



EUROPEAN MILITARY AIRWORTHINESS REQUIREMENTS (EMARs)

IMPLEMENTATION GUIDANCE

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Scope of Use

This EMAR Implementation Guidance document has been developed to provide the EDA pMS with guidance on a number of approaches that could be used to implement the EMARs. The contents have been based upon the experiences of pMS that have already implemented “EMAR like” regulations that are based upon the EASA regulations.

The contents of this document in no way compel any pMS to adopt any of the approaches detailed within it; rather it should be considered to be a mechanism to gain benefit from the lessons learnt from other pMS. This document should be considered to be a ‘living’ document that should be periodically updated to reflect new experiences that have been gained by pMS in implementing the EMARs that will benefit other pMS.

The initial issue of this document has been written prior to the full development of EMAD R and prior to the resolution of a number of key principles including Recognition. This should be taken into consideration when reviewing this document.

1. INTRODUCTION

With the publication in January 2011 of the first European Military Airworthiness Requirement (EMAR 145), one of a suite of European Military Airworthiness Requirements, the Military Airworthiness Authorities (MAWA) Forum requested the EDA to facilitate a workshop where the challenges that are being faced by pMS in implementing these Requirements into their own national airworthiness regulations could be discussed and possible solutions identified.

The Netherlands kindly volunteered to host the event which was held on 28 and 29 February 2012 at Woensdrecht Air Force Base. 30 attendees representing 12 pMS, the European Air Transport Command, the EDA and industry association representatives from Aerospace and Defence (ASD) came together with the goal of developing an 'EMAR Implementation Toolset' that would assist pMS to identify and use different methods to resolve common issues. As part of the workshop schedule, a visit to the aircraft maintenance facilities and maintenance training school at Woensdrecht was included. Both facilities are compliant with the NL's 'Military Airworthiness Regulations' (which are very similar to the EMARs), so this allowed workshop attendees to understand the challenges and practical solutions encountered by the NL in implementing their regulations and to visualize how this would look in practice.

2. BACKGROUND

On 10th November 2008 the EDA Steering Board in NADs formation tasked the EDA to work on the establishment of an EU-wide Forum for Military Airworthiness Authorities (MAWA), to enable initial discussions on harmonizing military airworthiness. An Ad-Hoc Project Group on Military Airworthiness Harmonisation was established and prepared an airworthiness roadmap in preparation for the establishment of the MAWA Forum.

The initial activities of the MAWA Forum focused on charting existing documents, rules and regulations and identify both commonalities that could form the basis for a common EU approach, together with the identification of shortfalls that are currently not addressed in comparison to the acknowledged civil approach. The goals of this MAWA Forum were then to recommend the following for adoption by pMS Military Airworthiness Authorities:

- a. Common regulatory framework;
- b. Common certification processes;
- c. Common approach to organisational approvals;

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- d. Common certification/design codes;
- e. Common approach to preservation of airworthiness;
- f. Arrangements for mutual recognition;
- g. The formation of a European Military Joint Airworthiness Authorities Organisation.

On 17th November 2009, the EDA Steering Board in Defence Ministers' formation declared their political support for national airworthiness authorities to develop and implement the European Military Airworthiness Requirements (EMARs) in line with the endorsed roadmap. The MAWA Forum established a number of Task Forces, consisting of SMEs from the pMS that had specific expertise in the appropriate airworthiness areas, to develop the EMARs. At the 9th MAWA Forum on 19th January 2011, EMAR 145 was approved.

On 24th March 2011 the NADs SB requested a report on the pMS's implementation status of EMAR 145. The EDA coordinated a report on behalf of the MAWA Forum that detailed the information requested by the NADs. Whilst carrying out this activity it became apparent that pMS could gain significant benefit from an EMAR workshop, at which a wide variety of EMAR Implementation issues could be identified, discussed and resolved. The workshop was held on 28th - 29th February 2012 at Woensdrecht Air Force Base in the Netherlands.

3. IDENTIFICATION OF THE NEED

At the 12th MAWA Forum on 22 September 2011 the possibility of holding a dedicated MAWA Workshop that would enable pMS to exchange their views and analyses on the implementation of the EMARs was discussed. The workshop would also enable the EDA to provide a clearer picture of the status of EMAR 145 implementation when providing feedback to the NADs SB. The concept was supported in principle by the MAWA Forum, who requested EDA to draft a proposed 'Planning Document' for approval. At the 13th MAWA Forum on 26th January 2012 the topic was further discussed and the MAWA Forum supported holding an 'EMAR Implementation Workshop'.

4. SCOPE

The MAWA Forum approved the Top-Level goal of the Workshop as being to "Establish a deeper understanding of the challenges facing pMS when implementing the EMARS, and the development of an 'implementation-toolset' of solutions to overcome these challenges".

In addition, the following further secondary goals were accepted:

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- a. Gaining a better understanding of the pMS's EMAR implementation challenges that have been experienced (past and present)
- b. The Identification of common barriers to national EMAR implementation (e.g. legal, duty holders, organisational structures, national army/navy/air force/civilian structural differences etc.).
- c. Gaining a better appreciation of the dependencies between the EMARs and their timings (e.g. production of 'Acceptable Means of Compliance', the development of EMAR 147 and 66 etc.). This topic could also include an understanding of whether EMARs can be implemented individually, or as a whole suite.
- d. What are the next steps for EMAR implementation? (To include the development of a common vision/direction of where the MAWA Forum would like to go and an understanding the difference between 'implementation' and 'adoption'.)
- e. The identification of agreed fundamental principles/agreements for EMAR implementation (e.g. core requirements). Is there an agreed understanding of the reason for change? What does implemented/adopted actually 'look like'? What is the end-game that nations should be aiming for?
- f. Gaining a better understanding of the linkage between EMAR implementation and Recognition (i.e. does a pMS have to implement all of the EMARs for Recognition?)

