Cover Sheet

Rulemaking Directorate

Policy Statement
Airworthiness Certification of
Unmanned Aircraft Systems (UAS)

E.Y013-01

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Reference	Title
Regulation (EC) No 216/2008	Regulation (EC) No 216/2008 of the European Parliament and of the Council of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC, OJ L 79, 19.03.2008, p. 1. (The "Basic Regulation").
Regulation (EC) No 1702/2003	Commission Regulation (EC) No 1702/2003 of 24 September 2003 laying down implementing rules for the airworthiness and environmental certification of aircraft and related products, parts and appliances, as well as for the certification of design and production organisations. OJ L 243, 27.9.2003, p. 6.

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Log of issues:			
Issue #	Issue date	Change description	Related documents affected by new issue
1	25/08/2009		

1. Introduction

This policy establishes general principles for type-certification (including environmental protection) of an Unmanned Aircraft System (UAS). The policy complies with the current provisions of The Basic Regulation, Regulation (EC) No 1702/2003 and all Management Board Decisions relating to product certification. Where existing certification procedures are at variance to this policy, the policy will take precedence and certification procedures will be amended accordingly. This policy shall be used by the Agency's staff when certificating UAS.

The policy represents a first step in the development of comprehensive civil UAS regulation and may be regarded as providing guidance to Part--21 Subpart B of Regulation (EC) No 1702/2003: Type-certificates and restricted type-certificates. This policy statement is therefore an interim solution to aid acceptance and standardisation of UAS certification procedures and will be replaced in due course by AMC and guidance material to Part-21 when more experience has been gained.

The background documents related to the development of the policy are listed in the table below:

A-NPA 16/2005	Advance - Notice Of Proposed Amendment (A-NPA) No 16/2005 Policy for Unmanned Aerial Vehicle (UAV) certification.
CRD 16/2005	Comment Response Document (CRD) to Notice of Proposed Amendment (NPA) 16-2005: Policy For Unmanned Aerial Vehicle (UAV) Certification
	Explanatory Note to CRD 16/2005

2. UAS Definition

An Unmanned Aircraft System (UAS) comprises individual system elements consisting of an "unmanned aircraft", the "control station" and any other system elements necessary to enable flight, i.e. "command and control link" and "launch and recovery elements". There may be multiple control stations, command & control links and launch and recovery elements within a UAS.

3. Scope of the Policy Statement

The Basic Regulation limits the Agency's responsibility for the safety oversight of unmanned aircraft through Article 1(2) and Article 4(4) together with Annex II. Unmanned aircraft excluded from Agency responsibility can be identified as follows:

Article 1(2) … [Those] *engaged in military, customs, police or similar services. The Member States shall undertake to ensure that such services have due regard as far as is practical to the objectives of this Regulation.*

Annex II (b) *aircraft* [of any mass] *specifically designed or modified for research, experimental or scientific purposes, and likely to be produced in very limited numbers.*

Annex II (d) *aircraft that have been in the service of military forces, unless the aircraft is of a type for which a design standard has been adopted by the Agency.*

Annex II (i) *unmanned aircraft with an operating mass of no more than 150 kg*

Safety oversight of an UAS excluded by the Basic Regulation is the responsibility of the Member States.

This policy specifically addresses procedures for the issuance of a type-certificate or restricted type-certificate. Operational regulations pertaining to UAS are not addressed within this policy.

4. Objectives of the Policy Statement

The overall objective of this policy is to facilitate acceptance of UAS civil airworthiness applications, while upholding the Agency's principle objective of establishing and maintaining a high uniform level of civil aviation safety in Europe together with the additional objectives stated in Article 2 of the Basic Regulation.

4.1 Airworthiness objective

With no persons onboard the aircraft, the airworthiness objective is primarily targeted at the protection of people and property on the ground[1]. A civil UAS must not increase the risk to people or property on the ground compared with manned aircraft of equivalent category.

Airworthiness standards should be set to be no less demanding than those currently applied to comparable manned aircraft nor should they penalise UAS by requiring compliance with higher standards simply because technology permits.

