



**Airworthiness Regulation
in the
Norwegian Defence Sector**
Airworthiness Regulation

MILITARY AIRWORTHINESS AUTHORITY - NORWAY

METADATA

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CHANGES FROM PREVIOUS VERSION

| Section | Change |
|---------|---|
| A | |
| B | |
| C | Introduced new para C.2 concerning applications to the MAA-NOR. Introduced new para C.3 concerning Occurrence reporting. |
| D | Introduced new para D.5 Airworthiness Directives |
| E | Added a minor clarification regarding aircraft maintenance program (AMP). |
| F | |
| G | |
| H | Adjusted UAS categories to better coincide with UK MAA and EASA, and expected EMAR classifications |
| I | Introduced new section concerning Operational Suitability Data and Operations Specifications. Included Helicopter Ship Integration requirements where this activity may affect airworthiness. |
| J | Introduced new section concerning Personal Flight Equipment (PFE), tools, and Aviation Life Support Equipment (ALSE) |
| K | |

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A. DEFINITIONS

Refer to European Military Airworthiness Document (EMAD) 1, Definitions and Acronyms, for definitions used in this Regulation.

For definitions and acronyms not listed in EMAD 1, refer to Appendix 1, Definitions and Acronyms.

B. INTRODUCTION

This Regulation contains regulatory text. Text on BLUE BACKGROUND is either Acceptable Means of Compliance (AMC) or Guidance Material (GM).

Any AMC provided in this document will ensure that the regulatory requirements are satisfied.

This Regulation opens for alternative AMCs to those provided in this document. However, any such alternative AMCs must satisfy the regulation text, and must be submitted to the MAA-NOR for approval before any use.

The Director of Norwegian Defence Materiel Agency, Air Systems Division (NDMA ASD) is the Materiel Authority for Norwegian Military Aircraft, Ground Based Air Defence equipment and Ground Support Equipment.

The Director of NDMA ASD is the acting Military Airworthiness Authority – Norway (MAA-NOR/NML) for all Norwegian Military Aircraft on behalf of the Military Aviation Authority, including requirements for materiel, organisations and personnel. The Director of NDMA ASD is managing the airworthiness authority within delegated power as Materiel Authority.

All airworthiness authority roles and tasks are performed by the NDMA ASD Airworthiness Authority department¹ (MAA-NOR).

The MAA-NOR is the National Military Airworthiness Authority (NMAA) as defined in EMAR.

For a description of MAA-NOR organisation, processes, information bulletins and regulations, refer to the internet webpage at www.maanor.no.

For all references to European Military Airworthiness Requirements (EMAR): refer to the latest version published in FOBID or at www.maanor.no.

B.1 PURPOSE

This Regulation states how the MAA-NOR will regulate and assess airworthiness of Norwegian Military Aircraft, including components, as defined in EMAR.

¹ Avdeling for militær luftdyktighetsmyndighet

Airworthiness is a technical attribute, defined in EMAR as:

“The ability of an aircraft or other airborne equipment or system, to operate in flight and on ground without significant hazard to aircrew, ground-crew, passengers (where relevant) or to other third parties.”

During management of continuing airworthiness (including maintenance), formal requirements and standards are used to ensure the continuing design level of risk.

Airworthiness is exactly the same as materiel safety (Materiellsikkerhet) of an aircraft. During the design phase, it is not a formal attribute, but is governed by risk.

Compliance to EMAR 21 implies that the initial and continued airworthiness of an aircraft type is in accordance with all requirements for materiel safety.

Compliance to EMAR 145 and M implies that the continuing airworthiness of an aircraft individual or fleet is in accordance with all requirements for materiel safety.

This Regulation provides instructions to organizations within the Norwegian Defence sector, as well as expected standards and contractual requirements to organizations outside the sector.

It provides alternative means for flight release of aircraft which do not fully comply with an approved certification basis.

It enables MAA-NOR acceptance of other, civilian and military, certifications; evaluations and inspections.

The Military Aviation Authority is regulated in Norwegian Air Law (LOV-1993-06-11-101) regulation §17-12 and §17-13.

Norwegian Air Law §17-4 requires that Norwegian Military Aircraft shall be airworthy. A non-conformance which causes an aircraft, part or appliance to be un-airworthy may be a violation of Norwegian Air Law.

The term Airworthiness Authority is a defined element of the Military Aviation Authority and is introduced in Norwegian military aviation through Provision for military aviation (Bestemmelser for militær luftfart, BML), issued by the Military Aviation Authority.

This Regulation for airworthiness is in response to the requirement in BML stating that NDMA ASD shall issue regulations for airworthiness, as well as Direktiv for Materiellforvaltning regarding requirements and issuance of regulations.

The Commander of the Royal Norwegian Air Force and the Commanding Officer (CO) of NDMA ASD have, as directed by the Ministry of Defence, entered into an agreement where the former is the airworthiness authority on behalf of the Military Aviation Authority.

The agreement is not a legal basis document to determine airworthiness requirements. For this reason, the Commanding Officer (CO) of NDMA ASD is managing the airworthiness authority within delegated power as Materiel Authority, as well as within the requirements from the Military Aviation Authority, including the agreement.

The MAA-NOR will comply with EMAR section B requirements.

B.2 SCOPE OF APPLICATION

Compliance with this Regulation is mandatory in the Norwegian defence Sector. This Regulation is applicable to all Norwegian Military Aircraft.

An aircraft registered in Norwegian Defence Aircraft Register (NDAR) is subject to this regulation regardless of the nationality or organization of the pilot or other related personnel, and regardless of whether the flight is performed in a foreign country.
State Aircraft on civilian register are under the jurisdiction the Norwegian CAA.

Foreign military aircraft operating in Norwegian airspace as part of exercises or other approved duties are not affected by this regulation.

All units and/or organizations within the Norwegian defence sector are required to enforce that any organizations or persons outside the Norwegian defence sector, that design, build, maintain, repair, modify, procure, supply, operate, or in any other way perform activities that may affect the airworthiness of Norwegian Military Aircraft, adhere to this Regulation.

Contracting units (including NDLO) are responsible for incorporating these requirements into procurement and maintenance contracts.

Failure to adhere to this Regulation could potentially render any contract null and void, or prohibit use of any procured equipment.

Operational aspects (Operations Personnel, Air Operations, Rules of the Air, Air Navigation) are not included in this regulation. All operational aspects including operational risk are within the authority of the Military Aviation Authority.

This regulation does not address survivability in a hostile environment.