5. EMAR IMPLEMENTATION ISSUES

Using the methodology outlined in Annex A, issues that were identified during an initial 'brainstorming' activity were analysed by the Workshop Attendees and 'categorised' into one of 6 main topic areas:

- a. Legal/Regulatory;
- b. Organisational;
- c. Communication/Marketing;
- d. Resource;
- e. People-Issues;
- f. Other-Issues;

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These issues were then reviewed and ‘grouped’ where appropriate to identify topics that had been raised several times by different attendees. Solutions that had either been successfully utilized by pMS, or could be considered for use, were then identified and captured. The aim was to produce a selection of considerations from which those responsible for implementing the EMARs within pMS could select solutions that would be most appropriate for the organisational structure within their nation. Individual issues were also captured, with possible solutions mapped to these where appropriate.

5.1 LEGAL/REGULATORY ISSUES

Issue: The need to develop a national airworthiness framework and establish the Military Airworthiness Authority’s (MAA) legal basis within it (particularly independence).

It was identified that prior to EMAR implementation, a pMS should establish a national airworthiness framework or structure within which the EMARs could be included. In addition, an entity or organisation within the pMS should be made responsible for the different aspects of airworthiness (‘continued’ and ‘continuing’). Ideally this should be achieved by establishing a Military Airworthiness Authority (MAA) as a single focal point for military airworthiness. The need for the MAA to have the appropriate level of authority, independence and ability to act was also discussed.

Possible solutions:

- a. If a nation has no pre-existing MAA, then consideration could be given to starting within an existing independent entity/organisation (e.g. from an existing Air Force structure or equivalent).
- b. The level of ‘Independence’ for the authority must be considered and will be determined based upon the pMS’s organizational structure. It is important that the MAA can demonstrate ‘independence’ in order to ensure that airworthiness decisions are made free from any other factors that could influence them.
- c. The size of an MAA will be dependent on a number of factors including the following:
 - i. Aircraft fleet size;
 - ii. Number of different aircraft types;
 - iii. Number of organisations that require approval;
 - iv. Existing organisational structure;
 - v. Coverage of different service e.g. Army, Navy, Air Force;

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d. To effectively establish an MAA, a pMS may require a national law to provide the required level of authority directly from government (nations will have a law authorizing their CAA).

e. The development of an approved national 'Basic Framework Document' may help to define the responsibilities and structure of a nation's military airworthiness organisation.

f. The entity (or MAA) that is responsible for military airworthiness should establish a formal relationship with (any appropriate) Civilian Equivalent organisations (i.e. national Civil Aviation Authority) in order to clarify the scope and boundaries of responsibilities between the 2 organisations.

- i. Relationships may have to be established by national law (with boundaries clearly established).
- ii. Relationship with Civil Authorities may have to be on a 'case-by-case' basis according to the needs of specific programmes (e.g. C27, A400M, NH-90 etc.).

g. The roles and responsibilities of the MAA (or other entity responsible for national military airworthiness) must be clearly defined. These should be agreed with all affected stakeholders. Also, the ability to impose corrective actions must also be clear (e.g. the ability to withdraw a Type Certificate, recommend restrictions etc.). Other factors to consider are that:

- i. The MAA must be rigid enough to ensure airworthiness is maintained but also flexible enough to ensure the delivery of operational capability.
- ii. The level of seniority of the head of the MAA may be a factor when trying to impose corrective actions.
- iii. The responsibilities of the operator should also be defined in order to ensure that there are no gaps between the MAA and the operator.

h. It may be necessary to implement the EMARs into National Law (the relationship between a nation's Aviation Law and their 'Airworthiness Regulations should be clarified first). Other factors to consider regarding the need to implement EMARs into national law are:

- i. If it is possible for the EMARs to be implemented directly (adopted) into National Regulations/Law, or is an alternative process required.
- ii. If it is possible to implement the EMARs before the AMC/GM is produced. If this is the case, can other AMC/GM (e.g. EASA) be used in the meantime?

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- iii. Consideration must be given to what language will need to be used for national regulation. (English language shall be used for Recognition purposes in accordance with the Basic Framework Document but if national regulations require translation, then the MAA will have to ensure that they meet this requirement.)
 - iv. When implementing a new national regulation for the EMARs, consideration should be given to transitional provisions/arrangements. Particular care should be given to the ability to combine existing regulatory systems with new regulatory systems (e.g. personnel 'licensing' schemes and the possible use of 'grandfather rights').
 - v. For clarity of understanding, a single basic regulation, applicable to all organisations (military and contractor) would be preferred and would provide greater interoperability. This would also allow 'standardisation' of regulatory forms/documents in use in the military and industry.
- i. The key national decision is whether to 'implement/adopt' the EMARs without change into national regulations, or instead to map/assess a nation's existing national law and regulations to identify and declare 'deltas' and shortfalls or to be able to declare 'full compliance'. Considerations include:
- i. The final goal according to the ministerial decisions should be for a "common approach" and the adoption of the EMARs.
 - ii. Commonality between nations and the ability to easily carry out 'recognition' will be reduced if the EMARs are not adopted, with EMAR compliance being declared instead.
 - iii. Awareness that during any transitional provisions where differences exist between national regulations and the EMARs, these may cause problems for international cooperation and recognition.
- j. The responsibilities of the operators/operating units within the new EMAR regulatory framework need to be clearly defined, agreed and communicated with stakeholders. The responsibilities and competence requirements at all levels within the organisation (for maintenance personnel and management) must be clarified.
- k. As national airworthiness regulation is adapted to implement the EMARs, it is important that national airworthiness processes and procedures are aligned to comply with the new regulations.
- l. The retention of control over national sovereignty shall be strongly maintained. The military airworthiness regulatory structure/framework and the arrangements for the MAA should enable nations to make sovereign decisions that are in their national interest.

Issue: It is important to find an arrangement for who will be the Military Type Certificate Holder (MTCH) for the aircraft types that are operated, especially for multinational projects.

