



A330 MRTT airworthiness regulatory framework. An EMAR 21J case study and next steps.

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DEFENCE AND SPACE

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AIRBUS



Content

- **Introduction to Airbus A330 MRTT**
- **A330 MRTT airworthiness regulatory framework analysis**
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Airbus Defence and Space – Military Aircraft portfolio



A400M Strategic and Tactical Mission Aircraft



A330 Multi Role Tanker and Transport Aircraft



C295 Highly versatile tactical airlifter



Eurofighter Air Superiority and Air Strike



A330 MRTT

A Wide Customer Base

- **97% Market Share** (excluding US) in the last 10 years
- **Combat Proven. 29 A330 MRTTs** in front line operations
- More than **150 000 FH** flown by the A330 MRTT fleet

A330 MRTT Initial Type Certification / Release to Service

(1) A330 – 200 Green Aircraft EASA TC



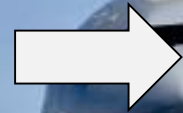
- Type Certification by EASA
- TC/ DOA holder: Airbus Commercial SAS
- For A330 MRTT, a change to the A330-200 TC is certified with EASA for the installation of the modified basic aircraft computers (with functions to be military certified inoperative/de-activated)



A330 MRTT Initial Type Certification / Release to Service

(1) A330 – 200 Green Aircraft EASA TC

**(2) ENGINE RR T772B/ GE CF6-80E1A3
EASA/ FAA TCs**



- Type Certification by FAA /EASA
- TC/ DOA holder: RR/ GE
- For A330 MRTT, a change to the engine TC may be needed to cover specific Beta-factors for A330 MRTT



A330 MRTT Initial Type Certification / Release to Service

(1) A330 – 200 Green Aircraft EASA TC

**(2) ENGINE RR T772B/ GE CF6-80E1A3
EASA/ FAA TCs**

(3) A330 MRTT EASA STC



- Supplemental Type Certification by EASA, covering:
 - ✓ Installation of all the structural MRTT modifications
 - ✓ Installation of external aerodynamic devices
 - ✓ Modification of some basic A/C systems (mainly due to interferences with the modification)
 - ✓ Installation of some military equipment and systems inoperative/de-activated (safe for carriage and no hazard/interference)
- STC/ DOA holder: Airbus Defence and Space SA



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EASA/ FAA TCs**

(3) A330 MRTT EASA STC

(4) A330 MRTT INTA Technical Certificate



- Technical Certificate by Spanish INTA, covering:
 - ✓ Installation and operation of all equipment not installed in the civil configuration
 - ✓ Activation and operation of those systems and equipment inoperative/ deactivated in the civil configuration
 - ✓ Specific AAR operation
 - ✓ Non-regression justification for GAC modified and non modified equipment when military functions are activated
- Technical Certificate applicant: Airbus Defence & Space SA

A330 MRTT Initial Type Certification / Release to Service

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EASA/ FAA TCs**

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(4) A330 MRTT INTA Technical Certificate

(5) A330 MRTT Specific Military Certification
(depending on Customer)



A330 MRTT Initial Type Certification / Release to Service


(1) A330 – 200 Green Aircraft EASA TC

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(4) A330 MRTT INTA Technical Certificate

(5) A330 MRTT Specific Military Certification
(depending on Customer)

A photograph of an Airbus A330 MRTT aircraft in flight, viewed from a low angle. The aircraft is white with blue accents on the tail and wings. It is flying against a clear blue sky. A large white arrow points from the list of certifications on the left towards a dark blue box on the right.