4.2 Environmental protection objectives

Where applicable, a UAS must comply with the essential requirements for environmental protection as stipulated in Article 6 of the Basic Regulation.

5. Procedure for UAS certification

Part-21 is applicable for the certification of UAS.

For the routine certification of civil UAS, existing type-certification procedures are retained. The issue by the Agency of a type-certificate (TC) will be based upon the applicant demonstrating compliance with a defined type-certification basis and a certificate of airworthiness (CofA) is granted to an individual UAS when compliance with the approved type design has been shown.

To reflect the level of maturity of the civil UAS industry and to facilitate an early introduction of civil UAS operations, an alternative approach, already within the scope of Part-21, may be used to gain airworthiness approval. This approach recognises that some UAS may benefit from a stepwise approach in conjunction with the issue of a restricted TC and/or restricted CofA. Such an option is provided for in Article 5(4)(b) and (c) of the Basic Regulation. It permits the issuance of a restricted TC and/or restricted CofA by derogation to the requirement for an aircraft to hold a type-certificate, provided the aircraft design conforms to a specific airworthiness specification and deviations from the essential requirements shall nevertheless ensure adequate safety with regard to its purpose. So, for example, design approval of a UAS intended for operation entirely over remote areas where the risk to third parties on the ground is considered negligible, could be approved under a restricted TC and/or restricted CofA. This alternative may be based on the safety target approach, using an overall target level of safety defined by the Agency, in lieu of a specified airworthiness code.

[1] The protection of other airspace users is dependent on ATC/ATM separation procedures and defined "detect and avoid" criteria, commensurate to the airspace class and type of operations (i.e. within or beyond visual line of sight). These aspects are considered outside of airworthiness. However, there will be an airworthiness function to verify that equipment designed to meet such criteria, together with the unmanned aircraft's performance, are satisfactory.

6. Specific guidance in complying with Regulation (EC) No 1702/2003, Part-21 subpart B.

21A.11: Scope

The terms 'aircraft', 'product' and "parts and appliances" used in 21A.11 and elsewhere, were written with manned aircraft in mind. The terminology could be construed as being inappropriate for UAS as account must be taken of the essential nature of non-aircraft related equipment (e.g. control station and parts of the command and control link), in establishing the airworthiness of a UAS. The terminology used also raises a question of compatibility with the Basic Regulation, and in particular Articles 1(1)(a); 3(c) and (d); and 4.

Following a review of the Basic Regulation and Regulation (EC) No 1702/2003, it has been concluded that the control station and any other equipment remote from the aircraft can be considered as a "part and appliance" on the grounds that it is functionally attached to the aircraft and has the same characteristics as parts and appliances installed in an aircraft. Accordingly, UAS control stations and other remote equipment performing functions that can prejudice take-off, continued flight, landing or environmental protection, shall be considered as part of the aircraft and included in the type-certification basis[2].

Identification of UAS elements to be included in the type-certification basis should normally be supported by a functional hazard assessment performed by the applicant.

21A.14: Demonstration of capability

Normally, any applicant applying for a UAS type-certificate or restricted type-certificate is required to demonstrate their capability by holding a design organisation approval (DOA) issued in accordance with Part-21 subpart J.

However, the Agency may accept alternative procedures under 21A.14(b) for those UAS that fall under 21A.14(b)(1), based on an appropriate justification by the applicant that the UAS is of simple design, including in relation to the level of autonomy, type of datalink used and the nature of systems.

21A.16A: Airworthiness Codes

The Agency has not developed specific CSs for UAS at the time of issue of this policy. UAS certification will be based on a determination of equivalence with the existing CSs developed for manned aircraft, wherever possible.

As additional UAS certification experience is gained, it can be expected that dedicated UAS codes or subparts developed to replace or supplement the existing CSs will start to emerge.

21A.16B: Special Conditions

[2] Further clarification will be provided in a future amendment to the Basic Regulation.

It is recognised from the outset that some special conditions (SC) will be required to address the unique characteristics of UAS. Typically, SC will include, but are not limited to, the following areas:

- Emergency Recovery Capability
- Command and Control Link
- Level of Autonomy
- Human Machine Interface
- Control station
- Due to type of operation
- System Safety Assessment

Guidance on formulating these SC and the factors that should be taken into account are provided in Section 7 of this policy.