The role of the Military Type Certificate Holder (MTCH) is considered pivotal in ensuring that the Continued Airworthiness of the military aircraft type can be assured and correctly managed throughout the service life of the aircraft. The MTCH is responsible for certain aspects of the airworthiness of an aircraft's type design (not individual aircraft) and shall be "competent" to carry out these functions. In cases where the MTCH is not within a MoD Organisation, then the organisation/individual carrying out these functions should be audited, assessed and approved. In some pMS it may be difficult to provide a non-MoD organisation to have responsibility or authority to act for some airworthiness matters. In this case, alternative arrangements will need to be considered.

Possible solutions:

- a. In order to reduce duplication of effort it may be possible to achieve an exchange of Type Certificates (including Military Type Certificates) with another nation. This can only be accomplished if "Recognition" is achieved between the pMS involved.
- b. Consideration could be given to the inclusion of the requirement for industry to be the MTCH within a contract to deal with the Type Certification process and other Continued (Design) airworthiness issues.
- c. In multi-national programmes it is important to identify who will be the MTCH early in the Design and Development phase in order to reduce the risk of programme delays caused by uncertainty. If a partner nation is unable to allow a non-MoD organisation to be the MTCH then this should be indicated early on in the programme. Possible solutions could include allowing industry to carry out certain design functions but retaining control and decision making with the MoD organisation.
- d. The airworthiness regulatory structure should be flexible enough to cover different solutions where compromises are needed for multi-national programmes.

Issue: Changes to existing contracts with industry.

The implementation of the EMARs into national regulations may require a modification or change to existing contracts with industry. This may or may not introduce additional costs in the short-term. Industry must also be willing to accept the changes, together with any associated increases in responsibility.

Possible solutions:

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- a. A firm stance could be that a precondition for any contract award with industry would be to have appropriate approvals in line with the EMARs
- b. Industry's organisational approvals (e.g. EMAR 21, EMAR 145 etc.) could be issued as part of the contract award/contract renewal process. This would reduce the costs involved with renegotiating a contract and would incentivise industry to gain approval.
- c. The negative aspect of waiting for a natural break in a contract would be the delay in implementing the EMARs due to the fact that existing contracts may be for a long period.

5.2 ORGANISATIONAL

Issue: Introduction of Continuing Airworthiness Management Organisations (CAMOs) (including Airworthiness Review Certificates and the baselining of an aircraft's Certificate of Airworthiness)

The implementation of EMAR 145 and EMAR M (when it is approved) require the establishment of a Continuing Airworthiness Management Organisation (CAMO) that would be responsible for the continuing airworthiness of the aircraft allocated to it. (It should be noted that there is some overlap between the responsibilities of the CAMO and those responsibilities traditionally associated with the entity responsible for the continued airworthiness of the Type Design.) This is made even more difficult due to the fact that the responsibilities of the CAMO are within the aircraft operator's responsibilities.

The implementation of EMAR 21 and EMAR M (when it is approved) will require each aircraft to have a valid Certificate of Airworthiness (CoA) confirming that each individual tail-number conforms to the approved aircraft design and configuration. The physical condition of each individual aircraft will be reviewed at a set periodicity to ensure that it is still in conformity and an Airworthiness Review Certificate (ARC) will be issued that revalidates the CoA.

Possible solutions:

- a. The positioning of the CAMO within the organisational structure (at the right level) is essential. Responsibilities must be clearly split between the 'operator' (who is responsible for managing the Continuing Airworthiness) and the 'maintenance' organisation.
- b. The physical proximity of the CAMO to the aircraft for which they are responsible and the EMAR-145 maintenance organisation needs to be assessed. It is possible for the CAMO to be remote from the maintenance organisation but for efficiency reasons co-location could be considered (whilst also maintaining the required level of segregation and independence from the maintenance organisation).

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c. The Continuing Airworthiness Manager's responsibilities (as the head of the CAMO) must be clearly defined taking into account:

- i. The need to properly define an acceptable level/rank for this responsibility.
- ii. The need for the individual to be able to act/impose any required changes to ensure the continuing airworthiness of the aircraft for which they are responsible.

d. It may be useful to be prescriptive within national regulations when defining the most appropriate CAMO structure. This may avoid misinterpretation of the regulations by those implementing them. However the regulation should be flexible enough to consider cases where it may not be possible to maintain a rigid structure. Factors to consider when determining the organisational structure of the CAMO are:

- i. The number of different aircraft types that they are responsible for and also the location of these aircraft.
- ii. Multiple CAMOs (on different bases) for single aircraft types (with a lead CAMO/Main Operating Base) where the type is operated out of more than one airbase.
- iii. A single CAMO on a base for multiple aircraft types (where different types are operated at the same air station).
- iv. Single CAMOs on a base with a single aircraft type, where a CAMO is responsible for a single type only.
- v. For aircraft on operations, consideration of the use of a 'Sub-CAMO' for 'in-theatre aircraft (how this works should be clearly detailed in the Continuing Airworthiness Management Exposition (CAME)).
- vi. A 'Civil' CAMO (e.g. an EASA approved CAMO) could be overseen by a "crown/state-servant" from the MoD for aircraft fleets that are either civil derivative/or purely civil variants.
- vii. Outsourcing of CAMO activities is possible but control should be retained within the MoD organisation (the MoD is still responsible for the continuing airworthiness of the aircraft that they operate).

e. Carrying out the first Airworthiness Review Certificate (ARC) on each aircraft will be difficult and challenging. An MAA may need to consider a transition plan until all aircraft have completed their first ARC. Factors to consider include:

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- i. There is a need for each individual aircraft to remain within a 'controlled environment' to avoid having to carry out the physical review of the aircraft annually (this can be extended to 3 years if an aircraft remains within a 'controlled environment').
- ii. A standard procedure/process should be developed for ARC inspections so that everyone involved in the process knows what is required, enabling appropriate preparations to be carried out. This also allows the process to be repeatable by others.
- iii. The initial ARC assesses the conformity of each aircraft against its 'type definition'. This can be challenging for legacy or historic aircraft where the type certification basis or type definition is not known. This may require:
 - a) An assessment and identification of mandatory modifications/changes in order to establish if they have been incorporated onto the aircraft.
 - b) Full access to historic data in order to determine the approved configuration of the aircraft.
 - c) For older aircraft, a pragmatic approach ('As Low As Reasonably Practicable') may be necessary, since not all airworthiness data may be accessible or even still exist. Risk assessment and management of any gaps that are identified will be required.
- iv. ARC inspectors are nominated by the CAMO but must be approved by the MAA. This may create a resource issue and may be the limiting factor for the speed that the aircraft fleet can be reviewed and issued with a CoA and an ARC.
- v. It may be possible to schedule the initial ARC at the same time as a deep maintenance activity, where access to each aircraft to assess the embodiment of modifications etc. will be easier and would not interrupt the operating schedule.
- f. Some nations may have 3 (or more) services (Army, Navy, and Air Force) that all currently manage continuing airworthiness differently. The introduction of a CAMO, CoA and ARC will need to be coordinated and harmonised throughout the different services. This would be made easier with the establishment of a national MAA.
- g. The linkages to, and the role of, a multi-national OpCon body in the airworthiness regulated environment needs to be established. Clear responsibilities of each must be understood.

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Issue: Organisational changes are necessary to implement a new regulatory structure.

The implementation of the EMARs may require organisational changes in order to comply with a new regulatory structure. These organisational transformations may take time to plan and put into effect and there may be resistance to change within the organisation.

Possible solutions:

a. The successful introduction and implementation of the EMARs requires top-level management endorsement of the required changes, including the following factors:

- i. Understanding the philosophy that underpins any new regulations and why they are being introduced.
- ii. There is an accepted need to change current processes to enable greater alignment between nations. Possible tools for change could be:
 - a) Continuous improvement mechanisms.
 - b) Lean Management techniques.
- iii. Change in the military culture from 'Can-Do' to 'Safe-Way' may be required.

b. Once established, the MAA (or other entity responsible for airworthiness) should be "legally competent" and should also be an Independent organization (or at the very least to be able to demonstrate independent decision making). It is particularly important that any MAA approved documents (MTC, DOA, POA, -145 147 & -M organisational approvals, maintenance personnel licences etc.) should be able to be recognised by other nations. Other factors include:

- i. The MAA (or other entity responsible for airworthiness) should be free from commercial, programme/procurement and operational pressures. In addition it should ensure:
 - a) That an appropriate linkage is made with Armaments programmes that are responsible for the delivery/support of equipment.
 - b) The adequate and appropriate involvement of Project Team experts, whilst also being able to show clear independence for airworthiness Decisions.

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- c) That classified/secure information can be handled appropriately.
 - ii. The capacity and ability of the MAA to carry out the required workload/responsibilities, including approval activities and the management of a licensing scheme, needs to be considered before implementing any new airworthiness regulation for the EMARs. In addition:
 - a) It may be possible to outsource some oversight and auditing activities, noting that independent monitoring of organisations should be finally approved by the MAA.
 - iii. Dual responsibilities (i.e. regulatory with operational/commercial) should be avoided for personnel within the MAA.
 - iv. Having all elements of the MAA co-located (all in one place) has proved to be very beneficial.
 - v. As the MAA matures, efforts should be made to increase its independence within the organizational structure.
 - vi. The structure of the MAA must be set at the correct rank/grade dependent upon the responsibilities it is given.
- c. The organisational structure of organisations that will be approved by the MAA must be in accordance with EMARs. In addition, the MAA should consider:
- i. They must have the appropriate Hierarchy/Accountability structure
 - ii. The use of Civilian or military personnel in key posts must be taken into account and the responsibility requirements for 'crown/state' servants should be established.
 - iii. Identification of core posts, and the associated minimum requirements for key personnel (both academic and experience profile).
 - iv. The organisation's relationship with Industry in a partnering environment must be clarified in the Exposition (which must be approved by the MAA).
 - v. The minimum requirements for multiple accountability for an individual who holds a 'key-post' in an organization with multiple EMAR approvals needs to be understood (e.g. a Base Commander at an AFB that has EMAR 145, 147 and M approvals, where the organisations are not legally separated).

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- vi. The 'grouping' of certain activities within one organization (e.g. a single centralized maintenance facility on a large military base with a single approval). In addition there could be a need to:
 - a) Understand the linkages to the MTC Holder.
 - b) Ensure separation of the Operator Organisation (CAMO) – vs.- EMAR 145 organisation.
 - c) Have clear distinctions between EMAR 145/M/21 organisations and their respective roles.
- vii. Establish national policy for the approval of Design Organisations and Production Organisations, within their own nation and internationally. Including:
 - a) The linkage between MTCH and OEM.
 - b) The need to report technical events to the MTCH and the originating certification authority.
 - c) The effective and appropriate management of Airworthiness directives that are issued and any related risk management activities.
- d. Consideration should be given to opportunities for 'pooling of resources' with other nations/organisations/MAAs in order to gain the necessary technical expertise for MAA personnel for nations with common aircraft types. This could include:
 - i. Support from a common pool of technical resources facilitated through a central organisation such as the EDA (EMJAAO).
 - ii. 'Resource-sharing' with other nations that have common aircraft types.
- e. A robust Cost Benefit Analysis (CBA) should be conducted to demonstrate that there could be 'nil manning resource cost increases' for introduction of a new airworthiness regulatory structure. A subsequent Business Case could justify any additional expenditure balanced against the possible cost savings from achieving Recognition by other pMS.
- f. Adequate training of internal auditors (within the approved organisation) is essential because one of the key-requirements for any organization to be approved is to demonstrate that they conduct internal audits.
- g. As for any organisational change or transformation an ambitious, but realistic, implementation schedule should be adopted. This can be promulgated in

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an EMAR implementation plan that is consulted with all stakeholders that could be affected by the changes.

h. The responsibilities and scope of the MAA (or other entity responsible for airworthiness) should be clearly defined in order to avoid any conflicts. The level and mechanisms for interacting with the approved organisations should also be defined, taking into account:

- i. How and who will manage the approvals of the organisations?
- ii. How and who will manage the approvals of aircraft maintenance programmes?
- iii. How and who will manage and issue Military Aircraft Maintenance Licenses? Including:
 - a) How to define the training programme for aircraft technicians to meet EMAR 66 requirements?
 - b) How to define the 'B mil' aircraft maintainer category to cover military specific aspects not covered by the B1 and B2 categories?
- iv. The need for the MAA to clearly define what level (if any) of 'privileges' that can be granted to other entities or organisations.

