UK Civil Aviation Authority

Operation of experimental aircraft under E Conditions

CAP 1220

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Acronyms

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AGL	Above Ground Level
ANO	Air Navigation Order
ARC	Airworthiness Review Certificate
BCAR	British Civil Airworthiness Requirement
CAA	Civil Aviation Authority
CAP	Civil Aviation Publication
CofA	Certificate of Airworthiness
CofG	Centre of Gravity
CRM	Crew Resource Management
DOA	Design Organisation Approval
eVTOL	Electric Vertical Take off & Landing
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration of the USA
MTOM	Maximum Take-off Mass
PPL	Private Pilot Licence
PtoF	Permit to Fly
RAeS	Royal Aeronautical Society
RPAS	Remotely Piloted Aircraft Systems
SI	International System of Units
SSDR	Single Seat De-regulated Microlight
STC	Supplemental Type Certificate
TC	Type Certificate
VTOL	Vertical Take off & Landing

Definitions

Definitions

Competent Person. This is the person who is responsible for the entire experimental test programme, and who signs the Declaration. The Competent Person may also, but not necessarily be, the Registered Owner of the Aircraft, or the Principal Test Pilot, or both.

Competent Person Authorisation Letter. This is the letter that an organisation, approved to authorise a Competent Person, will write to a person duly authorised, confirming them as Competent for the purposes of E Conditions. It will include a Competent Person Reference Number (CPRN).

Competent Person Reference Number (CPRN). This is a reference number that will be allocated to a Competent Person for the purposes of E Conditions.

Declaration. This is the document submitted to the CAA, signed by the Competent Person, which specifies prescribed information about the flight test programme in accordance with this CAP and will declare that the Competent Person has undertaken a risk assessment and is satisfied that all risks have been mitigated to an acceptable level.

Amended Declaration. This must be submitted to the CAA to update any of the information given on the original Declaration, except for the declared flight test period.

Supplementary Declaration. This must be submitted to the CAA following the expiration of the previous Declaration should the trial need to continue.

Dossier. The collection of documents containing information about the aircraft design and build, details of the flight test programme, a risk assessment and the Declaration.

E Conditions. Means the Conditions under which a United Kingdom registered aircraft may fly for experimental purposes when it does not have a CofA or a PtoF as set out in Chapter 3 of Part 1 of Schedule 3 of the Air Navigation Order 2016 (as amended).

Experimenting Team This is the team of people who undertake the project to design, build and undertake the flight test programme of the experimental aircraft, in every case all under the authority of the Competent Person. The Experimenting team can be a team of one, i.e. the Competent Person, but it is considered this would not normally be the case.

Letter of Acknowledgement This is the letter that the CAA will write to the Competent Person to acknowledge receipt of the signed Declaration, to confirm that it has been placed on file by the CAA and confirming that the aircraft has been entered on the UK Aircraft Register as an Experimental Aircraft operating under E Conditions.

Non-Part 21 experimental aircraft This means an aircraft which comes within paragraph (b) of Annex I of the UK Regulation (EU) 2018/1139 as retained and amended in UK domestic law under the Retained EU Law (Revocation and Reform) Act 2023.

Principal Test Pilot This is the test pilot nominated by the Competent Person and detailed in the Declaration as a principal member of the experimenting team.

RAeS Competent Person Request and Notification Form This is the form that a Member or Fellow of the Royal Aeronautical Society, who is also a Chartered Engineer registered with the Engineering Council via the Society, gives notification that they intend to act as a Competent Person.

Revision history

Revision history

November 2019

A number of experimental projects have flown under E Conditions since this guidance and information document was first published in 2015.

In collaboration with a working group of representative general aviation stakeholders we have reviewed the first edition. While this review found that it remained a robust and useful document it concluded that limiting E Conditions to A to A operations could be overly restrictive.

As well as covering editorial changes this edition includes requirements for ferry flight and A to B operations.

November 2024

Revision 3 incorporates changes raised and agreed by the E Conditions collaborative working group comprising of the CAA, RAeS and industry experts as a part of our regular review process.

Additionally, changes have been incorporated as a result of the work carried out to satisfy our public commitment to address the five Safety Recommendations issued by the AAIB relative to an accident involving an aeroplane operating under E Conditions.

Introduction

Introduction

This CAP provides guidance and information for those wishing to operate an Experimental Aircraft under E Conditions.

The UK Government is committed to reducing the burden of regulation, particularly where this is seen as disadvantageous to UK industry. The CAA is also committed, via the Government's Principles of Better Regulation, to establishing a proportionate safety regulatory framework coupled with a strategy of deregulating and delegating wherever possible. It is with regard to these strategic objectives that the CAA has formed a collaboration with the Royal Aeronautical Society to jointly develop the criteria and guidance contained herein to allow operation of experimental aircraft in a way previously not available in the UK.

The Royal Aeronautical Society, supported by the CAA, had also noted that there has been a trend towards an increase in the number of new modern light aircraft types, particularly kits, imported from overseas, while there has been a decrease in the number of new aircraft designed and developed in the UK. It was felt that the regulatory framework for developing and experimentally operating new light aircraft in the UK was contributing to this trend in that it was considered overly burdensome and was stifling innovation. This opinion was also supported by the comments the Government received in its Red Tape Challenge initiative aimed at General Aviation, conducted in 2013.

E Conditions

Operating an aircraft under E Conditions is a means to fly an experimental prototype or modified aircraft to test a concept in the air without having to obtain a PtoF, a CofA, comply with B Conditions or comply with the normal procedures contained in CAP553 BCAR Section A, Chapters A8-1, A8-9 and A8-21 for CAA approved Design and Production Organisations.

The fundamental principle of an operation under E Conditions is that a Declaration is filed with the CAA by someone who has met the requirements for an E Conditions Competent Person and who will take sole responsibility for the safe conduct of the entire experimental test programme. The aircraft must be registered with the CAA and it will be required to have third party insurance cover in accordance with Assimilated UK Regulation (EU) No. 785/2004. The Declaration, signed by the Competent Person, will include summary information such as start and finish dates and a brief description of the project. Most importantly, it will declare that the Competent Person has undertaken a risk assessment and is satisfied that all risks have been mitigated in accordance with Chapter 8 of this Guidance Material.

How a person may become a Competent Person for the purposes of E Conditions is described in Chapter 6.

In addition to the Declaration, the Competent Person must compile a Dossier of information about the aircraft and the proposed test programme. The Dossier will contain information about the aircraft design and build, details of the flight test programme, a risk assessment and the Declaration. The Competent Person will be the custodian of this Dossier and the CAA will have rights of access to the Dossier if requested. However, the CAA will require receipt of the E Conditions Declaration, signed by a Competent Person, prior to the commencement of flight of an experimental aircraft under E Conditions.

The E Conditions provision should not be confused with the US ’Experimental Category’ of operation which is commonly used for indefinite operations, typically of homebuilt aircraft which in the UK would be required to hold a National PtoF. By contrast, the E Conditions described in this CAP are intended to allow innovative experimental flight testing of a new idea or design within a clearly defined period.

CHAPTER 1

Regulatory context to E Conditions

Regulatory context to E Conditions

E Conditions is not intended to be a substitute for the certification process of a new aircraft or a change to an aircraft. Whatever the intention for the new design, individuals are strongly advised to engage with the CAA via email at ga@caa.co.uk before starting any project as the CAA will be able to advise on potential certification routes, if that is the eventual intention.

A National PtoF can be issued by the CAA if the aircraft concerned is outside the scope of the Basic UK Regulation[2] and specifically in Annex I which includes in paragraph (b) "aircraft specifically designed or modified for research, experimental or scientific purposes, and likely to be produced in very limited numbers.[1]

However, PtoF are issued to permit the operation of aircraft that do not meet the requirements of the International Civil Aviation Organisation (ICAO) Annex 8 – 'Airworthiness of Aircraft' but are nevertheless established to be airworthy and capable of safe operations under defined operating conditions and for defined purposes. Consequently, the CAA will only issue a PtoF once it is satisfied that the aircraft is fit to fly having regard to the airworthiness of the aircraft.

Existing regulations also provide for A and B Conditions. A Conditions are applicable to enable an aircraft of a design which has previously been approved to fly to qualify for the issue or renewal of a CofA. B Conditions are applicable to enable experimenting with or testing an aircraft, or to enable the aircraft to qualify for the issue or validation of a CofA or PtoF, or the approval of a modification of an aircraft. However, flying under B Conditions can only be carried out by an organisation specifically approved for the management and control of flights under B Conditions. The resources required and cost of obtaining such an approval are considered by many to be prohibitive and the reason for the decline in new light aircraft designed and developed in the UK. Further information on A and B Conditions can be found in CAP 553: BCAR Section A.

For the duration of the E Conditions operation, any previously held CofA or PtoF is suspended.

When the test flight programme is completed, the owner or Competent Person should contact the CAA for guidance on reinstating a national CofA or PtoF. Please note that it

[1] UK Regulation (EU) 2018/1139 as retained and amended in UK domestic law under the Retained EU Law (Revocation and Reform) Act 2023

may not always be possible to reinstate a pre-existing CofA or PtoF following operation under E Conditions. More information on next steps can be found in Chapter 15: Next Steps.

CHAPTER 2

Scope of E Conditions

Scope of E Conditions

E Conditions enables the flight testing of a UK Registered Experimental Aircraft which is to be flown by a flight crew of at least one pilot and has an MTOM of 2000kg or less, when overseen by a person considered as competent for the task. The MTOM of 2000kg is consistent with the ELA2 MTOM as defined in Article 1(j) of Assimilated UK Regulation (EU) No 748/2012[2]

Note: Single Seat De-Regulated microlights (SSDR) can continue to operate under the SSDR rules without the need for E Conditions.

It is important to note that E Conditions only provides alleviation from airworthiness standards for a limited period and under limited circumstances. SERA and Rules of the Air, Pilot Licensing and Registration must be complied with in full unless exemptions/permissions have been obtained from the CAA if required. Further guidance can be found in Chapter 3: General Guidelines.

The requirement for experimental testing may be because the aircraft, engine(s), propellers/rotors are of a new or unproven design, or because they have been modified. In addition, E Conditions can be used if the aircraft is being operated in a manner or role that is previously unproven.

Non-Part 21 aircraft that are either commercially built or amateur-built are eligible to operate under E Conditions. A Part 21 aircraft may be modified so that it becomes a non-Part 21 Annex I experimental aircraft. It will then be able to fly under E Conditions. The owner or Competent Person should notify CAA in such a case. Note that this is not a means of permanently transferring a Part 21 aircraft to a non-part 21 aircraft. As noted in Chapter 1, to operate under E Conditions, any CofA or PtoF for the aircraft must be suspended.

If the project wishes to use an aircraft previously operating on a national CofA or PtoF for E Conditions testing, and intends to transfer the aircraft back onto a CofA or PtoF afterwards, then the relevant responsible body (the CAA or airworthiness organisation responsible for administering the national PtoF) should be contacted before the aircraft is transferred on to E Conditions in order to ascertain whether the authority will agree to

[2] 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

consider reinstating the national CofA or PtoF, and, if so, what the Conditions on reinstatement should be. See Chapter 15: Next Steps for guidance.

The project will need to be defined as ‘Basic’ or ‘Advanced’ as outlined in Chapter 3. An independent review will be required for Advanced projects but is also recommended for Basic projects. This has been implemented to ensure the project meets the intent of this guidance and can be safely managed by the Competent Person.

It is up to the Competent Person to judge whether the Experimental Aircraft project comes within the terms of reference of the E Conditions rules as described in this CAP.

CHAPTER 3

General guidelines

General guidelines

The following general guidelines establish the working basis for the oversight of Experimental Aircraft operating under E Conditions.

