International Military Airworthiness Regulation Conference

Overview and challenge of the JMOD airworthiness certification

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Contents

• Objective
• Overview of ATLA and JMOD airworthiness system
• Challenge
• Conclusion
• Introducing the airworthiness certification system for Japan Self Defense Forces (JSDF) aircraft.

• Introducing a direction where the JMOD airworthiness certification system is going toward.
Last year (2015.10.1), 3 organizations and 3 departments of JMOD were integrated into ATLA.

- **Policy and rule maker**

- **Regulator of initial certification**

### Policy of ATLA

1. Ensuring superior technology and technological dominance
2. Ensuring appropriate acquisition through project management and promoting “Acquisition Reform”
3. Promoting international cooperation on defense equipment
4. Reinforcing defense production and technological bases
Overview

JMOD airworthiness organization structure

- **Airworthiness authority**
  - Internal Bureau
  - Joint Staff
    - Ground Staff Office
    - Maritime Staff Office
    - Air Staff Office
      - Ground Self-Defense Force
      - Maritime Self-Defense Force
      - Air Self-Defense Force
  - Defense Intelligence Headquarters
  - The Inspector General’s Office of Legal Compliance
  - Regional Defense Bureaus
    - Acquisition, Technology, and Logistics Agency (ATLA)
      - Director general for aerial system
    - System Development Section (Aerial) in Secretariat
    - Aircraft Project Management Div.

- **Policy and rule maker for operation**
  - Ministry of Defense
    - Defense Minister
      - Airworthiness authority
        - Policy and rule maker for operation
      - Acquiring, Technology, and Logistics Agency (ATLA)
        - Program Office
          - Single Independent body for Initial certification of domestically developed aircraft
      - Joint Staff
        - Ground Staff Office
        - Maritime Staff Office
        - Air Staff Office
          - Ground Self-Defense Force
          - Maritime Self-Defense Force
          - Air Self-Defense Force
        - Defense Intelligence Headquarters
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        - System Development Section (Aerial) in Secretariat
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- **Regulator of operational airworthiness**
  (Each chief of staff office is responsible for operational airworthiness for JSDF.)

- **Regulator of continuing & continued airworthiness**
  (Each commander of service’s material command is responsible for continuing & continued airworthiness for JSDF.)

- **Regulator of Technical airworthiness**
  - Director general for aerial system
Overview

Regulations -General Policy-

ICAO Convention

Compliance

Japan Civil Aeronautics Act

MOD/JSDF

Self-Defense Forces Act

Set as directives by defense minister

No need to comply with Civil regulation concerning Airworthiness, Personnel Qualification, Airfield and airfield facilities, etc.

Require regulation to ensure aircraft safety

Directive on aircraft operation

Directive on usage and boarding aircraft

Directive on certification for airman and instrument flight certification

Directive on ensuring aircraft safety

Annex Technical standard to ensure aircraft safety

& etc.

Technical Airworthiness

(Regulated by MLIT)

Airspace restrictions

Sense and Avoid

Report of major accident

ICAO Convention

Japan Civil Aeronautics Act

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& etc.

Technical Airworthiness

(Regulated by MLIT)

Airspace restrictions

Sense and Avoid

Report of major accident
Overview   Technical Standard

In the annex, various provisions are set to ensure aircraft safety.

1. General
2. Flight  ... General, Performance, Flying Quality
3. Strength  ... General, Flight Loads, Ground Loads, Miscellaneous Loads, Flutter, Divergence, Vibration, Fatigue Strength
5. Power plant  ... General, Independence of engines, Propeller Vibration, Cooling, Associated systems, Fire Protection
7. Engine  ... General, Test
8. Propeller  ... General, Test

Almost same regulation as Japanese CAA’s (JCAB) regulation.
Overview

Regulations - Design Standard -

Defined design standards in each program.