5.3 COMMUNICATION/MARKETING

Issue: Lack of national promotion of the EMARs and the gaining of high-level commitment.

Despite the Ministerial Political Declaration in November 2009, it is possible that within the military there may be a reluctance to implement the EMARs from within senior level management. This could be due to a lack of awareness of the benefits of the EMARs or it could be due to resistance to changing current regulations and national ways of working. In order to address this, the EMARs should be promoted and marketed internally in order to gain high level commitment to any change/transformation that is required to implement them.

Possible solutions:

- a. Remind senior management of their legal responsibility (which includes possibly up to Ministerial level) for ensuring the airworthiness of the aircraft that are operated by the nation by identifying the risks of not being able to demonstrate that airworthiness is being managed in a transparent and traceable way and may not be in-line with current best practice. Consider:
 - i. Lobbying at lower levels to gain buy-in to any regulatory change.

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- ii. Stressing the importance of airworthiness and providing recent examples of where airworthiness has not been adequately managed (and the implications this had for the military).
- b. National Approval of the BFD and subsequent updates is vital in order to provide a common understanding of military airworthiness and a commitment to implement the EMARs.
- c. Assigning the proper level of responsibility for the implementation of the EMARs into the national legal/regulatory framework. To achieve this it is important to identify the responsible individuals at the right level and to convince them.
- d. Promote the benefits of an airworthiness regulatory system that is aligned with the other pMS and the opportunities that can be realised if the EMARs are implemented. Including:
 - i. National benefits (improved reliability, availability, maintainability).
 - ii. International benefits (greater cooperation opportunities, reduced duplication, and greater interoperability).
 - iii. Improved support and relationship with Industry (national and international).
 - iv. Greater alignment of a nation's defence industry with the civil regulatory system.
 - v. Gaining similar positive experiences and feedback from the civil airworthiness regulatory system.
- e. Carry out a Cost Benefit Analysis (CBA) to underpin and justify the implementation of the EMARs.
- f. Issuance of privileges to industry to clarify legal risks and associated costs of compliance to the clause of 'effort' of ICAO and EASA (EC 216).
- g. The need for a 'Culture change' to one where airworthiness (and safety) is considered to be one of the main priorities for those responsible for providing aircraft capability.

Issue: Application of a coordinated communication strategy to address the lack of an individual's willingness for change

It is vital that support is gained at all levels from stakeholders within the organisation in order to successfully implement any change, but specifically any regulatory change

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required to implement the EMARs. A coordinated communication strategy with stakeholders may help to achieve the required level of buy-in to the regulatory change.

Possible solutions:

- a. Training (or at least the 'making aware') of airworthiness post holders of their existing legal responsibility for ensuring airworthiness (training could be extended to all other appropriate stakeholders).
 - i. Clear and documented delegation of responsibilities that are accepted by the post holders.
 - ii. Assisting ministers (particularly in areas like finance that do not typically have a large involvement in airworthiness) to understand their legal (duty of care) priorities.
 - iii. Airworthiness has a cost, but it can be limited. A fair communication on this issue is essential.
- b. Provision of training on the existing EASA regulatory system and improving the awareness of the EMARs regulatory system.
 - i. Introduction and promotion of a 'Just Culture'
 - ii. Making stakeholders aware of where to get the latest updated documents.
 - iii. Ensuring that personnel have the necessary English Skills (use of bi-language documents).
 - iv. Understanding and appreciating the goal of the EMARs and their link with the MAWA Roadmap objectives.
 - v. Attendance at MAWA Forum meetings and MAWA Conferences.
- c. Communication strategy needs to be both 'Bottom-Up' (organizational level) and 'Top-Down' (from Hd of Air Force). It should taking into account:
 - i. The strategy must be coherent and coordinated.
 - ii. Communication strategy may need to be autocratic from the start (requiring strength/leadership from 'the top').
 - a) Benefits will not be realized immediately, therefore there is a need to manage expectations.
 - b) Communication will require clarity of priorities.

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- iii. Use of existing Seminars/conferences/Newsletters (EDA/MAWA/domestic) may help to disseminate the message.
- iv. Message should describe benefits/risks.
 - a) Clarity of the message (avoiding any filtering between management levels).
 - b) Sell and promote the 'added value' of an MAA/EMARs.
- v. Stress the need for 'safety of flight' including airworthiness.
 - a) Human element (e.g. morale, confidence,)
 - b) Cost saving by avoiding airworthiness and safety problems.
 - c) Changing the safety culture/attitude.
- vi. Stress 'Lessons-Learnt' (e.g. from exchange visits).
 - a) Positive and negative experiences can both be beneficial.
- vii. Awareness of distance between management and the "shop floor".
 - a) Getting in touch with staff at a working level.
 - b) Strategies on how to answer any challenging or probing questions should be thought through.
 - c) Awareness of "Glass ceilings/floors" that prevent the transmission of messages between levels of management.

5.4 RESOURCE

Issue: Manpower availability/experience/retention and associated manning resource costs with regulatory activities

The availability of manpower with the correct level of experience and expertise is a universal concern. This is particularly an issue for the military as there is a constant turnover of manpower and this causes skill retention issues. In addition the military is under constant pressure to reduce manpower and still accomplish the same level of operations. There may be some concerns that the implementation of the EMARs and the establishment of an MAA could introduce a manning resource issue. If correctly managed this may not be the case.