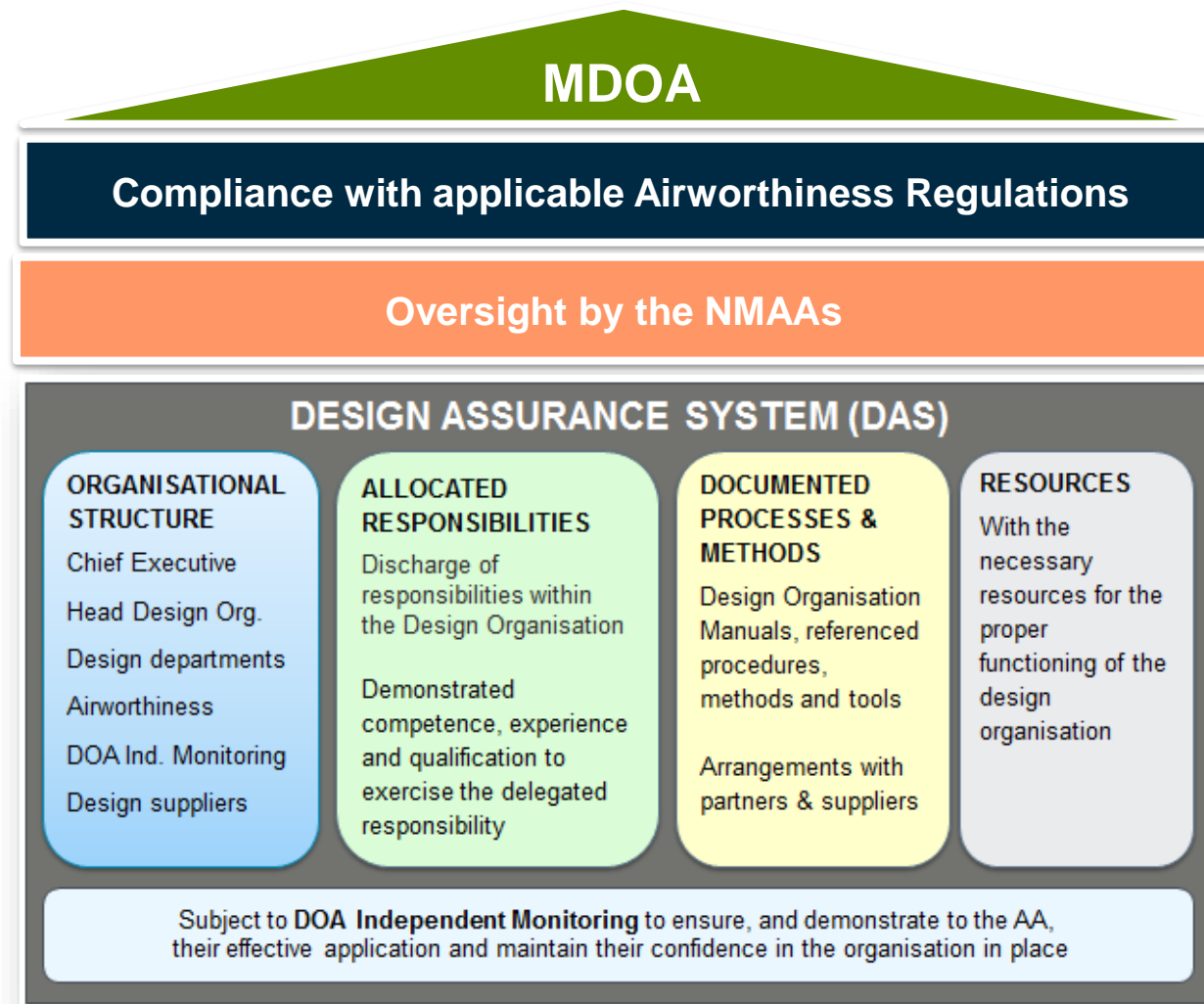
**Final A330 MTC or RtS
issued by the NMAA
of the Country of Registration**

