ASTM International Committee F38 on Unmanned Aircraft Systems

Standardizing UAS Operations

NDIA Test & Evaluation Conference
25 February 2008
Presentation Overview

- ASTM F38 Mission & Vision
- How we can help you
  - Published & Draft Standards
- Background on ASTM International
- Some Specifics about F38
- Questions
Committee F38

- **Vision**: Provide routine, safe UAS operations in civil airspace through standardization.

- **Mission**: Produce practical, consensus standards that facilitate UAS operations at an acceptable level of safety for use by industry, academia, government organizations and regulatory authorities.

- **Guiding Principle**: Practical standards are a cost effective means of promoting commercial success, and that consensus processes protect the balance of interests among stakeholders.
A Spectrum of Standards

Unregulated

Voluntary Industry Standards

Kites
Balloons
Models

Ultralight Vehicles
Gliders

Mandatory Industry Standards

Light Sport Aircraft

Large Aircraft
Airlines
Pilots

Heavily Regulated
F38 Subcommittee Structure

What do you need to fly?
…A System Safety Case

- Airframe certification
- Operations protocols & component performance
- Crew training & human factors consideration

- F38.01 Airworthiness Standards
  - Safe design, construction, test, modification, & inspection of the individual component, aircraft, or system; **hardware oriented**
- F38.02 Operations Standards
  - Safe employment of the system within the aviation environment among other aircraft & systems; **procedure/performance oriented**
- F38.03 Pilot & Maintenance Qualifications
  - Safe practices by the individuals responsible for employing the system; **crew oriented**
What do you need to fly?

- System certification
- Operations protocols and component performance
- Crew training and human factors consideration

You would need

- Reliability and Airworthiness Standards
  - Aircraft, Control Station, Datalink
- Support Equipment Standards
  - Launch & recovery equipment
  - Starters, power supplies, fueling / de-fueling, others
What do you need to fly?
- Airframe certification
- Operations protocols and component performance
- Crew training and human factors consideration

You would need
- Standardized flight procedures
- Standardized maintenance procedures
- Safe separation from other airspace users
- Others, of course
What do you need to fly?

- Airframe certification
- Operations protocols and component performance
- Crew training and human factors consideration

You would need

- Pilot certification system
  - Category and type, ratings, limitations
- Criteria to certify aircrews
  - Eligibility, Knowledge, Experience, Test Standards
- Criteria to certify maintainers
- Others, of course
### How We Can Help You: Published Standards

<table>
<thead>
<tr>
<th>Standard Number</th>
<th>Standard Title</th>
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<tbody>
<tr>
<td>F2395-07</td>
<td>Standard Terminology for Unmanned Aircraft Systems</td>
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<tr>
<td>F2501-06</td>
<td>Standard Practices for UAS Airworthiness</td>
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<tr>
<td>F2585-06</td>
<td>Design &amp; Performance of Pneumatic-Hydraulic Launch System</td>
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<tr>
<td>F2500-07</td>
<td>Standard Practice for UAS Visual Range Flight Operations</td>
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<tr>
<td>F2584-06</td>
<td>Standard Practice for Maintenance &amp; Manuals for Light UAS</td>
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<tr>
<td>F2612-07</td>
<td>Standard Practice for Design and Manufacture of Turbine Engines for Unmanned Aircraft Systems</td>
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<td>Standard Practice for Quality Assurance in the Manufacture of Light Airplane Unmanned Aircraft Systems</td>
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<td>F2667-07</td>
<td>Standard Practice for Design and Manufacture of Reciprocating Compression Ignition Engines for Unmanned Aircraft Systems</td>
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<td>F2635-07</td>
<td>Standard Classification for Unmanned Aircraft Pilot Certification</td>
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<tr>
<td>F2636-08</td>
<td>Commercial UAS Pilot Practical Test Standards</td>
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How We Can Help You: Items In Work

<table>
<thead>
<tr>
<th>WK11425</th>
<th>Private UAS Pilot Practical Test Standards (Dave Gibbs)</th>
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<tbody>
<tr>
<td>WK13935</td>
<td>Standard Guide for Mini-UAS Airworthiness (Jason Stiffey)</td>
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<tr>
<td>WK13989</td>
<td>Standard Practice for Mini-UAS Visual Range Operations (Dave Grilley)</td>
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<tr>
<td>WK12989</td>
<td>Standard Practice for Mini-UAS Operators (Dave Grilley)</td>
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<tr>
<td>WK8962</td>
<td>Standard Practice for Remote Control Pilots Operating within Visual Range (Dave Grilley)</td>
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<tr>
<td>WK13686</td>
<td>Suggested Procedures Guide for Applying for UAS Special Issuance and Type Certificates (Dr. Gerry Marsters, former Transport Canada Regulator)</td>
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<tr>
<td>WK15881</td>
<td>Specification for Design and Performance of UAS Recovery Systems</td>
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Leveraging Community Expertise
Community Value

Applying These Standards
- Package: Mini-UAS in Visual Range
  - Airworthiness (WK13935)
  - Operations (WK13989)
  - Pilots (WK12989)
- Creates a Safety Case
  - For Regulators
  - For Insurers

Buyer / User Adoption
- Simplifies procurement process
- Enables interoperability
ASTM’s Standards Development

- A Proven and Practical System that is Driven by Direct-Stakeholder Participation, for Developing **Voluntary, Consensus Standards** for Materials, Products, Systems & Services World-Wide.

- A Portfolio of Approximately **12,000 Standards** Used Internationally; 3,500 are the Basis of National Standards and Regulation in 76 Countries.

- Always Reflect Current Technology as they are Continually Revised.

- Over **31,000 Members from 130** Countries Participate on ASTM International Committees; users from 175 countries.

- Standards Development Process complies with WTO’s TBT Requirements.

- No Project Costs.
A FEW OTHER EXAMPLES……..

- A01 on Steel, Stainless Steel, & Related Alloys
- B07 on Light Metals & Alloys
- D02 on Petroleum Products & Lubricants
- D20 on Plastics
- E34 on Occupational Health & Safety
- E54 on Homeland Security Applications
  - E54.08 on Operational Equipment / Urban Search & Rescue Robots
- F04 on Medical Devices
- F37 on Light Sport Aircraft
- F39 on General & Utility Category Aircraft Wiring Systems
- F41 on Unmanned Undersea Vehicle Systems
What is a “Consensus Standards Body”

**Attributes**
- Openness with a “balance” of interest
- Formal processes including appeals
- Consensus (vice unanimity)
  - Must include a method for resolving negatives

**What is not**
- Company standards
- Government standards
- Standards mandated by law
- Market driven “de facto” standards
  - Examples: VHS, MS Windows
Defining F38’s “Balance”

- **Member Type**
  - Individual: $75 annual dues
  - Corporation: $400 annual dues
  - Temporary: Courtesy trial membership

- **Classification**
  - Producer: Seller of products and services
  - User: Buyer of products and services
  - General: Other interested parties

- **Voting Status**
  - Tracked by:
    - Type
    - Classification
    - Interest (i.e., company or organization)
### 215 Members

- 18 Countries / 4 Continents

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<th>Country</th>
<th>Count</th>
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<tr>
<td>Australia</td>
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<tr>
<td>United States</td>
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F38 Total Membership

Proportionally balanced

Category

Producer: 99
User: 45
General: 71
Total: 215
ASTM International Committee F38 on Unmanned Aircraft Systems

QUESTIONS?

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