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Possible solutions:

- a. It is important to establish the appropriate size for the MAA. This could be achieved by:
 - i. Possible benchmarking of other similar nations who have implemented EMARs who have similar aircraft types and fleet sizes.
 - ii. Defining the MAA's proposed 'end-state' and how the fully established MAA will look. In addition:
 - a) It may be appropriate to consider changing the rank/grade of personnel utilized during the initial 'Organisational change' phase' from that of the steady-state/post-implementation phase.
 - iii. Ensuring that there is sufficient staff for the required Regulatory and oversight activities.
 - iv. Additional funding may be required for personnel, accommodation, activities etc., dependent on the size and resources necessary for establishing/enhancing the MAA. This should be taken into account in the top level Cost Benefit Analysis (CBA) and balanced against the perceived benefits from EMAR implementation.
- b) Airworthiness knowledge management and experience within both the MAA and operational commands is critical to ensure continuity and expertise across the wide variety of airworthiness responsibilities. Including:
 - i. Regulatory activities (requires pragmatism in auditing and airworthiness knowledge).
 - ii. HR policy may be required to recognize airworthiness expertise at the proper level in order to retain skills and provide appropriately experienced personnel to airworthiness posts.
 - iii. Adapted management principles may be necessary as new regulations are introduced.
- c) The impact of the new organisational structure on manpower availability, and hence the ability to appoint personnel to airworthiness posts, must be understood. Considering:
 - i. It may be necessary to develop a skill matrix to demonstrate experience (both of individuals & teams) within the MAA and Op Cmds.
 - ii. Sharing of experience between organisations is critical.

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- iii. Recognition of the airworthiness authority/responsibility associated with:
 - a) Accountable manager.
 - b) Post holder.
 - c) Certifying maintenance staff.
 - d) Funding may be needed for the introduction of a licensing scheme (EMAR 66) if there is no existing national similar scheme.

5.5 PEOPLE-ISSUES

Issue: Setting the baseline competency of MAA personnel (including the identification of key Roles & Responsibilities within the MAA)

It is vital that personnel working within the MAA have the right level of competence and credibility in order to carry out their function as a regulator. In order to achieve this it is important to determine what this level of competency should be and to establish the correct level of experience for each of the roles within the MAA.

Possible solutions:

- a. Issue guidance to define the baseline competency that is believed to be necessary for MAA personnel. This could be based upon the 'mission statement' or defined role and scope of the MAA. Consideration should be given to the following factors:
 - i. Regulatory activities;
 - ii. Oversight activities;
 - iii. Initial airworthiness/certification activities;
 - a) Identifying all the fields of competence (flight, structures, avionics...);
 - iv. Appropriate level of authority necessary to perform task;
 - v. The experience level required (in-depth knowledge and experience in field of regulation is a very rare resource!);
 - vi. expertise in the various disciplines that are associated with airworthiness (initial, continuing, auditing, quality management etc.);
 - vii. Any pre-requisites considered essential prior to attending training courses;

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- viii. Other activities deemed necessary at a national level ('chartered' engineer status, membership of professional bodies, etc.);
- b. Competencies will have to be harmonized to ensure that the needs for Recognition between pMS can be achieved.
- c. The structure and size of the MAA will depend upon:
 - i. the size (and disposition) of the aircraft fleets to be regulated;
 - ii. The origin of the fleets to be regulated;
 - iii. The national needs and means;
 - iv. The number and type of organisations that need to be approved and regulated;
 - v. The national industry size;
- d. Consider the use of Subject Matter Experts from outside the MAA:
 - i. 'Shared' with other pMS;
 - ii. Contractors who work on behalf of the MAA (note that responsibility must remain within the MAA);
- e. If the MAA is to have military personnel working within it, then the selection of the correct individuals is key. Consider:
 - i. How being in the MAA may impact the career path for military personnel (will an MAA appointment slow down a military career for example?)
 - ii. The minimum term of personnel appointments (consideration of the time taken to 'learn' the job, but not too long so as to be no longer current).
 - iii. Personal development of personnel within the MAA.
 - iv. There must be continuity of personnel during a transition period and an assurance that sufficient personnel with experience will remain through to the 'steady-state' of the MAA.
 - v. Consideration could be given to making the position of 'Head of MAA' a last post before retirement, to remove any possibility of the post-holder having to return to the 'regulated community' and thus have this possibly influence their decision making.

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- vi. Human Resource staffs responsible for personnel placement must be able to anticipate and plan for:
 - a) The unique training requirements of the MAA environment.
 - b) The experience requirements necessary for personnel within the MAA environment (not just 'another appointment').
 - c) Minimising staff turnover where possible.
 - d) Establishing an appropriate balance between military and civilian personnel within the organization.
- vii. Consideration of possible incentives for military personnel in MAA environment (Salary, Career or a possible civilian career after retirement that recognizes their Subject Matter Expert experience, Credits for training (both civil and military)).

5.6 OTHER-ISSUES

Issue: The development of 'model' Exposition templates for use by organisations seeking approval

It may be possible to provide assistance to organisations that would like to be approved once the EMARs are implemented into national military airworthiness regulations by developing a 'model' template for the Exposition that the organisation is required to provide to the MAA. However, care should be taken that this 'model' Exposition is harmonised to a certain degree with other pMS to ensure consistency. In addition some intellectual tailoring of the 'model' Exposition will be required by the organisation seeking approval.

Possible solutions:

- a. Use of an 'Anybody's' template similar to those used by EASA. Factors include:
 - i. 1, 2 or 3 versions may be required dependent upon the size and variety of the nation's maintenance organization structure (i.e. maybe different templates for military and civilian organisations, if appropriate?)
 - ii. They should be 'Militarised' as required, though retaining easy mapping to the EASA format.
 - iii. Consideration to be given to either tasking the EDA or MAWA Forum to develop a generic template that pMS can then modify, or alternatively each pMS may develop their own?