An aircraft operating under E Conditions is not required to have a CofA, PtoF, type certificate, type approval or type acceptance. Any CofA or PtoF that is held in respect of the aircraft will be suspended on submission of the E Conditions Declaration.

The Competent Person will take sole responsibility for the safe conduct of the entire experimental test programme.

The Competent Person must compile an E Conditions Dossier consisting of five separate parts:

- Part A of the E Conditions Dossier is the Declaration. The Declaration provides summary information on the flight test programme and confirms that all identified safety risks have been assessed. Suggested risk assessment methods can be found in this CAP. The Declaration must be signed by the Competent Person and is the only part of the Dossier submitted to the CAA.
- Part B of the E Conditions Dossier comprises the details of the aircraft.
- Part C of the E Conditions Dossier comprises the details of the flight test programme and specific conditions and limitations relating to the operation of the aircraft.
- Part D of the E Conditions Dossier comprises the risk assessment. This is an assessment of the safety risks to ensure that adequate consideration and mitigation is given to all the risks and what measures have been taken to minimise them to a level as outlined later in this guidance material.
- Part E of the E Conditions Dossier is the Independent Review. The independent review aims to ensure that the E Conditions project is within the technical and management capability of the Competent Person. This is especially important with advanced projects but is also encouraged for basic projects.

The Declaration, signed by the Competent Person, should be accompanied by a copy of either the Competent Person Authorisation Letter or the Competent Person Request and Notification Form (as applicable) and the appropriate fee. A Letter of Acknowledgement from the CAA will serve as confirmation of the CAA's receipt of the valid Declaration. The aircraft must not fly until the written acknowledgement has been received.

A Letter of Acknowledgement does not attest to the airworthiness of the aircraft on the CAA's part. It merely advises that the CAA recognises that the aircraft will be flying under E Conditions with risks managed by the Competent Person. The CAA will not attest to the airworthiness of the aircraft and will place full reliance on the Declaration by the Competent Person.

Operation under E Conditions for an indefinite period is not intended. The period for operation under E Conditions must be specified on the Declaration but cannot initially exceed twelve months. The period can be extended by submitting a Supplementary Declaration. However, the CAA may refuse to issue a Letter of Acknowledgement for an E Conditions Declaration or Supplementary Declaration which in its reasonable opinion is repetitive. In that case, the aircraft must not fly under E Conditions. The circumstances of each Declaration will be considered when making this decision; in particular the number of previous Declarations submitted and the perceived complexity of the modifications or design in question.

An aircraft operating under E Conditions can only fly for the purposes prescribed within the E Conditions.

Passengers or cargo cannot be carried during E Conditions operation.

Commercial operations, including hire and reward, cannot be performed under E Conditions.

The Competent Person must have the agreement of the Registered Owner(s), individual or Company as identified on G-INFO in order to conduct the experimental programme using the aircraft.

Useful guidance on amateur-built aircraft can be found in CAP 659 (A Guide to Approval, Construction and Operation of Amateur Built Aircraft).

If a radio is to be installed or used on the aircraft, a Radio Licence must be obtained. Further information on radio licensing can be found on the CAA website.

The pilot licence must be suitable for the type of aircraft and flight characteristics to be flown. If the aircraft is of such new or novel design that it does not fit into a licence category or could be split over two licence categories, an exemption may need to be sought from CAA General Aviation Unit. The issuing of an exemption is not guaranteed and, if issued, will be based on the existing licenses, ratings and experience of the test pilot. It may be that there are different test pilots for different phases of flight testing based on the flight characteristics of the platform in a particular phase of flight and the qualifications held by the test pilot(s).

Unmanned testing of a platform falls under Assimilated UK Regulation (EU) 2019/945 and Assimilated UK Regulation (EU) 2019/947. A Specific Category Operational Approval or Pre-Defined Risk assessment (if applicable) from the CAA RPAS team will be required before any unmanned flight testing commences. Specific Category Operational Approvals

and Pre-Defined Risk Assessments have a separate oversight and approvals process to E Conditions and applicants should consider these timelines if unmanned testing falls into their development programme.

At the end of an E Conditions flight test programme, a prototype may be eligible for certification if the aircraft is subsequently shown to comply with the applicable airworthiness standards for the category sought and build conformity and quality has been demonstrated throughout the aircraft's construction period. More information is provided in Chapter 15: Next Steps.

Defining a project as 'Basic' or 'Advanced'

Due to the variation in scope and risk of E Conditions projects, a mechanism exists to determine if a project is Basic or Advanced and is up to the competent person to determine. This mechanism seeks to ensure projects are proportionately and appropriately managed utilising a risk-based approach and also ensure that the Competent Person has sufficient understanding of the project.

The two factors used to determine the complexity of a project are as follows;

Scale Risk – the ability of a Competent Person to keep abreast of changes to the aircraft configuration and progress with the flight test programme is going to be more challenging as the number people who are working on the project increases. If there is only one other person engaged with the project, the Competent Person will find it easier to understand the impact of the progress being made than if there are (e.g.) 10 people all working on their own part of the project and making changes. The more people and sections working on the project (commercial management, project management, design, safety, flight operations) the more difficult it will be for the Competent Person to adequately fulfil their obligations.

Novelty Risk – Some experimental programmes are centred around changes for which, whilst the embodiment might be different, the underlying technology is understood and broadly used in light aircraft. Other programmes may be exploiting technologies for which, whilst they may already be used in other fields of engineering, the full implications of their use in light aircraft are not so widely adopted or understood. E Conditions experimental programmes which fall into the latter category will be harder for the Competent Person to adequately risk assess and manage. Whilst this is hard to quantify, the Competent Person should be able to determine whether they consider an experimental programme to contain Low, Medium or High Novelty Risk.

Each of these factors have been given scores which, when multiplied together, make an assessment of the overall complexity of the project;

Scale Risk

NUMBER OF PEOPLE	SCORE
0-4	1
5-9	2
>10	4

Novelty Risk

NOVELTY RISK	SCORE
LOW	1
MEDIUM	4
HIGH	8

Scale Risk X Novelty Risk = Project Score

If the score is 8 or less, the project should be considered basic.

If the score is 9 or over, the project should be considered advanced.

Examples of Basic and Advanced projects with novelty reasoning are as follows;

Basic Project.	Small test team less than six people
	Conventional design proven technology rather than advance technology based
	Tried and tested proven technology typically used on other aircraft
Advanced Project	Any size of test team
	New innovative technology
	Unproven/new design powerplant with less than 500hrs flying time
	Total dependency on any form of electronic flight control

The classification of the project as ‘Basic’ or ‘Advanced’ shall be recorded in Section 7 of the E Conditions Dossier Part A: Declaration.

If the project is classified as advanced then an independent review should be conducted, however, an independent review is still recommended for Basic Projects. The independent review forms Part E of the E Conditions Dossier and is explained in Chapter 8

N.B. the ‘basic’ and ‘advanced’ terminology has been chosen to differentiate and avoid confusion with the terminology of ‘complex’ with regards to aircraft classification.

CHAPTER 4

Prescribed purpose of flight

Prescribed purpose of flight

Aircraft operating under E Conditions can only be flown for the purposes set out below.

The Competent Person must ensure that the risk assessment required under E Conditions includes consideration of all flights undertaken for any of the following purposes. This risk assessment must take into consideration the risk to third parties. Further guidance on risk assessments can be found in Chapter 8:Completing the E Conditions Dossier.

Experimenting with or Testing the Aircraft

This purpose is intended for experimental flight including proof-of-concept flying, or for operations such as determining whether an idea warrants further investigation. Examples of this activity include testing new aircraft design concepts, new engine or propeller or aircraft equipment installations, revised aircraft weight or weight distribution, new aircraft operating techniques or new uses for aircraft.

The amount of flight testing required to complete the test programme will depend on the type and complexity of the project. For example, flight testing in connection with a modification may require only one hour, whilst the flight testing of a prototype aircraft may require significantly more.

Note: Whilst the primary purpose of E Conditions is to conduct experimental test flights, if it is determined that the project has potential for future certification, it may be possible that credit can be given for data acquired from these flights. Careful recording of data, precise aircraft configuration control, and accurate documentation of results may help facilitate this, but early engagement with a suitably qualified organisation should be sought to ensure compliance with the regulations in this regard.

Demonstration of the aircraft

Demonstration flights may only be carried out following experimental or test flying. Some examples of this purpose include demonstrating the aircraft’s flight capabilities, performance, or unusual characteristics, or any engines or equipment installed on the aircraft.

Flight under E Conditions is not to be used for public exhibition.

Operations under this purpose are limited to an area, specified by the Competent Person, in the vicinity of the venue of the intended demonstration.

Before E Conditions operation for this purpose, the Competent Person should have established a maintenance programme for the continuing airworthiness of the aircraft, and

the aircraft should have flown successfully for at least 20 hours, or at least 5 hours if it is a type certificated, type approved or type accepted aircraft which has been modified. In some cases, this may not be adequate to provide a reasonable safety case, and thus the hours required will exceed the figures given above.

A to B Flights

If it is considered essential to the flight test programme to fly from A to B, and other transportation options are impractical, justification and details of the Airfield(s) to be visited must be detailed in Section 7 of the E Conditions Declaration form.

If, after the submission of the declaration with no A to B flights declared, an A to B flight is required for the successful execution of the flight test programme, an amendment to the declaration must be submitted as per Chapter 7.

Due to the experimental nature of aircraft flying under E Conditions and the associated level of airworthiness assurance, the extent and duration of A to B flights should be minimised to maintain the lowest possible risk profile. Prior to any A to B flight taking place the Competent Person must have established a maintenance programme for the continuing airworthiness of the aircraft, and the aircraft must have flown for at least 20 hours, or at least 5 hours if it is a type certificated, type approved or type accepted aircraft which has been modified. Where this is not adequate to provide an acceptable safety case, additional criteria must be determined by the Competent Person.

A risk assessment, as required in Part D of the Dossier, must specifically address the risks raised by the planned route. Examples such as pilot workload, risks to third parties on the ground, flying in airspace with other aircraft, consideration of terrain to be overflown should be included[3].

[3] This is a non-exhaustive list. All risks pertinent to the flight of the aircraft should be included in the risk assessment.

CHAPTER 5

Registration and marking

Registration and marking

To qualify for flight testing under E Conditions the aircraft must be ‘G’ registered.

If the aircraft is a type certificated, type approved or type accepted aircraft which has been modified, the type must be updated with UKCAA Aircraft Registrations, via Form CA1, with the suffix “(MODIFIED)” whilst it is being operated under E Conditions. For example, a PA28-161 with a non-standard engine operating under E Conditions should update the Aircraft Type to read – “Piper PA-28-161 (MODIFIED)”.

In addition to the nationality and aircraft registration marks, as required by ANO and CAP 523, The words “UK EXPERIMENTAL” must be displayed on the aircraft near each entrance to the cabin or cockpit in letters not less than 5 cm or more than 15 cm in height. The letters should be in block capitals of a style that is conspicuous and legible, and easily read by each person entering the aircraft.

A placard must be displayed within sight of all occupants of the aircraft to read "This UK registered Experimental Aircraft has not been approved and may only be flown by permission granted under ANO E Conditions."

If a ballistic recovery system is fitted, suitable indication of its position should be provided in the manner prescribed within CAA Mandatory Permit Directive 2019-005. To register the aircraft, Form CA1 must be completed. The aircraft’s experimental status will be recorded in the registration database G-INFO (http://www.caa.co.uk/ginfo)

Consideration should also be given to amending the aircraft logbooks with the revised type designation and any other place or document in which the aircraft type is referenced.

