up to 1,200kgs, but used for non-commercial purposes (a parameter relevant to the purposes of the study), was the absence in the source data of any identification, generally, of commercial or non-commercial use or certification.

As one of the objectives of the study is to compare accident rates, expressed as 'accidents per 100,000 hours' in the countries selected for the study, as between microlighting and the relevant aeroplanes, it is necessary to try and establish the national annual volume of activity (hours), as the measure of exposure to risk.

Unfortunately it was found that no such comprehensive records exist in many of the selected countries. At this stage of the overall study, it has not been possible to provide a comprehensive overview of relevant accident statistics for aeroplanes or even the raw data of aeroplane and pilot populations.

Therefore, for the purposes of the Phase 1 report, any aeroplane accident data and rates are almost without exception, guesstimates.

> The best estimates that can be made of the fatal accident rate per 100,000 hours for aeroplanes up to 1200kgs is in the region of 1.00. The equivalent rate per 1,000 aeroplanes is probably also in the region of 1.00.

2.9.1.2 Gliding accident data

The national gliding associations compile accident data annually. These databases have been the main source for the gliding accident statistics presented in this report.

An extensive and detailed database with causal analyses of gliding accidents going back over many years exists in some of the countries. Aggregation of causal analyses across the countries selected for this study has not been possible, but where individual countries' analyses are available they have been used to illustrate the typical profile of accident causes

For gliding, the key measure of activity that is reasonably available is the number of launches (i.e. flights). Some of the national statistics also provide total operating hours. In most countries the collection of the data on operating hours is not as comprehensive as flight numbers, and the reliability of the hours' data that is collected is almost certainly less robust.

In consequence the gliding accident rates in relation to flights require conversion to a rate per 100,000 hours, using some assumptions. These assumptions are set out in detail in the country sections of the Phase 1 report. As a surrogate measure, so as to be able to compare fatal accident rates between the different aircraft categories, rates per 1,000 aircraft have also been calculated. The glider population numbers for each country are assessed as reasonably accurate.

Only by understanding these assumptions can any meaningful comparison be made with the accident rates for microlighting.

2.9.1.3. Ballooning accident data

Ballooning population and accident data was obtained for some countries although activity data (hours) was not generally available. As the incidence of fatal accidents in the ten-year period was negligible, EASA agreed that the presentation of ballooning data could be included in the overview section of the Phase 1 report without the detail in the country sections.

2.9.2 Comparisons of accident rates between aircraft categories

In attempting to compare accident rates between the different categories, extreme caution needs to be exercised. This is because each activity has different characteristics in terms of the risk profile. Ballooning is quite different to the other activities; gliding is also distinct in terms of inherent risk. The two activities that resemble each other most closely in risk profile are microlighting and aeroplanes but unfortunately in this study, ascertaining the accident rates for aeroplanes up to 1,200kgs has proved particularly difficult.

Accident rates in the countries that were studied have remained constant for the ten years for the two predominant microlight types (flex-wing and 3-axis).

> Overall the findings were that that microlight fatal accident rate was around 1.4 per 1,000 registered aircraft, which compares with the glider fatal accident rate of around 1.4 per 1,000 aircraft

Microlighting would appear to have a similar fatal accident rate to gliding, when measured in relation to the respective aircraft fleet populations. Utilisation of gliders in terms of operating hours is probably higher than microlights as a result of the longer average times of the cross-country element. This is likely to place the fatal accident rate for gliding better than microlighting.

Comparison of microlighting fatal accident rates with CS 23 light aeroplanes is not really possible, as the data for the latter is generally not available in the segmented structure required.

Ballooning is statistically the safest form of light aviation in terms of the risk of fatal accidents.

2.9.3 Conclusion

The fatal accident rates in the three of the four aircraft categories under review are similar; they are within the same 'band width'.

Microlight rates appear on the surface to be slightly worse than aeroplanes, although it is emphasised that the data for aeroplanes is far from complete and the rates quoted are based on a few specific studies in a few countries in previous years. The fatal accident rate for ballooning is significantly less than the other three aircraft categories.

In trying to draw comparisons, however, it needs to be emphasised again that the different forms of flying present a different range of risks.

Table 4: Fatal and total accident rates comparisons

Accident rate	Microlights	Aeroplanes	Gliding	Balloons
No. of European countries in accident rate calculations	8	TBA	7	4
Countries excluded (no data)	-	TBA	Italy	France, Italy, Netherlands, Norway
Years covered by rates	2000 – 2009 (10)	TBA	2000 – 2007 (8)	2000 – 2009 (10)
Fatal accident rate per 1,000 registered aircraft	1.4	1.0 (E)	1.4	0.3
Fatal accident rate per 100,000 flights	Flight #s not available	Flight #s not available	1.2	Flight #s not available
Fatal accident rate per 100,000 hours	2.6 (E)	Hours not available	Hours not available	Hours not available
Total accident rate per 1,000 registered aircraft	9.8	TBA	14.9	11.5
Total accident rate per 100,000 flights	Flight #s not available	Flight #s not available	13.6	Flight #s not available
Total accident rate per 100,000 hours	17.3 (E)	Hours not available	Hours not available	Hours not available

2.10 Factors influencing the development and participation of the ELA 1 aircraft range, including regulatory aspects

The current regulatory environment for developing proportionate rules for aviation safety in the light aviation sector is influenced by the following factors:

1. The framework and specific requirements of the Basic Regulation
2. The move towards proportionality as expressed by the Commission and the Parliament coming after the enactment of the Basic Regulation 216/2008
3. Attempting to standardise across 27 Member States with widely different cultures, legal systems, approaches and attitudes
4. An underlying belief of 'compliance with ICAO' when much of ICAO approach was developed for CAT
5. Limitations increasingly being imposed by operational, planning and environmental restrictions: noise limits and number of movements at airfields.
6. A paucity of evidence-based rulemaking with quantified safety and cost / benefit cases on specific proposals at the detailed level
7. Political reactions and pressure to 'stop aeroplanes falling out of the sky' based on media-highlighted events
8. Despite over 100 years' experience, with a significant element of military aviation thinking, aviation is still treated as 'different' compared to many other activities in society and which are considered perfectly normal but perhaps riskier and which do not receive the same level of regulatory focus
9. The slowness to adopt 'Better Regulation' initiatives, both at EU and national governmental levels
10. A need for better understanding of cost factors at the micro economic level, as they affect light aviation
11. Slowness to adopt technological development in the light fully regulated aviation sector and adapting rules to fit in order to take advantage without extensive and expensive evaluation
12. Governments' propensity to control and not trust the common sense and expertise / knowledge of the industry and the regulated person
13. Reluctance to consider alternative approaches to achieving the aim of safe aviation for certain aspects, other than through legally-binding requirements and rules
14. A 'liability' culture, reflected in protection of the organisation and individual from claims

It is generally accepted that society needs a basic set of rules by which risk is mitigated in a wide variety of activities. However, a balance has to be struck between the extent of the rules and the point at which they risk generating a diminishing return. The diminishing returns are reflected in terms of the ability of the regulated person to absorb and retain information and comply, and the costs of compliance versus the safety benefit. Many governments have recognised this quandary in recent years and have published guidance for 'Better Regulation'. One criteria used in such guidance is 'proportionality'. Indeed the

Commission had recognised that better regulation initiatives focus generally on the following criteria:

- Proportionality - Regulators should only intervene when necessary. Remedies should be appropriate to the risk posed, and costs identified and minimised.
- Accountability - Regulators must be able to justify decisions, and be subject to public scrutiny.
- Consistency - Rules and standards must be joined up and implemented fairly.
- Transparency - Regulators should be open, and keep regulations simple and user friendly.
- Targeting - Regulation should be focus on the problem, and minimise side effects.

The non-commercial light aviation sector is largely one in which the activities are conducted for enjoyment, sport, fun and recreation. It is a free choice of the individual. It is done knowing and appreciating the risks involved, and is therefore approached in a responsible way by the vast majority. As in other walks of life, there will always be some who flout the basic rules but this is true of all human activity. So, a balance has to be struck between regulation and freedom, so as not to alienate the overwhelming majority who apply common sense and self-discipline in what is a risk activity. Over-regulation can generate reactions in perfectly law-abiding people, with the result that the attitude then spills over into areas where the sensible rules are broken as well.

Another important factor that is relevant to managing risk in light aviation is that the aircraft owner / pilot is usually close to all the factors that support his activity. He / she takes a much closer interest in the state of the aircraft, in the operating environment, than would a passenger on an airliner. He takes a close interest and personal responsibility. Whilst he may not be an expert engineer he will know his aircraft better than can be expected of an airline passenger. Therefore the rules around his activities should be tailored to the circumstances, relying to a greater extent on his involvement.

This close personal involvement in the light aviation sector drives one of the other key considerations, which is the cost of the activity. General aviation has become increasingly expensive for many. Whilst some of the cost increases can be attributed to fuel prices and to utilisation factors relative to fixed costs, there is clear evidence that regulatory compliance costs in their various forms have played a major part. These costs are driven not only by initial airworthiness and continuing airworthiness requirements, particularly modifications, but also by maintenance regimes and associated costs. Maintenance of a pilot’s licence, including the regular medical assessment, also contribute to rising costs

The net result of this has been a general reduction in participation levels in light aviation. It is also true that the availability of other forms of recreational activity has expanded in the last 40 years and light aviation is in a competitive marketplace for peoples’ choices.

For the sector to thrive and grow it needs newcomers in the form of young people. Therefore it needs to be accessible in terms of monetary cost and personal time. The same is true for older people, many of whom come to light aviation in retirement but with lower income than when they were working. Those who have been active in light aviation for many years and who want to continue in retirement also face similar affordability problems, although they can generally find the time. These are frequently the ones, particularly instructors, who have the most experience in safety management that can be passed on to the younger generations. The light aviation sector relies heavily on the voluntary nature of participation and support that characterises much of the activities.

All the above represent the challenges feeding into this RIA. In order to present a balance however, there are factors in the regulatory framework that are beneficial:

1. Opening up of borders within the EU for the free movement of products, people and services
2. Greater cross-border benefits of knowledge transfer, education and learning in safety management
3. The 'level playing field', which is more applicable to light aviation support services to than it is to the actual aviation activities, the vast majority of which are conducted within national boundaries
4. Aircraft modifications 'market' now across 27 member states

2.11 Stakeholders in the outcome of the RIA

The light aviation sector is well organised throughout the EU Member States. It comprises a variety of bodies that cover all or individual elements of the light aviation scene. Inevitably these organisations embrace a mixture of Annex II and non-Annex II aircraft, and thereby aircraft owners and pilots. All these organisations are stakeholders representing, at various levels, the interests of individual aircraft owners, pilots, operators, clubs, support service organisations etc.

2.11.1 Global level

Fédération Aéronautique International (FAI)
Federal Aviation Administration (USA)
International Aircraft and Owners and Pilots Association (IAOPA)

2.11.2 Pan-European level covering all aircraft categories

Europe Air Sports (EAS)
European Council of General Aviation Suppliers (ECOGAS)
International Aircraft and Owners and Pilots Association (Europe) – (IAOPA - Europe)
Light Aircraft Manufacturers' Association (Europe) - LAMA Europe

2.11.3 Pan-European level covering specific aircraft categories

European Gliding Union (EGU)
European Microlight Federation (EMF)
European Power Flying Union (EPFU)
European Federation of Light, Experimental and Vintage Aircraft (EFLEVA)
European Glider Manufacturers' Association

2.11.4 National level in Europe

Air Accident Investigation Agencies
National Aviation Authorities
Departments / Ministries for Transport in each Member State
National Aero Clubs (NACs)
National AOPA organisations
National aircraft category-specific associations for aeroplanes, gliding & ballooning
National subject-specific bodies (e.g. aviation safety)
National organisations representing the interests of support service businesses
Businesses providing products & services to the light aviation sector

2.11.5 Regional or local level

Flying clubs

Pilot training organisations
Airfield owners
Individual business serving the sector represented by aircraft in the ELA 1 range
Aircraft owners, pilots, operators

> The number of organisations potentially affected by the ultimate outcome of this study and the RIA is substantial, probably running to several thousands. The number of individuals in the EU who could be directly or indirectly affected by changes resulting from this RIA is probably of the order of 500,000

The estimated 500,000 number is compiled from a variety of data sources, primarily light aviation representative organisations in the light aviation sector, and a cross section of published data, making due allowance for double-counting.

2.12 Why the issues need to be addressed

1. The current Regulation and Part 21 Implementing Rules for initial airworthiness, applied to aircraft in the light aviation sector (ELA 1), whilst providing a level of safety that has been proven successful historically through its predecessor rules embodied in JAR 21, is regarded by many stakeholders as too burdensome economically for the light aviation sector. In part this is a reflection of the size of individual economic units that require regulatory approval and oversight. Proportionate to the turnover of these organisations, the regulatory compliance costs are significantly greater and represent a significant investment risk.
2. Alternative processes and procedures for the official acceptance of initial airworthiness of aircraft need to be explored and solutions found and agreed. The purpose is to achieve lower regulatory compliance costs for designers / manufacturers (particularly SMEs which typically populate this sector), so as to stimulate economic development whilst maintaining an acceptable safety level in respect of initial airworthiness. Reduction in the regulatory cost burden for launching new aircraft would also afford opportunities for greater competition amongst designers and manufacturers.
3. The combined European and worldwide market for the LSA / EuLSA is potentially significant in relation to the total global light aviation sector. Currently there is a barrier to marketing the LSA and EuLSA in Europe due primarily to the lack of an appropriate initial airworthiness code establishing standards, and also the regulatory costs associated with achieving type certification.
4. Harmonisation of the US LSA and proposed EuLSA design standards would benefit the industry from both a design and manufacturing viewpoint as well as for the end-users / customers.
5. Evidence of accident rates in the microlight aeroplane sector, which has varying degrees of national regulation throughout Europe but with no EASA-level initial airworthiness type certification, demonstrates that microlighting is not materially different to the EASA-regulated light aviation sector in safety outcomes as a result of initial airworthiness failures. Airworthiness regulatory compliance costs are significantly lower than those for EASA-regulated aircraft.
6. Part M (continuing airworthiness and maintenance) is proving to be a contentious invention for aircraft owners, pilots and service support organisations in some EU

Member States. This may be due in part to interpretation and implementation by some NAAs.

In general Part M has replaced national systems that over time have proved to be an adequate guarantee of safety levels. Part M is seen as a significant increase in financial burden with no potential gain in safety outcome. In some cases it is viewed as a potential reduction in safety due to the increased focus on paperwork rather than 'hands-on' practical maintenance. Whilst the original Part M was modified through the work of EASA working group M.017, so as to adapt it to the light aviation sector, there is a general belief amongst stakeholders that these modifications were not sufficient to make Part M more widely acceptable.