21A.17: Type-certification Basis

The type-certification basis will typically consist of the following:

a. Certification specifications selected and tailored from the applicable manned aircraft airworthiness code or codes

b. Special Conditions & interpretative material related to UAS specifics, added in accordance with 21A.16B, where the existing requirements do not contain adequate or appropriate safety standards.

The applicable airworthiness code or codes to be used as the reference for establishing the type-certification basis will be proposed by the applicant. A methodology for selecting the applicable airworthiness code(s), based on kinetic energy principles and equivalence with manned aircraft, is detailed in Appendix 1 of this policy.

Having selected the applicable airworthiness code(s), the applicant should propose a tailoring of the code(s) based on an identified methodology, together with the rationale and justification for choices made. Appendix 2 provides an acceptable methodology for the tailoring process.

The initial type-certification basis will be established by the Agency based on the applicant's proposals.

Note: The Agency acknowledges that USAR (Unmanned Systems Airworthiness Requirements) developed by the French Military Authorities, and later updated by NATO FINAS group to STANAG 4671, has been developed using a methodology closely related to the one described in this policy. At an applicant's request, the Agency may accept USAR version 3, STANAG 4671, or later updates, as the reference airworthiness code used in setting the type-certification basis, provided that:

- the applicable airworthiness code identified from application of the methodology in Appendix 1 of this policy does not indicate that safety standards in excess of CS-23 (single engine) are required, and
- the safety targets included in the system safety assessment reflect values resulting from the application of this policy.

21A.17(a)(1)(i) (Airworthiness specifications otherwise specified by the Agency)

The conventional approach to certification will normally lead to a type-certificate and certificate of airworthiness. For UAS where the unmanned aircraft poses little risk to people or property on the ground[3] (including take-off and landing), a restricted type-certificate and/or restricted certificate of airworthiness may be granted.

Where application is made for a restricted certificate of airworthiness under the provisions of the basic regulation (Article 5(4)) and detailed in Part 21 subpart H, the Agency will set specific airworthiness specifications to ensure adequate safety that are commensurate with the safety objectives and the level of imposed operational restrictions.

21A.18: Designation of applicable environmental protection requirements and certification specifications

From an environmental protection standpoint, there is very little difference between a manned and an unmanned aircraft. The essential requirements for environmental protection (ICAO Annex 16, Volumes I and II) make no distinction between manned or unmanned aircraft. Thus, in principle the normal environmental protection requirements are applicable.

7. Guidance on Special Conditions

7.1 Emergency Recovery Capability

While there is no mandatory airworthiness requirement to fit or configure systems to provide an emergency recovery capability, an applicant may propose such a capability in order to mitigate the effects of certain failure conditions (e.g. total loss of command and control link). Such a capability will normally consist of either:

a) A flight termination system; (e.g. a whole aircraft recovery parachute) which aims to immediately end the flight and to reduce the kinetic energy at impact, but does not necessarily ensure the crash / impact point location, or

b) Emergency recovery procedures; functions that could be implemented through UAS flight crew command or through an automatic pre-programmed course of action, that are intended to navigate the unmanned aircraft to a pre-selected emergency site and then to make a safe landing or terminate the flight.

In providing an emergency recovery capability, the applicant accepts that the unmanned aircraft may suffer loss or damage as a consequence of its use, but no additional hazard must be created to persons or property on the ground.

Consideration should also be given to the need for continued safe flight and landing. This will bring into question the appropriateness of a flight termination system that brings the unmanned aircraft down immediately when a failure occurs, regardless of location. Operational requirements may at a later time dictate the need for an emergency recovery capability and the form this should take, possibly as a function of the type of airspace being used and/or the intended area to be overflown.

[3] Generally this will apply to operations intended solely over remote areas. However, it may also apply to small aircraft and airships/balloons, if the kinetic energy from any likely crash scenario can be constrained to acceptable levels. This will need to be assessed on a case-by-case basis.