CHAPTER 6

The E Conditions Competent Person

The E Conditions Competent Person

A Declaration for flying under E Conditions may only be made by a Competent Person. The Competent Person may be the owner, designer, builder, aircraft modifier, pilot or any other person associated with the test programme, or alternatively may be a person employed, either paid or unpaid, to undertake the role. It is anticipated that, where necessary, the Competent Person will enlist the help of other individuals with the appropriate skills and experience as required[4].

The Declaration is made by the Competent Person alone.. The Competent Person undertakes to manage the whole programme and takes all responsibility for its safety.

When completing the Dossier, the level of detail included is at the discretion of the Competent Person.

Neither the Registered Owner of the Aircraft nor the Principal Test Pilot sign the Declaration (unless they are also the Competent Person). It is for the Competent Person to keep the owner and Test Pilot appropriately briefed on all aspects of the test programme.

There are two methods by which a person may become a Competent Person for the purposes of E Conditions:

- An Organisation for supporting Recreational Aviation (a Sporting Body), holding a BCAR Section A8-26 approval, may be further approved to authorise a Competent Person.
- A professional engineer who is both a Member/Fellow of the Royal Aeronautical Society (RAeS) and a Chartered Engineer registered with the Engineering Council via the RAeS is entitled to become a Competent Person by notifying the RAeS of an intention to do so.

Payment of fees to be a Competent Person in receipt of a Competent Person Reference Number (CPRN) will be a matter for the RAeS or Sporting Body to decide.

In general, it is the intention that, within the scope of the rules of E Conditions, there will be no limitations imposed on the Competent Person. It is however recognised that, in cases where the Competent Person is not a Chartered Engineer, but nevertheless authorised as

[4] It is strongly recommended that even where the Competent Person can fulfil multiple or all roles the involvement of other technical experts should be sought for the purposes of peer review.

a Competent Person, it may be appropriate for the Sporting Body to limit the scope of the approval. Limitations might for instance be aircraft weight, aircraft type, engine type, flight speed, etc.

Whilst there is no legal requirement for the Competent Person, whether paid or unpaid, to have indemnity insurance, it is strongly advised that the Competent Person obtains insurance to cover personal liability and takes appropriate professional advice in that regard.

The E Conditions flight test programme is deemed to be completed if the Competent Person ceases to be responsible for the test programme. Should the Competent Person lose or relinquish Competent Person status, E Conditions will immediately cease to apply to all projects for which he or she is the Competent Person and those flight test programme(s) would be deemed complete. A new Declaration would need to be submitted for the flight test programme to start again.

The routes to become a Competent Person

See Appendix C for a flowchart describing the Competent Person process.

Method 1 – RAeS route

The RAeS will record persons as competent for the purposes of E Conditions based on their Membership of the Society and their registration with the Engineering Council as a Chartered Engineer via the RAeS.

It is the view of the RAeS, supported by the CAA, that if a full member of the Society is also a Chartered Engineer via the RAeS, then they should be considered qualified as a Competent Person. The UK Standard for Professional Engineering Competence (UK-SPEC) defines the steps necessary to achieve professional registration as a Chartered Engineer. It describes the requirement to maintain and enhance competence once registered, and the obligations that are placed on registrants through their membership of a licensed professional engineering institution such as to act with integrity and in the public interest. Full details can be found in the latest edition of the UK-SPEC available from the Engineering Council website.

The Competence and Commitment Standard for Chartered Engineers states that Chartered Engineers must be competent throughout their working life, by virtue of their education, training and experience, to:

- Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology.
- Apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.
- Provide technical and commercial leadership.

- Demonstrate effective interpersonal skills.
- Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.

In addition, there is a Statement of Ethical Principles that lists four fundamental principles to guide engineers in achieving the high ideals of professional life:

- Accuracy and rigour.
- Honesty and integrity.
- Respect for life, law and the public good.
- Responsible leadership: listening and informing.

Every licensed professional engineering institution also has a Code of Conduct that places a personal obligation on its members to behave professionally and to act with integrity and in the public interest.

Since there are many institutions through which one can become registered, the additional criterion of being a RAeS member is considered an effective way of ensuring that an individual has demonstrated these competences in the field of aerospace and aviation.

When any person contacts the RAeS to notify them that they intend to act as a Competent Person, they will be required to sign that they have read, understood and agree to abide by the current RAeS Codes of Conduct.

A person who holds a specified qualification, and who has notified the RAeS that they intend to act as a Competent Person, will be a Competent Person for the purposes of E Conditions. The specified qualification is current Membership of the Royal Aeronautical Society and professional registration with the Engineering Council as a Chartered Engineer via the RAeS.

The submission to the RAeS of the Competent Person Request and Notification Form (obtainable from the RAeS) acts as the official notification of intention to act as a Competent Person. On receiving this notification, the RAeS will check that the individual is both a current Member or Fellow of the RAeS and a Chartered Engineer registered with the Engineering Council via the RAeS. The RAeS will then confirm to the individual that they hold the specified qualification to be a Competent Person for the purposes of E Conditions by returning the Competent Person Request and Notification Form with a CPRN issued by the Society. This CPRN must be quoted in the Declaration and any other documents issued by the Competent Person. The RAeS will keep a record of the Competent Persons to whom they have issued a CPRN.

If, after following the RAeS route, an individual ceases to be a member of the RAeS or be registered as a Chartered Engineer, they will no longer comply with the requirements of Competent Person status and therefore the status will no longer apply. In these

circumstances the RAeS will contact the Competent Person to rescind their Competent Person Reference Number.

Method 2 - Approval of an Organisation to Authorise Competent Persons

It is expected that several of the sporting organisations who have delegated authority from the CAA for oversight of their members activities under BCAR A8-26, such as the Light Aircraft Association and British Microlight Aircraft Association, will provide a route to authorise Competent Persons for aircraft projects that fall within their scope. This will enable consideration of those people that are not registered as a Chartered Engineer. In this case, an organisation such as a BCAR A8-26 sporting organisation may be granted an approval by the CAA to authorise persons as competent for the purposes of E Conditions. The exposition of such an organisation will describe the procedure by which they establish competence. Upon receipt of the application form (available from the relevant organisation), the organisation will begin this procedure which is expected to include an interview. The Competent Person will receive a Competent Person Authorisation Letter and a Competent Person Reference Number (CPRN) which must be quoted in all relevant correspondence. The sporting organisations will keep their own separate record of Competent Persons.

The Competent Person Self-Assessment

The Competent Person underwrites the E Conditions project and is solely responsible for the conduct and safety of the project and its team.

The self-assessment checklist in the E Conditions Dossier Part E serves as a framework for the Competent Person to evaluate their prior knowledge and experience against the skills and knowledge expected to be required of the E Conditions project. It can help identify areas where additional or external assistance may provide a safety benefit to the project.

It should be noted that this is a non-exhaustive checklist, the Competent Person should consider the full scope of the project and the competencies required and indicate if they will seek additional assistance.

Further to the knowledge and experience required, there are operational and commercial considerations that should also be reviewed to ensure the Competent Person has explored possible scenarios that may be faced during an E Conditions project. The below list provides some simple considerations that should be assessed by the Competent Person and the impact these will have on the E Conditions project and team.

Considerations – Operational Pressures

- Pressure to progress

- Briefing/Debriefing
- Deficiencies reporting
- Incident reporting
- Modification review

Considerations – Commercial/Finance Pressures

- Self-funded
- Investor funded
- Government grant
- Private Contract
- Full Pay/Expenses/Unpaid

CHAPTER 7

Declaration procedure for flights under E Conditions

Declaration procedure for flights under E Conditions

Submission of a Declaration to operate under E Conditions is made to the CAA Aircraft Registrations Dept. If the aircraft is not already registered, an application for registration must be made to the CAA Aircraft Registrations Dept using Form CA1. In the case of experimental modifications to an existing aircraft, the CofA or PtoF are suspended as a consequence of the issue of the Letter of Acknowledgement; once this has occurred the aircraft must not be flown unless under E Conditions. It may therefore be advisable to submit the Declaration only at a point in the experimental programme when E Conditions operations are expected to begin shortly.

For example, a Declaration could be submitted to the CAA on 5th March, stating that the test programme start date is 1st of August and end date is 31st July (12 months). In this example, if the CAA issue the Letter of Acknowledgement on 8th March, then the CofA or PtoF held in respect of this aircraft would also be suspended on 8th March. This means that the aircraft cannot fly at all until the start of the E Conditions test programme on 1st August.

The Competent Person must prepare a Dossier containing information about the aircraft design and build, details of the flight test programme and a completed risk assessment to ensure that adequate consideration is given to all the risks and the steps that have been taken to minimise them.

Flowcharts detailing the process for both new and existing aircraft can be found in Appendix C.

The Declaration forms part A of the Dossier, and can be found in Appendix B.

The Declaration can be submitted for one of three reasons:

1. New: To notify the CAA of the Competent Person's intention to operate an aircraft under E Conditions.
2. Amendment: To update any of the information given on the original Declaration, except for the declared flight test period.
3. Supplementary: To update any of the information given on the original Declaration, including the declared flight test period. Note: It is at the CAA's discretion whether to allow any further E Conditions operation.

If the Competent Person changes during an E Conditions test programme, then the test programme is deemed to be complete and a new Declaration is required.

It is mandatory to complete all fields in the Declaration (part A of the Dossier). The Competent Person must take due note of the obligations of the Declaration and sign it.

The completed Declaration confirms that before flying takes place the Competent Person will have undertaken a risk assessment and is satisfied that all safety risks in respect of the flight test programme have been mitigated to an acceptable level and that the risk to uninvolved third parties is low enough to be acceptable.

The Declaration is the only part of the Dossier submitted to the CAA.

A copy of the Competent Person Authorisation Letter or the Competent Person Request and Notification Form (as applicable) issued to the Competent Person by the relevant body must be included with the Declaration when it is submitted to the CAA to act as verification of the CPRN.

The Declaration reference number should be the aircraft's registration followed by the version number of the document. For example, G-EEEE/001 would be the first Declaration submitted in relation to G-EEEE.

The current version numbers of each section of the Dossier should be recorded on the Declaration.

The calendar duration of the flight test programme is intended to be a general guide to the length of the flight test and may not exceed twelve months. It is chosen by the Competent Person and may include reasonable contingencies for weather and unforeseen circumstances. The period can be extended by submitting a supplementary Declaration.

Throughout the flight test programme, the Competent Person must assess all risks of the flight test programme including those to uninvolved third parties.

Should the Competent Person cease to be satisfied that all risks have been mitigated to an acceptable level or ceases to be satisfied that the level of risk to uninvolved third parties is low enough to be acceptable, they should notify the pilot/operator of that fact. The Competent Person must not permit any flights to take place until they are satisfied that risks are again mitigated to an acceptable level.

The Declaration can be found in electronic form on the CAA website. A Declaration can be new, amended or supplementary. A fee will be charged for a new or supplementary Declaration.

The current charging structure can be found on the CAA website.

CHAPTER 8

Completing the E Conditions Dossier

Completing the E Conditions Dossier

The Competent Person is advised to follow these notes when compiling the Dossier.

The Dossier as described below should be seen as the minimum requirement. It is the Competent Person's responsibility to decide on the level of detail provided if additional material is appropriate. Throughout the experimental programme it may become necessary to re-evaluate particular elements and update them within the Dossier. For example, changes in the flight test programme may have an impact on the risk assessment which will need to be addressed. The Dossier should be treated as a living document, and as such be maintained to accurately reflect the current state of the aircraft and test programme.

Each part of the Dossier should be given a version number and a date. It is expected that the Competent Person shall ensure adequate configuration control of all documents.

Note*:* Changes to Parts B, C, D and E need not result in an amended Declaration.

The Dossier for an advanced project, or for a basic project when choosing to include an independent review, has five parts and is only complete when all five parts are present. For a basic project without a review, the Dossier consists of four parts. The signed Declaration (Part A) covers the whole Dossier.

