Certification Challenges and Proposals in Korea Standpoint

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Approved for Public Release; No sensitive material included. Reviewed by DAPA Service Management Team.
We want Flight Safety Harmonization based on Worldwide Transparency Cooperation
Scope

Contents

- Introduction
- ROK Military AC System
- ROK Military A/W Status
- ROK A/W Lesson Learn
- Proposals for International Community
- Conclusion
The Military Airworthiness Certification Act of August 2009 was the cornerstone of the military aviation safety in Korea.

The Act charges the Administrator of the Defense Acquisition Program Administration (DAPA) with

- Certificating Military Aircraft and Issuing COA
- Establishing safety standards

The Certification Planning Division assumes primary responsibility for airworthiness certification.
Republic of Korea (ROK)

The ROK faces
- Japan across the East Sea
- China across the Yellow Sea
- North Korea to the north

<table>
<thead>
<tr>
<th>Capital City</th>
<th>Seoul</th>
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<tbody>
<tr>
<td>Population</td>
<td>48.87 million</td>
</tr>
<tr>
<td>Language</td>
<td>Hangul</td>
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ROK Military A/W Certification System

- Act on Military Aircraft Flight Safety Certification (Act No. 11559)
- A/W Certification Criteria based on MIL-HDBK-516B, etc.
- A/W Engineering Agencies
- A/W Engineering Center
- Regulation on Military A/W Certification
Military A/W Cert’ criteria Set up

- Standard Airworthiness Certification Criteria
  - Based on “Mil-HDBK-516B”
- Other A/W Cert’ Criteria based on program features
  - FAA FARs, U.S Armed Forces HDBK, EASA CS etc.

Detail A/W working process regularization

- DAPA Regulation No. 214(3rd revision)
  - Certification procedure per type of program
  - Personnel management, training, inauguration process
  - Technical data management, support
  - Process for issuance of certificates
- Templates to apply A/W in working level
ROK Military A/W System (3/3)

**ROK A/W Certification Organization**

- **A/W Cert’ Board**
  - Advisory Consultant
  - Decision-Making & Advisory on the policy/engineering issues

- **Analysis, Test & Evaluation Bureau**
- **Control & Coordination**

- **Engineering Center (Air Force)**
  - **A/W Team**

- **Cooperation**
  - KARI
  - Civil A/W Cert’ Authority
  - Airspace strategy division

- **Program management organization**
  - IPT, Industries
  - Military Service

**ROK A/W Certification Organization**

- **ADD**
- **DTAQ**
- **ARMY**
- **AIRFORCE**
## Main A/W cases

<table>
<thead>
<tr>
<th>Program Type</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>R &amp; D</strong></td>
<td>KT-1, KUH, FA-50, UAV, etc</td>
</tr>
<tr>
<td><strong>Purchase</strong></td>
<td>F-X, C-130J, HAH, Maritime operation Helicopter, etc</td>
</tr>
<tr>
<td><strong>Upgrade</strong></td>
<td>KF-16, C-130H, CN-235, Maritime scouter, HH-60 upgrade, etc</td>
</tr>
<tr>
<td><strong>Export</strong></td>
<td>T-50i, KT-1T, KT-1P</td>
</tr>
</tbody>
</table>
Program Type and Budget comparison

Per Type:
- R & D: 39%
- Upgrade: 28%
- Purchase: 28%
- Export: 14%

43 Programs

Per Budget:
- Purchase: 52%
- R & D: 36%
- Upgrade: 11%
- Export: 1%

ROK Military A/W Status (2/9)
ROK Military A/W Status (3/9)

Weapon System Approval

- **'98.12**
  - KT-1
- **'03.7**
  - KA-1
- **'05.11**
  - KT-1T
  - Military Trainer
  - TC-09-001
- **'09.12**
  - KUH
  - Utility Helicopter
  - TC-2012-001
- **'12.6**
- **'12.10**
- **'13.6**
- **'13.11**
  - T-50i
  - FA-50
  - Military Light Attacker
  - TC-2012-002
  - KUH-1P

Effective Act for Military Airworthiness Certification
KT-1P Airworthiness Certification Status

- Subsonic Aircraft

- Airworthiness Certification Criteria
  - TACC based on FAR Part 23
  - 876 Articles / 8 Criteria (General, Strength, etc)

- Number of Compliance Date: 306 documents

- Type Certificate issued on December 22, 2009

- Certificate of Airworthiness issued for 00
T-50/FA-50 Airworthiness Certification Status

- **Airworthiness Certification Criteria**
  - TACC based on Mil-HDBK-516B
  - 1,324 Articles / 14 Criteria (General, Structure, etc)

- **Number of Compliance Date**: 1,278 documents

- **Type Certificate issued on October 31, 2012**

- **Certificate of Airworthiness issued for Supersonic Aircraft**
### Compliance Check List (Sample – T-50 International)