This regulation does not apply to Ground Based Air Defence (GBAD) systems.

B.2.1 RELATION TO OTHER DIRECTIVES AND REGULATIONS

This Regulation is subordinate to the policies of the Norwegian Ministry of Defence (MoD) for investment, materiel and logistics², in addition to the Directive for Materiel Management, and the regulations concerning airworthiness of Norwegian military aircraft as defined by the Military Aviation Authority³.

This document shall take precedence over any other directive or regulation than those listed above.

The Policies and Directive define materiel safety and the materiel authority⁴. For further information, refer to Fig. 1.

The Policies and Directive define materiel safety and assign the materiel authority (fagmyndighet materiell). These terms are separated into two parts, one where the MAA-NOR regulates and enforces airworthiness, and one where the materiel authority regulates military materiel categories beyond aircraft.

² Retningslinjer for investeringer i forsvarssektoren, Retningslinjer for Materiellsikkerhet i forsvarssektoren, Retningslinjer for Materiellforvaltning i forsvarssektoren, Retningslinjer for Logistikkvirksomheten i forsvarssektoren.

³ Bestemmelser for militær luftfart (BML).

⁴ fagmyndighet materiell

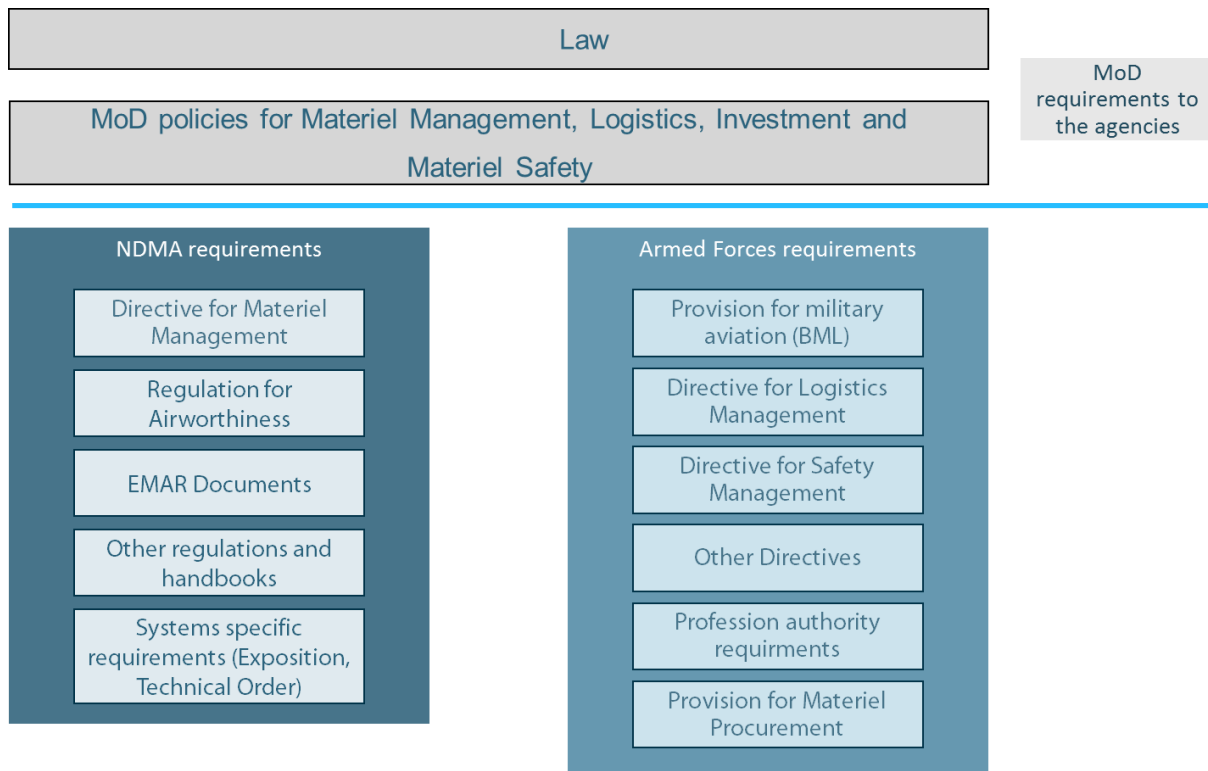


Figure 1, the relationship between Norwegian defence sector documents affecting airworthiness.

B.2.2 FITNESS FOR PURPOSE

Fitness for purpose (performance qualification) is not a part of airworthiness.

The processes and documents related to FFP evaluation shall be sufficiently separated from those used to evaluate airworthiness to enable separate approvals/certifications.

The primary reference for technical fitness for purpose (FFP) evaluation should be USAF AFMCI 63-1201 Attachment 3, Operational Safety Suitability and Effectiveness (OSS&E).

The airworthiness approval process follows given procedures to ensure that criteria are complied with. This approach will not always be cost-effective for FFP (example: repeated testing to ensure not only whether a system works, but also its Mean Time Between Failure, MTBF).

The airworthiness process is solely focused on the certification basis, which carries some, but generally limited, information on FFP.

The airworthiness process uses risk management as the primary tool for determining whether a type is airworthy. An FFP evaluation may need to use other and different assessment methods that are not allowable to use for determining airworthiness.

The operational user should provide statement of operating intent guidance and scope of the FFP evaluation.

An initial performance qualification should be performed prior to the Operational Test and Evaluation (OT&E) (or equivalent). This qualification should be of sufficient extent to initiate the OT&E. A full mission qualification should be performed after a suitable OT&E, or as defined by the user.

NOTE that a performance qualification cannot be in conflict with the airworthiness approval.

B.2.3 DECOMMISSIONING AND DISPOSAL

Any part or appliance that is scrapped or otherwise permanently withdrawn from service, shall be clearly and physically marked in order to safeguard against unintended or illegal use.

Aircraft are normally subject to specific end user agreements, which limit Decommissioning and Disposal (D&D) including potential buyers. Any end user agreements shall be closely observed during D&D.

C. GENERAL

Organizations within the Norwegian defence sector shall develop procedures to ensure that the objectives of this Regulation are fulfilled.

C.1 NORWEGIAN DEFENCE SECTOR AIRCRAFT REGISTER

The MAA-NOR is responsible for maintaining the Norwegian defence sector aircraft register⁵ (NDAR) comprising all Norwegian military aircraft.

The rules and provisions concerning the register are provided in *Bestemmelser for militært luftfartøyregister*.

