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 inadequate safety program

Risk of accidents due to lack of safety innovation

Risk
Extent of Safety Effort
Applying Our Safety Continuum

- 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
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.

TC & PC Required.
Certificate of Airworthiness.
Part 21.17(b)

Pending Part 107

Hobbyist
Micro and 107 Operations
BVLOS/Extended Operations
Controlled Operations

Level of Oversight Rigor.

FAA UAS SYMPOSIUM
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
  - UAS RC3 & LSA
  - F37 Industry Standards
  - UAS RC1 and RC2
  - F38 Industry Standards

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

- Level of Oversight Rigor.
- Scalable Production Oversight
- TC & PC Required.
- Adherence to Industry Standards.
- Certificate of Airworthiness.

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

**Standards**
- 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

**Design**
- Determine design meets performance and certification standards
- Evaluate manufacturers quality and production systems
- Issue production and airworthiness approvals for aircraft, engines, and parts

**Produce**
- Certify Airmen:
  - Pilot
  - Mechanics
- Appoint Designees:
  - Individual
  - Organization

**People**
- Approve Air Carrier operations
- Issue recurrent airworthiness certificates

**Operations**
- Approve Repair Stations and Maintenance Facilities
- Issue Repair Station Certificates

**Maintenance**
- 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

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**AVS is actively involved throughout the life-cycle of every aviation product**
Design and Production Approval

Standards
Airplane Definition
Detail Definition
Build
Test
Certification
Production

Familiarization Briefings
Application for TC/ATC/STC
Certification Project Notification
Application for Production Certificate
Preliminary Type Certification Board
Preliminary District Office Audit
Production Certification Board
Issue papers
Certification Basis
Equivalent Safety Findings
Special conditions
Exemptions
Airplane-level compliance findings
Detail-level compliance findings
Conformity Inspections
Certification plans

Define Requirements

Find Compliance

Federal Aviation Administration

FAA UAS SYMPOSIUM

EMBRY-RIDDLE
Aeronautical University