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- iv. 'Buy-in' for the use of any templates must be gained from the regulated community. Including:
 - a) 'Bottom-Up' and 'Top-Down' input into the design, structure and format of the template would be valuable
 - v. Standardisation is important (e.g. layout, Table of Contents etc.) and it is also important to aid the organisation's recognition by other nations.
 - vi. Organisations must be reminded that although the completion of the Exposition in accordance with the Template is important, it is the 'thinking process' that lies behind the creation of the Exposition that is essential.
 - vii. Templates should not just be copied, however there is also no need to 're-invent the wheel'.
 - viii. Detailed guidance for each element is necessary.
- b. Consideration should be given to the production of an English version (that may help recognition of MAAs).
 - c. MAAs may wish to provide 'standardised' processes for use in organisational Expositions (e.g. specifically for military organisations, where it may be important that the same processes are followed).

Issue: Development of an AMC/GM strategy

There is an important linkage between the EMARs and their associated Acceptable Means of Compliance (AMC) and Guidance Material (GM). The AMC contains the methodology that a pMS will use to show compliance with their national regulation (once the EMARs are implemented into national regulation). Therefore it is important for Recognition purposes to be able to understand how a pMS actually complies with their national regulation. The most straightforward and ideal way of achieving this would be to use the harmonised EMAR AMC/GM. However, if alternative means are used then a strategy needs to be developed to ensure that the national regulations can be met and also traceability with the EMARs can be easily achieved.

Possible solutions:

- a. The EMARs are being drafted to maintain consistency with EASA's AMC/GM. Consider if:
 - i. This generic AMC/GM may be the solution for pMS who may wish to develop/tailor it for their specific needs.
 - ii. Is it possible for an MAA to accept multiple AMC (i.e. several Acceptable Means of Compliance for a specific EMAR requirement).

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- b. Decide if AMC/GM is required by an MAA. Consider:
 - i. If an MAA can accept EASA/other alternative AMCs, as long as these are detailed in an Exposition.
 - ii. What is the MAA's approach to AMC/GM (use of wording 'should'/'shall'/'must'/'may' etc.).
- c. AMC/GM must be linked to an MAA's audit strategy where the process used is important.
- d. The standardisation and harmonisation of AMC/GM will be a strong aid for Recognition (possibly mutual).

Issue: Recognition of Certificates issued by other Authorities (civil or military)

This issue is mainly related to the development and agreement of EMAD-R which will contain the means for achieving Recognition between pMS. Similarly there may be a need for an MAA to recognise the certificates issued by their civil counterparts such as EASA or other CAAs.

Possible solutions:

- a. The harmonisation of Forms is important to facilitate easy recognition. Consider that:
 - i. Recognition may initially be Bi-lateral, tri-lateral, multi-lateral or project specific – whichever is most appropriate.
 - ii. Mutual acceptance of other nation's certificates depends upon transparency between MAAs.
- b. A centralised organisation or body (such as an EMJAAO) could develop a process to recognise DOA, Form 1, CoA, MTC etc. Consider:
 - i. A matrix of recognitions may need to be developed including:
 - a) Scope of recognition;
 - b) Acceptance of approvals;
 - c. An MAA could establish a validation process for recognition of MTCs that is issued by another pMS. This could include:
 - i. The certification basis and the applicable standards that were used.

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- ii. The development of an equivalent process to show the linkage between national and international standards.
- iii. The development of a tool to assist with the validation process. ('Question Sets' could be valuable for this process).
- d. Conduct a robust Cost Benefit Analysis (CBA) to determine whether Recognition is the most appropriate solution rather than revalidation of the Type Certification process.

6. KEY IMPLEMENTATION PRINCIPLES

Based upon experience gained to date, groups were also asked to identify the Key Principles that were considered essential for the successful implementation of the EMARs. These have been combined into the following topics:

- a. A clear vision on the need for safety oversight (including airworthiness) within the national military organisation.

This should include an understanding of the legal basis of the EMARs within a pMS, any Legal Decree or national Legislation that is necessary to implement the EMARs and the associated MoD instructions/regulations that are required. It must also include a clear statement on the establishment of the national MAA and its level of independence. To be successful, it is essential to have full co-operation between Ministers (who have ultimate responsibility for military airworthiness) & the Heads of Service who will be ensuring military airworthiness on their behalf.

- b. The creation of a robust implementation project plan with appropriate timescales that are agreed at a high executive level.

This could involve the establishment of a dedicated 'Project Team' with the objective of developing and managing a clear national EMAR implementation plan that has been accurately scoped and contains SMART objectives (Specific, Measurable, Achievable, Realistic, Timely). Key stakeholders need to be identified, pathfinder projects (if deemed necessary) nominated and transitional provisions should be clearly articulated. The plan must be ambitious but also realistic, and must also be 'closed-loop' to ensure that the objectives are met. Acceptance of the plan can be significantly enhanced with the identification of 'quick-wins' and the realisation of 'quick-benefits' to provide confidence in the new direction of travel.

- c. There must be stakeholder 'buy-in' at all levels.

Without stakeholder 'buy-In' at all levels, any changes to a nation's existing airworthiness structure will be exceptionally difficult. Clearly top-level political buy-

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in/commitment is essential, but equally important is 'buy-in' from the 'regulated' community. There must be a willingness to change (if necessary) the law, the airworthiness culture currently in place as well as a commitment at both organizational and individual level to change attitudes to airworthiness issues. The 'key-personnel' who will be driving the change must have credibility for the change to be effective and supported.

d. Clear Communication Strategy.

Stakeholder 'Buy-in' can only be gained with a clear, concise and effective communications strategy. This must identify the 'catalyst' for change, stress the high-level buy-in and detail the implementation plan. It should stress the benefits that will be realized (national, organizational and individual) and must be directed at all stakeholders.

e. Adequate resource support.

'Ensuring' and 'assuring' airworthiness has a cost. There is an inherent 'cost of ownership' to military aviation which includes the effective management and regulation of airworthiness. The appropriate regulatory organization(s) (MAA) must be in place, empowered by law/regulation and having posts occupied by 'Suitably Qualified and Experienced Personnel' (SQEP). Organisations carrying out airworthiness activities must be approved by the Regulatory Authority (MAA) and be in compliance with the EMARs. The Regulator (MAA) must have sufficient resources to ensure it can carry out effective continuing oversight and audit.

f. Additional principles:

The following principles were also identified as being important to the successful implementation of the EMARs:

i. 'Certification' process.