NOTE that for certain classes of unmanned aircraft, separate registration requirements are applicable. Refer to section H UNMANNED AIRCRAFT.

Any aircraft carrying Norwegian military marking (*ref TO-1-1-5004-1*) should be in the NDAR unless the marking is applied to a historic aircraft and the aircraft is de facto in another register.

Any aircraft, manned or unmanned, owned, leased and/or operated by organizational components of the Norwegian defence Sector (NDS) should be in the NDAR unless being in a civilian register or an MAA-NOR recognized military register.

C.2 APPLICATIONS TO THE MAA-NOR

Templates for applications to the MAA-NOR are found at www.maanor.no.

The applications should be sent via the channels listed in the "Contact Us" tab.

C.3 OCCURRENCE REPORTING

Any identified condition of aircraft or components which endangers flight safety shall be reported to the MAA-NOR.

All maintenance organisations, continuing airworthiness management organisations and production organisations shall report airworthiness related occurrences to relevant design organisation, or equivalent, when such reporting does not violate Norwegian security regulations.

Any organisation maintaining or performing continuing airworthiness management tasks on foreign registered aircraft shall report all occurrences that may relate to the airworthiness of foreign aircraft to the National Military Airworthiness Authority (or equivalent) of the state of registry, and to MAA-NOR.

MAA-NOR shall exchange information with foreign NMAAs as required by Recognition Implementing Arrangements (RIAs).

Furthermore, MAA-NOR should share information from reported occurrences with relevant foreign NMAAs in the interest of safety, when such information sharing does not violate Norwegian security regulations or confidentiality requirements.

MAA-NOR will remove personal details, and consider security, confidentiality and just culture before sharing information from reported occurrences with any entity.

⁵ Retningslinjer for Materiellsikkerhet i forsvarsektoren (RMS), para 2.3

C.4 SAFETY MANAGEMENT SYSTEM

All organizations that perform activities that may affect the airworthiness of Norwegian Military Aircraft, shall establish and maintain an effective Air Safety Management System (ASMS).

The SMS shall include organizational structures, accountabilities and procedures to ensure that the risks associated with hazards to flight operations are systematically and formally identified, assessed, and managed within acceptable safety levels.

The above is equally applicable to both military and civilian organisations (industry), and is applicable to all aircraft types, including legacy types, regardless of EMAR implementation status.

Each organization's ASMS should address the auditable facets listed below:

- a) Safety Policy and Objectives:
 - 1) Leadership, Commitment, Accountabilities and Responsibilities.
 - 2) Engaged Air Safety Culture.
 - 3) Air Safety Priority, Objectives and Targets.
 - 4) Organization, Key Safety Personnel, Air Safety Competencies.
 - 5) Defined Interfaces with Adjacent SMS.
 - 6) Emergency Response Planning.
 - 7) ASMS Documentation.
- b) Safety Risk Management:
 - 1) Reporting and Investigation.
 - 2) Hazard Identification.
 - 3) Safety Risk Assessment and Mitigation.
- c) Safety Assurance:
 - 1) Safety Performance Measurement and Compliance Monitoring.
 - 2) Management of Change.
 - 3) Continuous Improvement of the ASMS.
 - 4) Retention, Evaluation and Feedback of Information.
- d) Safety Promotion:
 - 1) Training and Education.
 - 2) Safety Communication.

Aviation managers and Accountable Managers' ASMS should enable their organization to manage Air Safety in order to mitigate associated Risks to Life (RtL) so that they are As Low As Reasonably Practicable (ALARP) and Tolerable for the Air System(s) for which they are responsible.

C.4.1 AIRWORTHINESS RISK ACCEPTANCE

Any airworthiness risk above the allowable risk level shall be accepted by the MAA-NOR, unless there is an operational emergency, refer to G, FLYING WITH UN-AIRWORTHY AIRCRAFT.

A thorough explanation of airworthiness risk, and assessment of such risk, is provided in USAF Airworthiness Bulletin 150 (AWB-150).

| Airworthiness Risk Level | USAF Hazard Risk Index (HRI) equivalence ¹ | Risk Acceptance |
|--------------------------|---|----------------------|
| GREEN/LOW | USAF HRI 18-20 | CAMO head of section |
| YELLOW, ORANGE (MEDIUM) | USAF HRI 10-17 | MAA-NOR |
| RED (HIGH) | High or serious risk USAF HRI 1-9 | |

The MAA-NOR will inform the user of any known risk higher than the allowable risk.

Some allowable risk levels are:

10^{-4} FHR total risk, fighter type aircraft ($2,5 \cdot 10^{-4}$ FHR total risk for F-35)

10^{-6} FHR for loss of life

10^{-6} FHR for loss of aircraft, average of all aircraft types

10^{-7} FHR for structural failure, average of all aircraft types

10^{-9} FHR for single catastrophic failure, average of all aircraft types

Any risks higher than this must be approved by MAA NOR management.

The MAA-NOR will formally inform the user of any known or suspected risk above the acceptable risk levels before any flight with the applicable type.

D. INITIAL AND CONTINUED AIRWORTHINESS

Initial and continued airworthiness of Norwegian military aircraft shall be in accordance with EMAR 21.

This requirement also includes legacy aircraft.

Initial and continued airworthiness includes changes, supplements and repairs.

Design organizations shall hold an approval or acceptance granted by a recognized authority, or perform the work in accordance with a regime regulated or accepted by a recognized authority. The MAA-NOR will assess and accept the regulatory construct.

The MAA-NOR can accept several design organization approval regimes. The primary means will normally be a Military Design Organisation approval (MDOA) iaw EMAR 21. Other examples may be

- DOMA iaw Italian AER(EP).P-10, System Design Responsible (SDR)
- Coordinating Design Organisation, typically granted to US Armed Forces Program Offices
- USAF Delegated Technical Authority iaw AFI 62-601

Unless otherwise agreed with the MAA-NOR, the Design Organization of the aircraft Type (Design Authority, Original Equipment Manufacturer or similar) shall be the MTC Holder.

D.1 NON-COMPLIANCES AND DEVIATIONS

When a Military Type Certificate (MTC) applicant or Design Authority (DA) cannot show compliance to the certification basis, the requirements laid out in EMAR 21 shall be adhered to.

When a Military Type Certificate (MTC) applicant or holder, Design Authority (DA) or other stakeholder cannot show compliance to other requirements, the organization shall take appropriate corrective actions to mitigate risk, ensure that all requirements are sufficiently met, and that any non-compliance is within acceptable total risk.