If emergency recovery capability relies on the pre-selection of emergency sites, the following guidelines on emergency sites is provided:

- Emergency sites shall be unpopulated areas
- Factors such as gliding capability and emergency electrical power capacity (e.g. in case of loss of power), should be considered in determining the location of emergency sites.
- When assessing the total probability of UAS Catastrophic events, failure to reach those emergency sites should be taken into consideration.
- Any assumptions made at type-certification as to the location of emergency sites should be identified as a limitation in the flight manual.

7.2 Command and Control Link

Consideration of the following airworthiness factors should be included in the UAS type-certification basis:

a) The UAS flight crew should be provided with a continuous indication of the command and control link signal strength together with the maximum link range.

b) Any single failure in the command and control system (uplink or downlink) should not affect normal control of the unmanned aircraft.

c) Uplinks/downlinks are sensitive to electromagnetic interference (EMI). The command and control link, in addition to operating in appropriate frequency band(s), should be adequately protected from this hazard.

d) Contingencies for failures or interruptions of the command and control link must be defined by the applicant and evaluated as part of the airworthiness certification. For example: lapse times, intermittent failures, alternate modes of command and control and total loss of command and control link.

Note: It is reminded that approval for all frequencies used in UAS operations must be obtained from national authorities. This is not part of an airworthiness approval.

7.3 Level of Autonomy

The level of UAS autonomy is likely to have the following impacts of certification issues:

- Human machine interface (trading autonomy level versus possibility of UAS flight crew intervention),
- Compliance with ATC instructions
- Command and control link integrity
- Handling of UAS failures and compliance with safety objectives
- Specific autonomy techniques (e.g. non-deterministic algorithms) but which have to prove safe behaviour
- Collision avoidance
- Type of airspace
- Avoidance of noise sensitive areas and objects.

7.4 Human Machine Interface

The type-certification basis should contain criteria relating to UAS specific human machine interface characteristics. These will typically include the following:

- Situational awareness
- The layout of displays versus minimization of human errors
- Colour coding and relevancy of existing manned criteria
- The nature of flight safety related parameters to be displayed
- Warning indications, including handling of emergency procedures
- The consequence of a failure condition on the UAS flight crew's workload.
- Minimum number of UAS operators required for flight safety
- Level of autonomy and automation

7.5 Control Station

The design of any element of the control station that could, due to failure, prejudice the safe control of the aircraft, must be approved as part of the type-certification.

7.6 Due to type of operation

Additional SC should be raised where operational requirements dictate the inclusion of a particular design feature not addressed in the airworthiness codes. For example:

- IFR operations for a VFR based certification (e.g. CS-VLA)
- Rules of the Air specify that an aircraft operating over a congested area must be able to maintain a safe altitude following the failure of one power unit.
- Detect & Avoid equipment

7.7 System Safety Assessment

UAS safety assessment shall be performed to show that the UAS complies with safety objectives - e.g. the probability level associated with the risk of an uncontrolled crash is less than an agreed figure and the severity of various potential failure conditions is compatible with their agreed probability of occurrence.

The system safety assessment should consider the system characteristics of a UAS design viewed as a whole and not confined to the unmanned aircraft.

The applicant may show compliance with the safety objectives by taking into account any mitigating provisions such as an emergency recovery capability, if provided. However, the use of the emergency recovery capability should not be used as a "catch-all" for every failure case or every non-compliance.

It is recognised that UAS safety objectives differ from those of manned aircraft (i.e. consideration should now focus on the protection of people and property on the ground). At the present time, work is still on-going to re-classify the severity of failure conditions for UAS to better reflect the changed safety objectives and to assign appropriate allowable quantitative probabilities and software and hardware development assurance levels. Such definitions and probability values will be included here in the first update to this policy.

As an interim position, quantitative values to be used in the assessment should be those applicable to xx.1309 contained in the applicable airworthiness code used as the reference in defining the type-certification basis of the individual UAS. As a result, numerical values will depend on the selected airworthiness code. In the absence of defined quantitative probability and software development assurance level criteria in the applicable airworthiness code, the minimum values contained in AC 23.1309-1C for Class 1 aeroplanes should be used. However, due to a UAS's increased reliance on systems for continued safe flight, and the fact that the system safety objectives contained in some airworthiness codes are founded on the assumption that simple electronic systems are used, higher quantitative values may be demanded by the Agency for some systems in order to achieve an overall equivalent level of safety with manned aircraft.