Example

<table>
<thead>
<tr>
<th>Category</th>
<th>Applied specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise and Emission</td>
<td>ICAO Annex 16 Environmental Protection Vol.1, 2</td>
</tr>
<tr>
<td>Flight Characteristic and Performance</td>
<td>MIL-C-5011, MIL-HDBK-1797</td>
</tr>
<tr>
<td>Landing System</td>
<td>MIL-B-8075, MIL-B-8552, MIL-L-8552, MIL-S-8812, MIL-PRF-5041, MIL-W-5013</td>
</tr>
<tr>
<td>Flight Control System</td>
<td>MIL-F-9490</td>
</tr>
<tr>
<td>Propulsion System</td>
<td>MIL-I-83294</td>
</tr>
<tr>
<td>Fuel System</td>
<td>MIL-F-38363</td>
</tr>
<tr>
<td>Hydraulic System</td>
<td>MIL-H-5440</td>
</tr>
<tr>
<td>Armament</td>
<td>MIL-I-8671</td>
</tr>
<tr>
<td>Bleed, Air-conditioning, Pressurization, De-icing, Anti-ice system</td>
<td>MIL-E-18927</td>
</tr>
</tbody>
</table>

Operational Requirement (issued by JSDF)

- MIL Spec.
- JSSG Series
- Ordinance for Enforcement of the Civil Aeronautics Act (issued by JMLIT)
- Airworthiness Standards (issued by JCAB)
- FAR Part 25 Airworthiness Standards (issued by FAA)

Directive (basic regulation that must be complied)

Technical Reviews on Preliminary Design Activity

Civil

Mil
Overview

Technical Review Board

Directive on Technical Review

Technical review board is taken place in each program, no matter what the program is.
Overview

Certification Process

Program Approval → Contract Award → Critical Design Review → First Flight → Certificate of Operation (IOC)

Planning
- Design standard development
- Basic design

Design & Manufacturing drawing
- Approve Design Standard
- Approve Basic Design
- Approve Manufacturing

Maintaining design activity
- Manufacturing
- Design compliance verification
- Evaluation & Validation testing

Evaluation & Validation testing
- Approve FF
- Test Plan
- Final Report

1. Technical Review Board Activities on Airworthiness
2. Program Office Activities
3. Contractor/Test Team Activities

Contractor activity

Test team activity
Overview

SDF’s certificate of operation

Directive on R&D for equipment

Directive on equipment acquisition board

✓ Operation by services (Same as Initial Operational Capability (IOC)).
✓ It is as compatible as Military Type Certificate (MTC).

ATLA
Report on technical readiness including airworthiness

Defense Minister
Consultation
Report

Certificate of operation
Issue

Equipment Acquisition Review Board
Chairman
State Minister of Defense
Board members
Administrative Vice-Minister of Defense, Vice-Minister of Defense for International Affairs
DG(Sect, BoDP, BoBP, DIH)
CofS (JS, GSDF, MSDF, ASDF)
CA, DCA

JSDF
Report on operational readiness including airworthiness
- Major test including airworthiness validation are conducted by ATLA, JMOD.

**Overview**

- Missile launched
- Software verification test
- Full-scale static strength test
- Landing load test
- Environmental Icing Test (engine)
- Full-scale fatigue strength test
Overview

<table>
<thead>
<tr>
<th>Year</th>
<th>Aircraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950</td>
<td>T-1 Trainer</td>
</tr>
<tr>
<td>1960</td>
<td>T-2 &amp; F-1</td>
</tr>
<tr>
<td>1970</td>
<td>C-1</td>
</tr>
<tr>
<td>1980</td>
<td>T-4</td>
</tr>
<tr>
<td>1990</td>
<td>F-2</td>
</tr>
<tr>
<td>2000</td>
<td>P-1 &amp; C-2</td>
</tr>
<tr>
<td>2010</td>
<td>US-2, SH-60K, OH-1</td>
</tr>
</tbody>
</table>

Our Experience

- **1950**: T-1 Trainer
- **1960**: T-2 & F-1
- **1970**: C-1, PS-1 Anti-submarine Amphibian
- **1980**: T-4
- **1990**: F-2
- **2000**: P-1 & C-2, US-2, SH-60K, OH-1

**1950 - 2010**

- **T-1 Trainer**
- **PS-1 Anti-submarine Amphibian**
- **C-1 Transport aircraft**
- **T-2 Trainer**
- **F-1 Support fighter**
- **T-4**
- **F-2 Fighter aircraft**
Our aircraft development methodology is based on our experience of developing 12 aircraft in 60 years.
We need to improve methodology due to standardization and harmonization on aircraft safety in the global context.

