International Military Airworthiness Regulation Conference

Translating Airworthiness Frameworks; the Complexity of Recognition

FLT LT Leon Purton
• Background – some motivation
  – Increasing awareness of requirements
• What is recognition?
• Why are we doing it?
• How is it being done?
• Recognition as an enabler - ASIC
• Militaries are not subject to the ICAO convention
• No oversight of the Authority—nobody checking the checker
• Reduced independence of Military Regulators—within the ‘Command Chain’ or Self-regulation
• International Military Airworthiness
  – Working Groups, Collaborative Forums and Projects across most of the Western militaries
  – Why are there so many working on a similar thing?
Increasing awareness of requirements

- Globally, awareness of the requirements to assure the safety of personnel on other Nations aircraft has dramatically increased.
- Initiated in 2003, following a NATO chartered Ukrainian troop transport from Afghanistan crashed in Turkey – killing all on board (UM 4230, YAK-42).
- 62 Spanish troops (and 13 flight crew) were killed and NATO paid some damages, this was the third Ukrainian crash in the last month (and the culmination of 105 total NATO deaths from aviation accidents over the last 10 years).
- Triggered establishment of NATO and ASIC airworthiness project groups and subsequently the US DOD Directive
  - Requires US DOD Authorities to validate the airworthiness management systems of the military nation prior to transportation of US DOD personnel
The working groups are progressing on common themes

NATO;
  – Established an Airworthiness Executive and are progressing an implementation plan for assuring that NATO personnel are safe on all aircraft.

ASIC;
  – Produced a recognition process for characterising airworthiness frameworks – AIRSTD AW 2003. This working group allows interaction of key parties from the three forums, allowing for development of a consistent approach.

EDA;
  – The MAWA forum developed the EMARs and the EMAD-R (recognition) – largely stimulated by European Industry who were tired of many countries differing regulatory requirements

Lastly, the US National Airworthiness Council were motivated for compliance with US DODD 5030.61 which dictates that US DOD personnel should be equally as safe on any other Nations military aircraft.
What is Recognition?

To Do List:
- Recognize someone today!
- 
- 
-
Everyone is different!

- Many methods for assuring airworthiness
- Everyone achieves their own level of safety through unique means
- How can you test where they are different?

**PAPER 1**

**PAPER 2**

**PAPER 3**

**PAPER 4**

[https://www.researchgate.net/profile/Leon_Purton](https://www.researchgate.net/profile/Leon_Purton)
The PBP Bow-Tie

Operating an Aircraft in a known role and environment

Top Event

Loss of technical integrity

- PRODUCT INTEGRITY
- PREVENT
- BEHAVIOURAL INTEGRITY
- PROCESS INTEGRITY

- DESIGN
- PRODUCE
- MAINTAIN

- MAINTAIN
- PRODUCE
- MAINTAIN

- PRODUCT CONSEQUENCE
- BEHAVIOURAL CONSEQUENCE
- PROCESS CONSEQUENCE
Identifying Regulator Interaction

Key to visualising regulatory framework
Examples - representation

EASA Bow-Tie Assessment

ADF (TAREG) Bow-Tie Assessment
Examples – External comparison

[Diagram showing comparisons between FAA and EASA processes]
So – everyone is different

• How do you exchange services and information
• Can ‘just-do-it’, or apply some diligence
• We do it through Recognition
What is recognition?

- Recognition
  - The diligent assessment of another Airworthiness Authority through an ICAO based question set
  - Upon satisfactory assessment they can be Recognised
  - Allows nations to utilise that recognition to facilitate utilisation of that Nations information and services subject to conditions and caveats.
  - Increases trust with the drive to decrease cost, particularly those driven by duplication
  - Globalisation of aviation
  - Confidence in the other system – different but competent
  - Equivalent OR an acceptable alternate
Civil vs Military

- Civil Airworthiness Authorities are audited by ICAO through a Continuous Monitoring Approach (CMA) under the Universal State Oversight Audit Program (USOAP)
- There is no Universal oversight of Military Organisations
Continuous Monitoring

Effective Implementation

- Legislation
- Organization
- Licensing
- Operations
- Airworthiness
- Accident Investigation
- Air Navigation Services
- Aerodromes

Global average, Australia, United States of America, United Kingdom of Great Britain and Northern Ireland, Nepal

http://www.icao.int/safety/Pages/USOAP-Results.aspx
Civil recognitions

- Very different implementations, but with a defined common foundation recognition is possible and achievable
- Large amount of time is spent with legal reviews
Civil vs Military

International agreements

**Arrangement with China**
- Memorandum of Understanding between CASA and the Civil Aviation Administration of China for the promotion of civil aviation safety.
- Implementation Procedures between CASA and the Civil Aviation Administration of China for the acceptance of airworthiness approval of aeronautical products.