2.13 What is an 'acceptable' safety level?

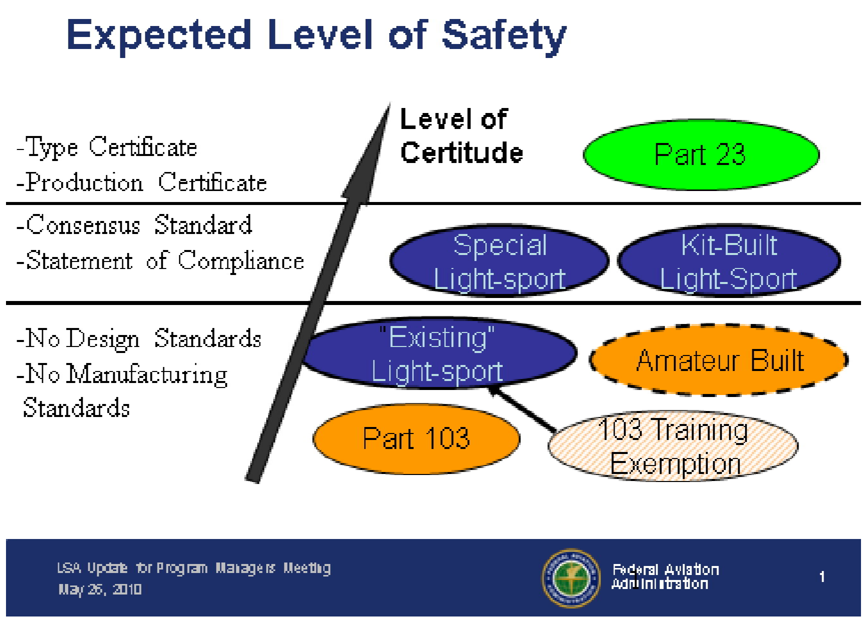
In this discussion of ELA 1, one of the most fundamental points to decide upon is 'what is an acceptable safety level' for this MTOM range?

It is generally accepted in aviation regulatory circles and thinking that the accident rate that can be expected in private, non-commercial aviation including air sports is not the same as for public commercial air transport. This distinction reflects the different purposes of the two 'extremes' of civil aviation. The question is whether the expected safety level can be expressed in a form of an 'acceptable' accident rate, for the different categories of accident.

It is clear that no such objectives or 'targets' can be set without accurate and complete statistics of actual accidents. Further, such accident data requires accurate causal analyses based on empirical evidence so that safety action programmes can be targeted at the areas where accidents happen. It follows that rule making, when found necessary, should be based upon that evidence of need, and should be proportionate to the risks and the aviation sector concerned.

In an FAA study, which sets out the philosophy in the USA it was stated that *"acceptable accident rates vary according to aircraft categories, type of operation and commercial versus non-commercial."*

As a starting point it should be possible to establish some broad principles. The FAA did this as part of the initiative to establish the LSA category of aircraft in 2004-05. The FAA diagram below shows the thinking that established such broad principles.



In this FAA example above the accompanying text states:

"*The expected level of safety of an LSA is not the same as (US) Part 23 certified products, nor is the level of FAA oversight the same:*

- *The LSA Rule raises the level of safety (via consensus standards) on a previously unregulated segment of aviation (Part 103)*
- *It bridges the gap between (Part 103) Ultralights and Part 23*
- *It raises the level of safety, but still not expected to meet Part 23*."

The parallel to the European situation is that the 'level of certitude' should broadly increase as the following factors increase or come into play:

a) MTOM
b) Pilot(s) and passenger-carrying capacity
c) Complexity of aircraft
d) Operating scope and environment
e) Commercial vs. non-commercial operation (though European airworthiness regulation does not distinguish between commercial and non-commercial use)

Table 5: Aircraft up to 2000kgs MTOM

Category	MTOM	Max Seats	Complexity *(3)*	Operating Scope	Commercial / Non-C	Regulatory
Amateur-built	up to 2730kgs? *(2)*	4	Non-complex	Day VFR	Non-C	National (Annex II)
Microlights	450kgs	2	Non-complex	Day VFR	Comm & Non-C	National (Annex II)
LSA	600kgs	2	Non-complex	Day VFR	Comm & Non-C	ELA 1 (LSA)
Gliders	850kgs / 900kgs	2	Non-complex	Day VFR & IMC	Non-C	ELA 1 (Gliders)
Balloons	3400cu.M.	4 / 5	Non-complex	Day VFR Night VFR	Comm & Non-C	ELA 1 (Balloons)
VLA	750kgs / 890kgs	2	Non-complex	Day VFR & IFR Night IFR	Comm & Non-C	ELA 1 (Aeroplanes)
Aeroplanes	1200kgs	4	Non-complex	Day VFR & IFR Night IFR	Comm & Non-C	ELA 1 (Aeroplanes)
Aeroplanes	2000kgs	4 - 5	Non-complex	Day VFR & IFR Night IFR	Comm & Non-C	ELA 2
Aeroplanes	2000kgs	4 - 5	Complex *(4)*	Day VFR & IFR Night IFR	Comm & Non-C	Full part 21 + related pilot licences etc.

(1) The table excludes helicopters, airships and autogyros which are outside the scope of the study
(2) Varies between 900kgs and 2730kgs MTOM according to country
(3) 'Complexity' is per the definitions of 'complex' and 'non-complex' in Basic Regulation 216/2008
(4) The 'complex' category is more theoretical than in practice

Thus if one considers the initial airworthiness proposals, for ELA 1 there is a case for sub-division if there is a risk of being driven by the 'highest common denominator'. That is, if proposals for consensus standards in place of DOA and POA approvals are not deemed appropriate for aeroplanes up to 1200kgs, then at least the LSA category (up to 600kgs) should be a candidate for the consensus standards approach. This would represent a principle of progression according to MTOM combined with operating parameters and use.

A further sub-division of ELA 1 would also be appropriate in order to separate:

ELA 1 – Gliders / Sailplanes
ELA 1 – Balloons
ELA 1 - Aeroplanes

In this way the rules, whilst having a basic commonality, could be tailored to the specific needs of each sub-category.

This RIA discussion should therefore try and reach a broad consensus on quantifiable risk, in terms of 'acceptable' accident rates for the ELA 1 range. This is turn will drive the regulatory solutions that are acceptable as being proportionate to acceptable risk. The impact of what is decided can only be measured if comprehensive accident reporting is implemented thereby creating the 'circle of actions' required to reduce accidents.

2.14 What are the risks (probability and severity)?

2.14.1 Proposed strategic changes

The core options in this RIA concentrate on the following proposed strategic changes to the regulatory framework and associated rules for the initial airworthiness of the ELA 1 MTOM range of aircraft (up to 1200kgs MTOM) and as a sub-set the LSA category (up to, say, 600kgs MTOM):

1. Transferring responsibility for determining the initial airworthiness compliance with certification standards from the regulator (EASA), through application of DOA and POA approvals of designers / manufacturers, to the designers and manufacturers themselves, based on the principles of self-declaration of compliance.
2. In place of the regulator's direct involvement in the initial airworthiness compliance process, allow recognised industry-based standards compliance monitoring bodies to be responsible for conducting industry consensus oversight processes of the designers and manufacturers on specific aircraft types.
3. In parallel or alternatively facilitating the creation or establishment of accredited / assessment industry-based bodies which would perform the oversight role of designers and manufacturers in the initial airworthiness processes to ensure compliance with approved technical specifications for aircraft. Such accredited / assessment bodies would have delegated responsibilities for their functions from either EASA directly or indirectly via NAAs.
4. The proposed change to industry-based responsibility is driven primarily by the need to reduce economic factors – costs of the current DOA / POA processes, resources and regulators' fees and oversight charges – whilst maintaining an appropriate and acceptable level of safety.

The current and long-accepted regulatory principles in 'fully regulated' aviation rely upon the traditional theory and approach that only the regulator has the technical expertise, capacity and independence to be able to certify a product (aircraft). Maybe also there is an unwritten assumption that only the regulator can be trusted to determine initial airworthiness compliance objectively. Such an approach was probably relevant and appropriate in the early days of civil aviation, particularly for commercial air transport, in order to protect the interests and safety of fare-paying passengers. But civil aviation has developed exponentially since the early days. Technology has developed out of all recognition, industrial systems of control have become the norm and awareness of risk in all its forms is far more mature.

For SMEs and the light aviation sector, this form of control is not seen to be as relevant in the 21st century, particularly when measured in economic terms and compared with alternatives.

2.14.2 Safety risk assessment factors and experience

In assessing the expected safety risks of these changes it is necessary to consider any potential changes in accident rates that would ensue – particularly fatal and serious injury accident rates – in this range of aircraft. Such assessment should cover a long enough time period in order to eliminate random events (accidents).

In considering comparable experience of such a scenario, three sectors of light aviation are particularly relevant:

(a) Microlights

(b) Amateur built aircraft

(c) The USA LSA

2.14.3 Microlight comparator

The Phase 1 study supporting this RIA was concerned primarily with the experience of microlights and the fatal accident rates in this category. The study also compiled evidence from the first 5 year period of the LSA category in the USA. The terms of reference of the study did not cover amateur-built aircraft.

As described in the Phase 1 report, the microlight sector across the EU countries studied has a variety of national regulations for initial airworthiness, ranging from very 'liberal' regimes such as in France to quite 'tight' and comprehensive with direct NAA involvement and oversight. In most cases, out of the eight countries studied, only one (The Netherlands) does not delegate initial airworthiness oversight to industry.

However, the conclusions from reviewing the microlight sector were that fatal accidents caused by initial airworthiness failure were relatively rare, whichever the country. Whilst the level of available detail and analysis of accident causes was often poor, the overall impression gained was that where accidents were attributed to or contained an element of 'aircraft or power plant failure' it was invariably ascribed to either flight outside the flight envelope or pilot engine / fuel management issues. Maintenance failures, particularly with power plants, also featured. Such causes cannot be reasonably be interpreted as 'initial airworthiness' related.

The general conclusion from microlighting therefore was that the fatal accident experience where initial airworthiness was the primary cause, was no worse than that experienced in the 'fully regulated' light aeroplane sector. This is significant. Also significant is the fact that accidents involving fatalities to 'uninvolved' third parties are almost unheard of, whether for microlights, CS 23 aeroplanes, gliders or balloons. The risks based on empirical evidence are limited almost exclusively to the occupants of the aircraft, or people on the ground near the aircraft when moving.

2.14.4 Amateur built aircraft comparator

Whilst a study of amateur built aircraft ('ABA') or their accident rates was not within the scope of the study, nevertheless it is worth considering this sector in principle in terms of a risk comparator.

ABAs are excluded for EU regulation by reason of being in Annex II of the Basic Regulation. ABA comprise a substantial element of the European light aircraft fleets in many countries. One of the Hawk study team members has extensive knowledge and experience of ABA.

Essentially ABA are mostly built by a owner / pilot from kits or parts supplied by a manufacturer. Often the manufacturer also manufactures the same aircraft type as a complete model ready for flight. So the designs are common. In the kit built cases, the owner / pilot builds the aircraft himself, involving anywhere between 500 and 3000 hours of his own labour. The supervision of the build process is however overseen usually by industry based 'accredited bodies'. The system in the UK is perhaps typical whereby the Light Aircraft Association (LAA), under delegation from the UK CAA, monitors the build progress and checks compliance with the relevant technical specifications and standards. The resulting product is given a PtF.

The ABA process is akin to what a one-man manufacturer would be under the options 1,2 and 3 in this RIA, overseen by an accredited / assessment body.

The fatal accident rates for ABA have not been compiled in Phase 1 of the study. However, the knowledge of the authors is that, as with other sectors, the incidence of fatal accidents caused by failures of initial airworthiness is rare.

It would seem therefore that the proposed transfer of initial airworthiness oversight for ELA 1 to industry is unlikely to generate an increase I the initial airworthiness fatal accident rate. In the case of ELA 1, compared to the ABA, there will nearly always be more experts involved in the design and particularly the build process and therefore a reduced risk of something crucial to airworthiness integrity being missed.

2.14.5 US LSA comparator

The results of studying the first five years of LSA experience in the USA revealed a similar story in fatal accidents. Initial airworthiness is not a statistically significant cause of fatal accidents. The USA consensus system, through ASTM, has so far proved to work, despite some criticisms of manufacturers in a recent FAA report

2.14.6 Other comparative factors

In broad terms the proposals in this RIA would, if implemented, take the oversight of initial airworthiness from direct involvement in certification by the regulator to industry-based responsibility under a recognised and approved structure. In many ways this would be comparable to the 'tighter' spectrum of microlight airworthiness oversight by industry-based bodies in certain countries such as UK, Germany, Sweden, Norway and Czech Republic, but not to the more 'liberal' approach in France.

In making this comparison, and attempting to assess safety risk, it is necessary to consider the other factors that could influence future accident rates after any change to the regulatory framework is made. It is suggested those factors include:

1. The degree of complexity of the aircraft (within the EU regulatory definition of 'non-complex aircraft')

2. The practical means by which designers and manufacturers are subject to an industry-based compliance process with the applicable standards

This RIA considers options for the ELA 1 range of aircraft. The proposed aircraft in this range are LSA, VLA, gliders, balloons and CS 23 aeroplanes up to 1200kgs MTOM. In 'complexity' terms of initial airworthiness and the appropriateness for a different approach to achieving compliance with technical specifications, the considerations can be broken down into the following broad categories:

(a) Airframe (envelope and basket for balloons), primary flight controls and undercarriage

(b) Engine including engine, fuel managements systems and propellers

(c) Avionics

The airframe factors (or for balloons cubic capacity of the envelope) do not generally increase in complexity through the MTOM range, though clearly they are different for different types of aircraft (e.g. gliders vs. aeroplanes). Therefore there appears to be no fundamental reasons to differentiate between these categories when considering the appropriateness of the means by which compliance with standards is achieved.

Engines and engine / fuel management systems can increase in complexity from LSA through VLA to CS 23 aeroplanes. There may be a case for considering a graduated approach to the means of compliance, with LSA, powered gliders and balloons being 'simpler'.

Avionic fits for LSA through to CS 23 aeroplanes can be very similar, though at present the CS 23 aeroplanes can tend towards the more complex, with gliders and balloons being far less complex.

2.14.7 Summary of risk

Based on the above analysis the conclusion is that moving the initial airworthiness oversight from the regulator to either an industry consensus process or a parallel accredited body authority would represent, in terms of probability, an improbable increased number of events compared to the current fatal accident level. However, a significant increase in such events would be 'hazardous' in terms of their severity were they to occur.

This conclusion is built into the risk index matrix in Attachment B, with a score of 8.

Section 3 Objectives

The overall objectives of the Agency are defined in Article 2 of the Basic Regulation (EC) No 216/2008. This proposal will contribute to the overall objectives by addressing the issues outlined in Section 2. The specific objective of this RIA is therefore:

Based on a study of microlight regulations in Europe, to evaluate options and make recommendations for any changes to the Basic Regulation and supporting Implementing Rules in respect of the complete range of regulatory topics relating to the MTOM range of aircraft in the proposed ELA 1 process in order to

(a) Reduce the regulatory burden (resource time and monetary cost)

(b) Foster increased economic development in the sector

(c) Provide an enhanced environment for increased participation levels, without affecting overall safety objectives.

Section 4 Policy options

4.1 Summary

Option 0

Do Nothing

This represents a position of 'no change' from the current proposals for ELA 1.

Option 1

Use of self-certification for Initial Airworthiness

This option focuses on changes to the EASA current proposals (as at July 2010) for aircraft within the ELA 1 MTOM range whilst retaining the overall legal scope of Community regulation in terms of the MTOM range of 451kg to 1,200kg. The option considers mainly initial airworthiness for which aircraft manufacturers would be responsible for self-declaring compliance of their products with design and production standards established through industry-based consensus processes. In addition the option considers other possible changes and improvements to other regulatory subjects for ELA 1. Implicit in Option 1 is the choice of manufacturers to retain or adopt either conventional DOA / POA approvals, resulting in TCs for initial airworthiness certification, instead of adopting the industry consensus route to compliance, depending *inter alia* on marketing and other considerations. The range of aircraft covered by the ELA 1 process would remain within the scope of Community regulations, suitably adapted.