The applicant/DA may suggest equivalent acceptable means of compliance, subject to approval by the MAA-NOR.

The MAA-NOR may suspend the approval, in whole or in part, in case of failure to comply within the requirements.

D.2 AIRWORTHINESS ASSESSMENT

All aircraft/air system types in NDAR shall be subject to a completed airworthiness assessment. For in-service types designated as legacy, separate procedures apply, see D.6 LEGACY AIRCRAFT.

DODD 5030.61 states: “all aircraft and air systems owned, leased, operated, used, designed or modified by DoD must have completed an airworthiness assessment”.

This is a good guideline also for Norwegian military aircraft.

The approved Airworthiness Assessment shall result in the issuance of a formal MAA-NOR certificate or permit.

This may either be a Military Type certificate (MTC), or a Military Permit to Fly (MPF) for aircraft for which the issuance of an MTC is not appropriate⁶.

The issuance of MTC may not be appropriate based upon the risk related to flying the type, or based upon any of the formal requirements that apply. Even if the formal requirements (documentation etc) are fulfilled, an MTC will never be issued if the actual or calculated/probable risk is higher than the acceptable risk levels.

Validation shall normally be based upon an MTC or Type Certificate (TC) from a recognized foreign Military Airworthiness Authority, see MAA-NOR RECOGNITION AND ACCEPTANCE OF FOREIGN AND CIVIL AIRWORTHINESS CERTIFICATION.

D.3 INSTRUCTIONS FOR CONTINUING AIRWORTHINESS

The holder of a type certificate, restricted type certificate, supplemental type certificate, design change or repair design approval or equivalent organisation shall furnish at least one set of complete instructions for continued airworthiness to the operator (Air Force).

For US Air Force or US Navy aircraft types, a US DoD Program Office is the MTC holder for the MTC issued by the original certifying authority.

Instructions for continuing airworthiness shall, where applicable, be approved, either by the MAA-NOR, an organisation with privileges granted by the MAA-NOR, or an authority recognized by the MAA-NOR.

⁶ EMAR 21 Subpart B

Instructions for continuing airworthiness are the instructions and information that are necessary for the continuing airworthiness of the aircraft, engine, propeller, parts and appliances, which must be developed or referenced by the design approval holder in accordance with the applicable certification basis.

The holder of a type certificate, restricted type certificate, supplemental type certificate, design change or repair design approval shall furnish at least one set of complete instructions for continued airworthiness to each operator upon its delivery, and thereafter make those instructions available on request to any other person required to comply with any of the terms of those instructions.

The type certificate or restricted type certificate holder may delay the availability of a portion of the instructions for continuing airworthiness, dealing with overhaul or other forms of heavy maintenance, until after the product or modified product has entered into service, but shall make those instructions available before the product or modified product requires such overhaul or heavy maintenance.

Changes to the instructions for continued airworthiness shall be made available to all known operators of the product affected by the change and shall be made available on request to any person required to comply with any of the terms of those changes to the instructions. The holder of a type certificate, restricted type certificate, supplemental type certificate, design change or repair design approval shall submit to the MAA-NOR a document describing the process for how changes to the instructions for continuing airworthiness are made available in order to comply with the first sentence.

D.4 SAFETY APPROVAL AND ADMINISTRATIVE APPROVAL OF AIRCRAFT (TEKNISK OG FORVALTNINGSMESSIG GODKJENNING AV FLY)

Safety approval and administrative approval is mandated through the MoD policy for material safety (RMS), and is not an EMAR airworthiness process. However, the processes overlap and should be combined as stated.

The airworthiness artifacts listed will, when combined, constitute the safety approval and administrative approval for a new air system:

1. An MTC or an MPF.

The validated MTC including its substantiating documentation (including risk assessment) shall constitute the Materiel Safety Approval (MSA)⁷.

2. A Military Certificate of Airworthiness (MCoA) or equivalent document or enterprise resource planning (ERP) entry.

The MCoA or equivalent shall constitute the Military Airworthiness Attestation⁸.

3. A Continuing Airworthiness Management Exposition (CAME)⁹.
4. A Maintenance Organization Exposition (MOE)¹⁰.
5. A document describing the planned usage of the materiel¹¹, referring to the CAME.

⁷ RMS para 8.2

⁸ BML para 2.3.1, Krav til luftdyktighet (Airworthiness Requirements)

⁹ EMAR M.A.704

¹⁰ EMAR 145.A.70

¹¹ Materielldriftsplan (MDP)

D.4.1 CRITERIAS FOR INITIAL ISSUE AND REVISION OF THE APPROVAL

A full safety and administrative approval shall only be performed on a system level (ie a new aircraft type).

On an exceptional basis, a full, new approval may be performed whenever a major significant modification affects the airworthiness of multiple systems (i.e. mid-life update with combined major avionics and structural modifications).

Subsequent changes and supplements shall, beyond the MTC, trigger an appropriate update or change to the existing approval.

Example: a new radio in an existing aircraft. In this case, the existing approval will be updated, as required to ensure the safety of the new configuration. This will always include MTC (supplement), configuration documents and AMP.

A minor, non-significant, change may be documented only as a minor change and as an update to the parts catalog.

D.5 AIRWORTHINESS DIRECTIVES

Any CAMO managing Norwegian military aircraft shall perform any Service Bulletin issued by the Design Organisation that affects airworthiness, and regard this as an Airworthiness Directive (AD).

If the SB only affects parts or assemblies that are not installed, the CAMO shall perform the SB before the equipment is released to service. If the SB is considered by the CAMO to otherwise not apply to the fleet, the CAMO should apply to the MAA-NOR for alternative AMC.

Service Bulletins marked as "Mandatory", "Alert" or "Emergency" or any TCTO/TCTD labelled as "Safety", "Immediate Action" or "Urgent Action" (except urgent operational requirements) would normally be expected to affect airworthiness and fall under this category.

D.6 LEGACY AIRCRAFT

Those aircraft registered in NDAR and in full service before 1st of January 2016 are designated as legacy aircraft.

Any Aircraft Type introduced into regular service before 1 January 2016; and that does not have any type of flight clearance issued based upon known and recognized Certification Criteria; and/or does not have a Military Type Certificate (MTC) issued by a recognized Airworthiness Authority, is a Legacy System.

Legacy aircraft types are not required to recertify airworthiness or update certification basis until undertaking a major modification.

D.7 SPECIAL REQUIREMENTS

Appliances shall be subject to airworthiness certification iaw EMAR 21.

