EUROPEAN DEFENCE AGENCY

THE EUROPEAN MILITARY AIRWORTHINESS BASIC FRAMEWORK DOCUMENT (BFD)

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MAWA

MILITARY AIRWORTHINESS AUTHORITIES FORUM

DOCUMENT CONTROL

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STATUS

The status of the document can take 3 values:

- **Working Draft**: Working copy to develop the proposed version or revision of the document.
- **Draft:** Version to be proposed to the MAWA Forum by the Advisory Group.
- **Approved:** Final version approved by the participating Member States for publication.

EDITION

The Edition Number will take the following format: **Edition X.Y.Y**:

The **value of X** will change after a **major** revision of the document.

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BASIC FRAMEWORK FOR THE EUROPEAN MILITARY AIRWORTHINESS AUTHORITIES (MAWA)

THE EUROPEAN MILITARY AIRWORTHINESS AUTHORITIES,

Having regard to the Treaty on European Union, signed on 13 December 2007 in Lisbon, and which entered into force on 1 December 2009, in particular Articles 42 and 45 thereof;

Having regard to Council Decision (CFSP) 2015/1835 of 12 October 2015 defining the seat, statute and operational rules of the European Defence Agency ("EDA Council Decision"), in particular Articles 2 and 5 thereof;

Having regard to the EDA Steering Board (SB MOD) Decision of 10 November 2008 approving the creation of an EU-wide forum for Military Airworthiness Authorities (MAWA), taking into account the work undertaken on harmonising national military airworthiness regulations;

Having regard to the Defence Ministers' Political Declaration regarding the timely development and implementation of the European Military Airworthiness Requirements of 17 November 2009 (EDA Doc. No. 2009/36).

WHEREAS

(1) A common European military approach to airworthiness would increase safety by providing military aircraft capable of performing their mission safely.

(2) Potential savings in time, cost and effort for the military and industry could be achieved if a common approach to airworthiness regulation and oversight was applied.

(3) Such a common approach to airworthiness would improve interoperability of common platforms and potentially reduce the logistic footprint of multinational operations.

(4) There are benefits in having a coordinated view on military airworthiness complementary to EASA and non-European military authorities.

(5) Recognising this, the SB MOD agreed on 10 November 2008 to the creation of a Military Airworthiness Authorities (MAWA) Forum under the auspices of the EDA, which was tasked with the harmonisation of military airworthiness requirements across Europe.

(6) In order to achieve this goal the SB MOD agreed to the implementation of the following key activities (EDA Doc. No. 2008/39):

a. Common Regulatory Framework.

b. Common Certification Processes.

c. Common approach to Organisational Approvals.

d. Common certification /design codes.

e. Common approach to preservation of airworthiness.

f. Arrangements of recognition.

g. Formation of a European Military Joint Airworthiness Authorities Organisation (to be confirmed within the forum).

HAVE AGREED TO THE FOLLOWING:

PURPOSE AND BACKGROUND

1. This Basic Framework Document (BFD) builds on the previous document and aims to set out the role, function and objectives of the MAWA Forum as stated in paragraph 7 and Annex A.
2. The BFD further defines the tasks to be performed respectively by the EDA participating Member States (pMS) and EDA to achieve the goals of the above mentioned roadmap and maintain the harmonised airworthiness regulatory framework through the MAWA Forum.
3. Through this BFD, the pMS aim:
   a. to ensure that a high consistent level of airworthiness is achieved throughout pMS;
   b. to avoid duplication of work between the National Military Airworthiness Authorities (NMAAs) of pMS; and
   c. to facilitate exchange of products, services and personnel with associated data not only between the NMAAs, but also between the NMAAs and other stakeholders.

DEFINITIONS

4. For the purposes of this BFD:
   a. "participating Member State" means a Member State that participates in the EDA.[1]
   b. "EU Parties" are institutions, bodies, offices and agencies of the European Union that are set up by, or on the basis of, the Treaty of the European Union (TEU) or the Treaty on the Functioning of the European Union (TFEU).
   c. "Third Parties" are countries that are not member of the European Union or organisational entities that are not established by or on the basis of the TEU or TFEU.
   d. "National Military Airworthiness Authority" means one or more entities designated by a pMS and having the necessary powers and allocated responsibilities for the airworthiness regulation, certification and oversight concerning their military aviation.
   e. "Military Aircraft" means an Aircraft (manned or unmanned) designed and/or operated for military use and/or registered, or intended to be registered, on the military register of a NMAA.
   f. "Military Unmanned Aircraft System (UAS)" means a UAS (composed of one or more Unmanned Aircraft (UA) and any equipment, apparatus, appurtenance, software or accessory necessary for the safe operation of the UAS), designed and/or operated for military use and/or registered, or intended to be registered, on the military register of a NMAA.
   g. "Controlled environment" is the situation in which the airworthiness of military registered aircraft in a nation is continuously managed by Continuing Airworthiness Management

[1] See also Article 3 of the EDA Council Decision.