Option 2

Delegation or devolution to Accredited Bodies (Assessment Bodies)

This option would consider the application of the concept of the use of Accredited Bodies to ELA 1, as referred to in Regulation 1108/2009, whilst retaining the overall Community regulatory framework with appropriate modifications. Accredited Bodies would be empowered by delegation to issue legal certificates of compliance with implementing rules and / or industry-based standards established by consensus processes. This option would be an alternative to Option 1 in respect of initial airworthiness but could also extend to the issue of certificates for other regulatory topics such as pilot training and licensing and training organisations. As with Option 1, the range of aircraft covered by the ELA 1 process would remain within the scope of Community regulations, suitably adapted.

Option 3

The Light Sport Aircraft (Aeroplane)

Within the context of options 1 and 2 this option considers the issue and distinct case of the proposed European Light Sport (LSA) Aeroplane category, which is part of the proposed wider ELA 1 aircraft MTOM range. Consideration is given to this primarily because there is now a significant regulatory timescale issue for designers, manufacturers and potential customers in relation to the European market. The USA LSA has now been in existence for over 5 years, being supplied by a significant number of European based manufacturers. Yet these manufacturers, and their potential customers in Europe, cannot sell a European LSA version in Europe as the aeroplanes are not issued with type certificates under EASA Part 21.

Option 4

A 'Mixed Economy'

This option would evaluate a range of issues under each regulatory topic for the range of aircraft from 451 kg up to 1,200 kg MTOM that are subject to Community regulation, with a view to recommending changes that would represent a mixture of regulatory approaches. It represents partial deregulation, with some regulatory topics and / or aircraft categories de-regulated from the EU level whilst retaining elements of the EU regulatory framework for certain aircraft categories and / or regulatory topics.

Option 5

Total de-regulation from EU regulation

This option would take the aircraft within the MTOM range of the ELA 1 process out of the scope of Community regulation completely and transfer them to Annex II of Basic Regulation 216/2008.

It is emphasised that in proposing these options the detailed technical and legal implications in terms of Community regulatory and EASA rule-making synergy are not elaborated in detail. The authors address the key strategic issues and principles in the proposed options and not try to work out the technical and legal solutions of how any of the options for change could be implemented. That would be the task of working group BR.010.

The options outlined above are not entirely mutually exclusive. Whilst Options 1 and 2 can be viewed as distinct alternatives in an overall solution, Option 3 could be regarded as a sub-set – albeit an important one specific to the urgent issue of the European LSA – of either Option 1 or Option 2.

In Options 0, 1, 2 and 3 no changes would be made to Annex II of Regulation 216/2008. Options 4 and 5 would involve increases in the scope of Annex II.

4.2 Criteria to be applied in the evaluation of options

Within the objectives of the options the key criteria used in the evaluation of the options are:

Safety

- Evidence from fatal accident data
- Safety risk and likely safety outcomes of proposed changes
- Proximity and form of regulatory compliance oversight
- 'Knowledge management' of operations and activities in the sector
- Ability of 'industry' to manage itself ('industry' embracing users such as pilots and aircraft owners and user associations as well as support enterprises for manufacturing, maintenance, training etc)

Environmental

- Reducing environmental impacts of light aviation in relation to fuel consumption and noise

- Enabling technological progress to reduce any environmental impacts

Economic criteria

- Free movement of aircraft, parts and personnel within the EU
- Economics for designers / manufacturers of aircraft and equipment
- Cost of participation by 'end users' (aircraft owners / operators, pilots, training organisations, clubs) embracing capital costs and operating costs, in the widest meaning of the word 'costs'
- Commercial vs. Non-commercial: the necessity for rules applicable to commercial operations in light aviation

Technological criteria

- Opportunity for technological innovation and progress – materials, performance, environmental

Social criteria

- Accessibility to and participation in light aviation
- Social factors relevant to particularly non-commercial, recreational and sporting aviation
- The volunteer nature of participants in many of the non-commercial light aviation sector's activities

Equity and proportionality

- Level playing field
- Proportionality of regulation in relation to acceptable risks for the light aviation sector

Regulatory Co-ordination and harmonisation

- Effect of options on EU aviation regulatory synergy and harmonisation

Section 5 Options Analysis

5.0 Do Nothing Option (Option 0)

5.0.1 Outline, reasoning and rationale for the option to be evaluated

This option is at first glance self-explanatory; however, in a dynamic and changing regulatory environment at Community level the option requires further explanation. By agreement during the study team's review meeting at EASA on 24th May 2010 and subsequently, the 'baseline' for evaluating the 'Do Nothing' option comprises the following:

- Initial Airworthiness: the relevant elements of Part 21 as currently applied together with the latest known proposals for ELA1, as embodied in the CRD Part 1 to NPA 2008-07 published 15th July 2010 in conjunction with the extant NPA 2008-07

- Continuing Airworthiness: the relevant elements of Part M as currently applied to EU regulated light aircraft in this MTOM range of 451kgs to 1200kgs

- Pilot training and licensing (including medical): the EASA Opinion 4/2010 with supporting Implementing Rules (FCL, excluding medical) published by EASA on 26th August 2010 and the CRD for NPA 2008-17c (medical) published by EASA on 23rd June 2010

- Pilot training organisations: the EASA NPA 2008-22 published by EASA on 30th October 2008, together with any feedback that may be provided by EASA officials within the timescale of preparing this RIA on progress towards the CRD that would indicate significant changes in approach for pilot training organisations in the light aviation sector. It is noted that the EASA workshop on NPA22 – 2008 was held on 20th to 21st October, after the production of the draft RIA. There has not been sufficient time to assimilate the CRD before production of this final RIA.

- Technical Personnel training and licensing: the EASA Opinion 04/2009 of 11th December 2009 based on the CRD for NPA 2008-03 published by EASA on 15th September 2009 for Licences for non-complex aircraft maintenance engineers.

- Operations: the NPA 2009-02 published by EASA on 30th January 2009, together with any feedback that may be provided by EASA officials within the timescale of preparing the RIA on progress towards the CRD that would indicate significant changes in approach for non-commercial operations in the light aviation sector.

In addition, it is necessary to evaluate the potential implications on the aircraft owners, pilots, training organisations and others of the definition of 'commercial operations' contained in the Basic Regulation 216/2008 as the future interpretation of this could have significant impact on the sector in areas other than initial and continuing airworthiness (where the distinction between commercial and non-commercial use does not apply).

In order to recommend this option the assumption needs to be made that the current EU law (initial and continuing airworthiness), modified by the current proposals for ELA 1, and the various rulemaking drafts in the pipeline for FCL, Medical, Ops, Training Organisations (Organisation Requirements and Authority Requirements), etc provide the ideal solution and cannot be improved.

5.0.2 Initial Airworthiness

Whilst it could be argued that the regulation and supporting implementing rules already in place for airworthiness are robust and provide a framework that minimises safety risks, nevertheless they do represent a framework that is highly prescriptive and relatively rigid. The consequence of this is that, particularly for both initial and continuing airworthiness, the organisational approvals, oversight structures and processes generate considerable costs for organisations. These costs are ultimately borne by the end users, when purchasing aircraft which are mainly used for recreational purposes.

The fundamental questions therefore are:

(1) Does this framework and structure provide a safety level at too high a cost?

(2) Are there alternative means in terms of framework and structures of ensuring a comparable safety level but at a lower cost?

(3) What is an acceptable safety level (or accident level) in relation to ELA 1 range aircraft with respect to airworthiness?

The latest proposals for ELA 1 (CRD to NPA 2008-07) provide some alleviation to the approach described above, but still require DOA and POA for initial airworthiness certification, albeit with the option of a combined approval. This proposal does not go so far as the USA approach for the LSA, whereby design and production standards are established by industry consensus through a form of peer review, without DOA and POA, at reduced cost. Compliance with the standards rests with the designer / manufacturer through self-declaration. Whilst this method only applies to aircraft up to 600kgs MTOM, and is not (yet) extended to aircraft up to a higher MTOM, nevertheless the principle should be considered for aircraft with a MTOM up to 1200kgs.

Issues arising from the study of microlights which are suggested to be addressed for ELA 1 cover:

- Manufacturers should have the option of not providing a TC for a type of aircraft
- Alternatively a form of certification could be issued by the manufacturer for each aircraft produced
- Part 21 contains a variety of constraints on owners of aircraft, such as having to gain regulatory approval for modifications. Where the manufacturer (still) exists, the manufacturer's approval of modifications should be sufficient through an industry-based declaration system. Some modulation of this may be needed where major modifications are proposed, but the threshold definition of 'major' might be revised

The ELA 1 CRD provides a significant step in the direction of a more industry-owned and focused method of determining initial airworthiness However, the fact that DOA and POA approvals are still required, with associated regulatory fees and resource implications for industry, means that the proposal is unlikely to meet the aspirations of the industry and other stakeholders. Therefore to that extent the 'do nothing' option, measured against the baseline of the CRD and in respect of initial airworthiness, is not recommended for further progress.

5.0.3 Continuing Airworthiness

Critical observations from the microlight sector, and many from within the light aviation sector regulated at Community level, concern the rules of Part M.

Some of the issues that stakeholders have with Part M and the main issues to be addressed with alleviations are:

- Minor modifications requiring EASA approval, with the associated costs, when alternatives such as manufacturer approval alone should often be adequate. Installation of instruments including 'standard parts' in glider instrument panels is one current 'hot topic' example

- The unnecessary separation of responsibilities and associated paperwork between the owner, sub part F, sub part G (CAMO) for the ARC, and inspectors has become too bureaucratic and more costly for light aviation aircraft, and could be simplified. Some commentators have observed that this structure has the potential for a reduction in safety through communication gaps

- Aircraft maintenance schedules could be generic rather than individual aircraft specific

- The requirement for Form 1 with parts, which often precludes being manufactured according to manufacturers' drawings for all light aircraft types, and not just an individual owner's aircraft

5.0.4 Pilot training and licensing

Whilst the EASA Opinion is still subject to MS scrutiny at the time of writing, a few points have been raised by stakeholders:

- The need for cross crediting of hours on comparable categories of Annex II aircraft in order to maintain the currency requirements of the EU licences (e.g. hours on Annex II gliders and aeroplanes should be recognised as qualifying for EASA licences for these two categories)

- Medical standards should be proportionate to risk and contain mitigating measures for those who cannot meet the full standards (this is understood to be the subject of yet-to-be-published AMC material)

- GMP qualifications should not go beyond the essential (but it is understood the additional GMP qualification criteria in the CRD are likely to be removed)

5.0.5 Operations

Comments accumulated reflect the desire for OPS rules for ELA 1 to be kept to the essential, simple and practical for safe operation, bearing in mind the nature of the aircraft and of the operations conducted.

5.0.6 Conclusion

In summary, the principal reasons put forward in this RIA for not progressing the 'do nothing' option to the point of making a positive recommendation are:

Table 6: Reasons for not progressing Option 0:

Initial Airworthiness	CRD NPA2008-07 still requires DOA/POA whereas views of MDM.032 group and original NPA 2008-07 promoted industry consensus process without DOA or POA. The experience of the microlight sector in Europe, and the USA LSA processes for airworthiness point in the direction of a further relaxation of direct regulatory authorisation and detailed oversight of design and production, without adverse safety consequences.
Continuing Airworthiness	Implementation of Part M as applied to light aviation has thrown up various criticisms. Whilst some of these may be due to *how* Part M has been implemented in some Member States nevertheless underlying the criticisms are genuine concerns about the organisational and responsibility aspects of Part M that have led to increased recurring costs (not just transition costs). Therefore Part M is an area of regulation and rules which would probably benefit from alternative more 'relaxed' proposals. Hence this RIA rejects the 'do nothing' option.
Pilot training & licensing	Opinion 2010/04, whilst acceptable in many respects by the stakeholder community in respect of ICAO compliant PPL licences and the LAPL, does still contain elements that it is understood could benefit from improvements on specific issues. Therefore reject 'do nothing' option in this respect.
Pilot medicals	Based on the current CRD information, sub-ICAO medical criteria and compliance processes are considered too restrictive and potentially more expensive than necessary for the risks of medical incapacitation, which from accident data obtained is very remote / statistically insignificant.
Operations	Based on the extant NPA 2009-02, for which the CRD is awaited, there are a variety of concerns from various parts of the light aviation community with the draft OPS rules. Whilst it is understood that changes are in hand leading to the CRD, until these are seen the 'do nothing' option cannot be recommended.
Training Organisations	The CRD to NPA 2008-22 being the latest proposals for organisation approvals for small organisations was published on 4th October 2010. Therefore consideration in this RIA has not been possible. Based on the NPA many stakeholders in the ELA1 light aviation sector were concerned that the proposals were overly prescriptive and burdensome; better alternatives should be considered. Therefore, subject to a review of the CRD and any stakeholder feedback, 'do nothing' is not a recommended option for this topic.

5.0.7 Recommendation

For the above reasons in this RIA the 'Do Nothing' Option is not recommended.

5.1 Option 1: Use of Self-Declaration system for Airworthiness within the ELA 1 process

5.1.0 Outline reasoning and rationale for the option to be evaluated

In essence this option would retain the current and proposed framework in terms of which aircraft categories are within the scope of the Basic Regulation. However, the option would require changes to some of the articles in the Basic Regulation (but not Annex II) or the Implementing Rules in the rule-making work-in-progress for Initial Airworthiness. The purpose of such changes to be evaluated would be to make them more acceptable to affected parties and communities in terms of, primarily, economic factors without materially and adversely affecting overall safety objectives.

(It is appreciated that should this option be taken forward in the proposed BR.010 working group, then the implementation timing of any changes are likely to be after the adoption of the implementing rules currently in drafting progress in EASA and the Commission rulemaking programme).

5.1.1 Proposed modification to ELA1 initial airworthiness requirements

The study of the microlight sector suggests that the initial airworthiness regimes applied in microlighting do not impact the safety outcome adversely, but do significantly improve the economic, social and technological outcomes. Therefore a modification of the ELA1 process is proposed, modelled on the approach taken by a number of European microlight airworthiness regimes and which is also similar to the US LSA airworthiness regime.

The aim of the proposed modification is to minimise the time and cost of regulatory overheads and to make maximum use of the widespread of expertise within the industry and the sector as a whole. Responsibility and control would remain with those directly involved with the activity, whilst the regulator interactions are removed from the critical business paths to an auditing role.

The most significant feature of Option 1 is the removal of DOA / POA requirement and their replacement with an Industry-wide consensus process, which relies upon manufacturer responsibility for compliance. The standards would be developed by the industry and administered by a standards Institution (such as ASTM International). EASA and/or the NAAs would retain a right of audit or intervention as necessary.

The basic principles of the existing ELA 1 system are maintained, namely the need for proactive oversight of airworthiness and the need for defined standards for design and manufacture.