Personal Carrying Devices Systems (PCDS) certification and integration shall be performed iaw. CS29.865(c)(2) Amdt. 6.

E. CONTINUING AIRWORTHINESS

Continuing Airworthiness shall be managed iaw EMAR M.

Legacy types shall be managed iaw the legacy regulation (*RMM*)¹² within the Norwegian defence sector. The management organization may apply to the MAA-NOR for managing legacy types iaw EMAR M.

Any CAME relating to Norwegian military aircraft is subject to approval by the MAA-NOR.

The MCoA may be in a digital format, i.e embedded into the applicable ERP computer system.

Whenever Norwegian Military Aircraft are maintained or operated iaw foreign military rules, the MAA-NOR remains the authority and shall be granted access to any airworthiness artifact, organization or person for audits, revision, counseling and any means of oversight, control etc that the MAA-NOR sees fit and that is within the MAA-NOR scope.

The MAA-NOR can invite any other party to any such activity, but must ensure that the invited party is eligible to entry and information sharing.

NOTE that Initial and Continued Airworthiness managed iaw USAF AFI 62-601; and Continuing Airworthiness managed iaw USAF AFI 21-101, is normally approved, with the condition that MAA-NOR does not accept self-regulation. Therefore, audits must be performed, either by the MAA-NOR, or by an organization recognized or authorized by the MAA-NOR.

Operational use of aircraft registered in NDAR is governed by the Military Aviation Authority (MLFM) through BML.

NOTE that continued airworthiness (changes, modifications and flight releases) shall be managed iaw EMAR 21, refer to D INITIAL AND CONTINUED AIRWORTHINESS.

E.1 AIRCRAFT MAINTENANCE

Aircraft maintenance shall be managed iaw EMAR 145.

Legacy types shall be managed iaw *RMM* within the Norwegian defence sector. The maintenance organization may apply to the MAA-NOR for managing the maintenance iaw EMAR 145 for legacy types.

Any MOE relating to Norwegian military aircraft is subject to approval by the MAA-NOR.

Training and authorization of technical personnel within the Norwegian defence sector shall be managed iaw Regulation for technical training¹³ (RFK Luft).

Refer to «*Regulation for approved parts, part sources and maintenance providers for Norwegian military Aircraft*» for detailed requirements and acceptable means of compliance for maintenance providers outside the Norwegian defence sector.

Scheduled maintenance requirements implemented by the legacy authority (fagmyndighet materiell) shall be considered as part of the approved Aircraft Maintenance Program. Adjustments of these scheduled maintenance requirements shall be approved by MAA-NOR, unless an indirect approval procedure specific to legacy maintenance requirements is approved as part of the CAME.

¹² Regulation for Continuing Materiel Safety, Management and Maintenance of Legacy Norwegian Military Aircraft, Ground Based Air Defence Materiel and Ground Support Equipment. Previous reference number BMF/L 750-1.

¹³ Reglement om faglige krav til vedlikeholdspersonell for luftmateriell

E.2 AIRCRAFT MAINTENANCE TRAINING

Aircraft maintenance training organisations shall be managed iaw EMAR 147.

Any MTOE relating to Norwegian military aircraft is subject to approval by the MAA-NOR.

E.3 AIRCRAFT STRUCTURAL INTEGRITY MANAGEMENT

Structural Integrity Management shall be performed iaw EMAD 20-20 Military Considerations on Using AMC 20-20 (Continuing structural integrity programme) For Military Applications.

The applicable design organisation (OEM) is responsible to ensure that there is a Structural Integrity Management system for all Air System types within their Area of Responsibility.

The CAMO (system responsible) shall ensure that the Structural Integrity Management system is sufficient to ensure an acceptable and demonstrable level of structural integrity.

E.4 NON-COMPLIANCES AND DEVIATIONS

When a maintenance organization, maintenance training organization or CAMO cannot show compliance to the requirements, the organization shall take appropriate corrective actions to ensure an equivalent level of safety. The maintenance organization or CAMO may apply for acceptable means of compliance, subject to approval by the MAA-NOR.

The MAA-NOR may suspend the approval, in whole or in part, in case of failure to comply within the requirements.

F. MAA-NOR RECOGNITION AND ACCEPTANCE OF FOREIGN AND CIVIL AIRWORTHINESS CERTIFICATIONS

F.1 GENERAL

The MAA-NOR may recognize a foreign airworthiness authority to perform any part of an airworthiness approval process, short of validating an MTC or issuing an MPF. European Military Airworthiness Document – Recognition (EMAD R) shall be the basis for such recognition.

The MAA-NOR will accept civilian certifications of common type versions from authorities recognized by EASA (this includes, but is not limited to, EASA, FAA, Transport Canada, National Civil Aviation Agency of Brazil ANAC).

The MAA-NOR may accept a foreign nation's military airworthiness approval, airworthiness artifact or related process as a basis for MAA-NOR airworthiness approval.

Recognized in this context means that the MAA-NOR has found the applicable organization to sufficiently comply with any requirement (within EMAR or other regulation set) that is relevant to the applicable scope. Further, that the MAA-NOR will trust the applicable output(s) from that organization as specified in the individual Certificate of Recognition.

If an organization initially is found not to show such compliance, the MAA-NOR is free to

1. Terminate the recognition effort
2. Delay the recognition to a later date
3. Adjust the scope/task so that the organization complies with the new scope.

In this event, the MAA-NOR will find alternative solutions to necessary activities/requirements falling outside the original scope.

Refer to EMAD R for further information.

After a recognition, the MAA-NOR may perform audits of the procedures and processes of the recognized organization and its' regulated community as required.

Utilization of a MAA-NOR-approved, foreign airworthiness authority's approval as a basis for Norwegian Military airworthiness approval is permissible provided the flight profile, operating environment, and continuous airworthiness program as approved for that aircraft and the air system is similar to the intended usage within the Norwegian Defence sector.

"As a basis" means that the MAA-NOR, based upon findings during recognition, prior performance and level of confidence, may approve the artifacts and/or processes without any further action, or the MAA-NOR may choose to verify the artifact or process.

The MAA-NOR will assess any gaps between the intended usage of the foreign approval and the Norwegian defence sector intended usage¹⁴ and ensure that any residual risk is within acceptable limits.

F.2 MAA-NOR ACCEPTANCE OF CIVILIAN OR FOREIGN MILITARY CERTIFICATIONS, EVALUATIONS AND INSPECTIONS

The basis for airworthiness certification shall be validated by and be subject to approval by the MAA-NOR. The basis for certification shall be the original certification from the primary certifying authority.

