



Boeing Defense, Space & Security

Boeing's Approach to Airworthiness/Certification of Military Aircraft



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Boeing Military Aircraft
Certification & Airworthiness
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Topics

- ▶ **Boeing Defense Systems Airworthiness Certification Council**
- ▶ **Boeing Military Products**
- ▶ **Tailored Approaches to Certification**
 - ▶ Commercial Derivative Aircraft
 - ▶ Military Aircraft
- ▶ **Leveraging International Military Type Certificates (MTCs)**
- ▶ **Recommendations for improvement**

Boeing Defense Systems Airworthiness Certification Council

Purpose:

- ▶ The Airworthiness Certification Council (AwCC) is a forum for certification and airworthiness leaders across Boeing Defense Systems
- ▶ Goal is to improve certification and airworthiness processes and activities from proposal through continued airworthiness

Council Strengths:

- ▶ Independent Subject Matter Experts (SMEs), Designated Engineering Representatives (DERs), Unit Members (UMs)
- ▶ Some sites have United Kingdom Design Approved Organization Scheme
- ▶ Assignment of Authority (AoA) has been delegated to Boeing by certain countries
- ▶ Communication across Boeing divisions



Boeing Military Aircraft

Boeing has 4 Divisions that Produce Military Platforms

▶ Vertical Lift



▶ Global Strike



▶ Mobility, Surveillance & Engagement



▶ Unmanned Airborne Systems Programs



Boeing Military Aircraft Platforms

Global Strike	Mobility, Surveillance and Engagement (MS&E)	Vertical Lift	Unmanned Airborne Systems (UAS) Programs
F/A-18E/F Super Hornet	Advanced Joint Surveillance Target Attack Radar System	A/MH-6M/ AH-6i Little Bird	H-6U Unmanned Little Bird
EA-18G Growler	KC-46 Pegasus	AH-64E Apache Guardian	RQ-21A Blackjack / Integrator
F-15 Programs	P-8 Programs	C/MH-47 Chinook	ScanEagle
	C-17 Globemaster III	C/MV-22 Osprey	S-100 Camcopter

Commercial Derivative Aircraft

Examples:



P-8A Poseidon
Maritime Patrol Aircraft



**Boeing 737-Next Generation
Family
Baseline Aircraft**



E-7A Wedgetail
Airborne Early Warning
& Control (AEW&C)



KC-46A Pegasus Tanker



**Boeing 767 Family
Baseline Aircraft**



Japanese Air Self-Defense Force
(JASDF) E-767 AWACS



Italian Air Force KC-767



JASDF KC-767

Commercial Derivative Aircraft (cont'd)

Certification Approach:

- ▶ Utilize the initial Type Certificates (TCs) from Federal Aviation Administration (FAA)
- ▶ Approve Modifications/Changes through Organization Designation Authorization (ODA)
- ▶ Develop Supplemental Type Certificates (STCs) for the military systems through the FAA Military Certification Office (MCO)



or:

- ▶ Submit artifacts and data for Military Type Certificate from Military Airworthiness Authority (MAA)
- ▶ **Option:** Delegate limited authority to BDS Internal Airworthiness personnel

Military Aircraft



**AH-6 Little Bird
Attack Helicopter**



**AH-64 Apache
Attack Helicopter**



**CH-47F/ICH-47F Chinook
Heavy Lift Transport Helicopter**



**C/MV-22 Osprey
Troop Assault Tiltrotor**



**F-15 Eagle and Strike
Eagle**



**F/A-18E/F Super Hornet
EA-18G Growler**



**KC-767 International Tanker
B-52H Stratofortress**



**H-6U Optionally Manned
Little Bird**



S-100 Camcopter UAS



**Scan Eagle Unmanned
Aircraft System (UAS)**



**RQ-21 Blackjack/
Integrator UAS**

Military Aircraft (cont'd)

Certification Approach:

- ▶ Requirements, Design / Development, Qualification / Certification
- ▶ Provide artifacts, data, and information to Military Airworthiness Authority
- ▶ Support the activities to issue MTCs (Airworthiness Release [AWR]) for US and International aircraft)
- ▶ **Option:** Delegate limited authority to Boeing Defense, Space & Security (BDS) Internal Airworthiness personnel