The basic principles of Option 1 are:

a. Designers / manufacturers will be totally responsible for compliance of their products.

b. Designers / manufacturers will ensure the initial airworthiness of their product design by compliance with appropriate and approved design standards.

c. Design standards would be developed through a visible and transparent consensus process, based on cross-industry input (such as ASTM International) together with EASA input.

d. The design standards, once agreed by industry consensus, would be deemed accepted and approved by EASA and form part of the agreed Certification Specifications.

e. EASA has the option to develop a recommended standard, but it will not necessarily be the sole standard to which an aircraft can be designed or manufactured

f. DOA approval by EASA would not be required for a designer/ manufacturer

g. Following normal aviation practice, two competent signatories stating compliance will be required. They may both be internal to the manufacturer, as required for DOA, or one or both may be external including independent experts.

h. Manufacturers will ensure the initial airworthiness of their products by compliance with appropriate and agreed Quality Approval standards.

i. Random audits of compliance of both design and production may be undertaken by EASA.

Additional considerations relate to the challenges faced by small start-up businesses, which have contributed so successfully to the microlight sector. Large fixed regulatory fees and charges applied before aircraft are ready for sale restrict the possibilities for start-up companies. The opportunity to reduce fees by using consensus standards should provide a positive economic stimulus.

5.1.2. Option 1: Responsibilities for Initial Airworthiness

(Table 7)

An **Accredited Body** may, under the Option 2 proposal, carry out the activities shown as the responsibility of either EASA or the NAA.

Activity	EASA	NAA	Consensus bodies	Designer / Manufacturer	Comments
Design					
Development of design standards	X		X		
Approval of design standards and limits of applicability	X				EASA to maintain a list of approved standards and limits of applicability
Choice of design standard				X	Within limits of applicability
Demonstration of compliance to design standard				X	
Statement of compliance				X	2 competent signatures required, internal or external to company
Auditing of compliance with design standard	X	(X)			Delegated (D) to NAA
Production					
Development of quality standards	X		X		
Approval of quality standards and limits of applicability	X				EASA to maintain a list of approved standards and limits of applicability
Choice of quality standard				X	Within limits of applicability
Demonstration of compliance to quality standard				X	
Statement of compliance				X	
Auditing of compliance with quality standard	X	(X)			Delegated (D) to NAA
Standardisation					
Interpretation of standards	X				When required to achieve standardisation
Test flying					
Development of standard for test flying	X		X		
Test flight authorisation				X	Within limits defined by standard for test flying
Oversight & Control					
Declaration of aircraft conformance with design and quality standards				X	For each individual aircraft

5.1.2 Comparison of Option 1 proposals to ELA1 proposals in CRD 2008-07 (Part I)

5.1.2.1 Type certificates and restricted type certificates

ELA1 current proposals require Type Certificates or Restricted Type Certificates. Option 1 proposals do not incorporate the concept of a type certificate; instead the manufacturer is responsible for stating compliance of each individual aircraft with the appropriate standards, for design, quality and any other requirements. In place of a TC, it is proposed that EASA or the NAA issues a Special Airworthiness Certificate for each aircraft, reflecting its design as compliant with the agreed consensus standards.

5.1.2.2 Criteria for ELA 1 aircraft range definition

No changes are proposed to the current proposals (July 2010), except consideration be given to merging the CS VLA with CS 23.

5.1.2.3 Demonstration of capability for design

ELA1 current proposals require EASA approval of a certification programme, Alternative Procedures to DOA (21A.14), or DOA, or a combined DOA/POA. These all require time and cost interaction with EASA within a manufacturer's critical path from initial concept through development to first sales. Option 1 utilises a random audit approach of the manufacturer's declared compliance with consensus design standards to assess the manufacturer's compliance with approved design standards.

5.1.2.4 Demonstration of capability for production

ELA1 current proposals require EASA approval of the manufacturing organisation in the form of a POA, (even where combined with a DOA). This requires time and cost interaction with EASA within a manufacturer's critical time-line from pre-production development to first sales. Option 1 utilises a random audit approach of the manufacturer's declared compliance with approved production quality standards (such as ISO or DIN) to assess the manufacturer's capability for production

5.1.2.5 Combined POA/DOA

No Design Organisation or Production Organisation approvals are required under Option 1.

5.1.2.7 Parts that do not need an EASA Form 1

ELA1 current proposals allow a limited range of parts to be manufactured by the owner; all others require an EASA Form 1 issued by an approved supplier. For Option 1, in the absence of Design Organisation and Production Organisation approvals, the manufacturer would be responsible for providing a statement of suitability of parts supplied, taking into account the part design data and its applicability to the aircraft receiving the part. This may take the form of a statement of part number and aircraft configuration on the manufacturer's release document. The manufacturer would also be able to define standard parts which may be sourced elsewhere, such as spark plugs, tyres etc which may be reasonably defined by manufacturer's part numbers and / or descriptions.

5.1.2.8 Changes to CS-LSA and use of Industry Standards

The ability to use the currently available standards, defined by EASA, industry or others, is an important part of both the current ELA1 proposals and Option 1. A list of accepted standards and their limits of applicability will be required. In particular, it is proposed that within Option 1 the complete set of ASTM International standards for the LSA class should be accepted within their limits of applicability as defined in the USA. The proposed additional requirements of CS-LSA would then also allow extension of the limits of applicability as requested by European parties.

5.1.2.9 Standard changes and repairs

Although not so significant, as no Design Organisation or Production Organisation approvals are required, the concept is still of value as it provides manufacturers with a large amount of well proven techniques. Manufacturers would still be responsible for specifying their acceptability in respect of their own products.

5.1.2.10 Harmonisation with FAA

Option 1 would allow almost complete harmonisation with the FAA for LSA aircraft within the USA LSA limitations, with only small differences in the details of auditing. For other aircraft categories Option 1 would extend the LSA example to heavier aircraft, but with the possibility to apply more detailed auditing in a proportionate manner. This may be compared to FAA considerations of extending industry-standards to FAR-23 aircraft.

5.1.3 Analysis of Impacts

5.1.3.1 Safety

It is suggested that a change from a DOA / POA environment to an industry-based consensus process is unlikely to result in a decrease of safety, since no significant variation of safety outcome is apparent in the microlight safety data between a fleet under full state regulation (Germany) and no State regulation of airworthiness codes (France). The evidence points to microlight accidents generally being caused by pilot errors and human factors far more than failures in initial airworthiness.

Extending these findings to heavier aircraft can be investigated by examination of the USA S-LSA accident data where 7 fatal accidents over 2 years equates to 3.5 fatal accidents p.a for an active aircraft population of around 1000, which is somewhat higher than the accident rates for microlights in most of Europe. However, this does not appear to be caused by airworthiness issues, with only one accident attributed to airworthiness. Rather, the FAA is concerned about human factors relating to pilots from heavier aircraft flying LSA aircraft without adequate conversion training.

Considering that the ELA1 process extends up to 1200kg, twice the LSA weight limit, and includes a number of 4-seat aircraft it poses the question as to whether airworthiness issues are more likely to occur. However, despite the higher masses the technology used on such aircraft is no more advanced than that used on a number of microlight aircraft and in most cases is more conventional. However, the consequences of failures are more significant, but considering the heavy bias towards human factor failings in all the aircraft classes, efforts towards improvement are better directed there.

Compared to the ‘do-nothing’ case (Option 0), the Option 1 proposal clarifies that the responsibility for airworthiness of aircraft rests with the manufacturers. Their ability to bear this responsibility is still assessed by an independent body, but the process is removed from the manufacturer’s design & development time-line.

It is possible that allowing more time to thoroughly assess a sub-set of the certification would be more revealing of lack of competence than expecting a regulator to have the time and expertise available to fully examine a certification submission. In the case where problems were found, further time and effort could be applied to audit the submission, until the assessor was satisfied with the competence of the manufacturer.

5.1.3.2 Environment

Affordable new designs should encourage a shift from existing traditional engines and airframes to modern, much more efficient engines and airframes which would reduce aircraft fuel consumption and noise.

A very large increase of participation in light aviation may increase overall fleet fuel consumption, however the volumes are insignificant compared to even very minor changes in automotive or airline fuel use.

5.1.3.3 Economic

The existing situation requires a manufacturer to demonstrate compliance with design and production standards to EASA, incurring large certification costs, fees and charges with little control of timescales. This is often long before any sales are achieved. The fees and charges for a small business developing an aircraft for the first time are shown in Table 3.

The cost is considered significant, comparable to the selling price of an aircraft in this category. The recurring annual costs for an established company with DOA / POA and a certified aircraft approval are shown in Table 4. These amount to a significant cost burden to manufacturers.

Table 8: EASA Fees and Charges for a VLA aircraft, less than 10 person DOA, less than €1 million production turnover

(assuming 5 year development time with company approvals in second year)

	Fee €	No of Years	Total €
DOA Approval	6,750	1	6,750
POA Approval	9,000	1	9,000
DOA surveillance	3,375	3	10,125
POA surveillance	6,500	3	19,500
Type certificate	6,000	1	6,000
Total			**51,375**

Table 9: EASA Annual Recurring Fees and Charges for a VLA aircraft, less than 10 person DOA, less than €1 million production turnover

	Annual Fee €
DOA surveillance	3,375
POA surveillance	6,500
Type certificate	900
Total	**10,775**

By avoiding the concept of ‘approval’, providing simplified prototype testing opportunities, and keeping fees proportionate to the developing size of the business, a potential manufacturer can develop an aircraft and commence sales with much lower regulatory overheads. Only in a case where the regulator determined that there was a problem affecting the initial airworthiness of the aircraft would the regulator have a more direct and detailed interaction with the business, by control over the flight status of the fleet, until any problems were rectified.

The savings in costs are likely to be considerable, and the shift of responsibility should allow the manufacturers to maintain better control over timescales.

Increased competition and reduced difficulty and uncertainty in certification are likely to encourage innovation in aircraft design and supporting technologies. In particular material technologies are often exploited to a greater extent in light aircraft, such as the large number of composite aircraft which have been in service for many years compared to its much slower take up in commercial aviation.

If the regulatory environment is sufficiently encouraging it is likely that a number of the existing microlight manufacturers will expand their range to heavier aircraft, such as the LSA versions already built for export. A significant number of microlight pilots are also likely to see the LSA class as a logical step, and if appropriate pilot licensing transition arrangements are implemented there are also large numbers of microlight instructors who would be likely to expand their teaching qualifications. Therefore there exists an industry / stakeholder sector and customer base ready to take advantage of more suitable regulations to re-invigorate and grow the ELA1 sector.

In addition, the current microlight gliders which are built with self launching engine capability to stay within the Annex II criteria, could then migrate to a higher mass and be developed alongside the EU-regulated gliders.

5.1.3.4 Social

Lower costs and greater control for start-up aircraft manufacturing companies are likely to encourage innovation and a range of choice of aircraft whilst increased competition and low regulatory overheads should keep aircraft prices low and thus increase the proportion of the population able to participate in aviation. All of these effects are clearly observed to have been critical to the success of the microlight aviation sector.

Increased participation in light aviation is likely to lead to a greater interest in aviation as a whole, encouraging development of skills in piloting, engineering, and many other roles essential to the European economy.

Light aviation is also valuable as a social activity and should not be undervalued in the European context. It is often a club-based activity with a wide range of social backgrounds represented and enjoying their activity together in an open access environment. International understanding is fostered by visits to international air shows and events including competitions.

Light aviation is also notable as an activity which may be continued or commenced by the older generation who have the time and resources to realise what may have been long-held ambitions to fly. Minimal medical requirements are important to avoid preventing older pilots unnecessarily from enjoying their flying.

5.1.3.5 Equity and proportionality

Option 1 would expand existing markets and open up new ones in Europe, on a level playing field, probably more so than Option 0 which retains the DOA / POA requirement.

A change to the regulatory fees and charges applied would better reflect the typically SME status of the vast majority of light aircraft manufacturers. At present the regulatory fees amount to much greater burden on the turnover of a business unit than those applied to much larger companies.

5.1.3.6 Regulatory coordination and harmonisation

The initial airworthiness system proposed is similar to the USA LSA system with the addition of random auditing. The USA LSA system appears to be moving towards a similar arrangement using an industry organised assessment body as the auditor.

5.1.4. Conclusion

The consensus approach has proved to be a workable solution in the US LSA category for MTOM up to 600 kg. There is therefore no reason in principle why this approach for Initial

Airworthiness on ELA1 cannot be extended to cover MTOM up to 1200 kg for aeroplanes, gliders and, although not defined by MTOM, balloons.

Whether or not this acceptable is dependent upon two factors:

5. The appetite for regulation and rule-making to accept a potentially higher degree of risk
6. Whether or not manufacturing industry sees a commercial advantage in participating in a consensus system up to 1200kg.

5.1.5 Recommendation

The recommendation is that the self-declaration system based on industry consensus processes should form part of the regulatory approach for ELA 1.

5.2 Option 2: Delegation (or devolution) to Accredited Bodies

5.2.1 Outline reasoning and rationale for the option to be evaluated

This option considers the possibility, presented by the inclusion of a reference in the preamble to Regulation 1108/2009, of introducing the concept and use of 'Accredited Bodies' as part of the process for the ELA 1 range of aircraft MTOM.

Microlighting in Europe is frequently managed by the national aero clubs or national microlight associations, with varying degrees of delegation from the Competent Authorities (NAAs) of the Member States. Such delegation operates under a wide range of types of national rules, but there is a common thread throughout in terms of scope. The involvement of personnel in these organisations, who have both a close affinity with and proximity to the activity, is viewed by the participants as very positive. This brings governance proximity to the pilot-owner stakeholders and the local microlight organisations.

Similar arrangements of delegation and management have been in place in many Member States for non-commercial light aviation that is now regulated at Community level. The activities cover gliding and ballooning in particular, as these activities depend on group organisation to one degree or another, either in clubs or operating groups. In turn these clubs and groups are members of a national body devoted to the oversight and management of their activities, again including safety management in particular.

For aeroplanes, similar arrangements exist in many countries although the scope of the involvement of the national organisation is sometimes different to those in gliding and ballooning. This is probably because flying aeroplanes can be independent of a club or operating group at local level and there is less impetus to organise the oversight and management of the activities of aeroplane owners on a national basis. It is emphasised however that experience varies considerably country-to-country, with some having large, strong and effective national associations (such as in France) and others being more inclined to leave it to a direct relationship between pilot owners, support organisations and the NAA.

This option therefore explores both the opportunities and compromises in the use of 'Accredited Bodies' for undertaking tasks traditionally carried out by the NAA (or EASA).

5.2.2 Qualified Entities

In the Basic Regulation 216/2008 there is a role for 'Qualified Entities'. Article 3 defines a Qualified Entity as *"a body which may be allocated a specific certification task by, and under the control and the responsibility, of the Agency or a national aviation authority."*

Annex V of 218/2008 sets out the criteria for a Qualified Entity. Amongst the criteria is the following:

"The entity, its Director and the staff responsible for carrying out the checks, may not become involved, either directly or as authorised representatives, in the design, manufacture, marketing or maintenance of the products, parts, appliances, constituents or systems or in their operations, service provision or use. This does not exclude the possibility of an exchange of technical information between the involved organisations and the qualified entity.

2. The entity and the staff responsible for the certification tasks must carry out their duties with the greatest possible professional integrity and the greatest possible technical competence and must be free of any pressure and incentive, in particular of a financial type, which could affect their judgment or the results of their investigations, in particular from persons or groups of persons affected by the results of the certification tasks."

Although the phraseology of the above extract in Annex V would imply application only in respect of airworthiness, these criteria effectively preclude most if not all light aviation national or regional / local bodies such as air sports or GA associations from being a qualified entity. This is because their functions and the representative nature of their activities could be deemed to be in conflict with the Annex V criteria. Only by separating these functions with clear lines of governance in each organisation might such barriers be overcome.