Organisations and their maintenance is carried out by Maintenance Organisations, that are regulated and approved by a single NMAA.

5. In addition to the above, the definitions under the European Military Airworthiness Document (EMAD) 1 apply.

AIRWORTHINESS AND ENVIRONMENTAL PROTECTION

6. Military manned Aircraft, including engines, propellers, parts and appliances intended to be mounted thereon, will comply with the essential requirements for airworthiness as stated in Annex B.

7. Military UAS will comply with the essential requirements for airworthiness as stated in Annex C. In addition to the essential Airworthiness requirements in Annex C, depending on the kind of operations to be performed (including the risks involved) by the UAS, some essential Airworthiness requirements for manned aircraft (in Annex B) might be applicable.

8. As regards noise and emissions, those manned aircraft and their engines, propellers, parts and non-installed equipment will comply with the environmental protection requirements as stated in Annex D, if so required by national regulations. Organisations involved in the design, production and maintenance of products will comply with point 8 of Annex D.

PRINCIPLES FOR IMPLEMENTATION

9. When implementing essential requirements for airworthiness (Annexes B and C) and environmental protection (Annex D), NMAAs will:

    a. reflect the state of the art and best practices in the field of airworthiness, and take into account worldwide airworthiness experience and scientific and technical progress in the respective fields;

    b. build on the best available evidence and analysis;

    c. allow for immediate reaction to established causes of accidents, serious incidents and intentional security breaches;

    d. promote cooperation and efficient use of resources between NMAAs;

    e. take non-binding measures, including safety promotion actions, where possible.

FUNCTIONS OF THE MAWA FORUM

10. The MAWA Forum has the following functions:

    a. To further develop, with adequate consultation, and publish European Military Airworthiness Requirements (EMARs) and European Military Airworthiness Documents (EMADs) for the use of the NMAAs in the field of airworthiness and environmental protection as stated in Annex B and/or in Annex C and Annex D.

    b. To define and maintain the general structure of the EMARs, as well as the scope of each EMAR so that each NMAA can implement this general structure and minimise any national regulatory differences across European programmes, with the objective that each individual EMAR becomes a uniform basis for national regulation across European countries, with minimal national regulatory differences being applied.

    c. To establish procedures that:

i. Cover the initial certification of products, services, organisations or personnel, as well as the continuing/continued airworthiness of military aircraft or UAS in service.

ii. Allow the use of one set of findings of compliance with EMARs in the fields of design, manufacture and maintenance for the benefit of, and in a manner acceptable to, all NMAAs.

iii. Include practical measures for making the findings of compliance with EMARs only once to the benefit of all NMAAs. These measures may include acceptance of findings of compliance made by industry, where industry conforms to agreed standards.

iv. Would enable a simplified administrative action from the applicant for each application and which could replace the currently existing national administrative documents by a single one valid under the national regulations and procedures of each NMAA.

v. Take into account existing harmonised arrangements for appropriate multinational programmes.

d. Explore the practicality and form of a European Military Joint Airworthiness Authorities Organisation (EMJAAO) to cover the fields of design and manufacture of products and their maintenance, noting that any proposals for the establishment of such an organisation will require approval at Ministerial Steering Board level.

COMMITMENTS OF NMAAS

11. The NMAAs hereby commit to:

a. Participate in the process of developing regulatory requirements and use their best endeavours to provide experts within the different working groups involved in this process.

b. Implement the EMARs, including their Acceptable Means of Compliance (AMC) and Guidance Materiel (GM), as soon as practicable, with the understanding that NMAAs reserve the right not to implement the EMARs for national reasons. Where the EMARs are not implemented, the opportunities for recognition may be limited.

c. Declare all their national regulatory differences to existing EMARs (whether they stem from a technical difference or from a difference in the structure between the set of EMARs and their national regulations), and to work towards the reduction of these national regulatory differences or their embodiment in the appropriate EMAR.

d. Participate in the definition of procedures enabling the findings of compliance with EMARs to be made only once in a way satisfactory to all NMAAs.

e. Make (in accordance with the agreed procedures in paragraph 11(c)) the findings of compliance with EMARs.

f. Accept these procedures and use them exclusively when checking compliance with the EMARs.

g. Make, without undue delay, the national findings for compliance with EMARs for those products, services, organisations or personnel which have been found to comply with the relevant EMAR (and, until they are removed, indicate any remaining national regulatory differences).