8. Other Issues

8.1 Certificate of Airworthiness

A certificate of airworthiness is issued to an individual UAS in accordance with Part-21 subpart H of Regulation (EC) No 1702/2003 and renewed in accordance with Part-M subpart I of Regulation (EC) No 2042/2003.

A UAS certificate of airworthiness may include multiple control stations and other system elements necessary to enable flight, provided they have been identified as part of the type design in accordance with 21A.31, or have been approved under a Major change or STC.

8.2 Noise Certificate

A noise certificate is issued to an individual UAS in accordance with Part-21 subpart I.

8.3 Permit to fly

Part-21 Subpart P is applicable to UAS.

A permanent permit to fly will not be issued to a UAS as an alternative to a certificate of airworthiness (See 21A.701 and associated GM).

8.4 Continuing Airworthiness

Annex I (Part-M) of Regulation (EC) No 2042/2003 is applicable.

8.5 Detect and avoid

Airworthiness certification is considered to address the intrinsic safety of the UAS. ‘Detect and avoid’ falls outside this area as its sole purpose is for anti-collision. The operating criteria on which it relies to adequately perform its function is dependent on the airspace being used and the aircraft flying into it (e.g. cooperative targets and non-cooperative targets). Such criteria should be defined by the authorities responsible for the safety regulation of air navigation services. Once the operating criteria have been established, the design, production, installation and operation of the equipment to ensure it functions correctly would be subject to design approval, similar to other installed avionic systems and equipment.

The opinion described above reflects the Agency’s view on where the responsibility boundaries should be put. It should not be interpreted that the Agency views the collision avoidance of lesser importance than the protection of people on the ground. On the contrary the Agency acknowledges that the definition of appropriate criteria for ‘Detect and Avoid’ is a key issue to the introduction of unmanned aircraft in non-segregated airspace.

The fact that type-certification does not address ‘Detect and Avoid’ should be reflected by a statement in the aircraft flight manual limiting operations to segregated airspace only or VFR operations in visual line of sight in non controlled airspace classes, unless mitigating measures for the absence of 'detect and avoid' certification have been accepted by the Authority responsible for the safety regulation in a specific airspace volume. Furthermore, as the installation of a detect and avoid system may invalidate the assumptions made in setting the TC basis (i.e. the protection of people and property on the ground only), a limitation should be placed in the TC together with an explanatory note in the type-certification data sheet.

8.6 Security

Although security is seen as a key issue for UAS, the Agency is not in a position to mandate security requirements since security is clearly outside the Agency's competences established by the Basic Regulation. However if security systems are mandated by the appropriate authority or installed voluntarily, they should not impact safety. For example some failure cases of encryption devices could impact control commands.

Appendix 1: Methodology for selecting the applicable airworthiness code(s)

This Appendix describes a method for obtaining a first outline of the certification specifications which should be applied to UAS. The method compares the hazard presented by a UAS with that of existing manned aircraft to obtain an indication of the appropriate airworthiness standards that should be applied. The most significant feature of this proposal is that it relies on a comparison with existing manned aircraft design standards, which contribute to a currently accepted level of safety and avoids controversial assumptions about future contributions to that level of safety from operational, environmental or design factors.

1. Comparison Criteria

The capability of an aircraft to harm any third parties is broadly proportional to its kinetic energy on impact. For the purposes of the comparison method it is assumed that there are only two kinds of impact; either the impact arises as a result of an attempted emergency landing under control, or it results from complete loss of control. More precisely, the two impact scenarios are defined as:

a. *Unpremeditated Descent Scenario* - A failure (or a combination of failures) occurs which results in the inability to maintain a safe altitude above the surface. (e.g. loss of power, WAT limits etc).

b. *Loss of control scenario* - A failure (or a combination of failures) which results in loss of control and may lead to an impact at high velocity.