A330 MRTT airworthiness regulatory framework analysis



- During the **initial Type Certification process**, NMAAs can rely on EASA Part 21/ DOA and on INTA SP Defence AiW regulation/ ROD for INTA Tech. Certificate
 - Only if specific block is to be certified with the final NMAA, National regulation can be requested to be applied by Airbus Defence and Space at this stage
- **Development and certification flights** are carried out under EASA DOA PtF privilege or under INTA Experimental Military PtF (depending on flight scope)
- But at the **MTC** issuance by the NMAA and **CAW**, NMAA can require to establish a MDOA compliant with the National regulation at the Country of Registration:
 - Final responsibility assumed by NMAAs, legal reasons and/ or sovereignty principles may demand NMAAs/ Airbus D&S to implement MDOA mechanism for ensuring continued airworthiness control
 - MDOA needs to consider EASA involvement for the STC and associated obligations, may take benefit of the INTA maintenance of the Technical Certificate and have to manage all interfaces across GAC and MRTT part

A330 MRTT airworthiness regulatory framework analysis



- Airbus D&S for the A330 MRTT product is accumulating several MDOAs
- Design Assurance System of Airbus D&S is subject to several airworthiness regulations:
 - National airworthiness regulations applicable to each MDOA
 - Part 21 for managing all EASA STC aspects and interfaces with A330 GAC
 - SP Royal Defence Airworthiness Decree for managing technical certification processes with INTA and interfaces with A330 GAC and EASA MRTT STC

A330 MRTT airworthiness regulatory framework analysis



- 1) **Complex DOA environment:** DOA with EASA for the STC, MDOAs with NMAAs as final AiW Authorities, ROD with INTA to manage the activities with INTA
- 2) **Whilst EASA DOA and regulatory frame is accepted by all NMAAs, lack of convergence and harmonisation for Military AiW regulations**
 - Different regulatory frames across NMAAs preventing or making difficult the single design assurance system approach for the A330 MRTT
 - Slow EMARs implementation by NMAAs (sometimes adapting rather than adopting)
- 3) **Different DOA privileges** depending on the applicable AiW regulations and MDOA
- 4) **Complex design assurance system processes**, in particular for continued aiw
 - Different availability and management of AiW artefacts depending on the applicable AiW regulations and DOA/ MDOA
 - Different DAS procedures for same CAW artefact

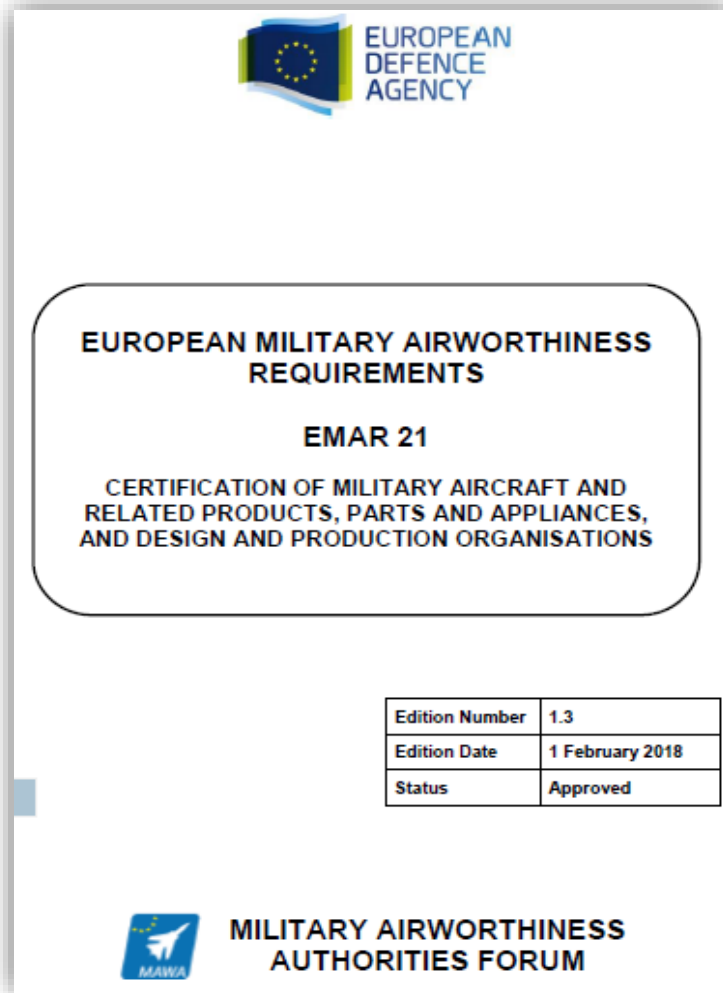
A330 MRTT airworthiness regulatory framework analysis