IMPLEMENTATION

12. As a principle, EMARs - including their AMC and GM - will be implemented minimising any differences as regards their objectives and content as far as practicable.

13. Implementation in this context means both transposition of EMARs into national regulation and/or legislation as well as the application to military aviation.

14. The EMAD document series supplement the EMARs but are not intended to be implemented within national regulation.

RECOGNITION

15. The European Military Airworthiness Document – Recognition (EMAD R) will be used as both a process and methodology to assess a NMAA to act in respect to defined airworthiness tasks. This can then be used as the basis to achieve recognition between pMS. However, recognising the outputs from a NMAA is a national decision that can only be taken by each pMS.

REVISION

16. This BFD and any of its Annexes may be revised, at the request of a member of the MAWA Forum or on a proposal from EDA, at any time. Requests and proposals for such revisions should be brought to the attention of the MAWA Forum Chair and approved by the MAWA Forum Executives after advice from the MAWA Airworthiness Requirements Advisory Group (ARAG). The approval may be sought via written procedure.

CONCLUSION OF PARTICIPATION

17. A member of the MAWA Forum may, at any time, indicate that it will no longer participate in the work of the MAWA Forum and apply the terms agreed under this BFD. This member will notify EDA well in advance, which will inform the other NMAAs of such decision.

ANNEXES:

A. Terms of Reference of the MAWA Forum, deleted from this sanitised version.

B. Essential Requirements for Airworthiness of manned aircraft.

C. Essential Requirements for Airworthiness of unmanned aircraft systems.

D. Essential Requirements for Environmental compatibility related to products.

ANNEX A - TERMS OF REFERENCE OF THE MAWA FORUM

This annex is deleted in this sanitized version, in order to make it releasable by EDA.

ANNEX B – ESSENTIAL REQUIREMENTS FOR AIRWORTHINESS OF MANNED AIRCRAFT

AIM

1. The aim of this Annex is to define joint essential military airworthiness requirements with due regard to the ICAO and EU principles. To this end, this Annex is based on Annex II to Regulation (EU) 2018/1139 as last amended and takes into account specific aspects of military operations. The detailed product specification including the airworthiness certification basis, will be established for each product with due regard to the airworthiness essential requirements and agreed with the NMAAs involved in a particular programme.

2. These essential requirements are the minimum that must be met and any deviation must be agreed with the NMAAs. It should be noted that the NMAAs involved in a particular programme can define more stringent requirements to meet particular National needs.

REQUIREMENTS

Product Integrity

3. Product integrity, including protection against information security threats, must be assured for all anticipated flight conditions and ground operations for the operational life of the aircraft. Compliance with all requirements must be shown by assessment or analysis, supported, where necessary, by tests.

3.1. Structures and materials

a. The integrity of the structure must be ensured throughout, and sufficiently beyond, the operational envelope for the aircraft, including its propulsion system, and maintained for the operational life of the aircraft.

b. All parts of the aircraft, the failure of which could reduce the structural integrity, must comply with the following conditions without detrimental deformation or failure. This includes all items of significant mass and their means of restraint.

i. All combinations of load reasonably expected to occur within and sufficiently beyond, the weights, centre of gravity range, operational envelope and life of the aircraft must be considered. This includes loads due to gusts, manoeuvres, pressurisation, movable surfaces, control, use of armaments and propulsion systems both in flight and on the ground.

ii. Consideration must be given to the loads and likely failures induced by emergency landings either on land or water.

iii. As appropriate to the type of operation, dynamic effects must be covered in the structural response to those loads, taking into account the size and configuration of the aircraft.

c. The aircraft must be free from any aero elastic instability and excessive vibration.

d. The production processes and materials used in the construction of the aircraft must result in known and reproducible structural properties. Any changes in material performance related to the operational environment must be accounted for.

e. It must be ensured, to the extent practicable, that the effects of cyclic loading, environmental degradation, accidental and discrete source damage do not reduce the structural integrity below an acceptable residual strength level. All necessary instructions for ensuring continued airworthiness in this regard must be promulgated.