Unpremeditated Descent Scenario:
For many aircraft the likelihood of the unpremeditated descent will be dominated by the reliability of the propulsion systems. For the calculation of kinetic energy at impact the mass is the maximum take-off mass and the velocity used is the (engine-off) approach velocity. i.e.

For aeroplanes	V =	1.3 X Stalling Speed (Landing configuration, MTOW)
For rotorcraft	V =	Scalar value of the autorotation velocity vector,
For airships/balloons	V =	The combination of the terminal velocity resulting from the static heaviness, and the probable wind velocity.

Loss of Control Scenario:
For the calculation of kinetic energy at impact for the loss of control case the mass is the maximum take-off mass and the velocity used is the probable terminal velocity. i.e.

For aeroplanes	V =	1.4 X Vmo (the maximum operating speed)
For rotorcraft	V =	Terminal velocity with rotors stationary.
For airships/balloons	V =	Terminal velocity with the envelope ruptured/deflated to the extent that no lifting medium remains[4].

For each scenario the kinetic energy has been calculated for a selection of 28 different civil aircraft; (21 aeroplanes, and 7 rotorcraft). The results are shown in Figures 1 and 2. On each Figure the "applicability region" for each of the existing aeroplane and rotorcraft

[4] If an applicant can show that a residual quantity of the lifting medium will always remain trapped in the envelope, then this can be taken into account. Consideration should also be given to the detachment of large items of mass (e.g. the gondola, engines or payload), as these could in themselves develop higher impact energies.

codes is shown. These regions have been established using practical constraints based upon the sample of the existing fleet, plus any weight and speed limitations specified in the applicability criteria of the codes of airworthiness requirements.

Kinetic Energy (as plotted) = (Mass (kg) X Velocity (kt)^2) / 10^9

2. Method of Comparison

To obtain an indication of the applicable airworthiness code(s) appropriate to a UAS the following steps are carried out:

a. Calculate the kinetic energy of the unmanned aircraft for each scenario.

b. Using these values and Figures 1 and 2 separately, determine the appropriate code(s) to be applied with the intent of preventing the occurrence of each scenario. i.e:

Figure 1 will provide an indication of the standards to be applied to any feature of the design whose failure would affect the ability to maintain safe altitude above the surface.

Figure 2 will provide an indication of the standards to be applied to any feature of the design whose failure would affect the ability to maintain control, (particularly rate of descent). Clearly, this must include primary structure.

If it is found that the aircraft fits within the region for more than one code, then this would indicate that it may be appropriate to apply a combination of standards. (e.g. CS-25 with reversions to CS-23 in some areas, or CS-23 with Special Conditions taken from CS-25).

c. Construct a certification basis which addresses the same aspects of the design as the existing codes and to the level indicated by the kinetic energy comparison. Clearly, SC will need to be considered for any novel features of the design not addressed by the existing codes. However, the extent of such special conditions should be comparable with the general level of airworthiness identified.