- 5) **Complex design-production-maintenance set-up:** Interfaces of design organisation with production (including spares) and maintenance organisations adapted depending on Programme
- 6) **Complex and duplicated management of changes to the design assurance system,** with EASA, INTA and each NMAA
- 7) **Duplicated and non-coordinated oversight of the design organisation** by AAs for the same design assurance system/ product
 - Same process/ subject/ people surveyed several times by different AAs
 - Different requirements / interpretations making difficult the management of the design assurance system, potential generation of conflicts
 - Neither coordinated nor shared oversight among EASA, INTA and NMAAs
 - High effort and dedication on Airbus D&S to manage all MDOAs and their oversight



EMAR 21 Case Study for A330 MRTT



- A high number of MAAs throughout the world have adopted or are in process to adopt EMARs, in other cases are ready to accept EMARs as an acceptable MoC with their National regulations.
- Largely mirroring the EASA regulation, EMARs are consistent with the EASA framework and allow for military specific requirements.
 - EMAR 21 connects civil and military airworthiness regulatory frames
 - Particularly beneficial for military products based on civil platforms as the A330 MRTT.
- EMAR 21 application for the FR A330 MRTT is presented as case-study
 - EMARs have been set as the applicable aiw regulatory frame
 - Case study is focused on EMAR 21 – design organisation (EMAR 21G for production of parts / spares and EMAR145 for aircraft conversion have been also implemented)

EMAR 21 Case Study for A330 MRTT



Principles of implementation of EMAR 21J in FR A330 MRTT

- EMAR 21 ed. 1.3 issued Feb 2018 as applicable regulatory frame. Subsequent editions will be considered in the frame of the change process of MDOA.
- FR MTC for both GAC and engine through a tacit recognition of the EASA certificates.
- FR MSTC issued covering the EASA MRTT STC, the INTA Technical Certificate (airworthiness approved through the MSTC) and a specific block certified with FR NMAA.
- EMAR 21.A.263(c) privileges granted to allow Airbus D&S issuing DOA deliverables and airworthiness approvals for the MSTC scope. Mechanisms and responsibilities defined to maintain MSTC links with EASA STC and take benefit of INTA maintenance of the technical certificate (occurrences, changes to the technical certificate including impact on approved manuals and ICAs).
- EMAR 21.A.263(d)1 privilege granted for Airbus D&S to declare the applicability for the MSTC, through validation of no impact to the military certification basis and the intended use, of AiW artefacts issued by GAC TC holder under its EASA DOA and by Airbus D&S as EASA STC holder under Airbus D&S EASA DOA.
- Engine is a non-affected part by the MRTT conversion so all airworthiness artefacts issued by the Engine TC holder are applicable to the A330 MRTT.