Thus what was a potential route by which some of the activities and responsibilities under discussion for ELA 1 could be delegated would appear to have been effectively closed off by the criteria in Annex V.

5.2.3 Accredited Bodies (Assessment Bodies)

Prior to the adoption of 216/2008 proposals had been made for 'Assessment Bodies'. This was seen as a means of delegating responsibilities for various activities to industry, which included organisations in the light aviation sector. One of the purposes of the proposal was believed to be keeping certain compliance activities cheaper for the end-user than requiring the NAAs to perform these functions.

The Council of Ministers did not adopt the proposal for 'Assessment Bodies' in the final stages of drafting 216/2008. However, in the extension of 216/2008 to aerodromes and ATM, recital 11 of EC Regulation 1108/2009 states:

"The Commission intends to begin work, in due time, on an examination of the feasibility and the necessity of introducing ***accredited bodies*** *for the certification of ATM/ANS systems and an evaluation of all possible options and impacts. The Commission could, if appropriate, make a proposal for further revision of this Regulation based on a full impact assessment."*

Further, in 1108/2009 Article 13 of 216/2008 is amended to add the following:
"Qualified entities shall not issue certificates"

Thus, even setting aside the criteria in Annex V, it is clear that a Qualified Entity could not fulfil the certification functions envisaged in this RIA discussion in relation to ELA 1, without as a minimum the involvement of the regulator in issuing certificates.

Recital 11 of 1108/2009 would appear to indicate willingness on the part of the Commission to consider certification functions for certain tasks to be conducted by 'accredited bodies'. (The latter term appears to be a replacement for 'Assessment Bodies'). Although in the context of 1108/2009 the suggestion for 'accredited bodies' is in relation to the certification of ATM/ANS systems there should be no reason in principle why this suggestion should not extend to certification in other aspects of aviation regulations. This is reinforced by the additional limitation for qualified entities not issuing certificates.

It is further noted that should this option be taken forward consideration should be given to Decision 768/2008/EC of the European Parliament and Council on a common framework for the marketing of products and Regulation 765/2008 of the European Parliament and Council setting out the requirements for accreditation and market surveillance relating to the marketing of products.

RIA Option 2 therefore considers the possibilities of a role for 'accredited bodies' (or assessment bodies – "ABs" for short) in relation to regulatory aspects in the ELA 1 range of aircraft. This would resonate with the concepts being developed for industry-based compliance certification for initial airworthiness, but may also be extend to other activities, amongst which are continuing airworthiness, pilot training and licensing & medical certification and pilot training organisations.

5.2.4 Regulated, devolved, delegated, or unregulated?

There are several terms that reflect varying degrees of change from a system directly-controlled by the statutory regulator. These terms of set out below in order to have clarity of meaning. The UK CAA developed the definitions some time ago. Reference in the definitions is to the NAA but could equally be interpreted in principle as EASA.

1. Full regulation

   There are legally binding rules and a statutory regulator with legal powers and duties. The NAA undertakes the oversight of this activity in-house and is fully responsible for its actions.

2. Devolution / devolved

   There are legally binding rules and a statutory regulator with legal powers and duties. The NAA, as regulator, may authorise some other body, such as a voluntary body representative of a particular segment of the aviation community, to carry out specific tasks in support of the NAA's function. The NAA approves the bodies to submit reports and recommendations on the basis of which the NAA issues the relevant licence or certificate. The NAA remains responsible for the process.

3. Delegation / delegated

   There are legally binding rules and a statutory regulator with legal powers and duties. The NAA delegates the entire function to another organisation. The NAA has no involvement in the process and the licence or certificate is issued by the delegated body but in the name of the Regulator / NAA. The NAA remains liable as the named body in the legislation.

4. Deregulation (unregulated)

   No legally enforceable regulation. Voluntary bodies may seek to encourage best practice but have no legal powers.

5.2.5 Scope and roles of Accredited Bodies (Assessment Bodies)

In 1108/2009 there is no definition of the scope or potential roles of ABs other than what is quoted above in 5.2.3.

For the purpose of this RIA, the following assumptions are made in respect of ABs:

1. ABs would be approved by EASA or by an NAA

2. AB status would be available to, for example, national or pan-EU GA or air sports organisations which are primarily engaged in the governance, safety management, operations, membership interests, representation etc of their particular sector of light aviation, without meeting the strict criteria of Annex V for Qualified Entities quoted above

3. AB status would also be available to other bodies which are not directly involved in the activities of the light aviation sector on behalf of end-users or members

4. ABs would be authorised to issue certificates of compliance with EU rules on behalf of EASA or an NAA

5. Such certificates could be in relation not only to initial and continuing airworthiness rules but also pilot training and licensing, training organisations, medicals and other aspects

6. There can be different ABs for different delegated regulatory tasks; equally an AB could cover a range of regulatory tasks

7. ABs would be accountable to EASA directly, or indirectly through an NAA, for conducting their activities as ABs in accordance with the terms of their appointment, and to standards which are established in these terms

8. ABs would be free to set their own charges to customers for the services performed

9. There could be more than one AB in a given geographic area or a given area of aviation certification activities – in other words a competitive field and not a monopoly

10. ABs would represent a 'delegation' of responsibilities for compliance with EU regulations and implementing rules, rather than 'devolution', because ABs could issue certificates

5.2.6 Why ABs and Analysis of Impacts

The key concerns of the EU-regulated light aviation sector, taking into account the experience of the microlight community in Europe and the LSA development in the USA could be addressed with the use of ABs.

5.2.6.1 Safety

GA membership organisations are in general proactive in safety management. It is in the interests of these organisations to foster a strong safety culture but at minimal cost. Generally they have the resources to do this. There is a wealth of safety management knowledge and activity across the EU at this national level but also very importantly at the local club level as well. The level of detail that can be addressed by the associations is far greater than an overarching pan-EU regulator because of both proximity and resources to deploy on problems. The danger in a centralised rule-based approach to safety alone is that owners, pilots and operators feel it is too remote and is disconnected from their own environment and they are 'not understood'. It therefore tends to build up a resistance to regulation.

The affected community is far more likely to accept the rules if they are the minimum necessary and are sensible. This is particularly the case if they see their own associations in a proactive role in linking the rules to their own activities, and those associations have 'ownership' of the rules and can implement them in a pragmatic and cost effective way.

The closer the rules are to the regulated person, the more likely they are to be accepted and complied with. The more remote they are seen, the more likely they are to be ignored.

There is therefore a potential partnership available to the EU regulator by engaging with the established organisations that can deliver the underpinning services for implementing the rules, providing the rules are sensible, appropriate and proportionate.
The deep and extensive knowledge base in the light aviation sector lies primarily with the owners, pilots, operators and support organisations whether local, regional or national. Whilst some NAAs and EASA have a number of people with that specialist knowledge, and in some cases are active participants in the light aviation sector, nevertheless the depth and range of knowledge amongst the staff of the regulators is inevitably limited by sheer numbers compared with the sector itself.

The sector draws on this intimate level of knowledge in its associations. The people are dedicated to its success because they have a personal interest and involvement with it. It is vitally important for the continuing development and success of the sector that this knowledge is retained and transferred from one generation to another. The more the knowledge is diffused the greater the risk of discontinuity, thus increasing risk.

One of the key features of light aviation is the level of personal responsibility that individuals take on for their own well-being and survival. There is an inbuilt instinct for self-preservation, and an independence of mind amongst what is largely an intelligent sector of the population. Of course there will always be exceptions, but invariably such people are weeded out through the training and supervision processes and mutual oversight.

This sense of responsibility is at risk of being diluted or destroyed if the participants feel they are not being trusted for their own destiny.

Therefore, providing the rules are appropriate, sensible and proportionate, participants are far more likely to react positively where they have a degree of control over their implementation through industry-based associations whether at national or local level.

The above arguments support the involvement of organisations as ABs in the process of implementing rules.

5.2.6.2 Environmental

The impacts on environmental issues are assessed as the same or very similar to those set out under Option 1 in section 5.1.3.2

5.2.6.3 Economic

One of the overall key drivers in the light aviation sector is the need to keep costs as low as possible for the owners, pilots, operators, clubs and support organisations. The activities are primarily recreational, leisure and sporting and therefore paid for out of taxed income. Some of the activities are in the nature of personal business travel for the aircraft owner or operator. Membership organisations in the light aviation sector have been long-established to serve the interests of their members and at a cost of members' services that is usually acceptable. Partly this is based on significant voluntary effort as well as a small cadre of professional management and support.

Without the activities of these organisations many or some of the roles and services would have to be provided by the NAA, or in more recent times, EASA. The cost base of NAAs and EASA, employing staff at higher salaries than in the GA organisations and with much higher supporting infrastructure overheads, are an order of magnitude greater than GA organisations. Therefore the regulators' costs of services to the end-user / stakeholder are significantly higher.

The primary focus of NAAs and EASA is commercial air transport, as that is the dominant agenda in terms of the travelling public and safety. Therefore the personnel and other resources of the regulators are limited in their availability to provide the equivalent services with those which the GA organisations are able to undertake. Even if the resources of NAAs or EASA are available for services to light aviation, the unit cost of providing them is 'uncompetitive'.

If the Community agenda of economic development and increased participation is to have real meaning then the option of delegating more responsibilities to 'industry' in the form of ABs is, prima facie, attractive. This is in fact what has happened in the USA with the LSA, except in the case of the USA it is 'devolution' as the FAA issues the airworthiness certificates for LSA and the Sport Pilot Licence. But the FAA is funded from general taxation, not fees for services. It was also the current practice in several EU MS, before the advent of EASA and EU regulations. NAAs have delegated responsibilities to GA organisations in light aviation, such as national aero clubs or the aircraft category-specific national organisations such as in gliding and ballooning particularly. That framework could be continued under the new regime to the benefit of both 'industry' as well as the NAAs and EASA.

5.2.7 Conclusion

In the absence of a DOA / POA under Option 1 (self-declaration linked to consensus standards developed and overseen by industry), which may not be accepted, and self-declaration of compliance with standards by manufacturers, some other or additional form of compliance verification process may be required. The ASTM-based consensus system for the US LSA relies upon manufacturer's declaration of compliance, subject always however to the reserve audit powers of the FAA.

Therefore an alternative would be for EASA standards and / or rules to be overseen in implementation by ABs, which would issue certificates of compliance on behalf of EASA.

This Option 2 is an alternative to Option 1 as it replaces the role of the manufacturer (in the instance of airworthiness) in self-declaring compliance with the agreed standards.

As with Option 1, Option 2 would be an alternative at the manufacturer's choice to full DOA / POA, so that they can retain flexibility for marketing and other purposes.

Under this proposal an AB would be audited by EASA, either directly or indirectly for a party appointed by EASA.

5.2.8 Recommendation

The recommendation is that the Option 2 proposal of using accredited bodies under delegation from either the NAAs or EASA to undertake compliance and associated certification functions should be investigated further and taken forward in working group BR.010.

5.3 Option 3: The Light Sport Aeroplane

5.3.1 Background

In 2005 the FAA in the USA introduced a new category of aircraft, the Light Sport Aircraft (LSA) together with a new type of pilot licence, the Sport Pilot Licence. This initiative was designed to 'fill the gap' between the Part 103 Ultralights and the 'conventional' CS 23 GA light aeroplanes. The LSA is limited to 600kgs MTOM (or 650kgs amphibian), single reciprocating engine if powered, 2 seats, 45kts maximum clean stall speed, maximum level flight continuous power 120kts, fixed undercarriage unless amphibian and in-flight non-variable pitch propeller. There are two sub categories of the LSA; the SLSA which is manufactured and 'ready to fly' and can be used for hire and reward, and the ELSA ('experimental LSA') which is assembled from a manufacturer's kit. The process for design and production of LSAs was made simpler by the adoption of industry consensus standards through industry-based standards organisations such as ASTM International. Each LSA is provided with an airworthiness certificate based on the manufacturer's statement of compliance, but not a type certificate. The associated Sport Pilot Licence was kept simpler than the full ICAO-compliant pilot licence needed to fly CS 23 aeroplanes. Two new maintenance ratings were added at the same time, which allowed owners to maintain and inspect aircraft.

The introduction of this LSA category opened a new market for designers and manufacturers, many of whom developed the LSA from the microlight aircraft sector. For some years microlight manufacturers, with origins in the traditional 'rag and tube' type aircraft market, had been developing more sophisticated 3-axis, stressed-skin and composite airframe aeroplanes for the microlight market, but limited to the microlight MTOM of 450kgs for two-seat aircraft. This mass limitation was causing design problems in terms of the payload for persons, baggage and fuel for an aircraft that could have a more extensive range without the MTOM limitation. The designers and manufacturers recognised the potential market for the LSA type aircraft which can provide greater payload flexibility for increased flight range and duration.

With the opening up of the new USA LSA market the European-based designers and manufacturers responded positively, developing aircraft for export from the EU to the USA in particular. Other countries outside the EU have also adopted the LSA category, either mirroring the USA or with some variations in technical specifications.

However, the European market was and is still is closed to the LSA because above 450kgs MTOM an aeroplane has to be type certified by EASA under Part 21. The LSA is not type certified through the traditional and existing DOA / POA process. Whilst a few European manufacturers hold DOA and POA approvals for other aircraft categories and types, the vast majority do not - being very small businesses - and are put off by the high cost of achieving DOA and POA approvals. One of the fundamental market issues for this new LSA category was price to the end buyer. Regulatory compliance costs – both EASA fees and the internal regulatory compliance resource costs of the designer / manufacturer - play a large part in the business cost base of the pre-sales development period. They represent a significant start-up financial risk for the business owner over and above the risks associated with developing a new aircraft type.

5.3.2. The Issue

European designers / manufacturers cannot sell their non-type certificated LSA models in Europe, except in some cases with special temporary arrangements such as a Permit to Fly for a limited period, based on EASA specified Flight Conditions. Yet there is a very significant potential European market to be satisfied. The market could be of a similar size to the USA market and more diverse. There is currently considerable frustration within both the end-user / purchaser and manufacturer communities. These communities are currently being denied the opportunity of a new category of light aeroplane. It is a category that offers greater performance and range than traditional microlights but is potentially cheaper to purchase and operate than traditional existing CS 23 certified aeroplanes. The LSA category also offers significant efficiency gains with more modern designs incorporating composite structures and airframes, enhanced technology including avionics and more efficient engines burning smaller amounts of unleaded fuel, making them quieter and more ‘environmentally friendly’.

This issue was recognised by regulators about five years ago. EASA established its MDM.032 group working in 2006 to formulate potential solutions to regulatory problems in ‘light aviation’, including the LSA category. The recommendations from MDM.032 in 2008 have not yet borne fruit, as the established regulatory process is slow. Solutions for enabling the European LSA, utilising the established rulemaking programme route, are still a long way away. The timescale is driven by end-to-end EU rulemaking processes, which include a long gestation period to secure a change in the Basic Regulation. A change in the Basic Regulation has so far been assumed as necessary in order to permit this category to be designed, produced and sold in the EU market without DOA and POA approvals.

5.3.3. Discussion and reasoning

The light aviation sector relies on the availability of good quality products that are economic to purchase and operate. The microlight sector has proved that with, in general, relatively light regulation in certain EU countries, in particular for initial airworthiness, the manufacturers can produce aeroplanes whose total costs can be kept within the pocket of the average private owner / pilot. The microlight industry has also proved it can be very innovative in its designs and adoption of new technologies. This is helped by less restrictive and more cost effective regulatory frameworks in several countries than those which apply to full EU-regulated CS 23 aeroplanes.