The information contained in the Dossier is intended to reflect good design practice.

Each section of the Dossier should list the principal members of the team who are particularly concerned with the element of the project being addressed in that section. There is no prescribed number of principal members of the team.

The Dossier should be retained for at least three years after the end of the flight test programme. If requested to do so, the Competent Person must produce the Dossier of information to an authorised person within a reasonable time.

E Conditions Dossier Part A: Declaration

Part A is the Declaration, and a copy should be included in the Dossier.

Section 7 of the declaration, which is a brief description of the E Conditions Project, should also include;

A) a statement to identify if the project is considered Basic or Advanced as described in Chapter 2: Scope of E Conditions.

B) the test location and geographical area of proposed flight testing

See Chapter 7 above for further information on the Declaration.

E Conditions Dossier Part B: Aircraft Design and Build

The SI metric system of units is the preferred option when stating numerical data.

Type of flying machine

The type of flying machine should be stated using generally accepted terminology, itemising any unusual features. Examples might be; ' aeroplane; aeroplane with canard configuration; aeroplane asymmetric configuration; biplane; helicopter; sailplane; microlight; gyroplane; airship- gas; airship – hot air, etc'.

Type of engine and propulsion

The type of propulsion should be stated, together with any unusual features. Examples might be ‘Single piston engine with twin contra rotating propellers, single piston engine with ducted fan; twin turbine engine; single jet engine with high by-pass fan; single mid-engine piston with pusher propeller; twin rotor helicopter,’ etc.

Type of operation of controls

The type of control should be stated, together with any unusual features. Examples might be ‘aileron, elevator, rudder; cable and push rod; fly-by-wire; hydraulic,’ etc

Type of construction – load bearing

The nature of load bearing structures should be briefly described. Where the fuselage is of a different form of construction to the flying surfaces etc this should be made clear. Examples might include: 'wood fuselage; composite wings; sheet metal wings; composite throughout; bolted aluminium tube fuselage fabric covered; bonded carbon tube fuselage fabric cover,’ etc.

Experimental features of the aircraft

Where the Experimental Aircraft is based on an existing airframe, new, revised or additional features should be itemised where appropriate. Examples might be: 'experimental main lift producing structure (wing, rotor); experimental pilot accommodation; experimental control surface (empennage, tail rotor etc); experimental aircraft with proven engine; experimental engine in proven airframe, etc.

Design Codes and Airworthiness Justification Statement

The Design Codes and Airworthiness Justification Statement summary should describe the principles behind assessing airworthiness For example: “The ‘Demoiselle’ has been designed to the structural requirements of BCAR Section S issue 6 sub-parts C and D, using CS-VLA amendment 1 as AMC. Critical parts of the structure have been proof load tested, including positive load tests of the main-plane. The remainder of BCAR Section S issue 6 (sub-parts D through G) have been used for guidance.”

Cockpit Ergonomics & Human Factors

As E Conditions projects may involve modification to previous aircraft, the cockpit layout, ergonomics, and operation may differ from the initial design. Projects may also introduce new or novel flight characteristics, displays and controls. Consideration should be given to how the pilot operates the aircraft control strategy (FAA, 2016a), the positioning of displays (FAA, 2016b) and the availability of alerts and warnings (FAA, 2016c). Appropriate visual, aural and/or tactile feedback is especially important during high workload situations.

Summary of Aircraft Build

To clarify what may be implied in the answers already given the origin of the build of the various major assemblies of the aircraft should be summarised. Examples might be: ‘amateur built airframe and propeller incorporating factory produced engine; professionally built experimental wings incorporated in an existing amateur built aircraft; etc’

Supplementary Pages

It is up to the Competent Person to decide on the level of detail provided if additional material is appropriate. However, the following supplementary documents are recommended.

- An engineering drawing showing the General Arrangement drawing of the aircraft. This drawing should include the principal dimensions, the location of the Centre of Gravity (showing the range for variable fuel load etc) and the Centre of Gravity limits assessed as within an airworthy range.
- Additional engineering drawings of the experimental feature if it is not clear in the General Arrangement drawing.
- A flight envelope diagram, including. both manoeuvre and gust load factors as well as critical speed limits.
- Detailed description of the aircraft. An example is a full description of a new aircraft design to include special design features, the control system, structure, accommodation etc. An alternative would be to provide marked up photographs, or an isometric drawing.

- Un-dimensioned perspective drawings (as produced by many computer packages) should only be included if they have a very clear value in describing an experimental feature.

The Dossier does not call for a compliance check list, nor for a summary of reserve factors. The Competent Person is, however, strongly advised to have this information available for possible future reference, at least for those features of the design that, by inspection, could be critical. For example, the application of an airframe design code may not be necessary on an engine project that makes little or no difference to the aircraft weight distribution.

To complement the airworthiness assessment, the principal results of structural testing may be declared. For example: "a reduced span wing sample was tested in combined bending and torsion to failure. While maintaining the proof torsion load the main spar failed at 1.3 times the calculated ultimate bending load. The test was conducted at room temperature." or for an engine "a test engine was ground run, while driving a dynamometer, at full power for 20 hours". For a new airframe there might be, for example, proof loading of both the fuselage and the wing. For an engine or propeller an appropriate amount of ground running would be expected.

There are other aspects of airworthiness that the Competent Person may have assessed and may want to show on supplementary pages. Reference could be made to investigative reports carried out during the design process. Items that may be considered include (but are not limited to):

- Aerodynamic lift and drag assessment.
- Stability and control
- Flight control forces
- Control surface volume coefficients
- Structural Assessment (over and above that declared above)
- Strength data for principal materials used
- Principal structural reserve factors
- Stiffness Assessment - wing/fuse
- Flutter assessment
- Fatigue life
- Elevated/Reduced Temperature effects
- Propeller Assessment
- Undercarriage Assessment

- Instruments including test
- Avionic equipment
- Performance assessment

E Conditions Dossier Part C: Flight Test Programme

Part C comprises the following fields.

Purpose and Specific Aims of the Proposed Test Programme.

Outline the basic aims, purpose and objectives for which the aircraft is to be tested. Include the estimated number of flight hours and number of flights required to accomplish the programme.

Details and Phasing of the Test Programme

Give details to include special preparations, phasing, and high-risk trials.

Base Airfield

This should be the address of the airfield at which the aircraft is based.

Emergency facilities available at the base airfield

To include relevant contact details.

Identified Test Area – Geographical location

A description of the test area must include sufficient details of the areas over which the flights are to be conducted including the boundaries of the flight test area and the maximum and minimum test heights. The test area may be identified using a map or any precise mapping nomenclature, including, for example, a defined radius from a fixed point (normally the base airfield), geometric shapes defined by Lat/Long or GPS co-ordinates or indeed geographic features such as roads, railways etc. The area in which the testing will take place will reflect the outcome of the risk assessment, taking into account such things as third party risk, terrain, alternative landing sites, and airspace restrictions. Guidance on specifying the test area can be found in the section on Flight Test Areas in this CAP.

Example: "Enstone will be the main test airfield. The test area is the open country between Banbury and Chipping Norton, with clearly defined routes into and out of Enstone airfield (see map). A private strip to the north of Hook Norton is the primary diversion in case Enstone becomes unavailable while the aircraft is airborne."

On-board, installed and special test equipment required

This should include installed equipment such as flight test sensors, flight recorders, cameras and any other, one-time installed equipment such as exciters or trailing static sensors.

Special airframe limitations

These should be identified where they differ from those given in Part B of this Declaration. Examples might be relevant Loading, Mass and Centre of Gravity limits, the need for testing extreme manoeuvres, departures, aerobatics, low level operations, special operations etc.

Special Meteorological and Operating Conditions under which the test will be carried out.

This should include consideration of populated areas, airspace, separation from other aircraft, and the take-off, departure and landing approach corridors. Define particular conditions and/or operational limitations necessary in the interests of the safety of the aircraft and other airspace users, and persons on the ground or water.

Maintenance Programme

In the case of modifications to existing airframe types, maintenance schedules should continue to be applied and the aircraft should continue to be released for flight by an appropriately qualified engineer.

Inspection requirements (including special provisions)

Special inspection procedures should be established by the Competent Person covering all E Conditions modifications and completely new build airframes. All inspections should be recorded in the appropriate flight logs and aircraft maintenance records.

Safety Precautions and Systems appropriate to the test

Where additional safety equipment is intended to be used this should be identified.

E Conditions Dossier Part D: Risk Assessment

Hazard identification and Risk Assessment

The operation of experimental aircraft, especially those flown during the test phases of developmental or modification projects, can, by its very nature, involve elevated levels of risk. Whilst measures should be taken to minimise them, there are no regulations attempting to limit the risks to the participants involved. However, the Competent Person must make it clear that all reasonable precautions have been taken to minimise risk to any third party.

The E Conditions Dossier Part D must include identification of the hazards of the intended operation and an assessment of risks to third parties. These may include other airspace users and persons on the ground or water. Attached to this must be a summary of all reasonable precautions and limitations imposed to minimise this risk. Sample templates for laying out this assessment are included in Appendix B. These tables are deliberately not prescriptive, but rather indicative of the scope to be addressed. The tables may be used together or separately, or indeed replaced by an alternative as deemed suitable for the project in hand by the Competent Person. The intention of Tables 1 and 2 in Part D of Appendix B is to cover the possibility of the aircraft or modification being outside conventional design regulations. Where the design is conventional and has been carried out with reference to an existing certification code, that code may be quoted as a sufficient answer. In the event of an accident the answers given in Part D can be used as evidence in the accident investigation.

The risk factors listed in Table 1, or indeed additional factors, may or may not be relevant to the specific Prescribed Purpose under consideration. If doubt exists, contact the CAA.

It is the responsibility of the Competent Person to ensure all participants in the test team are properly aware of the risks of the test programme.

Notes on a well-recognised methodology for assessing safety risk

The following notes may serve as a guide to an appropriate methodology for assessing risk and are largely taken from the ICAO Safety Management Manual, Doc 9859, AN/474 [5]. Much more detail and other analytical models may also be found in this ICAO manual. Similar guidance can be found in FAA AC 23.1309-1E[6].

- The term “Safety Risk” is used to differentiate from, for example, financial risk, legal risk or economic risk.

[5] http://www.icao.int/safety/SafetyManagement/Documents/Doc.9859.3rd%20Edition.alltext.en.pdf

[6] https://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/1019681

- Key topics are;
  - Probability,
  - Severity,
  - Tolerability and
  - Management.

An ICAO ‘Severity’ table is given below.

Severity	*Meaning*	*Value*
Catastrophic	- Equipment Destroyed - Multiple deaths	A
Hazardous	- A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied on to perform their tasks accurately or completely. - Serious injury - Major equipment damage	B
Major	- A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency. - Serious incident - Injury to persons	C
Minor	- Nuisance - Operating limitations - Use of emergency procedures - Minor incident	D
Negligible	- Few Consequences	E

It is noted that the guidance in FAA AC23.1309-1E classifies the serious or fatal injury to an occupant as Hazardous.

‘Probability’ is the likelihood or frequency that a safety consequence or outcome might occur. A typical risk probability table is presented with both qualitative and quantitative criteria. Other more sophisticated tables are available.

Likelihood	**Meaning**	**Value**
Frequent	Likely to occur many times (has occurred frequently)	5
Occasional	Likely to occur sometimes (has occurred infrequently)	4

Remote	Unlikely to occur, but possible (has occurred rarely)	3
Improbable	Very unlikely to occur (not known to have occurred)	2
Extremely improbable	Almost inconceivable that the event will occur	1

A ‘Safety Risk Index’ may be assessed by combining the results of the probability and severity tables.