**Arrangement with Singapore**
- Technical Arrangement on Airworthiness Certification between CASA and the Civil Aviation Authority of Singapore.
- Memorandum of Understanding between CASA and the Civil Aviation Authority of Singapore on aviation safety.
- Technical Arrangement on aviation maintenance between CASA and the Civil Aviation Authority of Singapore.

**Arrangement with Korea**
- Memorandum of Understanding between CASA and the Ministry of Land, Transport and Maritime Affairs, Korea for the promotion of aviation safety.
- Implementation Procedures between CASA and the Ministry of Land, Transport and Maritime Affairs, Korea for the acceptance of airworthiness approval of aeronautical products.

**Agreement with EASA**
- Agreement with EASA
  Cooperative Agreement for Airbus A380

**Arrangement with New Zealand**
- High Level Arrangement between the Australian and New Zealand Governments on Mutual Recognition of Aviation-related Certification.
- Operational Arrangement between CASA and the Civil Aviation Authority of New Zealand in relation to mutual recognition of Air Operator Certificates.

**The Australia-US Bilateral Aviation Safety Agreement**
The Bilateral Aviation Safety Agreement (EASA) between Australia and the US came into effect on 28 November 2006 with an exchange of diplomatic notes. The EASA allows for the import to the US of certain aeronautical products designed and manufactured in Australia, and Australian acceptance of certain FAA approvals.

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- Civil aviation has ‘recognitions’ that enable easier transfer of information and services.
- Commonly takes the form of multiple tiers;
  - Memorandum of Understanding on Aviation Safety (**Enabling**),
  - Implementation Procedures for acceptance of airworthiness products and services (**Exchanging**).
- They are very formal, legislative agreements with long gestations and no global standard for the process.
Military Recognition Scope

- Multi-faceted approach
  - Competence of the Authority for satisfying airworthiness goals
    - Carriage of personnel, operations in our airspace
    - Satisfaction of ICAO airworthiness manual and state safety requirements
    - Enabling Arrangement
  - Benchmarking of Service/Provisions
    - Verification of equivalence to International requirements
    - Enables exchange of information and services
    - Largely aircraft agnostic
    - Exchanging Arrangement
  - Confirmation of Suitability/Applicability of the Services sought for a specific aircraft
    - Use of design, production and maintenance for each aircraft
    - Air Operators quality check
    - Need to establish complementary logistics/financial arrangements
    - Implementing Arrangement
- These are hierarchical and the scope of a recognition is determined by the level of required interaction.
Why do recognition?

BASSED ON ALL THE HEAD TILTS, MAYBE I’D BETTER EXPLAIN THIS AGAIN...
Small country reliance

- Australia (and many other Nations) rely on other Nations for aircraft acquisition, sustainment and support of their military aviation assets
- Current mechanisms for use of those Nations services and information requires re-validation for each aircraft
- There are numerous relationships being managed; Australia

- These relationships are identified in this figure, but this does not illustrate the strength of that reliance
So who does the ADF interact with?

- This covers the breadth of Australian Military interactions.
- The width at the end of each chord illustrates the number of organisations;
  - Heavy reliance on the US understandable
  - Increasing reliance on European nations
  - ARH Tiger, MRH Taipan, KC-30A, PC-9, C-130 common users, etc...
So who does the ADF interact with?

- If you examine the countries.... All but the US and Canada are adopting EMARS
- Australia can see great benefit from adoption of the EMARs (adopted as DASRs)
- May be able to influence US lexicon
- Canada very similar to TAREGs
Industry motivation

• Many people have discussed the ‘why’
• I like pictures...
Rasmussen’s Safety Drift Model

Safety Policy and Culture

Safety Barrier

Organisational Position

Barrier for economic failure

Established Financial Gradient (towards least cost)

Management Pressures

Established Workload Gradient (towards least effort)

Barrier for resource overload

Actual edge of safe performance

Perceived boundary of safe performance
How will we do it?