The CS 23 aeroplane sector has existed for some 50 years with aeroplanes that are now showing their age in terms not only of disproportionate operating costs, limited as they are by stringent continuing airworthiness rules, and also by considerable cost barriers to technological improvement and modification.

CS 23 aeroplane owners who only need two-seat aeroplanes look on the USA LSA development with envy. Currently, their only options for owning similar aircraft are to stay in the more expensive CS 23 market or to attempt a ‘home-built’ (Annex II) aeroplane of similar performance, of which many varieties exist. However, ‘home-building’ is not for everyone.

One of the leading and the largest European producer of microlight and (USA) LSA aeroplanes recently stated that there is a huge market for new aircraft in the MTOM range up to 1200kgs (ELA 1) in the next 10 to 15 years. He sees clear advantages of a new approach to design and production through industry consensus standards rather than the traditional DOA and POA and believes that starting with the LSA category as soon as possible would be an ideal pathway to this. The technological improvements fostered in the microlight world are being rolled out to the LSA category, and in due course can be adopted for aeroplanes up to 1200kgs. Without the opening of the European market for LSA the manufacturers will not have sufficiently large markets to achieve the necessary economies of scale, and many will fall by the wayside.

In order for LSAs to be available to the market in the European Community, other than on a temporary basis, it is suggested the following issues need to be addressed and resolved:

1) Finalisation of design criteria and an official certification standard (CS-LSA) acceptable to the industry (designers, manufacturers and end-users / customer-owners).
2) The technical harmonisation of design criteria as far as possible between the USA LSA and the future European LSA.
3) Lower initial airworthiness regulatory compliance costs for designers and manufacturers than the existing Part 21 mandatory DOA / POA approvals route.
4) Acceptance by the European regulators (European Commission supported by EASA) of the principle of alternative means of demonstrating compliance with CS-LSA, such as manufacturers' self-declaration through an agreed alternative process, in place of DOA and POA approvals.
5) Determining the form of initial airworthiness 'certification' that would be available by utilising 'industry consensus' and / or 'industry self-declaration' methods instead of TCs through DOA and POA approval.
6) Timescale. The view ascertained from industry is that it is totally unacceptable to wait a possible further five years (2015-16) before the Basic Regulation *might* be changed to accommodate the LSA requirements.
7) Recognition by the European regulators of the critical importance of this subject to a sector of European light aviation, that is presently being 'left behind' in terms of market opportunities and satisfying latent market demand because of delayed regulatory action

The proposed European LSA category represents the lower MTOM range (450 to 600kgs) of the proposed wider ELA 1 MTOM range of aircraft up to 1200kgs. Whilst under the Terms of Reference this study is concerned primarily with proposals for the ELA 1 range, in terms of timescale urgency the more pressing regulatory issues relate to the European LSA.

5.3.4. The Proposals

In this option the proposals are:

- To find a means by which the initial airworthiness acceptance of the European LSA can be implemented through industry consensus processes without DOA / POA approvals but staying within the current framework of Part 21 of the Basic Regulation; or failing that -
- To fast-track a change to the Basic Regulation (say, within 12 to 15 months maximum) to bring about the industry consensus alternative means of initial airworthiness acceptance for the European LSA without DOA / POA approvals; and
- To progress on the 'normal' timescale, the necessary changes to the Basic Regulation for the remainder of the ELA 1 range of aircraft, in order to incorporate industry consensus alternative means of initial airworthiness acceptance.

5.3.5. Safety Case

The experience to date of the 5-year-old LSA category in the USA as concluded by the FAA and the findings of this study is that initial airworthiness is rarely a factor in fatal accidents (reference, Phase 1 report). As with other sectors of light aviation the primary causes of fatal accidents in LSA relate to pilot skills, experience, handling and decision making. From this it can reasonably be concluded that the manufacturer self-declaration and industry consensus system employed in the USA for determining the safety of design and manufacture (initial airworthiness) of LSA is acceptable.

Therefore, in order to meet the requirement for a faster resolution of the LSA issue than the currently proposed timescales would indicate, it is necessary for EASA to consider if and how these proposals can be implemented.

5.3.6. Option

In summary, this option proposes that:

1) A rapid solution should be found for an industry-acceptable initial airworthiness implementation of the proposed European LSA, using industry consensus processes, either by means of an appropriate interpretation of and route through Part 21, or a fast-track change to the Basic Regulation to enable this to happen; and
2) A longer-term change to the Basic Regulation, to allow for industry consensus initial airworthiness processes for the ELA 1 MTOM range of aircraft, other than LSA.

5.3.7. Conclusion

Finding a solution to enable the European LSA to be manufactured and sold within the European Community is a very urgent and important issue for the industry and its prospective customers. The proposals in this option would address the 'problem' posed in recital 5 to Basic Regulation 216/2008, which states (emphasis added in **bold**):

"It would not be appropriate to subject all aircraft to common rules, in particular aircraft that are of simple design or operate mainly on a local basis, and those that are home-built or

particularly rare or only exist in a small number; such aircraft should therefore remain under the regulatory control of the Member States, without any obligation under this Regulation on other Member States to recognise such national arrangements. However, proportionate measures should be taken to increase generally the level of safety of recreational aviation. ***Consideration should in particular be given to aeroplanes and helicopters with a low maximum take-off mass and whose performance is increasing, which can circulate all over the Community and which are produced in an industrial manner. They therefore can be better regulated at Community level to provide for the necessary uniform level of safety and environmental protection****."*

If a fast-track solution can be found for the LSA it would meet the requirement of recital 5.

In particular this solution would:

1) Leave the very low mass microlight aeroplanes under national rules, within Annex II
2) Allow the more technically advanced LSA category to develop within a European regulatory framework
3) Provide an alternative for owners and pilots of light two-seat aeroplanes that are potentially technically, economically and environmentally more attractive than conventional legacy CS 23 aeroplanes.

5.3.8 Recommendation

It is recommended that EASA and working group BR.010 investigate the implementation of a 'fast track' solution to enable the LSA consensus process to be adopted as a matter of urgency.

5.4 Option 4: The 'Mixed Economy'

5.4.1 Outline reasoning and rationale for the option to be evaluated

The purpose of this option is to examine the possibility of retaining agreed elements of regulatory topic within Community level regulatory scope (undertaken by EASA) whilst de-regulation of other elements from EU level to national level (administered by the NAA or delegated to an Assessment Body) so as to achieve a more proportionate approach and greater ownership and proximity for safety management. In effect, some aspects are controlled by EASA and others by the State NAA

5.4.2 Discussion

The concept of varying the regulatory approach for different topics and having a mixture of Community and National regulations to enable a 'best-fit' for each regulatory topic, appeals to certain sectors of end-users and the industry, especially with regard to mitigating the burden of regulatory costs – the principle driver in the minds of many end-users and in the industry.

However, the arguments in favour of gaining a 'proportionate approach' or optimising regulatory costs are far outweighed by the propensity for confusion and cost increases that would accompany a European-wide dichotomy of regulatory responsibility.

A 'mixed economy' would be the opposite of a total system approach adopted by the Community legislators for aircraft and operations within the scope of the Basic Regulation. A fragmented approach would require enormous co-ordination at the interfaces between national regulations and Community regulations and rules for a particular regulatory area. The number of such interfaces would reflect the number of MS, making the tasks very complex. Further, where national rules are applicable, end users would have to rely upon bi-lateral agreements for cross border free movement.

Some NAAs would either no longer have the resources or may simply not wish to engage in partial control of regulatory topics. Additionally, there will be some states that may have a preference to retain control over a subject that other states wish to be undertaken at Community level, and *vice versa*.

Furthermore, the regulatory environment that would result from the implementation of this approach is unlikely to satisfy the basic aims and objects of the Community in regulating at Community level (Recital 5 of BR 216/2009), and for this reason alone it would be unlikely to succeed.

5.4.3 Conclusion

For the above reasons this option was not explored further in this RIA.

5.5 Option 5: Total De-regulation from EU level regulation

5.5.1 Outline reasoning and rationale for the option to be evaluated

Implementing this Option would take the aircraft within the ELA 1 process out of the scope of the EU regulation and into Annex II of the Basic Regulation.

The rationale behind this option is that, from the evidence gathered, the rate of fatal accidents in microlighting is not materially different to that of the Community-regulated ELA 1 range of aircraft. In many MS microlighting appears to be unaffected by the absence generally of more ‘hands-on’ national state regulatory frameworks, compared with the range of aircraft from 450kgs up to 1,200kgs that are now subject to Community regulation. This light regulatory environment in microlighting has encouraged and enabled technological and economic development as well as growth in participation levels that compare favourably with the Community-regulated sector.

The perceived burden of Community-wide regulation either in place or in development, compared with previous or existing national regulations governing aeroplanes, gliders and balloons, is regarded by many user groups and stakeholders as disproportionate for the nature of the activities and risks in this sector. The proposal is therefore that the ELA 1 range of aircraft may be adequately controlled by remaining under the national regulatory control, where both ICAO and non-ICAO compliant options have been developed successfully over many years, as well as greater flexibility in airworthiness compliance.

The primary driver for considering this option is the fear of increased regulatory costs and increased complexity, and their impact on aircraft owners, pilots, clubs and supporting small industry suppliers.

There is also an argument that Community regulations as they affect this sector could lead to reductions in safety, particularly with Part M and some elements of the proposed FCL and current draft medical implementing rules. Some have also expressed concern that the evolving Community rules, added to those for airworthiness already in place, will lead to a reduction in participation in the light aviation sector represented by the ELA 1 range, rather than an increase in participation, particularly in times of economic stringency.

5.5.2 Discussion

Under this option, in effect, the light aviation sector for the ELA 1 range would revert to its pre-EASA status whereby only national regulation and rules apply. In that respect, conceptually, it is relatively easy to establish what would be gained and what would be lost by such a move. This is addressed briefly below.

If this option were pursued it would mean a fundamental change in the scope of the Basic Regulation, transferring all aeroplanes from 451kgs up to 1200kgs MTOM, as well as gliders and balloons, to Annex II, or at least those which are non-complex and used non-commercially. These aircraft are already operating within the EASA initial and continuing airworthiness rules, but are still operating under national pilot training, licensing, medical and operational rules.

The table below illustrates, for Initial Airworthiness the possible gains or dis-benefits from de-regulating from the EU level.

5.5.3 Initial Airworthiness (Part 21)

Table 10: deregulation gains and dis-benefits

Objectives	Potential Gain	Potential dis-benefit
EU agenda (free movement between States)	None	Removes free movement without alternative mutual recognition for cross-border movement.
Safety	Some gain arising from proximity of national regulator to and knowledge of local designers / manufacturers	Removes pan-EU common certification standards for each category of aircraft; previous JAR ‘rules’ and codes resurrected.
		No ‘common market’ development of new standards applicable across the EU
Economic	Release from EASA POA/DOA fees and charges, but replaced with national fees and charges, which vary country to country.	Removal of pan-EU type certification which provides economies of scale for designers / manufacturers.
	Proximity to regulator and possible improvement in timescales for development and certification.	
Organisational	Proximity to regulated parties	NAAs need to reconstitute functions to provide initial airworthiness services
Resources	Potential for re-introducing delegated arrangements previously in place	NAAs have to re-staff following transfer back from EASA of responsibilities for initial airworthiness.
Environmental	No material impact	No material impact
Social	Enhances more local involvement and ownership in activities	Dilutes pan-EU community connections

5.5.4 Conclusion

It is clear from just the review of one segment of regulation that this option is unlikely to provide an overall net benefit in either practical or economic terms for the stakeholders or the regulators, given the extent of unwinding of the existing pan-European processes that would be required.

Furthermore, the wording of recital 5 of Basic Regulation 216/2008 indicates that “*consideration should be given to* ***regulate at Community level*** *aeroplanes and* *helicopters.....that can circulate all over the Community and that are produced in an industrial manner.*"

Given the intent of Recital 5, it is unsurprising that any move or recommendation to further de-regulate back to National level is unlikely to be viewed favourably by the Commission and would be unlikely to be adopted.

5.5.5 Recommendation

The option is not recommended for further consideration.

6.0 Analysis of impacts

6.1 Methodology

The Phase 1 study and this RIA, whilst containing some monetary parameters from the world of microlight aircraft and the current EASA fees and charges for manufacturers of LSA, does not have available sufficient wide-ranging financial data to enable the use of the cost-effectiveness analysis (CEA) or cost-benefit analysis (CBA) analysis tools.

Therefore the assessment of impacts is set out using the Multi-Criteria Analysis (MCA) together with elements of qualitative assessment, based on the text in this RIA. Some monetary / financial criteria are used where appropriate and available.

6.2 Definition of the assessment criteria

In assessing the options the following criteria are used. Some criteria are specific to the European LSA issue – as indicated in the table below - whilst other criteria apply to the whole ELA 1 range.

Table 11: Assessment criteria

Overall objectives	Code	Assessment criteria applied to the options
Safety	SAF-1	Industry-based consensus process for initial airworthiness compliance with agreed standards resulting in significant numbers of alternatively certified aircraft.
	SAF-2	(LSA) Absence of type certificate for European LSA; replace with other form of 'certificate' for each aircraft
	SAF-3	Fatal accident rates caused by failings in initial airworthiness – likely to increase or decrease?
	SAF-4	Increased effectiveness of safety management through proximity of oversight / involvement of 'industry'
	SAF-5	Use of industry-based approved accredited bodies – safe alternative to regulator's oversight?
Environmental	ENV-1	(LSA) Fuel consumption / emissions and noise
	ENV-2	(Other) Fuel consumption / emissions and noise
Economic	ECO-1	(LSA) Opening the EU market to designers & manufacturers for European LSA: economic growth
	ECO-2	Ensure competitiveness of European industry and a level playing field in the internal market
	ECO-3	Lower initial airworthiness compliance costs compared with regulator-based DOA/POA approval route
	ECO-4	Regulators' work load and costs
Equity and Proportionality	EQF-1	Ensuring proportionate rules for Small and Medium sized Enterprises (SMEs) / General Aviation
	EQF-2	In accordance with the expressed position of the Commission and Parliament on proportionality in rulemaking?
	EQF-3	Application throughout the EU
Social	SOC-1	Are the options likely to generate favourable or negative social effects and participation?
Regulatory harmonisation	REG-1	Consistency and compatibility with the objectives of European aviation safety law
	REG-2	Consistency and compatibility with ICAO where appropriate
	REG-3	Timeliness of implementation of options
	REG-4	(LSA) Harmonisation with USA LSA standards
	REG-5	Adherence and regulatory compliance

6.3 Safety impact

Based on the assessed experience of the microlight sector and also the USA LSA category there is a low negative safety impact expected with a change to an industry consensus based approach to initial airworthiness for ELA 1 in place of the traditional DOA / POA approach. The change would be primarily for economic reasons for the manufactures and ultimately the end users in terms of aircraft owners and pilots.

All the evidence from the accident statistics points to a very low incidence of fatal accidents caused by failures in initial airworthiness, whether in aircraft regulated by the MS or as now EASA, and those aircraft subject to forms of initial airworthiness regulatory control utilising the expertise of industry and sector associations.