Risk probability		Risk Severity				
		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	**5A**	**5B**	**5C**	**5D**	**5E**
Occasional	4	**4A**	**4B**	**4C**	**4D**	**4E**
Remote	3	**3A**	**3B**	**3C**	**3D**	**3E**
Improbable	2	**2A**	**2B**	**2C**	**2D**	**2E**
Extremely improbable	1	**1A**	**1B**	**1C**	**1D**	**1E**

Safety ‘Tolerability’ criteria may then be selected as shown below.

Risk index range	Description	Recommended action
5A, 5B, 5C, 4A, 4B, 3A	High risk	Cease or cut back operation promptly if necessary. Perform priority risk mitigation to ensure that additional or enhanced preventative controls are put in place to bring down the risk index to the moderate or low range.
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C. 1A	Moderate risk	Schedule performance of a safety assessment to bring down the risk index to the low range if viable.
3E, 2D, 2E, 1B, 1C, 1D, 1E	Low risk	Acceptable as is. No further risk mitigation required.

In the high risk range the risk is unacceptable and significant mitigation measures are required to reduce the level of risk to as low as reasonably practicable.

In the moderate risk range the level of risk is of concern and mitigation measures are required to reduce the level of risk to as low as reasonably practicable. Where further risk reduction/mitigation is not practical or viable, the risk might be accepted by involved parties, provided that the risk is understood and is accepted by those involved. Moderate risk to third parties is not acceptable. The associated risk of serious injury to uninvolved third parties has been determined to be extremely improbable. Extremely improbable has been determined to mean 1x 10-6 in FAA AC23.1309-1E. This figure is also an acceptable numerical value for the risk calculations within this guidance.

In the low risk range the risk is considered acceptable provided the frequency of occurrence remains low.

The criteria for E Conditions include that an assessment of risk to third parties is low, and the Competent Person needs to have demonstrated that appropriate mitigating actions have been taken.

In summary, the following philosophy is to be adhered to:

- the associated risk of serious injury to uninvolved third parties must be determined to be extremely improbable, and
- the associated risk of serious or fatal injury to the pilot and ground crew should be reasonably mitigated, and the pilot and ground crew understand and have consented to the residual risk.

Section D

This part of the Dossier should include identification of the hazards of the intended operation and an assessment of the risks to third parties.

Tables 1 and 2 in Part D of Appendix B are suggested templates with some example questions included. Should the specific test programme require it, a different format may be used. However, the questions relating to third party risk are important and mitigations should be identified for all items.

It is good practice to conduct an assessment of the intended operations using a claim, argument and evidence process.

For example:

Claim – an assertion that is made (e.g. ‘The pilot is suitably experienced and qualified for the intended operations’)

Argument – this describes the argument to support the claim (e.g. The pilot holds a ‘xxxxxxxxx’ licence and has ‘xxx’ hours experience, ‘xx’ hours of which have been relevant for the intended operating environment, etc.)

Evidence – this references the evidence to support the argument. (So, to support the claim ‘the pilot is suitably experienced and qualified for the intended operations’, the pilot’s log book could be referenced. It is important that any referenced evidence is either already embedded in the safety assessment or is attached as an enclosure.

Table 2 in Part D of Appendix B is a suggested template for the claim, argument and evidence process.

E Conditions Dossier Part E: Self-Assessment and Independent Review

Self-Assessment

Each E Conditions project can vary greatly and, as such, the Competent Person should conduct a self-assessment for each project they undertake to ensure their knowledge and experience is relevant to the specific E Conditions project.

The Competent Person Self-Assessment should be reviewed and expanded as required for the Competent Person to evaluate their prior knowledge and experience against the skills and knowledge expected to be required of the E Conditions project.

Independent Review

The independent review aims to confirm that the E Conditions project is within the capability of the competent person to fully understand and properly manage. This is especially important with advanced projects but is also encouraged for basic projects.

The independent reviewer should read the completed dossier in full and attest that the level of skill and knowledge declared by the competent person meets the skills and knowledge expected to be required of the E Conditions project.

The Independent reviewer should be a senior person within the project group (Owner/Chief Engineer/Test Pilot etc) or someone who is suitably qualified in aviation engineering to provide an impartial opinion (MRAeS or higher/Chartered Engineer).

The independent reviewer shall complete and sign the statement in the E Conditions Dossier – Part E.

CHAPTER 9

The Letter of Acknowledgement

The Letter of Acknowledgement

A new Declaration or supplementary Declaration to fly under E Conditions does not become valid until the CAA issues a formal Letter of Acknowledgement.

Provided that the Declaration contains all required information, is signed and accompanied by the appropriate fee, the CAA will issue a Letter of Acknowledgement to the Competent Person and amend G-INFO to show the aircraft to be operating under E Conditions and the duration of the programme. It should be noted that in the case of experimental modifications to an existing aircraft, the CofA or PtoF is suspended as a consequence of the issue of the Letter of Acknowledgement; once this has occurred the aircraft must not be flown unless under E Conditions and within the flight test period stated on the Declaration. Upon receipt of the Letter of Acknowledgement the Competent Person will be able to undertake the flight test programme.

The Competent Person remains responsible for the entire flight test programme under E Conditions.

The Letter of Acknowledgement will usually be valid for the period stated on the Declaration, unless specifically stated otherwise.

The Authority can prevent any aircraft from flying. Such action may be taken if the CAA considers that an unsafe condition is likely to exist if the aircraft is flown, if the aircraft is being operated against the provisions of the ANO, and/or in the interests of safety of other airspace users and/or persons on the ground or water.

If the aircraft ceases to be on the UK civil aircraft register, or if the Competent Person ceases to be an E Conditions Competent Person, or if the Competent Person on the project changes, then the flight test programme is deemed to have been completed and a new Declaration must be submitted.

CHAPTER 10

Flight test areas

Flight test areas

E Conditions aircraft must only be operated in a specified flight test area unless operating a ferry flight with the permission of the CAA. The flight test area, including maximum and minimum safe height, must be specified by the Competent Person and clearly identified in the Dossier. It should not be over built-up areas or in congested airspace. Furthermore, take-off and landing approach paths should not pass over populated areas unless the risk assessment indicates the risk to uninvolved third parties is low enough to be acceptable.

The test programme must be carried out in accordance with extant Rules of the Air and should be in accordance with ATC and local airfield rules.

A Notice to Airmen (NOTAM) is required for operations that fall under the definition of Non-Standard Flights. Guidance on Non-Standard Flights can be found in the UK Integrated Aeronautical Information Package (IAIP) En Route Information ENR1.1[7]. However, if E Conditions operations can comply with the requirements of the ANO and Rules of the Air, a NOTAM may not be required. Further assistance may be sought from the CAA by contacting AUSOps@caa.co.uk.

In some cases, it may be appropriate to change the operating area after a period of testing. However, the designated test area must remain compliant with the requirements to mitigate risk to third parties, and the resultant risk assessment should be added to the Dossier.

If the area in which the aircraft is being operated is expanded, suitable considerations should include the pilot's findings as to whether the aircraft is reliable, controllable and has no hazardous operating characteristics, and the acceptability of the maintenance history/ defect history whilst the aircraft has been in the existing test area.

[7] http://www.nats-uk.ead-it.com/public/index.php%3Foption=com_content&task=blogcategory&id=4&Itemid=11.html

CHAPTER 11

Pilot qualifications

Pilot qualifications

The pilot of any aeroplane flown under E-conditions must meet two essential requirements: they must be approved by the E-conditions *Competent Person,* and they must be a pilot with a current licence and medical certificate or where appropriate, medical declaration, suitable for the aircraft to be flown. If this role is subject to valuable consideration, the pilot must hold a professional licence (CPL or ATPL), otherwise any suitable Private Pilot's Licence is acceptable.

Where the aircraft has characteristics that are covered by relevant differences training (for example tailwheel, variable pitch propeller, pressurisation) that is recognised as part of the normal licencing process, the pilot must have had that differences training signed-off by a suitably qualified instructor. Where an aircraft has characteristics which are unusual or unique but not currently considered by licencing regulations, consideration should be given to how to ensure the pilot will develop those competences. Advice on this can be sought from the CAA's General Aviation Unit (ga@caa.co.uk) and can also be solicited from the Society for Experimental Test Pilots (setp@setp.org) along with flight test specialists within national members organisations (LAA, BMAA, BBAC, BGA, etc.)

Within E-conditions, the pilot who leads testing of an aircraft is termed the *Principal Test Pilot*. Both they, and all other test pilots and flight test observers must be approved by the Competent Person. There is no specific qualification for the flight test observer, other than that their presence on board the aircraft must serve a test purpose.

The Competent Person should also consider the following in selection and training of a project's test aircrew, especially but not only pilots:-

- Relevant total experience in flying, and in particular in managing failures and emergencies, of similar aircraft and systems.
- Recency of flying experience: for example relevant experience in the last six months is almost certainly more valuable than similar experience ten of more years earlier. Somebody whose recent flying experience is low may well not have the capacity to safely conduct test flying.
- Technical understanding of the aircraft, including any novel characteristics.
- Training and/or experience in flight testing, including project relevant flight test techniques, preparation and execution of test plans and test cards, airborne data taking, and the preparation of flight test reports.
- Whether they have had CRM training (CRM = Crew Resource Management, that is training in communication and decision making in a safety critical aviation environment.)
- Whether they have had any test flying training and/or experience in flying aircraft with atypical or unknown handling characteristics.

It is always reasonable for a Competent Person to ask for and retain (copies of) proof of qualifications, training and experience.

CHAPTER 12

Flight test safety

Flight test safety

A carefully thought-out Flight Test Programme should be prepared. Useful further references can be found in Appendix A.

All flight testing involves some degree of risk. In many cases risk levels will be low and possibly no more than encountered during the normal operations of certificated aircraft. Other instances, for example the evaluation of stall handling, spinning or flutter characteristics, will involve higher levels of risk and should be conducted with greater caution.

Some basic flight test safety aspects worth considering during any flight test programme are as follows:

a) **Aircrew.** Flight test aircrew should be suitably experienced and current to carry out the intended flight test programme. Pilot experience and qualifications, in themselves, do not necessarily make for a fully prepared test pilot;

b) **Work-Up.** Testing may be preceded by a training and work-up programme during which specific flight test techniques and sortie profiles are rehearsed. This is particularly relevant to any testing that involves elevated risk profiles. Planning and risk management processes should be applied to work-up training programmes in the same manner as they are applied to the actual testing;

c) **Test Planning.** All flight testing should be subject to a planning process. Plan to test ‘from inside-out’ – from the centre of the envelope to the edges, from low risk areas to those of higher risk. Have an idea where the limits will be and approach them with caution. Then ‘plan the flight, fly the plan’ – only planned test points should be addressed during any sortie. Contingency test points may be carried into a sortie; however, ad-hoc testing should not occur;

d) **Hazard Analysis and Risk Management.** This must be completed as stipulated in Chapter 8.

e) **Test Conduct.** There are many general safety issues for consideration during conduct of the actual test programme, for example;

   i. **Crew Duty/Fatigue/Perceived Pressure.** Team members should be aware of the propensity for personal fatigue to create a flight safety hazard. Flight testing should be avoided when there is any element of Flight Crew fatigue.

ii. **Crew Resource Management.** Crew Resource Management (CRM) principles should be considered as part of the flight test planning process.

iii. **Observers –** Observers should only be carried if it is considered that it would be beneficial to overall safety for an observer to participate in the testing and that this justifies the hazard to the additional person. Although E Conditions platforms do not include multi crew operations, consideration should be given to how the Observer and Pilot interact when operating and, in essence, require multi crew cooperation. This is especially prevalent when the observer has little or no piloting experience. Ensure agreed terminology is understood and used to ensure full understanding between Pilot and Observer, working towards a good CRM environment.

iv. **Briefings.** For any test flight performed under E Conditions, a comprehensive flight briefing should be conducted. The briefing should be attended by all the flight crew participating in the flight, the Competent Person and other specialists as required. It may be beneficial for the person responsible for preparing or maintaining the aircraft to attend also.

f) **Criteria for Termination of Test**. The criteria for terminating individual tests should be defined, especially for any testing entailing elevated risk levels.

