Certification of UAS

A Risk-Based Approach

Date: April 20, 2016
Aircraft Certification Service (AIR)

- Development of Standards and Policy
- Certification and Production of aircraft, engines, propellers, aircraft parts and appliances;
- Continued operational safety (COS) management
UAS Safety – From Experience

Successful history of integrating new technologies into the National Airspace System (NAS) safely

Proven risk-based approach to safety

Balance of acceptable level of safety with societal safety demands

FAA will apply a risk-based approach to UAS Certification
System Safety – The Safety Continuum

Too little rigor…
→ safety escapes
→ fatal accidents increase

SEEK
Establish appropriate balance in our regulatory approach
Achieve safety objectives while imposing the least burden on society.
Total Risk

Too much rigor…
→ innovative safety enhancements don’t reach the fleet
→ Finite dollars that could be spent on safety enhancements go elsewhere
→ fatal accidents increase

Risk of accidents due to lack of safety innovation

Risk of accidents due to inadequate safety program

Risk
Extent of Safety Effort
Applying Our Safety Continuum

Level Of Cert Rigor

Societally Accepted Risk & Desire for Low Cost

Society’s Demand for Safe Outcomes

Part 91 Ops

Part 135 Ops

Part 121 Ops

Part 25 Transport Category Passenger Aircraft & UAS Risk Class 6

Large Part 25 Business Jets

Part 23 Commuter Aircraft & UAS Risk Class 6

Part 23 Business Jets

Part 23 Light Jets, Twins, & UAS Risk Class 5

Part 23 Single Engine & UAS Risk Class 4

Light Sport Aircraft & UAS Risk Class 3

Amateur Built

sUAS Risk Class 1&2

Models

Zero Risk

No Operations

No Innovation

SIUM

EMBRY-RIDDLE Aeronautical University
Existing Regulatory Framework

**Part 21 Certification & Production Requirements**

Based on Typical Operations

- **UAS RC6 & Part 25**
- **UAS RC5 & Part 23 Light Jets and Twin Engines**
- **UAS RC4 & Part 23 Single Engine**
- **F39 & F44 Industry Standards**
- **UAS RC3 & LSA**
- **F37 Industry Standards**
- **UAS RC1 and RC2**
- **F38 Industry Standards**

Requirements are driven by risk and scalable based on risk assessments and CONOPs.

- **Pending Part 107**
- **Certificate of Airworthiness**
- **Part 21.17(b)**

**Level of Oversight Rigor**

- **Hobbyist**
- **Micro and 107 Operations**
- **BVLOS/Extended Operations**
- **Controlled Operations**
Future Regulatory Continuum

Future State - Part 21 Certification & Production Requirements

Pre-Decisional - Based on Typical Operations

- UAS RC6 & Part 25
- UAS RC5 & Part 23 Light Jets and Twin Engines
- UAS RC4 & Part 23 Single Engine
- UAS RC3 & LSA
- UAS RC1 and RC2

Requirements are driven by risk and scalable based on risk assessments and CONOPs.

- No Airworthiness Certificate Required.
- Part 107
- Part 21.19X
- Part 21.17(b)

Level of Oversight Rigor:

- Scalable Production Oversight
- TC & PC Required.

Globally Proposed Categories:

- OPEN
- SPECIFIC
- CERTIFIED

F39 & F44 Industry Standards
F37 Industry Standards
F38 Industry Standards

Hobbyist | Micro and 107 Operations | BVLOS/Extended Operations | Controlled Operations

FAA UAS SYMPOSIUM

Federal Aviation Administration

EMBRY-RIDDLE
Aeronautical University.
Scalable Production Oversight

• Establish production certificate (PC) risk categories similar to the type certificate (TC) risk classes
  – Current resources will not accommodate PCs for all UAS
  – Scalable approach allows the dedication of FAA resources where the risk is highest
Strategic Goal, Risk-Based Certification

Rising to the Challenge

• Creating Our Regulatory Continuum Now
  – Working pathfinders and 13 projects under the current regulatory structure
  – International Collaboration - ICAO, EASA, etc.

• Ready for the Future
  – Our certification projects inform future rule changes
  – Considering further changes for low and medium risk UAS

• Importance of Industry Engagement
  – Engage EARLY and OFTEN about new technologies
  – Upfront involvement will help the FAA determine the certification basis and get out of the critical path to certification

https://www.faa.gov/uas/
https://www.faa.gov/uas/
<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Design Requirements</th>
<th>Operations</th>
<th>CONOPS</th>
<th>TC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 Year</td>
<td>Few Design Requirements</td>
<td>Highly Limited Operations</td>
<td>Specific CONOPS</td>
<td>Highly Limited TC</td>
</tr>
<tr>
<td>3-5 Year</td>
<td>More Design Requirements</td>
<td>Well Defined Operations</td>
<td>More Flexible CONOPS</td>
<td>Limited TC</td>
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<tr>
<td>5-10 Year</td>
<td>Highest Design Integrity</td>
<td>Integrated Operations</td>
<td>Multiple CONOPS</td>
<td>Typical TC</td>
</tr>
</tbody>
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Aviation Lifecycle

Establish safety and certification regulations and policy
- Provide guidance on ways to meet the intent of the regulations and policy
- Promote voluntary engagement and cooperation with enhanced safety programs

Standards

Design
- Determine design meets performance and certification standards
- Issue design approvals (type certificates)
- Evaluate manufacturers quality and production systems
- Issue production and airworthiness approvals for aircraft, engines, and parts
- Appoint Designees:
  - Individual
  - Organization

People
- Certify Airmen:
  - Pilot
  - Mechanics

Operations
- Approve Air Carrier operations
- Issue recurrent airworthiness certificates
- Approve Repair Stations and Maintenance Facilities

Maintenance
- Approve Repair Station Certificates

Continued Operational Safety
- Continual Oversight and Surveillance of:
  - Air Carriers
  - Manufacturers
  - Repair Stations
  - Designees
  - Airmen
  - Air Traffic Organization
- Apply tools to manage risk and gain compliance:
  - Airworthiness Directives
    - Precursor identification
    - Data Sharing
    - Enforcement

AVS is actively involved throughout the life-cycle of every aviation product