3.2. Propulsion

a. The integrity of the propulsion system (i.e. engine and, where appropriate, propeller) must be demonstrated throughout and sufficiently beyond the operational envelope of the propulsion system and must be maintained for the operational life of the propulsion system, taking into account the role of the propulsion system in the overall safety concept of the aircraft.

b. The propulsion system must produce, within its stated limits, the thrust or power demanded of it at all required flight conditions, taking into account environmental effects and conditions.

c. The production process and materials used in the construction of the propulsion system must result in known and reproducible structural behaviour. Any changes in material performance related to the operational environment must be accounted for.

d. The effects of cyclic loading, environmental and operational degradation and likely subsequent part failures must not reduce the integrity of the propulsion system below acceptable levels. All necessary instructions for ensuring continued airworthiness in this regard must be promulgated.

e. All necessary instructions, information and requirements for the safe and correct interface between the propulsion system and the aircraft must be promulgated.

3.3. Systems and equipment (other than non-installed equipment)

a. The aircraft must not have design features or details that experience has shown to be hazardous.

b. The aircraft, including those systems, and equipment required for the assessment of the military type design, or by operating rules, must function as intended under any foreseeable operating conditions, throughout and sufficiently beyond, the operational envelope of the aircraft, taking due account of the system or equipment operating environment. Other systems or equipment not required for military type-certification, or by operating rules, whether functioning properly or improperly, must not reduce safety and must not adversely affect the proper functioning of any other system or equipment. Systems and equipment must be operable without needing exceptional skill or strength.

c. The aircraft systems and equipment, considered separately and in relation to each other, must be designed such that any catastrophic failure condition does not result from a single failure not shown to be extremely improbable and an inverse relationship must exist between the probability of a failure condition and the severity of its effect on the aircraft

and its occupants. With respect to the single failure criterion above, it is accepted that due allowance must be made for the size and broad configuration of the aircraft (including specific military systems and operations) and that this may prevent this single failure criterion from being met for some parts and some systems on helicopters and small aircraft.

d. Information needed for the safe conduct of the flight and information concerning unsafe conditions must be provided to the crew or maintenance personnel, as appropriate, in a clear, consistent and unambiguous manner. Systems, equipment and controls, including signs and announcements must be designed and located to minimise errors which could contribute to the creation of hazards.

e. Design precautions must be taken to minimise the hazards to the aircraft and occupants from reasonably probable threats, including information security threats, both inside and external to the aircraft, including protecting against the possibility of a significant failure in, or disruption of, any non-installed equipment.

3.4. Non-installed equipment

a. Non-installed equipment must perform its safety function or function relevant for safety as intended under any foreseeable operating conditions unless that function can also be performed by other means.

b. Non-installed installed equipment must be operable without needing exceptional skill or strength.

c. Non-installed equipment, whether functioning properly or improperly, must not reduce safety and must not adversely affect the proper functioning of any other equipment, system or appliance.

3.5. Continuing airworthiness

a. Military aircraft must be operated in a controlled environment.

b. All necessary documents including instructions for continuing airworthiness must be established and made available to ensure that the airworthiness standard related to the aircraft military type and any associated part is maintained throughout the operational life of the aircraft.

c. Means must be provided to allow inspection, adjustment, lubrication, removal or replacement of parts and non-installed equipment as necessary for continuing airworthiness.

d. The instructions for continuing airworthiness must be in the form of a manual, or manuals, as appropriate for the quantity of data to be provided. The manuals must cover maintenance and repair instructions, servicing information, trouble-shooting and inspection procedures in a format that provides for a practical arrangement.

e. The instructions for continuing airworthiness must contain airworthiness limitations that set forth each mandatory replacement time, inspection interval and related inspection procedure.

Airworthiness aspects of product operation

4. The following must be shown to have been addressed to ensure safety for those on board or on the ground during the operation of the product:

    a. the kinds of operation for which the aircraft is approved must be established and limitations and information necessary for safe operation, including environmental limitations and performance, must be established;

    b. the aircraft must be safely controllable and manoeuvrable under all anticipated operating conditions including following the failure of one or, if appropriate, more propulsion systems, taking into account the size and configuration of the aircraft. Due account must be taken of pilot strength, flight deck environment, pilot workload and other human-factor considerations and of the phase of flight and its duration;

    c. it must be possible to make a smooth transition from one flight phase to another without requiring exceptional piloting skill, alertness, strength or workload under any probable operating condition;

    d. the aircraft must have such stability as to ensure that the demands made on the pilot are not excessive taking into account the phase of flight and its duration;

    e. procedures for normal operations, failure and emergency conditions must be established;

    f. warnings or other deterrents intended to prevent exceedance of the normal flight envelope, must be provided, as appropriate to the aircraft military type;

    g. the characteristics of the aircraft and its systems must allow a safe return from extremes of the flight envelope that may be encountered.