The briefing should discuss the aircraft build standard, weight and Centre of Gravity, the changes since last flight and their predicted effect, the tests to be performed, techniques to be used, criteria for termination of test, use of test equipment and aircraft limitations.

Weather, airfield conditions and NOTAMs should also be reviewed as part of the flight briefing.

Local airfield staff and users should be informed of the experimental nature of the activity.

It is recommended that a briefing pack be prepared that can be provided to the emergency services should an incident occur. This pack could contain information such as the planned route, the personnel on board and whether potentially explosive items such as ballistic recovery systems are embodied.

A copy of the agreed test plan and Certificate of Clearance should remain on the ground whilst the flight is taking place. See below for further information on the Certificate of Clearance.

CHAPTER 13

Operating conditions, limitations, and noise certification

Operating conditions, limitations, and noise certification

Conditions and limitations for operation of an aircraft operating under E Conditions are as stated in Part C of the Dossier.

In planning the flight test area, care should be taken to avoid causing undue disturbance to those on the ground.

Currently, an aircraft specifically designed or modified for research, experimental or scientific purposes must have a noise certificate. This is required by the Air Navigation (Environmental Standards For Non-EASA Aircraft) Order 2008.

The CAA is seeking an amendment to that Order to exclude aircraft operating under E Conditions from the requirement for a noise certificate. In the meantime, the CAA has issued an exemption for aircraft operating under E Conditions from the requirement to have a noise certificate; the current status of the noise exemption can be found in ORS4 No.1460.

CHAPTER 14

Flight documentation

Flight documentation

All flights under E Conditions should be covered by a Certificate of Clearance. The Certificate of Clearance should be amended or replaced by a new certificate whenever a change is made to the aircraft design standard or to any document or action referenced by the Certificate of Clearance.

The Certificate of Clearance should normally contain the following information:

- Name of Competent Person;
- The date of issue and Certificate number;
- Type, serial number and registration of the aircraft;
- A reference to documents defining the design of the aircraft;
- A reference to the flight test schedule(s);
- The maximum weight and centre-of-gravity limits;
- All pertinent operating limitations;
- The minimum crew;
- Any other restrictions considered necessary;
- The test airfield(s) and a reference to documents defining the test area;
- A statement that the design standard (if applicable) and conditions stated on the certificate are adequate to conduct the necessary flight tests;
- A statement that the build standard of the aircraft conforms to the design standard (if applicable) and that the aircraft is in a satisfactory condition;
- A statement of compliance with a programme of maintenance (see below);
- A statement that the flight crew (and ground observers) understand and accept the test plan and limitations for the flight and that a pre-flight briefing has been carried out;
- A statement that the Competent Person is confident the aircraft will meet the risk assessment targets.
- A statement, signed by the Competent Person and Principal Test Pilot, that the aircraft has been inspected and considered fit for flight as below;

It is hereby certified that the aircraft identified above has been inspected and is considered fit for flight.

Signed (Competent Person)……..... Date ……

Signed (Principal Test Pilot)……..... Date ……

An initial Certificate of Clearance, or an amended Certificate of Clearance following any change to the aircraft design standard or to any document or action referenced by the Certificate of Clearance, should be signed with respect to inspection and design standard by a person or persons nominated by the CP. There can be duplicated roles, but at least two independent signatures are required.

Any aircraft flying under E Conditions should continue to be maintained in accordance with any maintenance schedule or programme approved for the aircraft (if applicable). Any aircraft flying under E Conditions for which there is no approved maintenance schedule or programme should be maintained in a satisfactory condition in accordance with a programme of maintenance prepared in accordance with appropriate procedures. These procedures should include provisions for any additional maintenance, which may arise from development or modifications to the aircraft while operating under E Conditions. Similarly, all relevant logbooks should be maintained.

A flight log of all flights, including take-off and landing times, should be maintained and should also include notification of both modifications and maintenance, as well as changes to the weight and balance of the aircraft following a take up of fuel, crew or installed load. Such changes must not fall outside the limits set in the Certificate of Clearance. Entries in the log must be signed off by the pilot.

CHAPTER 15

Next steps

Next steps

Returning to PtoF or CoA

For aircraft that previously held a PtoF or CofA and modification approval is not to be pursued, the modification(s) must be removed and the aircraft returned to its original state before it can be flown again, unless it is intended to use it for a subsequent E Conditions experiment under a new E Conditions declaration.

If the aircraft is returned to its original state, the aircraft must be signed-off by an appropriate organisation or individual. After this sign-off, certification can be reapplied for from the relevant responsible body. It is recommended that guidance is sought prior to transferring an aircraft over to E Conditions from the responsible body in these circumstances.

Reasons the relevant responsible body may not agree to reinstate the CofA or PtF include when the test programme may stress the airframe in a way that it was not designed for, adversely affecting the airworthiness of the aircraft (such as, for example, by causing a significant yet unquantified reduction in fatigue life). It can be particularly difficult to assess the structural implications of changes without access to the type record or original design calculations for the aircraft type.

Requirements for reinstating the CofA or PtoF will likely include:

- Agreement on how the aircraft shall be maintained while flying on E Conditions;
- Agreement on how any changes made to the aircraft for the test programme will be reversed and how any residual changes (for example redundant holes or redundant vacant attachments) will be approved.

Further Development and Certification

A significant aim of E Conditions is to allow the test flying of an innovative experimental aircraft, even though there may be no intention to seek certification of the experimental aircraft once the test flying is complete. The guidance below, however, covers possible ‘approval’ steps after the initial scope of the E Conditions project.

The guidance below refers to using E Conditions to develop a design – the design of a new aircraft type, or a change to the design of an existing aircraft type, or the design of an item of equipment – with the intention of having that design approved. There is also

guidance in case it is desired that the prototype (aircraft or modification) eventually qualifies for a PtoF or CofA.

Note that the CAA will not ordinarily approve a design directly; an E Conditions project will need to potentially engage the services of a suitable Design Organisation Approval holder. A DOA holder is a design organisation approved by the CAA to approve designs (or make recommendations to the CAA regarding the approval of designs).

The DOA holder should be contacted early in the project in order to agree a ‘certification plan’. The certification plan will address:

- The approval basis (the certification standard/airworthiness code or special condition) for the design;
- The means of demonstration of compliance with the approval basis;
- The level of involvement of the DOA holder as the project progresses.

Involvement of the DOA holder as the project progresses is very important. In all but the most straightforward and conventional of projects the means of demonstration of compliance, and even the approval basis, may need to be adjusted as knowledge is gained and the design developed. Progressing without the involvement of the DOA holder is therefore a significant project risk.

The DOA holder may suggest using B Conditions, using a suitable A8-9 flight test organisation or A8-26 sporting organisation, as an alternative to E Conditions as a means of carrying out test flying. In some cases this may better reflect the division of responsibilities within the test organisation, and may allow an easier transition to a national CofA or PtoF.

Often, after the test programme is completed, experimental prototype aircraft are retired, or prototype modifications removed. However, if the intention is to eventually gain a CofA or PtF for the prototype (aircraft or modification), then the prototype (aircraft or modification) must be manufactured, and the manufacture documented, in accordance with relevant production and quality control procedures. Consult with the relevant responsible body (the CAA or airworthiness organisation responsible for administering the PtoF) before manufacture to ensure that the correct procedures are followed. If, as is often the case, the design of the prototype differs in detail from the final approved ‘production’ design standard, then the design differences must also be approved.

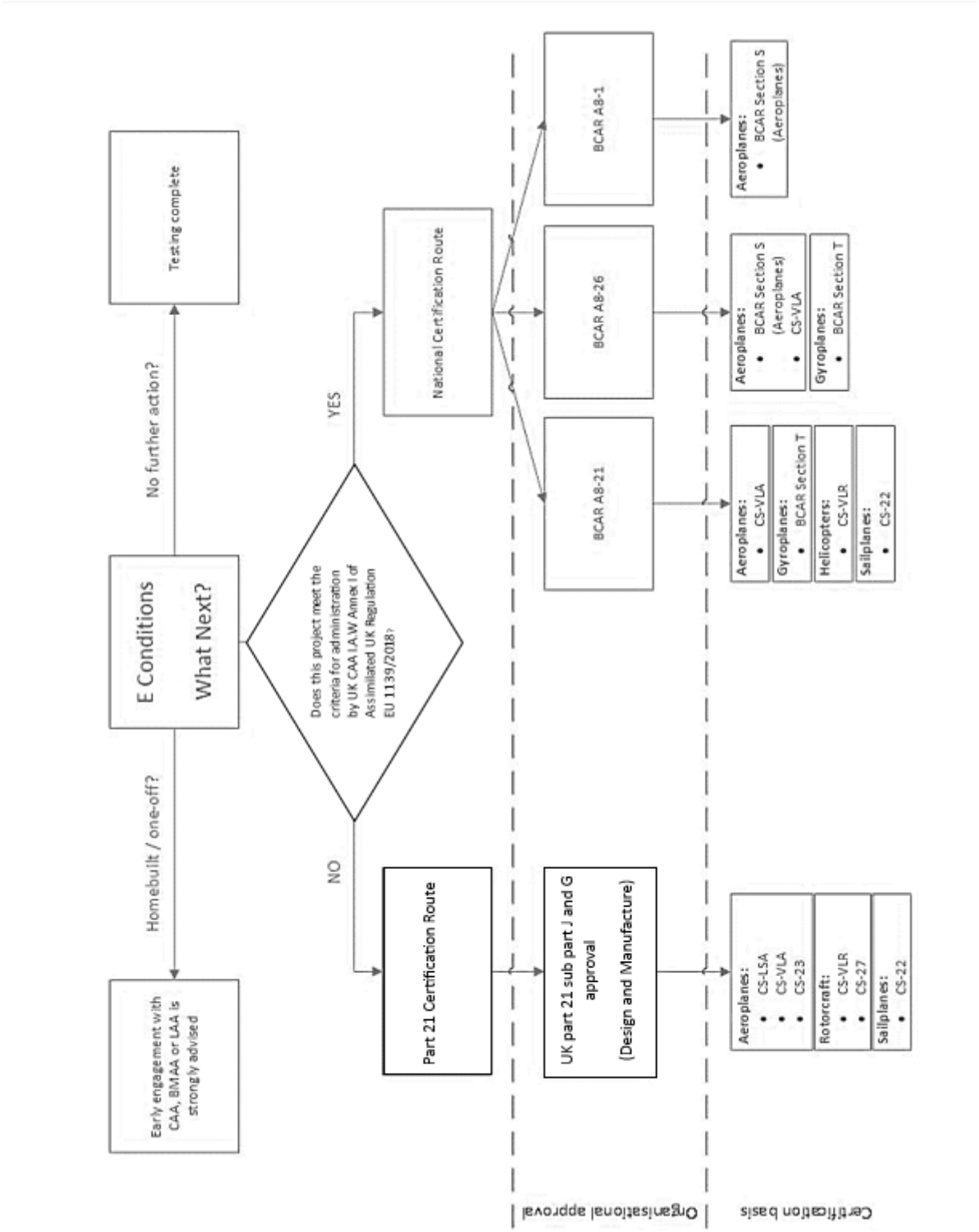
Notes:

The E Conditions Competent Person’s authority is limited to authorising flight on E Conditions. Although the Competent Person will risk-assess a new design for the purposes of test flying, it is the DOA holder (not the Competent Person) who has to be satisfied that the design complies with appropriate requirements (approval basis) before it is approved.