<table>
<thead>
<tr>
<th>No.</th>
<th>Standard Airworthiness Certification Criteria</th>
<th>Tailored Airworthiness Certification Criteria</th>
<th>MOC</th>
<th>Verification Document</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.1</td>
<td>Hydraulic and pneumatic systems</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 8.1.5 | Verify that adequate crew station information is available to notify the flight crew of the hydraulic and pneumatic systems' operating conditions. JSSG–2009 B.3.4.2.1.3/B.4.4.2.1.3, B.3.4.2.1.4.3/B.4.4.2.1.4.3, B.3.4.2.1.4.4/B.4.4.2.1.4.4, B.3.4.2.2.3/B.4.4.2.2.3, M.3.4.13.3/M.4.4.13.3 | Verify that adequate Crew Station information is available to notify the Flight crew of the hydraulic systems' operating conditions. 8.1.5-a System fluid monitoring. A means shall be provided to monitor hydraulic system fluid quantity. A means to indicate hydraulic fluid level should be located on or near the hydraulic reservoir. 8.1.5-b System Pressure Indication Pressure indicating equipment shall be provided to indicate the system pressure in hydraulic systems or subsystems. 8.1.5-c System Low-Pressure Warning Light A warning light shall be installed in the cockpit in a conspicuous location to warn the pilot of low hydraulic system pressure. 8.1.5-d Instrumentation interface(s). As a minimum, the following instrumentation should be provided:  
   a. Hydraulic power system pressure (each system)  
   b. Low pressure indicator (each system) | 1 | 85H5500–101 85H5700–101 | Hydraulic System Installation Drawing |
|     |                                               |                                               | 7  | 85AEI–29–0100          | Hydraulic System Fill, Bleed, Leak Check And Operation Checkout For T-50 |
|     |                                               |                                               | 1  | 1T–50A–2–29GS–00–1     | IV. Hydraulic System Indicating (29–30–00) |
|     |                                               |                                               | 7  | 85AEI–29–0100          | Hydraulic System Fill, Bleed, Leak Check And Operation Checkout For T-50 |
|     |                                               |                                               | 1  | 85DS2931–201           | Schematic Diagram – Hydraulic Pressure IND/LOW Warning |
|     |                                               |                                               | 7  | 85AEI–29–0100          | Hydraulic System Fill, Bleed, Leak Check And Operation Checkout For T-50 |
|     |                                               |                                               | 1  | 85DS2931–201           | Schematic Diagram – Hydraulic Pressure IND/LOW Warning |
|     |                                               |                                               | 7  | 85AEI–29–0100          | Hydraulic System Fill, Bleed, Leak Check And Operation Checkout For T-50 |
KUH-1 Airworthiness Certification Status

- **Airworthiness Certification Criteria**
  - TACC based on FAR Part 29
  - 773 Articles / 9 Criteria (General, Structure, etc)

- **Number of Compliance Date**: 1,251 documents

- **Type Certificate issued on June 18, 2012**

- **Certificate of Airworthiness issued for 00**
Lessons from an importer standpoint

- Airworthiness compliance (technical) data-sharing required
- The difficulty of continued airworthiness certification in the case of a change to the form, fit, function during the service life
  ⇒ Need to share the airworthiness compliance data for the independent airworthiness determination by importing country
Lessons from a developer standpoint

- Difficulty for selecting the airworthiness criteria to ensure appropriate level of safety for a brand new aircraft developed by Korea
  - the Difference of A/C requirement between ROK – Allied nations, etc.
  - Combined efforts to build the more cost-effective military airworthiness system and the global harmonization of military airworthiness criteria
Lessons from an exporter standpoint

- Increasing demand for A/C based on International airworthiness requirements.
- Difficulty to reach an agreement on the fundamental airworthiness principles
  - Strengthen cooperation and close coordination between exporter and importer to enhance the flight safety
Without the airworthiness compliance data, how can the authority assure that the imported aircraft is safe?

How to achieve the performance with “absence of danger”?

How to reach an agreement with importing country on the fundamental airworthiness principles?

In common, a definite and unchanging policy is that “Safety is paramount”
International cooperation status

Europe A/W system Harmonization
- 2008 MAWA (Military Airworthiness Authority) establish under EDA (European Defense Agency)
- Purpose: Harmonized A/W system throughout whole military environment

NATO A/W system Harmonization
- Begin as a temporary group-chartered Working Group in 2010 under NATO Defense Agency
- Purpose: Establish integrated A/W system between member states and expand to the world

ASIC (Air and Space Interoperability Council) A/W activity
- Mar. 2011 A/W working group formulate in ASIC
- Purpose: Process set for mutual recognition and exchange of A/W information among joining members
To ensure the international level of the airworthiness for the military aircraft

- **A need for world-wide regulatory framework** (Not an EU-wide regulatory framework)
  - Feed-back from Asia for more improvement of requirements
    * Conference, Seminar, Working Group, Task Force membership, etc
  - **Infrastructure building for global harmonized A/W system**
    - Global harmonization of military airworthiness standards, procedures and audit

- **A need for flexible and adaptable airworthiness criteria to allow innovative technology**
  - **Airworthiness certification of the current aerospace weapon system with the state-of-the-art technology** (including a wide range of mitigation measures to reduce the risk of UAV operations)
  - **Enhanced military-Civil cooperation** (including the possibility for outsourcing of maintenance and repair to reduce time and costs)
To promote the level of international aviation safety throughout the world, a seamless competition for the performance and harmonized cross-border co-operation for the safety is essential.”

Fly Together!

The airworthiness compliance data-sharing enables the importing country to make a determination of independent airworthiness and to ensure the operational safety during the service life.

To develop and export the military aircraft with international level of safety, the global regulatory framework is needed.
√ 2014 ROK International Military Airworthiness Conference (Biennial)

- Topic: Int’l Cooperation for Military A/W on rapidly changing environment
- Period / Venue: June, 2014 (2days) / Seoul
- Participants (TBD): Any members with interests on ‘Flight Safety’

Looking forward to hearing from You!!!