5. The operating limitations and other information necessary for safe operation must be made available to the crew members.

6. Product operations must be protected from hazards resulting from adverse external and internal conditions, including environmental conditions.

    a. In particular, and as appropriate to the type of operation, no unsafe condition must occur from exposure to phenomena such as, but not limited to, adverse weather, lightning, bird strike, high frequency radiated fields, ozone, use of armaments (hot gas ingestion, debris,), etc., reasonably expected to occur during product operation, taking into account the size and configuration of the aircraft;

    b. Cabin compartments, as appropriate to the type of operations, must provide passengers with suitable transport conditions and adequate protection from any expected hazard arising in flight operations or resulting in emergency situations, including fire, smoke, toxic gases and rapid decompression hazards, taking into account the size and configuration of the aircraft. Provisions must be made to give occupants every reasonable chance of avoiding serious injury and quickly evacuating the aircraft and to protect them from the effect of the deceleration forces in the event of an emergency landing on land or water. Clear and unambiguous signs or announcements must be provided, as necessary, to instruct occupants in appropriate safe behaviour and the location and correct use of safety equipment. Required safety equipment must be readily accessible;

c. Crew compartments, as appropriate to the type of operations, must be arranged in order to facilitate flight operations, including means providing situational awareness, and management of any expected situation and emergencies. The environment of crew compartments must not jeopardise the crew's ability to perform their tasks and its design must be such as to avoid interference during operation and misuse of the controls.

Organisations (including natural persons undertaking design, production, continued airworthiness management or maintenance)

7. As appropriate to the type of activity, organisation approvals must be issued when the following conditions are met:

   a. the organisation must have all the means necessary for the scope of work. Those means comprise, but are not limited to, the following: facilities, personnel, equipment, tools and material, documentation of tasks, responsibilities and procedures, access to relevant data and record-keeping;

   b. as appropriate for the type of activity undertaken and the size of the organisation, the organisation must implement and maintain a management system to ensure compliance with the essential requirements set out in this Annex B, manage safety risks in accordance with Appendix I to Annexes B and C and aim for continuous improvement of that system;

   c. the organisation shall establish arrangements with other relevant organisations, as necessary, to ensure continuing compliance with the essential requirements for airworthiness set out in this Annex B;

   d. the organisation shall establish an occurrence reporting system as part of the management system under point (b) and the arrangements under point (c), in order to contribute to the aim of continuous improvement of safety. The occurrence reporting system shall be compliant with the applicable national law.

8. In the case of maintenance training organisations, the conditions under points 7.c. and 7.d. do not apply.

9. Natural persons undertaking maintenance must acquire and maintain a level of theoretical knowledge, practical skills and experience as appropriate to the type of activity.

COMPLIANCE TO THE REQUIREMENTS

10. Compliance to the Requirements will be established in accordance with the following:

    a. Design of products

       The design of a product will be subject to certification and will be issued with a military type certificate. Changes to that design will also be subject to certification and will result in the issuance of a certificate, including of military supplemental type certificates. Repair designs will be subject to certification and will be issued with an approval.

       An approval will be issued in respect of the operational suitability data associated with a military type design. That approval will be included in the military type certificate or the military restricted type certificate as applicable.

That military type certificate, that certificate of changes, that approval of repair designs and that approval of the operational suitability data will be issued upon application when the applicant has demonstrated that the design of the product complies with the certification basis established to ensure compliance with the essential requirements at Annex B and that the design of the product has no feature or characteristic making it environmentally incompatible or unsafe for operation.

That military type certificate, that certificate of changes, that approval of repair design and that approval of the operational suitability data may also be issued without such application, by an organisation approved which has been granted the privilege to issue those certificates or approvals when that organisation has determined that the design of the product complies with the conditions established by the NMAA.

No separate military type certificate will be required for the design of engines and propellers that have been certified as part of the design of an aircraft.

b. Design of parts

The design of parts will be subject to certification and may be issued with a certificate.

That certificate will be issued upon application, when the applicant has demonstrated that the design of the part complies with the certification basis established to ensure compliance with the essential requirements at Annex B.

That certificate may also be issued without such application, by an organisation approved which has been granted a privilege to issue those certificates, when that organisation has determined that the design of the part complies with the certification basis established to ensure compliance with the essential requirements at Annex B.