DOA holders are not under the same legal obligation as the CAA to engage with applicants. DOA holders are normally commercial organisations who may decline to take on a project for commercial reasons. This includes A8-26 sporting organisations i.e. the LAA and BMAA.

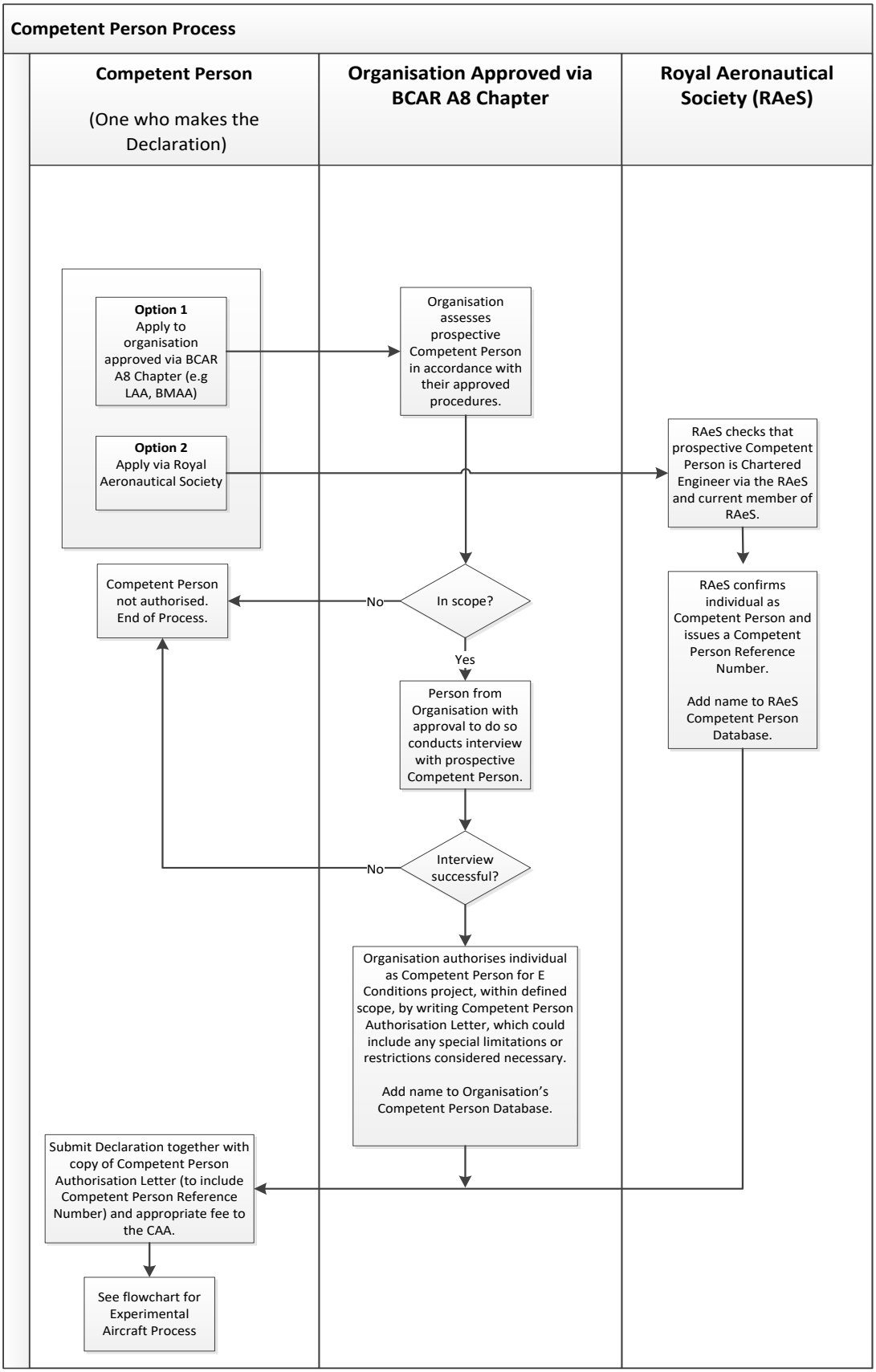
Early engagement with the CAA/LAA/BMAA prior to commencement of the project to discuss post-testing certification of the aircraft/modification is strongly advised

The diagram below illustrates the potential options for certification once flight testing is complete:

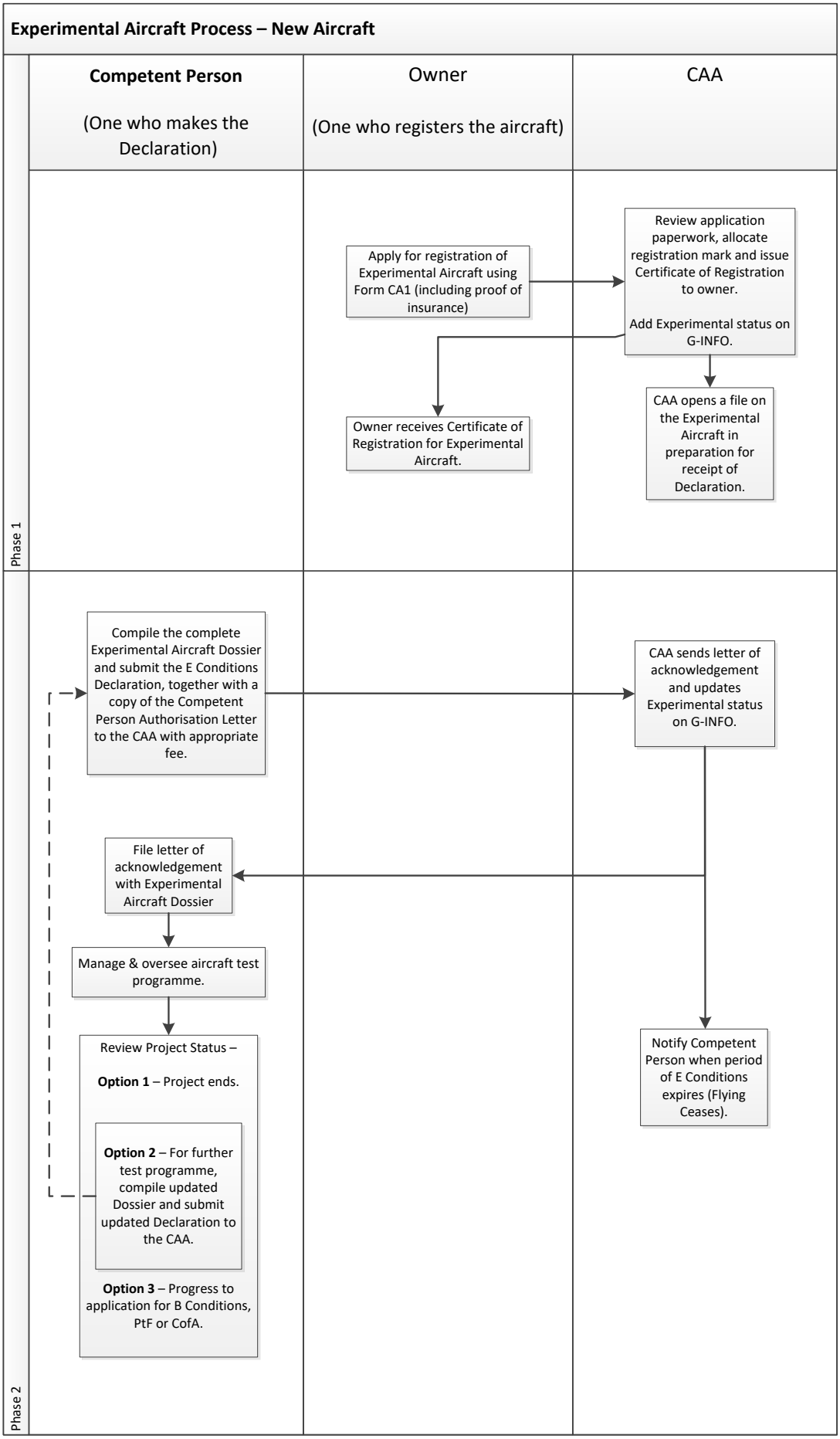

E Conditions
What Next?
Testing complete
No further action?
Homebuilt / one-off?
Early engagement with CAA, BMAA or LAA is strongly advised
Does this project meet the criteria for administration by UK CAA I.A.W Annex I of Assimilated UK Regulation EU 1139/2018?
YES
NO
National Certification Route
Part 21 Certification Route
UK part 21 sub part J and G approval
(Design and Manufacture)
BCAR A8-1
BCAR A8-26
BCAR A8-21
Aeroplanes:
BCAR Section S (Aeroplanes)
Aeroplanes:
BCAR Section S (Aeroplanes)
CS-VLA
Gyroplanes:
BCAR Section T
Aeroplanes:
CS-VLA
Gyroplanes:
BCAR Section T
Helicopters:
CS-VLR
Sailplanes:
CS-22
Aeroplanes:
CS-LSA
CS-VLA
CS-23
Rotorcraft:
CS-VLR
CS-27
Sailplanes:
CS-22
Organisational approval
Certification basis

This flowchart outlines the certification routes available to take an E Conditions project into the regulatory structure. Whilst E Conditions is not a shortcut to certification, it can provide manufacturing and performance data to support a commercial venture into a new product before commting the regulatory requirments. This flowchart shows the routes for Part 21 and Non Part 21 aircraft, the organisation approvals that need to be held to approve the design and the certification basis to which the design can be approved.