The process for certifying an aircraft type underpins the airworthiness activities associated with each individual aircraft throughout its entire in-service period. Policies and procedures must be in place for the approval of Type Certificates and the process for gaining Initial Certification. Clear lines of responsibility for each phase of this work must be developed.

ii. Gap Analysis.

For the Implementation Plan to be effective, it must be accompanied by a gap-analysis to assess what needs to be done (structural, organizational and individual). This will identify the resources necessary for successful implementation, and will help to define the transitional processes that need to be put into place (e.g. 'grandfather rights' for previously qualified maintenance personnel). It will also assist in the identification of 'best-

practice' within an organisation that can be used in other areas where applicable.

7. FURTHER WORK

During the workshop the following activities were identified as requiring resolution to enable the effective implementation of the EMARs within a nation's regulatory suite. They were out of the scope of the EMAR Implementation workshop, but are being worked by other workstreams:

- a. Military Type Certificate Holder (Task Force 2).
- b. Recognition of organizational approvals cross borders (Task Force 1).
- c. Recognition of MAAs between nations (Task Force 1).
- d. Recognition of CofA by other pMS for export (Task Force 1)

ANNEXES

A. Methodology

B. Attendees

Methodology

Day 1: Implementation Challenges

Sessions 1 & 2:

Short Presentations from pMS that have already transformed their national military regulations using “EASA like” regulations. Presentations included the following information:

- Timelines/how long it took for national transformation.
- Problems encountered and how they were resolved.
- Organisational changes that were involved. Were they necessary?
- If it were possible to do it again, what would be done differently?
- Ongoing issues caused by national transformation.
- How the EMARs are going to be implemented into the national regulations.
- National legal framework overview

Session 3:

Sub-Group Session (split into 2 groups) to identify and discuss any common difficulties that have been presented or have been experienced by the pMS. These groups were constituted from personnel with ‘Continued’ airworthiness responsibilities and those with ‘Continuing’ airworthiness responsibilities to ensure that sub-groups are able to capture their analysis correctly.

This was a brain-storm type activity with sticky ‘post-its’ to collect all the issues onto large posters.

Group Analysis of the results for the identification of common difficulties. Issues were assessed and ‘sentenced’ using a ‘rough-cut’ priority scoring system.

This was achieved by:

- *Using a 2 x 2 grid of ‘degree of difficulty to implement’ (low, high) and ‘impact of not implementing’ (low, high).*
- *2 ‘Group’ posters were developed (1 for ‘Continued’ AW issues, 1 for ‘Continuing’ AW issues) by transferring the sticky ‘post-its’ onto common sheets.*
- *The aim was to get stakeholder “buy-in” of what are the agreed common difficulties within each area.*

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Session 4:

Worked Example by a visit to the facilities within Woensdrecht Air Force Base.

The purpose of the visit was to look at EMAR implementation (or the NL equivalent) on the base, how any problems were resolved and benefits that have been gained.

Day 2: Solutions

Session 1:

Sub-Group Session (split into 2 groups) covering Continued (EMAR 21 & EMACC) and Continuing Airworthiness (EMARs 145/147/66 & M) to develop possible generic solutions (the 'tool-set') to the issues that were raised during Day 1 (issues for the individual groups to discuss were allocated by facilitators).

Session 2:

Report-Back of the possible solutions identified in Session 1 to the whole group with time for discussion and feedback.

Followed by: Sub-Group Session (split into 3-4 groups) to identify what the essential, or key, principles should be for EMAR implementation.

Session 3:

Report-Back of EMAR implementation key principles with discussion.
Group Analysis of the results and agreement of common key principles

Session 4:

Discussion – Way-Ahead for the progression of 'Parked Issues'

Workshop Attendees

	Last Name:	First Name:	Rank/ title:	Organisation:
1	CROUVEZIER	SYLVAIN	OF2	EATC
2	SCHOOTEDEN	RUDI	OF3	EATC
3	BODET	GUY	Captain (OF2)	Belgian Defence
4	DURIEZ	RICHARD	LT-COL (ICETA)	DSAE
5	LOUDES	THOMAS	MAJOR	DGA
6	BAUDOIN	François	MR	ASD (DASSAULT AVIATION)
7	WALKER	PETER	MR	ASD (BAE SYSTEMS)
8	GRASSO	ALESSIO	LT COL	IT MOD – DAA (AIR ARMAMENT DIRECTORATE)
9	PLEVKA	JAN	MR	EDA
10	GARVIE	CARL	MR	EDA
11	HARDING	DAVID	MR	EDA
12	STEGMEIR	JURGEN	MR	EDA
13	BELL	JEFF	CDR	UK MAA
14	VAN DEN HOUT- TEGELAERS	ELISABETH (ELLEN)	MAJOR	RNLAF
15	VAN BOVEN	JAAP	LT KOL	MAA NL
16	KUNIMÄGI	PAUL	LT COL	Estonian Air Force HQ
17	KAJAMAA	ANNELI	CAPT	Estonian Air Force HQ
18	BERKE	MARTIN	TRDir	BWB DE
19	ALBRECHT	FRANK	OTL (LTC)	WaSysKdo Lw, DE
20	SUNDSTEDT	AKE	LTCOL	SE MAA
21	LJUNGHOLM	JAN	LTCDR	SE MAA
22	CABRAL	TERESA	MAJOR	Portugal MAA
23	VAN DER JAGT	WILLEM	LCOL	Defensie Materiel Organisation NLD, Airsystems Branch
24	VAN DER HORST	JACOBUS	MR	NL MAA
25	KOKKINOS	PATROKLOS	MAJOR	CY/MOD
26	DE WIT	BAS	LT COL	RNLAF
27	CORPORAAL	HENCK	COL	NL MAA
28	WAWOE	PATRICE	LT	NL MAA

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29	POTMAN	KOEN	MAJOR	RNLAF
30	BALOGH	NICOLAY	MAJOR	RNLAF