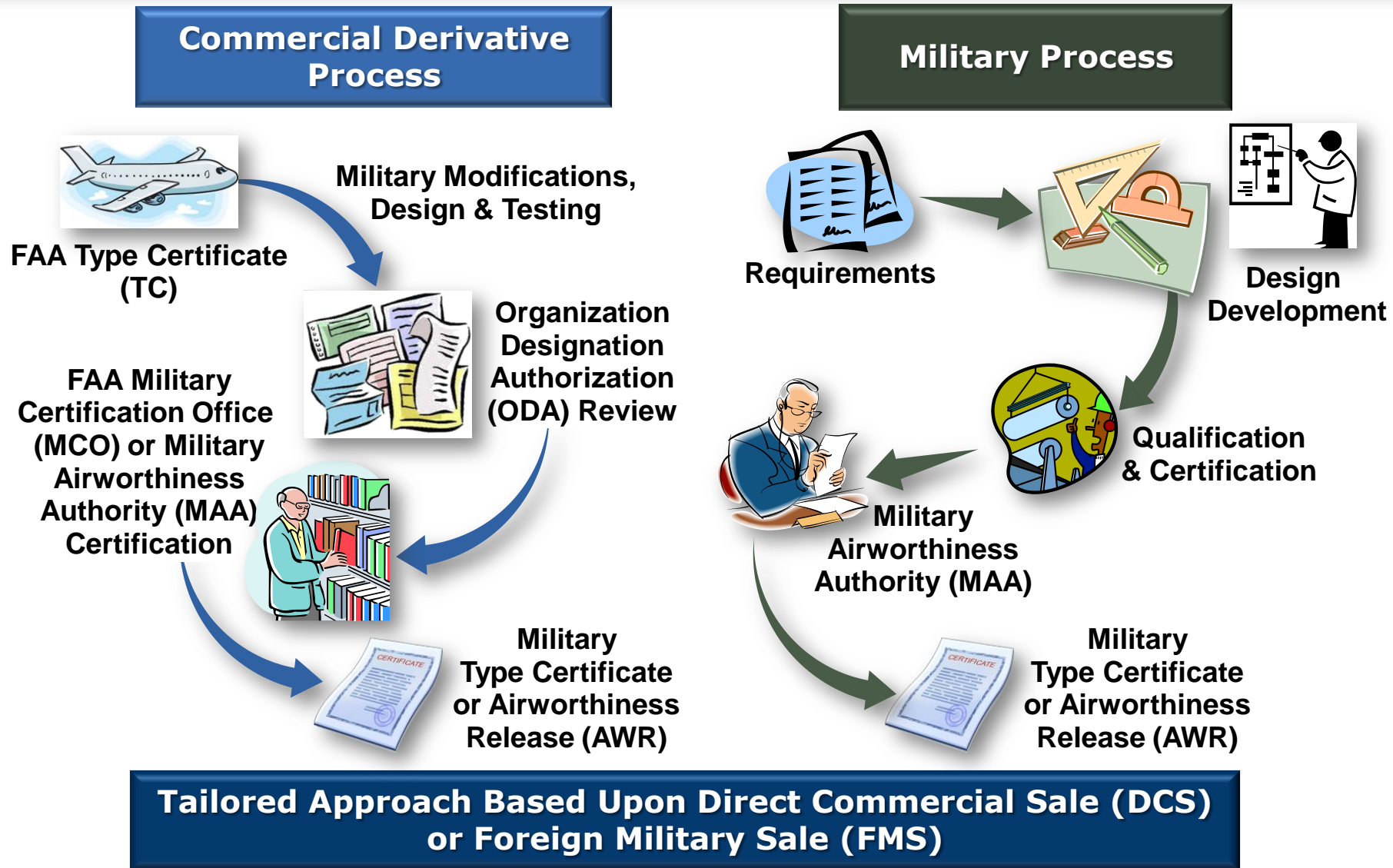
Military Aircraft (cont'd)

Various Tailored Approaches:

- ▶ **Type Design Examination and Delegated Airworthiness Authority (Assignment of Authority)**
- ▶ **Comply with DEF-STAN-970 with supplemental White Papers**
 - ▶ Sub-System Qualification Documents, Safety Case
- ▶ **Support European companies certification to Defence Ministries**
- ▶ **US Government may provide AWR for air vehicles**
- ▶ **Opened “books” to customers for audits of:**
 - ▶ Data, processes, records, documents, procedures, artifacts
 - ▶ Provided statements of compliance, and white papers



Military Certification Comparison



Military Type Certificates (MTCs)

- ▶ **For both the Customer and Industry, Certification is:**
 - ▶ Expensive
 - ▶ Time consuming
- ▶ **How do we help increase confidence in other country's MTCs?**
 - ▶ Supplemental Audits of manufacturers
 - ▶ Closer examination of the safety records of same platform in other countries
 - ▶ Examine other MAAs certification processes
- ▶ **How do we ensure safety and airworthiness, but save time and money?**

Military Type Certificates (cont'd)

What can industry do to improve the Military Aircraft certification process and save money?

- ▶ **Offer Airworthiness / Certification delegates**
 - ▶ Assignment of Authority (AoA)
- ▶ **Improve Audits from MAAs**
 - ▶ “Open Book” policies of documents
- ▶ **Provide supplemental information / data**
- ▶ **Improve the way industry demonstrates how compliance and certification was accomplished with other countries**
 - ▶ Examination of certification processes (Type Design Examinations)



Boeing's Recommendations to Improve Certification Process and Reduce Costs

- ▶ **Permit certification discussions with the manufacturer's airworthiness personnel with MAA prior to contract award**
- ▶ **Early discussions on:**
 - ▶ Basis of Certification
 - ▶ Methods of Compliance
- ▶ **Contractor – MAA Agree on the certification approach**
- ▶ **Early development and acceptance of Certification Plans**
 - ▶ Identify the artifacts and results expected
- ▶ **Delegate some Authority where practical/reasonable**
- ▶ **Continue with Mutual Recognition of Airworthiness - MTCs**



Thank you. Questions?

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Acronym Definitions

- ▶ **Airworthiness Certification Council (AwCC)**
- ▶ **Airworthiness Release (AWR)**
- ▶ **Assignment of Authority (AoA)**
- ▶ **Designated Engineering Representative (DER)**
- ▶ **Federal Aviation Administration (FAA)**
- ▶ **Japanese Air Self-Defense Force (JASDF)**
- ▶ **Military Airworthiness Authority (MAA)**
- ▶ **Military Certification Office (MCO)**
- ▶ **Military Type Certificate (MTC)**
- ▶ **Mobility, Surveillance and Engagement (MS&E)**
- ▶ **Organization Designation Authorization (ODA)**
- ▶ **Subject Matter Expert (SME)**
- ▶ **Supplemental Type Certificate (STC)**
- ▶ **Type Certificates (TCs)**
- ▶ **Unit Member (UM)**
- ▶ **Unmanned Airborne Systems (UAS)**