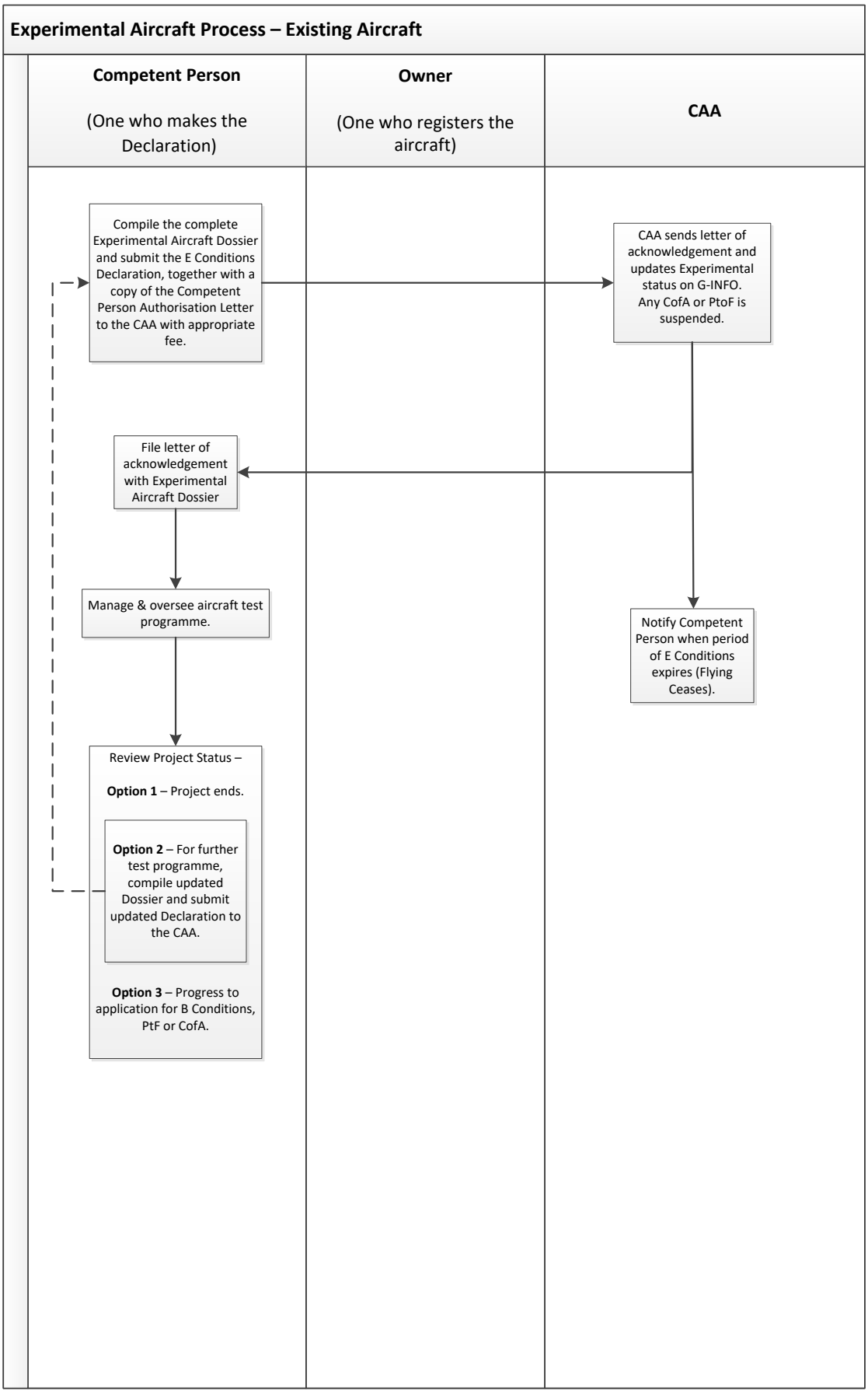
Process Flowcharts



This flowchart shows the process to become a Competent Person – either through the Royal Aeronautical Society or an organisation approved and BCAR A8. It is a visual representation of the process outline in Chapter 6 of this CAP.


Experimental Aircraft Process – New Aircraft
Competent Person
(One who makes the Declaration)
Owner
(One who registers the aircraft)
CAA
Phase 1
Apply for registration of Experimental Aircraft using Form CA1 (including proof of insurance)
Review application paperwork, allocate registration mark and issue Certificate of Registration to owner.
Add Experimental status on G-INFO.
Owner receives Certificate of Registration for Experimental Aircraft.
CAA opens a file on the Experimental Aircraft in preparation for receipt of Declaration.
Phase 2
Compile the complete Experimental Aircraft Dossier and submit the E Conditions Declaration, together with a copy of the Competent Person Authorisation Letter to the CAA with appropriate fee.
CAA sends letter of acknowledgement and updates Experimental status on G-INFO.
File letter of acknowledgement with Experimental Aircraft Dossier
Manage & oversee aircraft test programme.
Review Project Status –
Option 1 – Project ends.
Option 2 – For further test programme, compile updated Dossier and submit updated Declaration to the CAA.
Option 3 – Progress to application for B Conditions, PtF or CofA.
Notify Competent Person when period of E Conditions expires (Flying Ceases).

This flowchart shows the process of starting an E Conditions project with a new aircraft design. It is a visual summery of the E Conditions process outlines in the CAP.


Experimental Aircraft Process – Existing Aircraft
Competent Person
(One who makes the Declaration)
Owner
(One who registers the aircraft)
CAA
Compile the complete Experimental Aircraft Dossier and submit the E Conditions Declaration, together with a copy of the Competent Person Authorisation Letter to the CAA with appropriate fee.
CAA sends letter of acknowledgement and updates Experimental status on G-INFO. Any CofA or PtoF is suspended.
File letter of acknowledgement with Experimental Aircraft Dossier
Manage & oversee aircraft test programme.
Notify Competent Person when period of E Conditions expires (Flying Ceases).
Review Project Status –
Option 1 – Project ends.
Option 2 – For further test programme, compile updated Dossier and submit updated Declaration to the CAA.
Option 3 – Progress to application for B Conditions, PtF or CofA.

This flowchart shows the process of starting an E Conditions project with an existing aircraft. It is a visual summery of the E Conditions process outlines in the CAP.

APPENDIX A

References

References

General Aviation Policy Framework | Civil Aviation Authority (caa.co.uk)

CAP659 – Amateur Built Aircraft: A Guide to Approval, Construction and Operation of Amateur Built Aircraft

CAP737 – Flight Crew Human Factors Handbook

CAP2289 - Guide for Innovators: On the Path to Certification

CAP2290 - Guide for Innovators: Getting your prototype off the ground

FAA-H-8083-2A - Risk Management Handbook

FAA-H-8083-3C – Airplane Flying Handbook

FAA-H-8083-25B – Pilots Handbook of Aeronautical Knowledge

FAA-H-8083-30A – Aviation Maintenance Technician Handbook - General

FAA-H-8083-31A - Aviation Maintenance Technician Handbook - Airframe

FAA-H-8083-32A - Aviation Maintenance Technician Handbook - Powerplant

FAA AC 23-8C - Flight Test Guide for Certification of Part 23 Airplanes

FAA AC 27-1B - Certification of Normal Category Rotorcraft

FAA AC 90-89C - Amateur-Built Aircraft and Ultralight Flight Testing Handbook

FAA AC 90-116 - Additional Pilot Program for Phase I

DOT/FAA/TC-16/56 - Human Factors Considerations in the Design and Evaluation of Flight Deck Displays and Controls V2

(Specific guidance as follows)

FAA (2016a), Controls, Chapter 6, Human Factors Considerations in the Design and Evaluation of Flight Deck Displays and Control, version 2, DOT/FAA/TC-16/56, December 2016. pp183~230

FAA (2016b), Display Hardware, Chapter 2, Human Factors Considerations in the Design and Evaluation of Flight Deck Displays and Control, version 2, DOT/FAA/TC-16/56, December 2016. pp5~41

FAA (2016c), Consideration for Alerting, Chapter 4, Human Factors Considerations in the Design and Evaluation of Flight Deck Displays and Control, version 2, DOT/FAA/TC-16/56, December 2016. pp113~157

Risk References:

ICAO Safety Management Manual Doc 9859

Systematic Safety – Safety Assessment of Aircraft Systems

E Lloyd & W. Tye

Civil Aviation Authority

London, July 1982

Risk Assessment:

A brief guide to controlling risks in the workplace

HSE INDG163 (rev4) 08/14 5pp

Managing risks and risk assessment at work – Overview -HSE

Management of health and safety at work

Management of H&S at Work Regulations 1999

Approved Code of Practice and guidance

HSE L21 (2nd edn) 2000 (web-friendly version 09/09) 54pp

http://www.hseni.gov.uk/l21_management_of_health_and_safety_at_work.pdf

Reducing risks, protecting people

HSE’s decision-making process

HSE 2001 88pp

The tolerability of risk from nuclear power stations

HSE Books 1992 ISBN 0 11 886368 1 65pp

http://www.onr.org.uk/documents/tolerability.pdf

APPENDIX B

The Dossier

The Dossier

E Conditions Dossier Part A: Declaration

Please read CAP 1220 before completing this form

The Declaration form is located on the CAA website's E Conditions Page.

The Declaration form should be completed, printed and signed by the Competent Person.

It is mandatory to complete all fields on the Declaration.

Section 7 of the declaration should, along with a brief description of the E Conditions Project, include;

A) a statement to identify if the project is considered Basic or Advanced as described in Chapter 2: Scope of E Conditions.

B) the test location and geographical area of proposed flight testing

A fee will be charged for a new or supplementary Declaration. The current charging structure can be found on the CAA website.

When complete, the Declaration should be sent to the CAA's Aircraft Registration department along with the CPRN confirmation and the appropriate fee.

E Conditions Dossier Part B: Aircraft Design and Build

Version Number:

Date:

Details of each Principal member of the aircraft design and build team:

Name

Address

Email

Phone

Principal function

a) Date Build commenced
b) Date Build completed
c) Type of flying machine
d) Type of engine and propulsion
e) Type of operation of controls
f) Type of construction - load bearing
g) Experimental features of aircraft
h) Maximum occupants:
    In original Design
    Under E Conditions
i) Propulsion:
    Power/Thrust
j) Aircraft mass:
    Nominal empty
    Max AUM
k) Dimensions:
    Length
    Width

Height

l) Speeds:

Estimated stall

Design Maximum

m) Performance:

Estimated Climb full power

Estimated Sink zero power

n) Design Load factors:

g+/-

o) Design Codes and Airworthiness Justification Statement:

p) Summary of Aircraft Build

q) General colour scheme

Suggested supplementary sheets:

Dimensioned 3 view drawing of aircraft

Flight envelope limits – Graph

Further drawings (if applicable)

Additional detailed description of the aircraft

Further airworthiness assessment

E Conditions Dossier Part C: Flight Test Programme

Version Number:

Date:

Principal members of the flight test team:

Details of each principal member of the flight test team:

Name

Address

Email

Phone

Principal function

a) Purpose and specific aims of the Proposed Test Programme
b) Details and phasing of this Test Programme
c) Base airfield (including contact details)
d) Emergency Facilities at base airfield (including contact details)
e) Identified Test Area – Geographical location
f) On-board, installed and special test equipment required
g) Special airframe limitations.
h) Specific Meteorological and Operational Conditions under which the test will be carried out.
i) Maintenance programme
j) inspection requirements (including special provisions)
k) Safety precautions and systems appropriate to the test

E Conditions Dossier Part D: Hazard identification and risk assessment

Version Number:

Date:

Details of each principal member of the hazard identification and risk assessment team:

Name

Address

Email

Phone

Principal function

Table 1:

Sample template for laying out the Risk Assessment

- Question
- Answer
- Mitigation of Risk

Example questions could include but not be limited to:

- How novel or untested is the aircraft or modification(s) made to it?
- How has the flight test programme been planned to minimise third party risk to those on the ground and in the air?
- What aspect of the test programme may pose the greatest risk to third parties (e.g. engine failure, structural failure, control failure)?
- Considering the heights and speeds of the flight envelope, coupled with the aircraft's weight, do you consider the test area sufficient?
- Identify what population is under the designated test area.
- Is pilot experienced in test flying/ current on this type or class of aircraft?
- Is the test aircraft fitted with a safety chute or equivalent?
- What emergency services will be available across the airfield/ test area?
- Are there any other risk factors to be taken into consideration?

Table 2:
Sample template for laying out the claim, argument and evidence process

- Claim Number
- Claim
- Argument
- Evidence

E Conditions Dossier Part E: Self-Assessment and Independent Review

The Competent Person Self-Assessment

Knowledge

Knowledge	Competent Person Relevant Knowledge	Project Team/Consultant Relevant Knowledge
Materials		
Structure		
Structural review		
Mechanical Systems		
Aerodynamics		
Stability and control		
Propulsion		
Electronic systems		

Knowledge	Competent Person Relevant Knowledge	Project Team/Consultant Relevant Knowledge
Computer systems		
Ergonomics		
Human Factors		

Experience

Experience	Competent Person Relevant Experience	Project Team/Consultant Relevant Experience
Airworthiness		
Aircraft Design		
Aircraft Build		
Flight Test Programme		

The Independent Review

E Conditions Independent Review Statement:

I confirm that (E Conditions Competent Person) has identified and understood the full scope of this E Conditions project and support their declaration on having the appropriate knowledge and experience to act as the Competent Person. They have identified any areas in which their knowledge or experience could be enhanced, and sought guidance as required to ensure the required level of safety and oversight is maintained.

Independent Reviewer

Name……..

Position……

Highest Relevant Qualification……

Date…….

Signature…….

Competent Person

Name……..

Date…….

Signature…….