No separate certificate shall be required for the design of parts that have been certified as part of the design of a product.

c. Design of non-installed equipment

the design of non-installed equipment will be subject to certification and may be issued with a certificate.

That certificate will be issued upon application, when the applicant has demonstrated that the design of non-installed equipment complies with the certification basis established to ensure compliance with the essential requirements at Annex B.

That certificate may also be issued without such application, by an organisation approved which has been granted a privilege to issue those certificates, when that organisation has determined that the design of the non-installed equipment complies with the certification basis established to ensure compliance with the essential requirements at Annex B.

d. Individual aircraft

1. Individual aircraft will be subject to certification and will be issued with a certificate of airworthiness and, if so required by national regulations, with a noise certificate.

Those certificates will be issued upon application, when the applicant has demonstrated that the aircraft is in conformity with the design certified, and that the aircraft is in condition for safe and environmentally compatible operation.

2. The certificate of airworthiness shall remain valid as long as the aircraft and its engines, propellers, parts and non-installed equipment are maintained in accordance with the essential requirements related to continuing airworthiness and are in condition for safe and environmentally compatible operation.

e. For aircraft with no valid Certificate of Airworthiness a Permit to Fly may be issued.

f. Organisations

1. Organisations responsible for the design and production of products, parts and non-installed equipment will be subject to certification and will be issued with an approval. That approval will be issued upon application, when the applicant has demonstrated that it complies with the rules established by the NMAA for ensuring compliance with the essential requirements referred at Annex B. That approval will specify the privileges granted to the organisation and the scope of the approval.

2. An approval will also be required in respect of:

(a) organisations responsible for the maintenance and continuing airworthiness management of products, parts and non-installed equipment, and

(b) organisations involved in the training of the personnel responsible for the release of a product, a part or non-installed equipment after maintenance.

The approvals will be issued upon application, when the applicant has demonstrated that it complies with the national regulation established by the NMAA to ensure compliance with the essential requirements at Annex B.

3. The approvals will specify the privileges granted to the organisation. Those approvals may be amended to add or remove privileges, by a NMAA according to its national regulation.

4. The approvals may be limited, suspended or revoked when the holder no longer complies with the rules and procedures for issuing and maintaining such approval.

g. Personnel

1. Personnel responsible for the release of the maintenance performed on aircraft will be required to hold a licence.

That licence will be issued upon application, when the applicant has demonstrated that he or she complies with the national regulation established by the NMAA to ensure compliance with the essential requirements at Annex B.

2. The licence will specify the privileges granted to the personnel. The licence may be amended to add or remove privileges.

3. The licence may be limited, suspended or revoked when the holder no longer complies with the rules and procedures for issuing and maintaining such licence.

AMC

11. AMC illustrate a means, but not the only means, by which EMARs can be met and a regulated entity may decide to show compliance by other means. Hence only a NMAA can agree alternatives to the published AMC. AMCs are strongly recommended practices and a justification will be required to the NMAA if they are not followed. The burden of proof that the requirements are satisfied rests entirely with a regulated entity when alternatives are proposed to the NMAA.

ANNEX C – ESSENTIAL REQUIREMENTS FOR AIRWORTHINESS OF UNMANNED AIRCRAFT SYSTEMS

AIM

- The aim of this Annex is to define joint essential military airworthiness requirements with due regard to the ICAO and EU principles. To this end, this Annex is based on Annex IX to Regulation (EU) 2018/1139 as last amended and takes into account specific aspects of military operations.
- These essential requirements are the minimum that must be met and any deviation must be agreed with the NMAAs. It should be noted that the NMAAs involved in a particular programme can define more stringent requirements to meet particular National needs.

RISK-BASED, PERFORMANCE-BASED APPROACH TO UAS OPERATIONS

Taking into account in particular the nature and risk of the operations concerned and the operational characteristics of the UA/UAS concerned a certificate may be required for the design, production and maintenance of UA/UAS and their engines, propellers, parts, non-installed equipment and equipment to control them remotely, as well as for the personnel and organisations involved in those activities.

The certificate, if/when required, must be issued upon application, when the applicant has demonstrated that it complies with the national regulation adopted to ensure compliance with the essential requirements in this Annex.

The certificate, if/when required, must specify the privileges, the safety-related limitations and the operating conditions. The certificate may be amended to add or remove limitations, conditions and privileges, in accordance with the national regulation adopted to ensure compliance with the essential requirements in this Annex.