FIGURE 1 - UNPREMEDITATED DESCENT SCENARIO

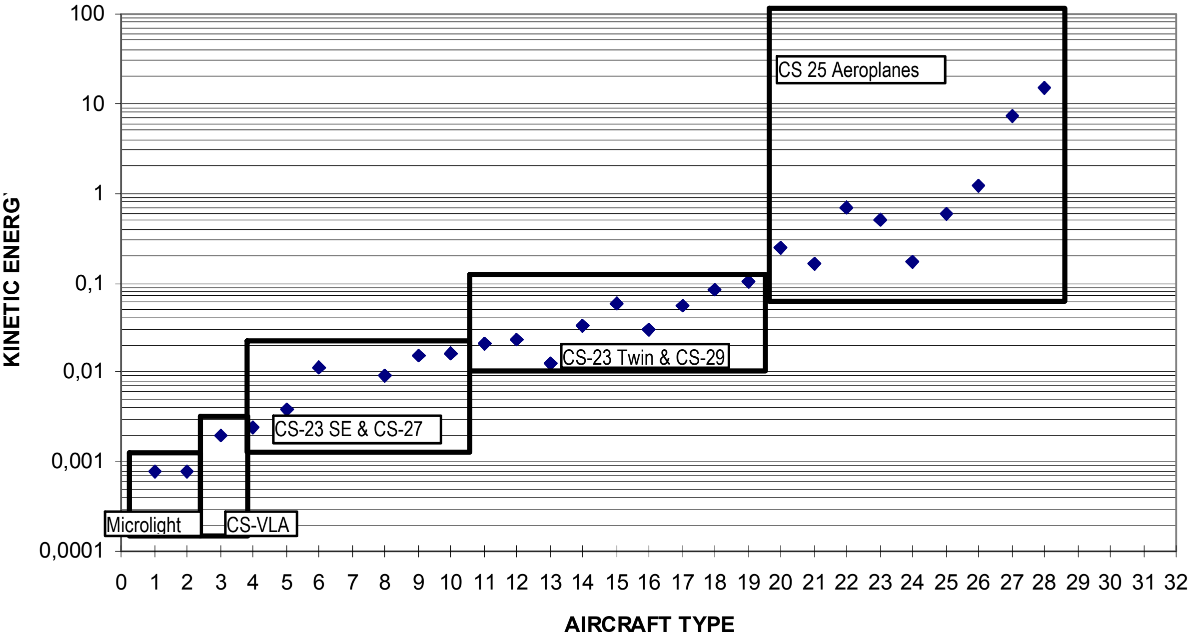
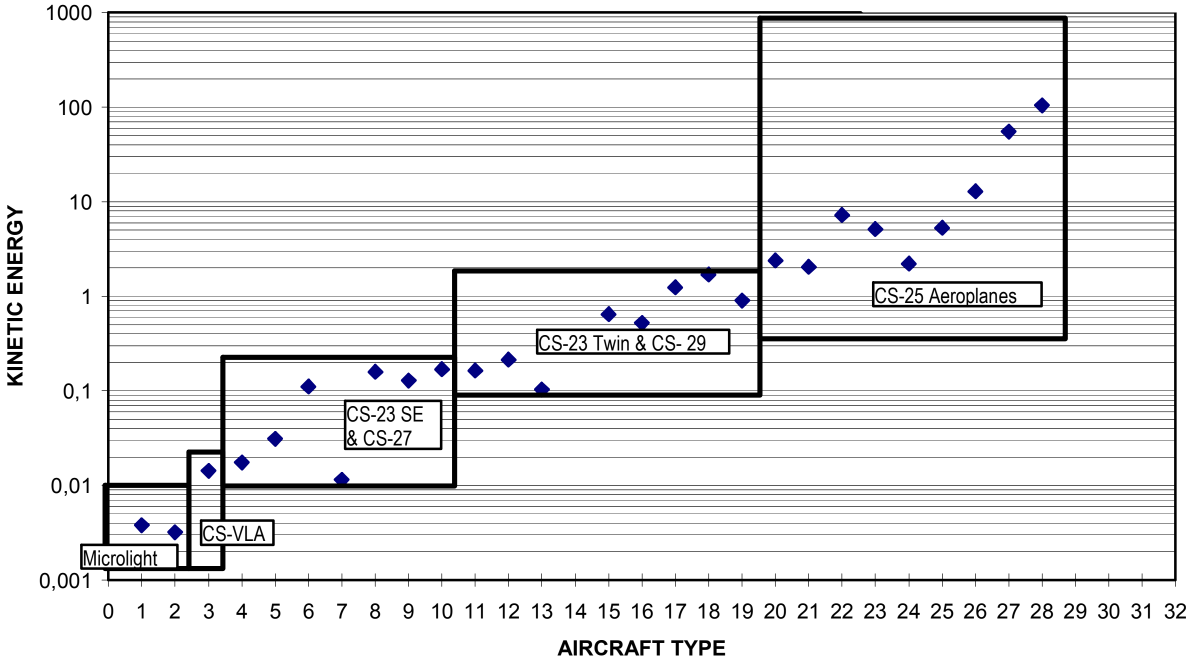


FIGURE 2 - LOSS OF CONTROL SCENARIO



Aircraft Key:

1. Flex wing microlight,
2. 3-axis microlight,
3. Piston Single - CS-VLA
4. Piston Single 2 seat,
5. Piston Single 4 seat,
6. Large Piston Single
7. Helicopter 2 seat
8. Mid-size Helicopter
9. Mid-size Helicopter
10. Mid-size Helicopter
11. Piston twin
12. Piston twin,
13. Piston twin
14. Piston twin
15. Light Corporate Jet
16. Large Helicopter
17. Large Helicopter
18. Large Helicopter
19. Small Twin Turboprop
20. 50 seat Turboprop
21. 50 seat Turboprop
22. 100 seat airliner
23. Corporate Jet
24. Corporate Jet
25. 50 seat airliner
26. Single-aisle Airliner
27. Wide Body Airliner
28. Wide Body Airliner

3. Practical examples

a. Global Hawk

Global Hawk is a High Altitude Long Endurance (HALE) UAS produced by Northrop Grumman in the USA with a primary role of reconnaissance/surveillance. Global Hawk is powered by a single turbofan engine. Its estimated characteristics are: a gross weight of 25,600 lbs (11,600 kg), a maximum operating speed (V_{MO}) of 345kts and a stall speed (V_S) of 95kts. Using these parameters gives energy levels of 0.177 (unpremeditated descent scenario) and 3.53 (Loss of control). These are illustrated in Figures 1 & 2 and indicate that CS-25 standards are applicable throughout.

b. Application to Predator

The RQ-1A Predator from General Atomics is a Medium Altitude Long Endurance (MALE) UAS which has seen extensive operational experience within the military. Powered by a single piston-engine, the estimated parameters for Predator are: MTOW of 1,900lbs (855kg), Vmo of 120kts and Vs in the region of 56kts. For the "unpremeditated descent" scenario, this equates to energy levels of 0.0046 (CS-23 single-engine) and for the "loss of control" scenario 0.024 (CS-23 single-engine). The certification basis for the Predator would therefore be CS-23.

c. Application to Hunter

Hunter from IAI is a short range UVS which was/is operated by the armies of USA, Israel, Belgium and France. The Hunter comes in both standard and endurance versions and is powered by 2 Moto-Guzzi engines. The two versions of the aircraft have gross weights of 726 kg and 952 kg respectively. The values for each version and each scenario are shown in Figures 1 and 2 of appendix 1 to attachment 2 to the policy. Although there is a small overlap with CS-VLA in one case, it can be seen that the guideline standard is CS-23 for both versions of the aircraft.

d. Application to StratSat

StratSat is an unmanned communications airship intended for long duration missions stationed above population centres. For this aircraft the "unpremeditated descent" analysis indicates that a standard equivalent to CS-23 as applied to single-engine aeroplanes would be appropriate. The "loss of control descent" analysis indicates that standards equivalent to a combination of CS-25 and CS-23 Commuter Category should be applied to reduce the probability of such an event. Thus the basis for civil certification of this aircraft should be the airship equivalent of CS-23 supplemented as necessary by requirements from CS-25 and CS-23 Commuter.

Appendix 2: Methodology for tailoring the selected airworthiness code(s)

The following guidelines propose a methodology to be used to tailor the selected airworthiness code(s) when establishing the type-certification basis.

The applicant should provide the Agency with a tailoring proposal for the reference CS using the following type of categorisation for each individual certification specification contained within:

F: Certification specification is *Fully* applicable.
I: "*Intent*" of the certification specification is applied but not as exactly worded (interpretation / slight change required in order to make it suitable to UAS application).
N/A: Certification specification *Not Applicable* as clearly and obviously not relevant to UAS applications (e.g. relates to crew or passengers onboard the aircraft)
N/A-C: Certification specification *Not Applicable* due to assumed UAS configuration
P: Certification specification is only *Partially* applied (e.g. part of it may be "N/A")
A: *Alternative* criteria are proposed

Rationale for the above categorisation should be presented and justified by the applicant for each certification specification. Where found necessary, certification review items (CRIs) should be raised by the Agency to address specific issues. This is in particular valid where the category "A" has been proposed. These CRIs may subsequently lead to the development of special conditions or interpretative material to provide an equivalent level of safety with the original intent of the certification specification.