The existing EASA, FAA or other (typically foreign military) certification will normally be used as the certification basis for issuing the Norwegian MTC. The MAA-NOR will normally not introduce any other certification basis, unless certification basis is missing for certain types of equipment (i.e. is not certified for the applicable use).

Any ambiguities between the existing certification and the Norwegian Military requirements (usage spectrum, statement of operating intent, additional requirements etc), will normally be handled through an MTC Change or Supplement.

Following approval, the (Military) Type Certificate (TC or MTC) shall be validated by the MAA-NOR. For any items not included in the original TC, an MAA-NOR-approved basis for certification shall be used to define military airworthiness certification criteria, standards, and methods of compliance. Normally, this should be either European Military Airworthiness Certification Criteria (EMACC) or the original basis for certification.

NOTE that the civilian CS (23, 25, 27 and 29) is incorporated and cross referenced in EMACC.
NOTE that MIL-HDBK-516 has a mostly shared document structure with EMACC.

G. FLYING WITH UN-AIRWORTHY AIRCRAFT

Whenever an operational emergency that involves clearance to fly with an aircraft that is un-airworthy, the following shall apply¹⁵:

The authority that orders such flying shall assume full responsibility for all risks involved, including risk to life.

The authority that orders such flying shall assume full responsibility for any additional expense of returning the aircraft to airworthy status after end of operations.

¹⁴ Refer to DoDD 5030.61, May 24, 2013, ENCLOSURE 3, Change 1, 06/25/2015

¹⁵ Retningslinjer for Materiellsikkerhet para 9.6

The applicable user shall without delay inform the MAA-NOR about flying with un-airworthy aircraft, The MAA-NOR will inform the user of known risk related to the flight(s), and may advise risk mitigating actions for airworthiness risks.

Non-emergency cases where the MAA-NOR concludes that the risk is within acceptable levels (if necessary, after prescribing risk mitigating actions) should be authorized by the MAA-NOR through an MPF including conditions and limitations. In this case, the aircraft is airworthy as long as it is operated within the published flight conditions and limitations, and normal procedures apply.

Guidance material can be found in UK MoD RA 1330 - Special Clearances.

G.1 POST UN-AIRWORTHY FLYING

After completion of the applicable flight/operation/campaign, the aircraft shall be deemed non-operational until the MAA-NOR declares that the risk of continued operations is within acceptable levels, and the MAA-NOR is ready to assume such risk.

H. UNMANNED AIRCRAFT

Also referred to as Remotely piloted air systems (RPAS) or unmanned air/aerial vehicle (UAV).

Unmanned aircraft shall be categorized iaw the categories below.

The operator (within the defence sector this would normally be the Air Force/Army/Navy unit, or CAMO where applicable) shall apply to the MAA-NOR for applicable certifications and approvals.

When operating inside a danger area or restricted area, the limitations regarding visual line of sight, distances and heights may be extended in accordance with operational regulations.

For technical requirements, refer to appendix 6, UAV airworthiness requirements per category.

Even if operating inside a danger area or restricted area, the UAV shall be categorized iaw the categories below as the basis for the technical approval.

H.1 CLASSIFICATIONS AND AIRWORTHINESS REQUIREMENTS

H.1.1 OPEN CATEGORY (0, 1A)

Open Category operations present a low risk, and are bounded by three main factors:

- 1) The Maximum Take Off Weight (MTOW) of the UAV is less than 25 kg.
- 2) The UAV is operated within Visual Line of Sight (VLOS).
 - a. Operations Beyond Visual Line of Sight (BVLOS) (A1 BVLOS) may be permitted, provided the operator can demonstrate to the MAA-NOR a sufficient system to manage risk to civil and manned military aviation.
- 3) The UAV is not flown at a height greater than 120 m (400 ft) from the closest point of the surface of the earth.

The Open Category is divided into three operating sub-categories:

- 1) **Open A1** (Fly 'over' people). Operations within the Open A1 subcategory are only to be conducted with UAV that present a low risk due to their low MTOW (less than 250 g, or 900 g with max speed 19 m/s) and their physical attributes /construction. The Open A1 subcategory allows operations over uninvolved people but not over open-air assemblies of more than 1,000 people.
- 2) **Open A2** (Fly 'close to' people). Operations within the Open A2 sub-category are only to be conducted with UAV that have a MTOW of less than 4 kg and are capable of being operated safely to a minimum horizontal distance of 30 m from uninvolved people, or down to 5 m horizontally if a "low speed mode" is fitted and selected. "Low-speed mode" limits the maximum speed to 3m/s when selected by the Remote Pilot (RP).
- 3) **Open A3** (Fly 'far from' people). Operations within the Open A3 sub-category are only to be conducted with UAV that have a MTOW of less than 25 kg. The Open A3 sub-category allows for operations in areas that are clear of uninvolved persons but not within 50 m of Congested Areas.

Safety approval and administrative approval (teknisk og forvaltningsmessig godkjenning, TFG) for UAV in the OPEN class shall be on class-level.

Registration for UAV in the OPEN class shall be per type, and not per individual.

H.1.2 SPECIFIC CATEGORY (1B, 2, 3)

Specific Category operations present a greater risk than that of the Open Category, or one or more elements of the operation fall outside the boundaries of the Open Category.

The Specific Category is divided into two sub-categories:

- 1) **Specific S1.** Operations within the Specific S1 sub-category are those to be conducted with UAV that have a MTOW of less than 25 kg, and are required to operate Beyond Visual Line of Sight (BVLOS) up to a maximum of 2,000 m from the RP.
- 2) **Specific S2.** Operations within the Specific S2 sub-category are those to be conducted with UAV that either:
 - a. Have a MTOW of 25 kg or greater, or
 - b. Have a MTOW of less than 25 kg, and are required to operate BVLOS in excess of 2,000 m from the remote pilot (RP).

Safety approval and administrative approval (TFG) for SPECIFIC class shall, based upon an individual assessment for each type, either be on type level or on class-level.

H.1.3 CERTIFIED CATEGORY

Operations within the Certified Category present a greater risk than that of the Specific Category and present an equivalent 2nd and 3rd party risk to that of manned aviation.

RPAS will be categorized within the Certified Category if:

- 1) They are intended to be operated over open-air assemblies of more than 1,000 people, or
- 2) They are designed to carry people, or
- 3) They carry weapons or dangerous cargo outside of designated Danger Areas, or
- 4) The MAA-NOR determines that the residual risk is too great unless the UAV is certified, based on a combination of: MTOW, UAV size, VLOS or BVLOS operation, overflight of people, airspace integration and classification, detect and avoid, etc.