The certificate, if/when required, must be limited, suspended or revoked when the holder no longer complies with the conditions, rules and procedures for issuing or maintaining such certificate, in accordance with the national regulation adopted to ensure compliance with the essential requirements in this Annex.

REQUIREMENTS

1. Essential Airworthiness requirements for the Design, Production and Maintenance of UA/UAS

   1.1. NIL

   1.2. An UA/UAS must be designed and constructed so that it is fit for its intended function, and can be operated, adjusted and maintained without putting persons at risk.

   1.3. If necessary to mitigate risks pertaining to safety arising from the operation, the UA/UAS must have the corresponding and specific features and functionalities. According to the needs those features and functionalities must ensure that applicable limitations, prohibitions or conditions be complied with, in particular with respect to the operation in particular geographical zones, beyond certain distances from the operator or at certain altitudes.

   1.4. The organisation responsible for the design or production or for the marketing of the UA/UAS must provide information to the operator of an UA/UAS and, where relevant, to the maintenance organisation on the kind of operations for which the UA/UAS is designed together with the limitations and information necessary for its safe operation, including operational performance, airworthiness limitations and emergency procedures. This information must be given in a clear, consistent and unambiguous manner.

2. Additional essential Airworthiness requirements for the Design, Production and Maintenance of UA/UAS

The following common requirements are valid for all categories of UAS operations in a reasonable proportion to the respective risk involved:

2.1. Airworthiness

a. An UA/UAS must be designed and manufactured so that it is fit for its intended function, and can be operated, adjusted and maintained in a way that the safety of the person operating the UA or of third parties in the air or on the ground, including property, can be satisfactorily demonstrated;
b. An UA /UAS must provide product integrity that is proportionate to the risk in all anticipated flight conditions;
c. Following the manufacturer's instructions/manuals, an UA must be safely controllable and manoeuvrable, as necessary under all anticipated operating conditions including following the failure of one or, if appropriate, more systems. Due account must be taken of human-factor considerations, in particular available knowledge about factors conducive to safe operation of technology by humans;
d. An UA/UAS and its engines, propellers, parts, non-installed equipment and equipment to control the UA remotely must function as intended under any foreseeable operating conditions, throughout, and sufficiently beyond, the operation for which the UA/UAS was designed;
e. UA/UAS and their engines, propellers, parts, non-installed equipment and equipment to control the UA remotely, considered separately and in relation to each other, must be designed such that the probability of a failure condition and the severity of its effect on people on the ground and other airspace users are mitigated;
f. Any equipment to control the UA remotely involved in the operation must be so as to facilitate flight operations, including means providing situational awareness, and management of any expected situation and emergencies;
g. The design of UA/UAS, engines and propellers must minimize the hazards arising from conditions, both internal and external to the UA/UAS and their systems, that experience has shown to have a safety impact. This includes protection against interference by electronic means.
h. The manufacturing processes, materials and components used to produce the UA/UAS must result in adequate and reproducible properties and performance that are compliant with the design properties.

2.2. Organisations

Organisations involved in UA/UAS design, production, maintenance, and training must meet the following conditions:

a. The organisation must have all the means necessary for the scope of its work and ensure compliance with the essential airworthiness requirements for its activity.
b. The organisation must implement and maintain a management system to ensure compliance with the relevant essential airworthiness requirements set out in this Annex, manage safety risks in accordance with Appendix I to Annexes B and C and aim for continuous improvement of this system. Such management system must be proportionate to the organisation's type of activity, size of UA and category of UAS operation.
c. The organisation must establish an occurrence reporting system, as part of the safety management system, in order to contribute to the continuous improvement of safety.

Such reporting system must be proportionate to the organisation's type of activity, size of UA and category of UAS operation.

d. The organisation must establish arrangements, where relevant, with other organisations to ensure continuing compliance with the relevant essential airworthiness requirements.

2.3. NIL

2.4. NIL

2.5. Essential requirements relating to electromagnetic compatibility and radio spectrum, for UA/UAS, as well as associated engines, propellers, parts and non-installed equipment.

a. UA/UAS, engines, propellers, parts and non-installed equipment must be designed and produced in such a manner, having regard to the state of the art, as to ensure that:

i. NIL;

ii. they have a level of immunity to the electromagnetic disturbance which allows them to operate without unacceptable degradation of their intended use.

b. UA/UAS, engines, propellers, parts and non-installed equipment must be designed and produced in such a manner, having regard to the state of the art, to avoid harmful interference.

3. Essential environmental requirements for UA/UAS

Unmanned aircraft shall comply with the environmental protection requirements set out in Annex D, if so required by national regulations.