- **Sub Sect A**
  - Airworthiness Authority
  - Always invoked

- **Sub Sect B**
  - Airworthiness Inspection

- **Sub Sect C**
  - Production Oversight

- **Sub Sect D**
  - Aircraft Certification
Exchange of homework

- EMAR document suite contains a process for recognition
  - European Military Airworthiness Document for Recognition (EMAD R)
  - Contains a set of questions for exchange
- Military Airworthiness Requirements Question-set (MARQ) used as a translator between Nations
  - Based on the ICAO SARPs
  - Each Nation completes the same questions (self-description of how), can be used for comparison – or translation of lexicons
  - Normally followed by a face-to-face audit/review to enhance comprehension and understanding
  - MARQ has been adopted as the standard for recognition by ASIC, NATO, US DOD and European Defence
  - Internationally endorsed and defensible process
**EMAD R - RECOGNITION**

<table>
<thead>
<tr>
<th>MARQ Sub-Section A - Airworthiness Authority</th>
<th>Completing RP</th>
<th>Reviewing RP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unique Identifying Reference</td>
<td>Goal Level</td>
<td>Airworthiness Safety Goal</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------</td>
<td>-------------------------</td>
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<tr>
<td>1.1.5.4</td>
<td>3</td>
<td>The Authority has an effective method of keeping track of key airworthiness correspondence between the public, industry, and certificate holders.</td>
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<tr>
<td>Critical Element Number 6 (CE 6) - Licensing, Certification, Authorization and Approval</td>
<td></td>
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</tr>
<tr>
<td>1.1.6</td>
<td>2</td>
<td>An airworthiness assurance system has been established, according to the level and scope of aviation activity.</td>
</tr>
<tr>
<td>1.1.6.1</td>
<td>3</td>
<td>The Authority conducts type certification (see MARQ Ed 1 further details)</td>
</tr>
<tr>
<td>1.1.6.2</td>
<td>3</td>
<td>The Authority ensures production (see MARQ Ed 1 further details)</td>
</tr>
</tbody>
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**EMAD R - RECOGNITION**

<table>
<thead>
<tr>
<th>MARQ SUB-SECTION A - AIRWORTHINESS AUTHORITY - GUIDANCE MATERIAL</th>
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<tr>
<td>Unique Identifying Reference</td>
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<tr>
<td>---------------------------------------------</td>
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<tr>
<td>Critical Element Number 1 (CE 1) - Primary Aviation Legislation</td>
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<tr>
<td>1.1.1.5a</td>
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<tr>
<td>Critical Element Number 2 (CE 2) - Specific Operating Regulations</td>
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<tr>
<td>1.1.2a</td>
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<tr>
<td>1.1.2b</td>
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<td>1.1.2c</td>
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<td>1.1.2g</td>
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<td>1.1.2h</td>
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IMARC 2016
Aligning with ICAO helps

**ADF**
AMS
When based on TAREG

**MARQ**
(based on ICAO SARPs)

**Other**
Airworthiness Authority’s AMS
not ICAO or EMAR based
ADF
AMS
based on DASR

EMAD R
MARQ
(based on ICAO SARPs)

Other
Airworthiness
Authority’s
AMS
not ICAO or
EMAR based

ADF
AMS
based on
DASR

EMAD R
MARQ
(based on
ICAO SARPs)

Other
Airworthiness
Authority’s
AMS
ICAO or
EMAR based
Recognition; three forums with one goal

• NATO, US DOD NAC and ASIC are all focussed on improving Global Aviation Safety through characterisation of risk to life
• Progression towards a Total Aviation focus
• Interaction through these forums – and conferences like this – stimulate and progress International Airworthiness and Aviation Safety
• ASIC is developing a Roadmap document
ASIC Airworthiness Working Group

• Introduces the Airworthiness Working Group (AWWG)
• Defines the Role, Purpose and Mandate
• Outlines Primary, Secondary and Tertiary Responsibilities

- ASIC Mandate enabled by MOU
- Operational Risk Best Practice
- Flight Operations Benchmarking
- Benchmarking Principles for AW
- Revised Terms of Reference
- Defined standard for Recognition

AIMC 2016
In Closing

- Military airworthiness is a global topic
- Increasing interest in benchmarking beyond Airworthiness to Flight Operations and Aviation Support Systems
- EMARs can provide a defensible, inter-continental standard for which a National system can be benchmarked
- It is no longer sufficient to state, yes we are different, but we are good – could you defend your system?
- These recognitions provide an opportunity to test/plan for the future, not review against the past.
- Benchmarking your system against EMARs and conducting recognition will provide a peer review of your system against ICAO derived principles.
It’s time to change lanes

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