All the indicators are that a move to industry-based consensus processes, maybe combined with the use of ‘accredited bodies’ to oversee through audit or otherwise compliance with approved airworthiness standards, would not materially affect the fatal accident rates of the aircraft categories concerned.

6.4 Environmental impact

The implementation of the European LSA is forecast to lead to overall environmental improvements compared with current Part 21 / CS 23 aeroplane fleets, where substitution of fleet type occurs. This is due to the improved aerodynamic and engine technologies adopted from microlights in the LSA category for the USA market, but as yet not available to the European market. A fast track implementation of LSA in Europe would accelerate this potential benefit.

If the principles of a consensus process for initial airworthiness are extended to aeroplanes in the ELA 1 range then similar environmental improvements will become evident in due course. Whilst new Part 21 / CS 23 aeroplanes are now reaching the market with improved technologies, the number of manufacturers able to compete in the market is limited by economic factors derived from the regulatory framework. Relaxing this framework should encourage more players which is turn may lead to increased competition and probably increased product volumes.

The environmental gains in the LSA and CS 23 aeroplane categories would not be as applicable for sailplanes and balloons, which already have negligible environmental impacts

6.5 Social impact

Light aviation and in particular flying light aeroplanes, including the proposed LSA category, could be rejuvenated through a relaxation of regulations. If lower capital and operating costs are achievable there is the potential for a reversal of the downward participation trends in the last 20 years. Recreational aviation is an important activity in the lives of a significant number of EU citizens from a young age (14+) right through to people in their later life (70+). It is a legitimate pursuit offering adventure, discipline and particular skills which are life- experience enhancing. Cost has become an increasingly significant barrier to access. Medical barriers also need to be challenged using objective risk criteria. Anything that can be done to reduce these barriers should be pursued.

6.6 Economic impact

Provided the impact of safety is neutral or even slightly negative, the largest positive impact from the changes proposed is likely to be economic. An industry consensus-based process for ELA 1 initial airworthiness is likely to be far more attractive to most manufacturers, and certainly the smaller ones. This is turn will generate benefits downstream in terms of the range of products, their cost and the market size, particularly if the LSA category can be implemented without further undue delay.

The industry-based approach would release EASA and NAAs from a significant element of their certification activity cost bases, allowing concentration on the heavier end of GA and also CAT.

European manufacturers need to be able to compete on level terms with their counterparts in the USA in particular, but also in the future with manufacturers in emerging economies of the Far East, India and China. At present they are at a competitive disadvantage by not having a LSA European market in particular.

6.7 Equity and proportionality

The impact of implementing the proposed options 1, 2 and 3 is likely to be highly positive for SMEs, particularly those with LSA models for the European market. It would enable them to compete more effectively with the 'big players'.

6.8 Impact on regulatory coordination and harmonisation

Option 1 requires an amendment to the Basic Regulation and / or Regulation 1702 (Part 21) to enable an industry consensus process to be used in place of the requirement for a DOA and POA, and the need for a Type Certificate.

Option 2, which proposes the use of accredited bodies, probably requires an amendment to the Basic Regulation also.

Option 3, which addresses the urgent need for the European LSA to be implemented, and is complementary to Options 2 and 3, requires either a route to be found within the current Basic Regulation and Part 21 requirements or a change to the Basic Regulation.

As regards ICAO, a precedent has been established by the FAA for the LSA to be accepted in the USA.

6.9 Interpreting the comparison of options

The Multi Criteria Analysis (MCA) scoring is used with a range of scores for each of the criteria against each of the options. The scoring system used is +5, +3, +1, 0, -1,-3,-5 (Attachment C). The descriptors attribute a score for each of the criteria in terms of whether the option assessed is expected to result in a better (+) or worse (-) outcome than Option 0 (no change to current proposals).

6.10 Weighting of impacts in comparison of options

The weightings applied to the various criteria against which the options are compared, are those used in the EASA RIA template (Attachment B). A weighting of 3 is attributable to safety criteria, 2 to environmental and 1 to each of economic, equity and proportionality, social, and regulatory harmonisation. These weightings have been agreed by EASA as appropriate to this RIA.

7.0 Comparing the options

Overview of expected impacts with coloured (+/-) scores in (brackets):
N/A = Not applicable
Options 1 to 5 represent a change from Option 0 which represents the current proposals from EASA for ELA 1. All Option 0 criteria are scored as 0 (zero). Table 12: Policy options comparison

Impacts	Code	Policy Options					
		Option 0 No change	Option 1 Consensus process	Option 2 Accredited bodies	Option 3 LSA fast track	Option 4 Mixed Economy	Option 5 De-regulation
Safety	SAF-1	N/A (0)	Slight risk of decrease in safety of IAW (-1)	Any risk of decrease in safety of IAW mitigated by use of ABs (+1)	Any risk of decrease in safety of IAW mitigated by use of ABs (+1)	Risk of regulatory confusion outweighs potential cost benefits (-3)	Treatment under transfer to Annex II will lead to different IAW regimes (-3)
	SAF-2	LSA would have TC (0)	Alternative certificate should be almost as safe as DOA/POA (-1)	Alternative certificate should be almost as safe as DOA/POA (-1)	Alternative certificate should be almost as safe as DOA/POA (-1)	**Assume IAW still EASA**: No change from Option 0 (DOA/POA) (0)	Treatment under transfer to Annex II – would LSA happen? Unlikely (-5)
	SAF-3	No change (0)	Minimal risk of increase in IAW fatal accidents (0)	Minimal risk of increase in IAW fatal accidents (0)	Minimal risk of increase in IAW fatal accidents (0)	Minimal risk of increase in IAW fatal accidents (0)	Minimal risk of increase in IAW fatal accidents (0)
	SAF-4	N/A (0)	'Proximity' likely to improve safety (+1)	'Proximity' likely to improve safety (+1)	'Proximity' likely to improve safety (+1)	No change from Option 0 (0)	'Proximity' likely to improve safety (+1)
	SAF-5	N/A (0)	N/A (0)	'Proximity' likely to improve safety (+1)	'Proximity' likely to improve safety (+1)	No change from Option 0 (0)	Assuming re-use of national ABs - 'Proximity' likely to improve safety (+1)
Environmental (see note below)	ENV-1	LSA reduced fuel consumption / quieter (technology) than CS 23 a/c (0)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would LSA happen? Unlikely (-5)
	ENV-2	CS 23 a/c – potential for reduced fuel consumption / quieter (technology) (0)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would ELA 1 happen? Unlikely (-5)

Impacts	Code	Policy Options					
		Option 0 No change	Option 1 Consensus process	Option 2 Accredited bodies	Option 3 LSA fast track	Option 4 Mixed Economy	Option 5 De-regulation
Economic	ECO-1	LSA – new EU market -positive growth (0)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change in principle from Option 0 but increased a/c production has positive impact (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would LSA happen? Unlikely (-5)
	ECO-2	Competition and level playing field for those companies that can afford DOA / POA (0)	More companies likely to participate under consensus process (+3)	More companies likely to participate under consensus process with ABs' involvement (+3)	More companies likely to participate under consensus process with ABs' involvement (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would ELA 1 happen? Unlikely (-5)
	ECO-3	Still regulatory generated costs of DOA / POA (0)	Lower IAW regulatory compliance costs (+5)	Lower IAW regulatory compliance costs offset by AB costs (+3)	Lower IAW regulatory compliance costs offset by AB costs (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would ELA 1 happen? Unlikely (-5)
	ECO-4	Regulatory resources required – high cost base (0)	Regulator's involvement reduced significantly (+3)	Regulator's involvement reduced significantly (+3)	Regulator's involvement reduced significantly (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would ELA 1 happen? Unlikely (-5)
Equity and Proportionality	EQF-1	Not proportionate for SMEs compared with other options (0)	Consensus approach = proportionate for industry (+3)	Consensus approach = proportionate for industry (+3)	Consensus approach = proportionate for industry (+3)	No change from Option 0 (0)	Treatment under transfer to Annex II – would ELA 1 happen? Unlikely (-5)
	EQF-2	Not considered proportionate to risk (0)	Considered to align with Commission & Parliament intentions (+5)	Possibly considered to align with Commission & Parliament intentions (+3)	EASA ability to find by-pass to Part 21 or willingness of Commission to fast track LSA unknown (-3)	Not the expressed wish of Commission or Parliament (-5)	Not the expressed wish of Commission or Parliament (-5)
	EQF-3	Applies throughout EU (0)	No change to Option 0 (0)	No change to Option 0 (0)	No change to Option 0 (0)	No change to Option 0 (0)	Does not apply uniformly in EU (-5)
Social	SOC-1	LSA - positive social effects. Other categories – marginally positive (0)	LSA - positive social effects (+3) Other ELA 1 – more positive than Option 0 (+1)	LSA - positive social effects (+3) Other ELA 1 – more positive than Option 0 (+1)	LSA – very positive social effects (+5)	No change to Option 0 (0)	Difficult to evaluate – probably negative for LSA (-5). Other ELA 1 tending to positive? (+1)

Impacts	Code	Policy Options					
		Option 0 No change	Option 1 Consensus process	Option 2 Accredited bodies	Option 3 LSA fast track	Option 4 Mixed Economy	Option 5 De-regulation
Regulatory harmonisation	REG-1	Consistent with EU law currently (0)	A degree of alignment with principles of other areas of EU law but not yet aviation safety law (+3)	A degree of alignment with principles of other areas of EU law but not yet aviation safety law (+3)	Not consistent with current EU law but fast track not tried yet for this topic (-1)	No change to Option 0 (0)	Not consistent with objectives of the EU (-5)
	REG-2	ICAO compliant (0)	No TC - Sub ICAO? (-1)	No TC - Sub ICAO? (-1)	No TC - Sub ICAO? (-1)	No change to Option 0 (0)	Revert to previous IAW status – mixed scenario (-3)
	REG-3	Timeliness in question (0)	Still likely to be full regulatory timescale for change – same as Option 0 (0)	Still likely to be full regulatory timescale for change – same as Option 0 (0)	Urgent issue could be resolved (+5)	Uncertainty creates further confusion (-5)	Revert to previous IAW status – mixed scenario (-3)
	REG-4	Not harmonised (yet) with US LSA (0)	More likely to achieve harmonisation (+3)	More likely to achieve harmonisation (+3)	More likely to achieve harmonisation (+3)	No change to Option 0 (0)	Prospect of EU LSA category lost and harmonisation with US LSA lost (-5)
	REG-5	Industry would have to be compliant (DOA / POA) (0)	Compliance with industry process no less likely than with DOA / POA (0)	Compliance with industry process no less likely than with DOA / POA (0)	Compliance with industry process no less likely than with DOA / POA (0)	No change to Option 0 (0)	Compliance with national IAW rules as likely as with EASA rules (0)

Note: In the assessment of impacts against the environmental objective and criteria, the scoring reflects in part a substitution effect. This is where, for example, the adoption of an option is expected to result in lower environmental impacts as a result of a change from ownership and operation of current types of aircraft to new types with more efficient engines, airframe aerodynamics etc. A substitution effect may be offset in part by an increase in overall volume of the activities of both types of aircraft.

Table 13: MCA (Multi Criteria Analysis) overview

Objectives/ Criteria	Code	Weights	Scores (Un-weighted)							Scores (Weighted)					
			Option 0	Option 1	Option 2	Option 3	Option 4	Option 5		Option 0	Option 1	Option 2	Option 3	Option 4	Option 5
Safety	SAF-1	3	0	-1	+1	+1	-3	-3		0	-3	+3	+3	-9	-9
	SAF-2	3	0	-1	-1	-1	0	-5		0	-3	-3	-3	0	-15
	SAF-3	3	0	0	0	0	0	0		0	0	0	0	0	0
	SAF-4	3	0	+1	+1	+1	0	+1		0	+3	+3	+3	0	+3
	SAF-5	3	0	0	+1	+1	0	+1		0	0	+3	+3	0	+3
Environmental	ENV-1	2	0	+3	+3	+3	0	-5		0	+6	+6	+6	0	-10
	ENV-2	2	0	+3	+3	+3	0	-5		0	+6	+6	+6	0	-10
Economic	ECO-1	1	0	+3	+3	+3	0	-5		0	+3	+3	+3	0	-5
	ECO-2	1	0	+3	+3	+3	0	-5		0	+3	+3	+3	0	-5
	ECO-3	1	0	+5	+5	+3	0	-5		0	+5	+5	+3	0	-5
	ECO-4	1	0	+3	+3	+3	0	-5		0	+3	+3	+3	0	-5
Equity and Proportionality	EQF-1	1	0	+3	+3	+3	0	-5		0	+3	+3	+3	0	-5
	EQF-2	1	0	+5	+5	-3	-5	-5		0	+5	+5	-3	-5	-5
	EQF-3	1	0	0	0	0	0	-5		0	0	0	0	0	-5
Social	SOC-1	1	0	+2	+2	+5	0	-5		0	+2	+2	+5	0	-5
Regulatory harmonisation	REG-1	1	0	+3	+3	-1	0	-5		0	+3	+3	-1	0	-5
	REG-2	1	0	-1	-1	-1	0	-3		0	-1	-1	-1	0	-3
	REG-3	1	0	0	0	+5	-5	-3		0	0	0	+5	-5	-3
	REG-4	1	0	+3	+3	+3	0	-5		0	+3	+3	+3	0	-5
	REG-5	1	0	0	0	0	0	0		0	0	0	0	0	0
Totals			0	+34	+37	+31	-13	-72		0	+38	+47	+41	-19	-94

Options 1 (consensus standards without DOA/POA) and 2 (use of accredited bodies) are both positive; option 3, being a fast track proposal to implement the European LSA and complementary to Options 1 and 2 is also positive.

7.1 Assessment of Options

This section deals essentially with one proposed change to the Basic Regulation for light aircraft. That is, to delegate responsibility for the determination of compliance with initial airworthiness standards for ELA 1 aircraft from EASA to industry by the establishment of a consensus process operated by a recognised standards body

The aircraft manufacturer would self-declare compliance with the agreed standards of design and production. The initial airworthiness design standards would be determined either by EASA (by means of Certification Specifications) or by industry consensus, with input to that process from EASA. This reflects Option 1.

In addition, Option 2 proposes oversight and / or audit of the implementation of the consensus process and manufacturers' compliance by approved 'accredited bodies'. Certificates, in a form to be determined, would attest the airworthiness of each of the products and would be issued by accredited bodies on behalf of EASA or an NAA.

A further modulation is contained in Option 3, which is a recommended 'fast track' to implement Option 1

The nature of the risk evaluated is the risk of an increase in the rate of fatal accidents caused in future <u>by a failure of insufficient oversight or inappropriate initial airworthiness design codes.</u> The fatal accident risks considered are focused on both the pilot and other occupants of an ELA 1 aircraft. In addition the fatal accident risks to 'uninvolved' third parties, outside the aircraft, are also considered.

The risk evaluation is sub-divided into:

1) Proposed European LSA aeroplanes (450-600kg) for which there is currently no separate fatal accident data in Europe

2) The remainder of the proposed ELA 1 MTOM range, which includes

a) Aeroplanes from 600kgs to 1200kgs MTOM

b) Gliders / sailplanes (current MTOM 850kgs)

c) Balloons (current envelope capacity 3200 Cubic Metres)

The risk evaluation for aeroplanes, including the proposed European LSA, is based on evidence drawn from 10 years of fatal accident data of the Annex II microlight aviation sector in Europe and the 5-year fatal accident data for the USA LSA category. These sources are the only two available sectors in terms of current and past initial airworthiness compliance processes that offer broad comparisons. The other comparable sector is amateur-built aircraft (also Annex II) where initial airworthiness is in most countries determined with varying degrees of industry-based oversight. However, the collection of data on fatal accidents for this sector was not within the scope of the study.