International transfer of defense equipment and technology. Change to the policy “Three Principles on Transfer of Defense Equipment and Technology”

Aircraft safety management through life cycle.

Established a section responsible for airworthiness matter.

Reorganize certification process and use internationally harmonized technical (certification) standards.

Revising the directive on ensuring aircraft safety and creating subordinate rule.
Challenge Established airworthiness section

Director General of Project Management (C)

3 × DDG Project Management (U)

Project Planning Div.

Joint Systems Div.

3 × Project Management Div.

3 × Technology Management Div.

In Aircraft Project Management Div.

Airworthiness Section

Manager for Airworthiness Section (C)

4 × Senior Specialist for Airworthiness

(1C & 3U)

2 personnel

(2C)

・Making policy and rule to ensure aircraft safety
・Review of application (RNAV, RVSM), etc.

New (2016.4.1～)

I’m here.

Challenge Established airworthiness section
Directive on ensuring aircraft safety (Revised)

- Regulations relating to SDF type Certification procedure and type certificate
  - Selection of certification criteria
    - JCAB’s certification criteria, MIL-HDBK-516 series, EMACC,
    - Certification criteria of civil mutual recognition agreement by JCAB
    - FAA, EASA, Canada, and Brasil’s certification criteria)
  - Tailored certification criteria for each project (development and purchase)
  - Compliance report
  - SDF Type certificate issued

- Regulations relating to repair, altered, and change a design the aircraft
  - Major modification in repair, alteration, and design which affect airworthiness

Instruction on ensuring aircraft safety of R&D aircraft for ATLA (New)

- Regulations relating to applicant and application documentation for SDF type certificate.
- First flight requirements for domestic development.

Still provisional, not enact.
### Challenge After enact the new directive (certification process)

<table>
<thead>
<tr>
<th>Program Approval</th>
<th>Contract Award</th>
<th>Critical Design Review</th>
<th>First Flight</th>
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</thead>
<tbody>
<tr>
<td>Design basis development</td>
<td>Design &amp; Manufacturing drawing</td>
<td>Maintaining design activity</td>
<td>SDF Type Certificate issued</td>
</tr>
<tr>
<td>Planning</td>
<td>Basic design</td>
<td>Manufacturing</td>
<td>Evaluation &amp; Validation Testing</td>
</tr>
<tr>
<td>Approve Tailored Airworthiness Certification Criteria</td>
<td>Approve Design Basis</td>
<td>Approve Basic Design</td>
<td>Approve Manufacturing</td>
</tr>
<tr>
<td>Approval</td>
<td>Test Plan</td>
<td>Approval</td>
<td>Final Report</td>
</tr>
<tr>
<td>Compliance Report</td>
<td>Contractor activity</td>
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<td></td>
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</table>

1. Technical Review Board Activities on Airworthiness
2. Program Office Activities
3. Contractor/Test Team Activities

**IMARC 2016**

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Further strengthening the our airworthiness organization and authority to ensure aircraft safety need to be done.

Bi-lateral mutual recognition among international airworthiness communities.

Establish databases of the past domestically developed aircraft (P-1, C-2, US-2, etc.) to prepare for the transfer of these aircraft.
Conclusion

- Overview of JMOD airworthiness organization.
- Overview of ATLA’s airworthiness certification manner.
- Current status changing in the directive.

We will reinforce JSDF’s airworthiness with studying other nation’s airworthiness system and follow the direction of harmonization in the global context.

Thank you for your kind attention !.
Your questions are welcome !.

But please speak slowly !!.

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