EMAR 21 Case Study for A330 MRTT

AIRBUS	DEFENCE AND SPACE	Military Aircraft
DP-000-033 Annex 2 Issue B Revision 1		
Procedure		
DESIGN ORGANISATION MANUAL ANNEX 2 for MDOA EMAR21J-001-DGA		
<p>OBJETO / PURPOSE:</p> <p>Airbus Defence and Space S.A. (Airbus DS hereunder in this document) is an approved design organisation by EASA with ref. EASA.21J.032. The Design Organisation Manual (DOM) DP-000-033 is the handbook by which Airbus DS complies with requirement Part 21.A.243 of COMMISSION REGULATION (EC) No 748/2012 dated 3 Aug 2012.</p> <p>The DOM DP-000-033 supplemented by this Annex 2 for MDOA EMAR21J-001-DGA (Annex 2 hereunder in this document) serves as the basis for the approval of Airbus DS as Military Design Organisation (MDOA) by the Direction Générale de l'Armement (DGA) in accordance with EMAR 21 requirements.</p> <p>This Annex 2 to the DOM DP-000-033 confirms, supplements and/or complements when necessary, each chapter of the DOM DP-000-033 to define the specific organisational structure, responsibilities, resources and procedures under the MDOA EMAR21J-001-DGA and to ensure compliance with EMAR 21 requirements.</p> <p>ALCANCE / SCOPE:</p> <p>This Procedure is applicable to all relevant personnel and organisations involved in the design, certification and / or continued airworthiness of all products covered under the scope of the MDOA EMAR21J-001-DGA, including Engineering, other Military Aircraft Organisations, partners and suppliers.</p> <p>Applicable Discipline(s): All disciplines are affected.</p>		
<p>Preparado / Prepared</p> <p>Name: Jesús Cofías</p> <p>Function: Head of DOA Management, Policies and Expertise</p> <p>Date:</p>	<p>Chequeado / Checked</p> <p>Name: José Luis Asenjo</p> <p>Function: Head of Processes & Operational Certification</p> <p>Date:</p>	
<p>Aprobado / Approved</p> <p>Name: Juan Román</p> <p>Function: Head of Product Integrity</p> <p>Date:</p>	<p>Autorizado / Authorised</p> <p>Name: Miguel Ángel Morell</p> <p>Function: Head of Military Aircraft Engineering</p> <p>Date:</p>	
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Design Assurance System (DAS) under EMAR 21J MDOA

- DAS of Airbus D&S under EASA DOA (part 21 compliant) extended to cover the complete MSTC perimeter and ensure compliance with EMAR 21 requirements.
- Annex to the EASA Design Organisation Handbook (DOH) supplementing it as needed to define the specific organisational structure, responsibilities, resources and procedures under the MDOA EMAR21J and to ensure compliance with EMAR 21 requirements.
- EASA DOH supplemented by this Annex serving as the basis for the approval of Airbus DS as MDOA by the FR NMAA law. EMAR 21 requirements.
- Taking benefit of EASA DOA Management and oversight, mechanism defined.
- All DOA processes adapted from Part 21 to ensure EMAR 21 compliance and consider all potential scenarios in case of affecting EASA STC, INTA Technical Certificate or specific block certified by FR NMAA.



EMAR 21 Case Study for A330 MRTT

Conclusions from EMAR application in FR A330 MRTT

- ✓ One single and consistent design assurance system, integrating all activities needed to ensure A330 MRTT airworthiness
- ✓ Defined roles and responsibilities among different AiW Authorities participating in A330 MRTT, increase of visibility to all Actors
- ✓ Higher standardisation of the practises, one single “language” based on Part 21/ EMAR 21
- ✓ Simplified MDOA management and oversight approach based on EASA DOA
- ✓ Connection between civil and military aiw regulatory frames
- ✓ Taking benefit of EASA activities, including regulatory rulemaking
- ✓ Better coordination and definition of DOA processes for application by the design organisation and FR NMAA and Operator, in particular for continued airworthiness matters
- ✓ Saving of time and resources for NMAA and Industry



A330 MRTT airworthiness regulatory framework

Next Steps

EMARs applicability for the A330 MRTT fleet would bring a high benefit to NMAAs, Operators and Industry.

To progress on the implementation of EMARs for A330 MRTT fleet:

- ✓ **NMAAs to adopt EMARs** (or incorporate with minimum change) into the National regulations **or to accept EMAR as acceptable mean of compliance** with National regulations
- ✓ Airbus D&S to develop a **single design assurance system, EMAR 21 based**, valid for the overall fleet (specificities may be considered depending on Programme) and future contracts
- ✓ **DOA Working Group** to be established involving all A330 MRTT NMAAs and Airbus D&S, with the purpose to manage all A330 MRTT DOA related aspects in a coordinated and visible manner

Thank you