The evidence collected in the study shows that the number of fatal accidents that are attributable directly to a failure of initial airworthiness as the primary cause is negligible in the case of aeroplanes and gliders and virtually non-existent in balloons.

The question therefore is, would transferring responsibility for initial airworthiness compliance to industry, through the mechanisms proposed and described, be likely to adversely affect this extremely low fatal accident record due to initial airworthiness failings?

7.2 Evaluation

7.2.1 European LSA

The probability of incremental initial airworthiness failure (i.e. over current rates) through the alternative compliance process is assessed as 'improbable' – a risk score of 2.

It is estimated that 1 incremental event may occur for every 8,000 aeroplanes over their expected life. As the LSA category would be new, the expected European LSA aeroplane population by the end of 20 years is forecast to be c. 12,000. Using these figures the incremental fatal accidents would be 1.5 involving, statistically, between 1.5 and 3 people.

In terms of severity the events would be classified as 'hazardous' because of the estimated fatalities, thus a risk score of 4. The resulting compounded risk score is thus 8.

7.2.2 Rest of ELA 1 range

7.2.1.1 Aeroplanes from 600kgs to 1200kgs MTOM

The probability of incremental initial airworthiness failure (i.e. over current rates) through the alternative compliance process is assessed as 'improbable' – a risk score of 2.

It is estimated that 1 incremental event may occur for every 8,000 aeroplanes over their expected life. As the aeroplanes produced under this process would be new, the expected new aeroplane EU population by the end of 20 years is forecast to be c. 15,000. Using these figures the incremental fatal accidents would be 0.5 involving, statistically, between 0.5 and 2 people.

In terms of severity the events would be classified as 'hazardous' because of the estimated fatalities, thus a risk score of 4. The resulting compounded risk score is thus 8.

7.2.2.2 Gliders / sailplanes

The probability of incremental initial airworthiness failure (i.e. over current rates) through the alternative compliance process is assessed as 'extremely improbable' – a risk score of 1. (This is because sailplanes are less complex than LSAs and aeroplanes, being mainly without engines and propellers as the means of take-off and landing.)

It is estimated that 1 incremental event may occur for every 6,000 sailplanes over their expected life. As the gliders produced under this process would be new, the expected new glider population by the end of 20 years is forecast to be c. 5,000. Compared to the current EU sailplane population of c. 21,000 the number of new gliders produced under the alternative process may not be as great as sailplanes have been type certified to date.

Using these figures the incremental fatal accidents would be 0.8 involving, statistically, between 0.8 and 1.6 people. In terms of severity the events would be classified as 'hazardous' because of the estimated fatalities, thus a risk score of 4. The resulting compounded risk score is thus 4.

7.2.2.3 Balloons

The probability of incremental initial airworthiness failure (i.e. over current rates) through the alternative compliance process is assessed as 'extremely improbable' – a risk score of 1. This is because balloons are the simplest form of aircraft. It is estimated that 1 incremental event may occur for every 15,000 balloons over their expected life.

As the balloons produced under this process would be new, the expected new balloon population by the end of 20 years is forecast to be c. 3,500. [Current annual worldwide balloon production is c. 700 p.a.]. Compared to the current EU balloon population of c.

4,000 the number of new balloons produced under the alternative process may not be as great as balloons have been type certified to date.

Using these figures the incremental fatal accidents would be 0.2 involving, statistically, between 0.8 and 1.0 persons. In terms of severity the events would be classified as ‘hazardous’ because of the estimated fatalities, thus a risk score of 4. The resulting compounded risk score is thus 4.

Attachment A: High level comparison of Regulatory Frameworks

Table 14: High-level comparison of regulatory frameworks at the current time: Microlights, USA LSA and EU regulated light aviation

	Microlights **UK & France as examples**	**USA LSA**	**EU regulated light aviation**
Initial airworthiness			
Design control	From self-declaration (F) to national legal standards for which oversight is delegated to industry bodies (UK)	Industry consensus standards	Part 21 - DOA
Production control	From self-declaration (F) to national legal standards for which oversight is delegated to industry bodies (UK)	Industry consensus standards	Part 21 - POA
Design standards	From self-declaration (F) to national legal standards for which oversight is delegated to industry bodies (UK)	Industry consensus standards	EASA Certification Specifications (CS)
Major Modifications	From self-declaration (F) to national legal standards for which oversight is delegated to industry bodies (UK)	Industry consensus standards	EASA approval (fees)
Minor Modifications	From self-declaration (F) to national legal standards for which oversight is delegated to industry bodies (UK)	Industry consensus standards	EASA approval (fees)
Repairs	From self-declaration (F) to national legal standards for which oversight is delegated to industry bodies (UK)	Industry consensus standards	EASA approval (fees)
Oversight	Industry and NAA	Industry and NAA	NAAs' audit and EASA standardisation

	Microlights UK & France as examples	USA LSA	EU regulated light aviation
Regulatory compliance costs	Minimal (F) to medium (UK)	Low	Generally very high
Continuing Airworthiness			
Organisation Approvals	None (F) through to delegated by NAA (UK)	None	Sub parts F and G, Part M
Degree of owner-maintenance	Extensive (F & UK)	Mostly complete	Reasonable for non-complex work
Separation of duties	None (F) through to basic separation for inspector sign-off (UK)	None	Yes – CAMO (ARC), engineers, inspectors, owners
Maintenance personnel			
Licensed	None (F) to owner maintenance with inspector sign-off	Yes. 2 ratings for either inspection or inspection and repair.	Yes – L Licence
Qualifications	None	'Repairman certificate'	Reasonable
Training	None	Reasonable	Reasonable
Pilot Training			
Syllabus exists	None (F) through to comprehensive (UK)	Full syllabus	Yes – FCL Opinion including sub ICAO LAPL
Instructors	None (F) through to comprehensive (UK)	Sport Pilot Instructor rating	Yes – FCL Opinion including sub ICAO LAFI
Examiners	None (F) through to comprehensive (UK)	Sport Pilot Examiner rating	Yes – FCL Opinion
Licensed or registered airfields	Generally no	No	Not specified
Licence	NPPL(M)	Sport Pilot Licence	PPL or LAPL (proposed)
Issuing authority	Varies from national association (F) to NAA (UK)	FAA	Competent Authority (NAA)

	Microlights UK & France as examples	USA LSA	EU regulated light aviation
Processing authority	Varies from national association (F) to NAA (UK)	FAA	Competent Authority (NAA) probably; or possibly QE?
Maintaining Currency / renewal	Varies from no renewal (F) to periodic validation (UK)	Annual	No renewal but periodic min. hours for currency, flight with instructor & medical validity
ICAO compliant licence	No	No	Yes, except LAPL
Pilot privileges & ratings			
Day / VFR	Yes	Yes	Yes
IFR	No	No	Yes for aeroplanes (PPL). Gliders – depends of outcome of FCL.008
Towing	Yes in some countries	No	Yes aeroplanes / TMG
Aerobatics	No	No	Yes
Airspace access	Yes	Yes	National rules
Medical			
Standards	Minimal through to ICAO Class 2	Driving licence medical	Proposed ICAO Class 2 or LAPL sub ICAO
Process	Self-declaration through to doctor's examination	Self-declaration	AME or (for LAPL) GMP
Renewal	F No Requirement UK yes – NPPL(M) based on age	Valid so long as driving licence not withdrawn for medical reasons	Periodic – 5 yearly to 45;
Mitigation measures	UK yes – NPPL(M) two levels for pax carriage or solo	N/A as linked to driver's licence	To be determined (AMC)

	Microlights UK & France as examples	USA LSA	EU regulated light aviation
Training Organisations			Proposed in CRD
Registered	No (F) through to yes (UK) and for some other countries	Registered	No
Approved	Generally not (F&UK)	Yes	Yes
Documented SMS	In some countries, yes especially UK and Nordic	Yes	Yes
Designated personnel	Yes	Yes	Yes
Operations			
Commercial	Yes – training and aircraft hire in some countries	Training and hire allowed. Passenger carrying allowed but not for reward	No, except PPL instructor level
Limitations	Day, VFR	Day, VFR (and night if aircraft is adequately equipped and the pilot holds a full PPL)	None
Airfields	Generally exclude access to major airports and regional airports for CAT	No rules	National rules unless A/F in scope of BR 1108/2009
ATM / Airspace			
Applicable rules	National rules	National rules	National rules
Participation in activity			
Increasing or decreasing	Increasing	Increasing	Decreasing or level

Attachment B: Risk assessment – RIA guidance

ICAO defines safety as the state in which the risk of harm to persons or property damage is reduced to, and maintained at or below, an acceptable level through a continuous process of hazard identification and risk management.

Thus, risk assessment is a key element managing safety. Risk is expressed in terms of predicted probability and severity of the consequences of a hazard taking as a reference the worst foreseeable situation.

In order to define the elements probability and severity the following tables were developed based on the ICAO framework.

Table 12: Probability of occurrence[1]

Definition	**Value**	**Description**
Frequent	5	Likely to occur many times (has occurred frequently). Failure conditions are anticipated to occur one or more times during the entire operational life to each aircraft within a category.
Occasional	4	Likely to occur some time (has occurred infrequently). Failure conditions are anticipated to occur one or more times during the entire operational life to many different aircraft types within a category.
Remote	3	Unlikely, but possible to occur (has occurred rarely). Those failure conditions that are unlikely to occur to each aircraft within a category during its total life but that may occur several times when considering a specific type of operation.
Improbable	2	Very unlikely to occur. Those failure conditions not anticipated to occur to each aircraft during its total life but which may occur a few times when considering the total operational life of all aircraft within a category.
Extremely improbable	1	Almost inconceivable that the event will occur. For rulemaking proposals aimed at CS-25, CS-29 or CS-23 (commuter) aircraft, the failure conditions are so unlikely that they are not anticipated to occur during the entire operational life of the entire fleet. For other categories of aircraft, the likelihood of occurrence may be greater.[2]

[1] These categories need to be applicable to a wide range of safety issues and are taken from the ICAO Safety Management Manual. The description is harmonised with CS-25. Note that these descriptions are indicative only and may have to be adjusted for different rulemaking tasks depending on sub-sector of aviation.

[2] The category 'extremely improbable' here can also include cases where the probability cannot be quantified as 10^{-9}.

Table 16: Severity of occurrences

Definition	**Value**	**Description**
Catastrophic[3]	6	Multiple deaths (4+) and equipment destroyed (hull loss)
Hazardous	4	A large reduction of safety margins Maximum 3 fatalities Serious injury Major equipment damage
Major	3	A significant reduction of safety margins Serious incident Injury of persons
Minor	2	Nuisance Operating limitations Use of emergency procedures Minor incident
Negligible	1	Little consequences

[3] Note that severity category 'Catastrophic' was attributed the value of 6. This has been done in order to distinguish a 'Catastrophic/Extremely improbable' case from a 'Negligible/Frequent' case. The former is considered to be of medium significance whereas the latter is of low significance as the potential outcome is limited.

Table 13: Risk index matrix

Probability of occurrence		Severity of occurrence				
		Negligible	Minor	Major	Hazardous	Catastrophic
		1	2	3	4	6
Extremely improbable	1	**1**	**2**	**3**	**Gliders/ Balloons**	**6**
Improbable	2	**2**	**4**	**6**	**Aeroplanes & LSA**	**12**
Remote	3	**3**	**6**	**9**	**12**	**18**
Occasional	4	**4**	**8**	**12**	**16**	**24**
Frequent	5	**5**	**10**	**15**	**20**	**30**

Table 14: Description of the different risk indices

Risk index		**Description**[4]
13-30	High significance	Unacceptable under the existing circumstances.
6-12	Medium significance	Tolerable based on risk mitigation by the stakeholders and/or rulemaking action.
1-5	Low significance	Acceptable, but monitoring required.

[4] The descriptions are based on the ICAO Safety Management Systems Handbook. However, as the SMS system is geared towards operators and not regulators, the descriptions were adjusted to better reflect EASA's needs.

Attachment C: MCA tables

Score	Descriptions	Example for scoring options relative to the economic criteria
+5	Highly positive impact	Highly positive safety or environmental protection impact. Savings of more than 5% of annual turnover for any single firm; Total annual savings of more than 50 million euros
+3	Medium positive impact	Medium positive safety or environmental protection impact. Savings of 1% - 5% of annual turnover for any single firm; Total annual savings of 5-50 million euros
+1	Low positive impact	Low positive safety or environmental protection impact. Savings of less than 1% of annual turnover for any single firm; Total annual savings of less than 5 million euros
0	No impact	
-1	Low negative impact	Low negative safety or environmental protection impact. Costs of less than 1% of annual turnover for any single firm; Total annual costs of less than 5 million euros
-3	Medium negative impact	Medium negative safety or environmental protection impact. Costs of 1% - 5% of annual turnover for any single firm; Total annual costs of 5-50 million euros
-5	Highly negative impact	Highly negative safety or environmental protection impact. Costs of more than 5% of annual turnover for any single firm; Total annual costs of more than 50 million euros

Attachment D: Abbreviations & Acronyms

Abbreviation	Definition
AB	Assessment (or Accredited) Body
ABA	Amateur Built Aircraft
a/c	Aircraft
AMC	Acceptable Means of Compliance
Amdt	Amendment
AMO	Approved maintenance organisation
ASTM	American Society for Testing & Materials
BFU	Bundestelle fur Flugunfalluntersuchung
BMAA	British Microlight Aircraft Association
BR	Basic Regulation
CAA	UK Civil Aviation Authority
CAMO	Continuing Airworthiness Maintenance Organisation
CAT	Commercial Air Transport
C of A	Certificate of Airworthiness
CRD	Common response Document
CS	Certification Specifications
DAeC	Deutscher Aero Club
DOA	Design Organisation Approval
DULV	Deutscher Ultraleichtflugverband
EAA	Experimental Aircraft Association
EASA	European Aviation Safety Agency
ELA	European Light Aircraft
EU	European Union
EULSA	European Light Sport Aircraft
FAA	Federal Aviation Administration
FAR	Federal Airworthiness Regulation
FCL	Flight Crew Licensing
Ft	Feet
GA	General Aviation
ICAO	International Civil Aviation Organisation
JAA	Joint Aviation Authorities
JAR	Joint Aviation Requirements
kg	Kilogram
LAA UK	UK Light Aircraft Association
LAA-CR	Czech Light Aircraft Association
LAPL	Light Aeroplane Pilots Licence
Lb	Pounds (weight)
LBA	Luftfahrt-Bundesamt (German CAA)
LSA	Light Sport Aircraft (USA)
MS	Member State(s)
MTOM	Maximum Take off Mass
NA	Not Applicable
N/K	Not known
NAA	National Airworthiness Authority
NPA	Notice of Proposed Amendment
NPPL	National private pilot’s licence
NTSB	US National Transportation Safety Board
POA	Production organisation approval
PtF	Permit to fly
RCofA	Restricted Certificate of Airworthiness
Ref	Reference

RIA	Regulatory Impact Assessment
RTC	Restricted type certification
SLSA	Special Light Sport Aircraft (USA)
TC	Type certificate
USA	United States of America
VFR	Visual Flight Rules
VLA	Very light aircraft