For Certified category, all the rules of manned aircraft apply (i.e the system and related organisations and persons are required to fulfill the requirements and apply for those approvals applicable to manned aircraft that the MAA-NOR finds relevant).

Table 1, UAV Classes. Refer also to Regulation 140-20(A).

| NATO/BFL 140-20 class | AR Class | Airworthiness requirements |
|------------------------|---|----------------------------|
| Class 0 below 249g | OPEN below 25kg (Specific if BVLOS) | Refer to Appendix 6 |
| Class 1A 250g-25kg | | |
| Class 1B 25-150kg | SPECIFIC or CERTIFIED | Refer to Appendix 6 |
| Class 2 150-600kg | | |
| Class 3 above 600kg | | |

H.2 ARMED UNMANNED AIRCRAFT

Armed unmanned aircraft shall be classified in the CERTIFIED category.

NOTE: certain types loitering ammunition and similar technologies may be regarded as ammunition. Military ammunition shall be approved by the appropriate military authority. If in doubt, contact the MAA-NOR.

I. OPERATIONAL SUITABILITY DATA (OSD) AND OPERATIONS SPECIFICATIONS

Refer to EMAR 21 Revision 2.0. 21.1.(k).

Operational Suitability Data (OSD) shall be approved by MAA-NOR under the type certificate, to be used by operators and training organizations.

I.1 PILOT, FLIGHT CREW AND MAINTENANCE TYPE RATING TRAINING

For pilot and flight crew type rating training, refer EMAR 21.1.(k). Refer to OSD – Flight Crew Data for further AMC/GM.

For training of maintenance personnel refer to EMAR 21.1.(k). Refer to OSD – CS-MCS Maintenance Data for further AMC/GM).

I.2 MASTER MINIMUM EQUIPMENT LIST (MMEL)

A categorised list of on-board systems, instruments and equipment that may temporarily be inoperative for flight shall be developed for each specific aircraft type.

For new aircraft types this list shall be approved (validated) by MAA-NOR as part of the certification (validation) process, for other aircraft types the operator (CAMO) shall ensure the list is developed. The list shall either be prepared by the organisation responsible for the type design, or by an organisation otherwise approved by the MAA-NOR.

Any airworthiness-related equipment or system not on the list must be functional for flight.

The list should contain the following:

1. Approval status, including date of approval and effective date.
2. A preamble, containing considerations on the purpose and limitations, utilisation, multiple inoperative items, rectification interval extension, definitions and, if appropriate, clarifying notes which adequately reflect the scope, extent and purpose of the list
3. The list of items, including for each item:
 - the rectification interval category;
 - the number installed or a dash symbol, as applicable;
 - the number required or a dash symbol, as applicable;
 - the operational procedure symbol, as applicable;
 - the maintenance procedure symbol as applicable;
 - placarding indications, as applicable; and
 - any associated conditions and limitations, including the intent and periodicity for the accomplishment of the operational and maintenance procedure, as applicable.

For further guidance, refer to EASA *Certification Specifications and Guidance Material for Master Minimum Equipment List (CS-MMEL)*.

I.3 AIRCRAFT SIMULATORS

Simulators for military aircraft types should be designed, produced and operated iaw EASA CS-FSTD(A) Aeroplane Flight Simulation Training Devices or CS-FSTD(H) Helicopter Flight Simulation Training Devices.

Before use, the supplier or training organisation shall document that the simulator satisfies qualification requirements iaw one of 14 CFR Part 60, JAR-FSTD A/JAR-FSTD H, or any other Part 60 document issued by a Military Aviation Authority recognised by MAA-NOR, or by a CAA. Any non-compliances shall be documented.

For OSD, refer to CS SIMD Simulators Source Data as AMC/GM.

FSTD operators are within the authority of the Military Aviation Authority (MLFM).

I.4 REDUCED VERTICAL SEPARATION MINIMUM (RVSM)

The MAA-NOR will normally assess RVSM performance as part of initial airworthiness certification/validation. Additionally, the operator may apply to the MAA-NOR for an RVSM airworthiness approval for military aircraft types.

To obtain an RVSM airworthiness approval of the aircraft and equipment to operate a 300 m (1000 ft) vertical separation within RVSM airspace, the applicant shall show compliance to EASA CS-ACNS Subpart E Section 2, RVSM, or the equivalent FAA AC 91-85, Authorization of Aircraft and Operators for Flight in RVSM.

This includes requirements for

- RVSM performance;
- Aircraft system;
- Airworthiness approval;
- Continued airworthiness (maintenance)

The MAA-NOR may accept other RVSM certification standards as equivalent (e.g. JAA TGL6). The MAA-NOR will issue the technical approval as a Form 139 Operations Specification.

I.4.1 TECHNICAL APPROVAL OF MILITARY AIRCRAFT THAT DOES NOT FULFILL SPECIFIC AIRCRAFT SYSTEM REQUIREMENTS SET OUT IN THE CIVIL REGULATION

NOTE that no exceptions for state (i.e. military) aircraft exist in Eurocontrol airspace. However, specific technical approvals as described in the paragraph below, should be acceptable.

This is different from domestic use within the US National Airspace System (NAS), where the following two exceptions are established:

- Military aircraft equipped with a single RVSM compliant altitude measurement system for DRVSM (Ref c)
- RVSM separation is provided to formation flights comprised of only RVSM compliant aircraft when flying in the NAS (ref FAA Notice 7110.406, May 2005)

The operator must prove that

- the certified altitude measurement system is compliant with SPA.RVSM.110 (a) (level of the Implementing Rule, binding) and
- the certified altitude measurement system must be specified by a certification specification different from the CS-ACNS (non-binding):
 - since the RVSM technical MASPS are included in the CS-ACNS, the military authorities willing to issue an RVSM approval for such aircraft types have to demonstrate that the technical fit of the aircraft is fully compliant with the ICAO provisions and that this aircraft type does not hamper the level of safety in the RVSM airspace.
 - In that case, it is recommended to publish a dedicated RVSM approval data package, as defined in the CS-ACNS – Book 2 – AMC1 ACNS.A.GEN.010 (b) section.

