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
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.

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

Total Risk

System Safety – The Safety Continuum

Federal Aviation Administration

FAA UAS SYMPOSIUM

EMBRY-RIDDLE Aeronautical University
Applying Our Safety Continuum

Part 91 Ops

135 Ops

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

Society’s Demand for Safe Outcomes

Societally Accepted Risk & Desire for Low Cost

Level Of Cert Rigor

Zero Risk
No Operations
No Innovation

SIUM
Existing Regulatory Framework

Part 21 Certification & Production Requirements

Based on Typical Operations

UAS RC6 & Part 25

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

UAS RC5 & Part 23 Light Jets and Twin Engines

UAS RC4 & Part 23 Single Engine

F39 & F44 Industry Standards

F37 Industry Standards

UAS RC3 & LSA

F38 Industry Standards

UAS RC1 and RC2

Pending Part 107

Certificate of Airworthiness

TC & PC Required

Part 21.17(b)

Hobbyist

Micro and 107 Operations

BVLOS/Extended Operations

Controlled Operations

Level of Oversight Rigor
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

F39 & F44 Industry Standards

F37 Industry Standards

F38 Industry Standards

UAS RC3 & LSA

UAS RC1 and RC2

No Airworthiness Certificate Required.

Part 107

Part 21.19X

Part 21.17(b)

Hobbyist

Micro and 107 Operations

BVLOS/Extended Operations

Controlled Operations

Level of Oversight Rigor.

Requirements are driven by risk and scalable based on risk assessments and CONOPs.
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/)
Type Certification AC Covers Near, Mid, & Far Term

1-3 Year
Few Design Requirements
Highly Limited Operations
Specific CONOPS
Highly Limited TC

3-5 Year
More Design Requirements
Well Defined Operations
More Flexible CONOPS
Somewhat Limited TC

5-10 Year
Highest Design Integrity
Integrated Operations
Multiple CONOPS
Typical TC
### Aviation Lifecycle

<table>
<thead>
<tr>
<th>Standards</th>
<th>Design</th>
<th>Produce</th>
<th>People</th>
<th>Operations</th>
<th>Maintenance</th>
<th>Continued Operational Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish safety and certification regulations and policy</td>
<td>Provide guidance on ways to meet the intent of the regulations and policy</td>
<td>Promote voluntary engagement and cooperation with enhanced safety programs</td>
<td>Determine design meets performance and certification standards</td>
<td>Evaluate manufacturers quality and production systems</td>
<td>Issue design approvals (type certificates)</td>
<td>Continual Oversight and Surveillance of:</td>
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<tr>
<td>- Air Carriers</td>
<td>- Manufacturers</td>
<td>- Repair Stations</td>
<td>- Designees</td>
<td>- Airmen</td>
<td>- Air Traffic Organization</td>
<td>• Approve Air Carrier operations</td>
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<tr>
<td>- Approve Repair Stations and Maintenance Facilities</td>
<td>• Issue Recurrent airworthiness certificates</td>
<td>• Issue Repair Station Certificates</td>
<td>• Certify Airmen:</td>
<td>• Approve Air Carrier operations</td>
<td>• Issue recurrent airworthiness certificates</td>
<td>• Apply tools to manage risk and gain compliance:</td>
</tr>
<tr>
<td>- Pilot</td>
<td>- Mechanics</td>
<td>• Appoint Designees:</td>
<td>• Issue recurrent airworthiness certificates</td>
<td>• Appoint Repair Stations and Maintenance Facilities</td>
<td>• Issue Repair Station Certificates</td>
<td>- Airworthiness Directives</td>
</tr>
<tr>
<td>- Individual</td>
<td>- Organization</td>
<td>• Approve Repair Stations and Maintenance Facilities</td>
<td>• Issue Repair Station Certificates</td>
<td>• Approve Repair Stations and Maintenance Facilities</td>
<td>- Data Sharing</td>
<td></td>
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<tr>
<td>AVS is actively involved throughout the life-cycle of every aviation product</td>
<td>• Apply tools to manage risk and gain compliance:</td>
<td>• Approve Repair Stations and Maintenance Facilities</td>
<td>• Issue Repair Station Certificates</td>
<td>• Approve Repair Stations and Maintenance Facilities</td>
<td>• Enforcement</td>
<td></td>
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