4. Essential requirements for registration of UA/UAS and their operators and markings of UA/UAS

4.1. NIL

4.2. NIL

4.3. NIL

ANNEX D – ESSENTIAL REQUIREMENTS FOR ENVIRONMENTAL COMPATIBILITY RELATED TO PRODUCTS

1. Products must be designed to minimise noise as far as possible taking into account point 4.
2. Products must be designed to minimise emissions as far as possible taking into account point 4.
3. Products must be designed to minimise the emissions arising from the evaporation or discharge of fluids, taking into account point 4.
4. Any trade-offs between design measures intended to minimise noise, the emission of different species and the discharge of fluids must be taken into account.
5. The total range of normal operating conditions and geographical areas where the aircraft noise and emissions are of concern, shall be considered when minimising noise and emissions.
6. The aircraft systems and equipment required for environmental protection reasons must be designed, produced and maintained to function as intended under any foreseeable operating condition. Their reliability must be adequate in relation to their intended effect on the environmental compatibility of the product.
7. Any instructions, procedures, means, manuals, limitations and inspections needed to ensure continuing compliance of a product with the essential requirements set out in this Annex must be established and provided to the intended users in a clear manner.
8. The organisations involved in the design, production and maintenance of products must:
    a. have all means necessary to ensure compliance of a product with the essential requirements set out in this Annex; and
    b. establish arrangements with other relevant organisations as necessary to ensure compliance of an product with the essential requirements set out in this Annex.

APPENDIX I to ANNEXES B AND C – POLICY ON SAFETY MANAGEMENT SYSTEM (SMS)

General

1. The main purpose of an SMS is to ensure that, beyond assuring mere compliance with national regulations, organisations have the capacity of identifying the risks they may pose to flight safety and mitigating those risks.

2. Accidents having generally multiple, cross-domain causes, NMAAs and organisations should have a consistent approach when dealing with the identification of hazards and management of safety risks.

3. It is considered that effective implementation of SMS is the most important driver for implementing a risk- and performance-based approach.

Applicability and consistency

4. As a general principle, all organisations exposed to or possibly contributing to aviation safety risks, should be subject to SMS requirements. Possible exceptions should be determined based on:

    a. the overall contribution of a particular activity to the safety of the total system;

    b. the relative costs and benefits of SMS implementation both for organisations and NMAAs.

5. Applicability dates should be adapted to the type of activity of the organisations, in particular as regards their contribution to aviation safety risks.

6. In order to minimise changes in existing regulations and therefore the impact on organisations, the introduction of SMS requirements into new domains should be based on a careful gap analysis between existing requirements and the ICAO Annex 19 framework.

7. While minimising those changes, the resulting regulations should foster consistent implementation of SMS in the regulated fields. This is particularly important for those organisations holding multiple approvals within the scope of the applicable national regulations.

8. Harmonised NMAA requirements should support the development and maintenance of standardised and recommended practices as well as the streamlining of competent NMAA management systems and procedures and ensure consistency in organisation approvals.

Proportionality and flexibility

9. The Organisation's SMS must be commensurate with the size and complexity of the organisation and the level of risks involved.

10. To ensure proportionality and flexibility, the SMS requirements at National Implementing Rule (NIR) level should be limited to key principles. Non-essential implementation provisions should be included as AMC.

11. The implementation provisions at AMC level should be further adapted to the size, nature and complexity of specific technical domains or categories of organisations, while ensuring a consistent approach between different technical domains.

Implementation

12. The development and acceptance of industry standards and Safety Promotion material should be encouraged to support SMS implementation.

13. SMS implementation should be given reasonable time, beyond the mere implementation deadline, following a phased, performance-based approach.

14. Further emphasis should be put on supporting the implementation of simple, robust and proportionate SMS for simple, low-risk organisations.

Small organisations

15. Safety management principles, centred on the individual, should systematically be considered when developing or amending national regulations.

International harmonisation

16. While providing proportionality and flexibility the harmonised management system framework should address the elements of ICAO Annex 19 as follows:

    a. Safety policy and objectives

        i. Management commitment and responsibility

        ii. Safety accountabilities

        iii. Appointment of key safety personnel

        iv. Coordination of emergency response planning

        v. SMS documentation

    b. Safety risk management

        i. Hazard identification

        ii. Safety risk assessment and mitigation

    c. Safety assurance

        i. Safety performance monitoring and measurement

        ii. The management of change

        iii. Continuous improvement of the SMS

    d. Safety promotion

        i. Training and education

        ii. Safety communication