I.4.2 INSTRUCTIONS FOR CONTINUING AIRWORTHINESS FOR THE RVSM SYSTEM

Instructions for continuing airworthiness for the RVSM system shall consider:

- accordance with the component manufacturers' maintenance instructions and the performance criteria of the RVSM approval data package
- Repair procedures must ensure RVSM performance, and shall be accepted by the MAA-NOR
- Airframe geometry or skin waviness checks
- accuracy and integrity of the autopilot automatic altitude control system

The technical certification must be accompanied by operational requirements. Guidance may be found in EASA Part-SPA.

I.5 SHIP HELICOPTER OPERATING LIMITS (SHOL)

I.5.1 SPECIFIC DEFINITIONS

Ship Helicopter Operating limits - (SHOL) a set of envelopes for operations of one specific helicopter type and one specific ship class (or individual vessel), that define the wind and ship motion conditions in which the aircraft can operate for a particular configuration and light level. Operations include, but are not limited to, take-off and landing, parking, towing (traversing) (all with or without deck lock), storage and maintenance.

Helicopter landing site – A nominated site, which may be crewed or uncrewed, containing one or more points where one helicopter can land.

Helideck – (helicopter deck, civilian vessels only), a purpose-built helicopter landing site located on a ship (or other floating offshore structure), including all structure, fire-fighting appliances and other equipment necessary for the safe operation of helicopters.

Aviation facility – the systems or items specifically provided aboard ship for the operation of helicopters. (MPP-02)

I.5.2 GENERAL

Approval for HOSTAC operation is part of the technical approval of ships with aviation facilities. Similarly, HOSTAC operation is part of the initial airworthiness approval of new helicopter types intended for maritime operations. The MAA-NOR will include activities necessary to ensure safe HOSTAC operations.

Embarked operations or operations using an extended SHOL compared to HOSTAC SHOL require a flight test campaign for each helicopter type as well as for each class of ship. The initial flight test requires an application for a military permit to fly to the MAA-NOR.

For the application to be valid, the operator/CAMO must engage:

1. A design or research organisation acceptable to the MAA-NOR
2. A test flight organisation acceptable to the MAA-NOR
3. The ship or helicopter deck operator.

For military vessels the ship operator will normally be the Royal Norwegian Navy. For civil vessels helicopter deck operator will normally be the shipping company.
The MAA-NOR will issue the final SHOL approval as a Form 139 Operations Specification.

I.5.3 REQUIREMENTS FOR HELICOPTER OPERATIONS (OPENING THE DECK)

Opening the deck requires a flight test, as one means of compliance (MoC).

If the applicable helicopter type version is not already included in any MPP-02.1.1 Ship/Aircraft interoperability matrix, the initial flight test requires an application for a military permit to fly to the MAA-NOR.

I.5.4 REQUIREMENTS FOR SHOL FLIGHT TESTING (MILITARY PERMIT TO FLY)

The application shall be in the form of a safety case or test plan.

The safety case/test plan should include, but not limited to:

1. General description of activities, helicopter type and ship class
2. Relevant requirements, including certification criteria (typically CS 29, EMACC 6.1.10 etc, or AMACC tailored)
3. The applicable means of compliance (MoC) to establish the envelope, or to estimate an envelope as basis for flight testing.
4. Flight conditions and test plan for flight testing as basis for military permit to fly for testing actual envelope
5. the following data must be available for the helideck:
 - a. Physical dimensions, including D-value(s)
 - b. structural strength
 - c. measured friction values
 - d. ship turbulence and motion characteristics (See Appendix 7)
 - e. obstacle clearance

NOTE that if flight test is the only means of compliance, a target of 250 landings must be performed. Simulations, analyses or other MoC will normally reduce this number.

Any additional envelope expansions shall be submitted in a separate application (i.e. low level navigation etc).

I.5.5 REQUIREMENTS FOR SHOL APPLICATION AND APPROVAL (FORM 139)

The application shall be in the form of a safety case, including compliance evidence documents (test reports etc) and the final envelopes and other data packages to be issued in the applicable flight manual(s).

1. The application must include evidence that during lashing/traversing:
 - a. structural limitations of the aircraft are not exceeded; or, alternatively:
 - b. revised inspection or life intervals

(both latter must origin from an EMAR 21 approved organisation, or equivalent as determined by the MAA-NOR).
2. Any revisions to the AMP
3. A statement from the ship or helicopter deck operator that defines the configuration, and includes a sufficient procedure to
 - a. prohibit operations following any modifications to ship aviation facilities or other top deck design, or the helicopter landing site, that can have any impact on airflow to the aviation facilities or helicopter deck, including safety distances.
 - b. Apply for a new or revised SHOL approval to the MAA-NOR if a modification that may affect the SHOL envelopes is performed.

I.5.6 UAV SHIP INTEGRATION

Whenever a UAV is to be operated in the maritime environment (ie: embarked aviation), the ship operator and ship certifying authority are likely to be essential in the provision of Subject Matter Expertise for the categorization proposal and submission.

I.5.7 REFERENCES

- Reglement for operasjoner med militære helikopter 130-10B (B)
- Reglement for helikopteroperasjoner fra Sjøforsvarets fartøyer RFS-90
- Fridtjof Nansen Class HMS-100 SHOLs Document, revision 12
- NATO STANAG 1194/MPP-02 Helicopter operations from ships other than aircraft carriers (HOSTAC)
- NATO STANAG 1435 Maritime Operations Involving Helicopters Taken Up From Trade (Htuft, i.e requisitioned civilian helicopters) - MPP-02.3.8
- NATO Allied Naval Engineering Publication ANEP-77, NAVAL SHIP CODE (NSC)
- Rules for ships in the Norwegian Navy (RUNA)

Civil regulations, relevant for landing on civilian ships:

- Forskrift om luftfart med helikopter - bruk av offshore helikopterdekk (tidligere BSL D 5-1)
- Forskrift om krav til teknisk/operativ godkjenning av flyplasser

J. PERSONAL FLIGHT EQUIPMENT, AVIATION LIFE SUPPORT EQUIPMENT AND TOOLS

The terms PFE and ALSE are not directly covering for determining airworthiness impact. Some PFE/ALSE may be carry-on items, which may be integrated by the operator (ref EMAR 21.A.303).
Some PFE/ALSE may be non-installed equipment (NIE).
Some PFE/ALSE may be subject to certification specifications and will therefore be subject to MAA-NOR approvals.

Tools are part of EMAR 145 scope.

K. REQUEST FOR REVISIONS OR CHANGES

Request for revisions or changes shall be forwarded to the MAA-NOR, NDMA Air Systems Division. See contact information at www.maanor.no .