ASTM International Committee F38 on Unmanned Aircraft Systems

Standardizing UAS Operations

NDIA Test & Evaluation Conference

25 February 2008

ASTM International *Standards Worldwide*

Committee F38 on Unmanned Aircraft Systems

UVS International / Paris, France / June 2007

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

Mandatory Industry Standards

Heavily Regulated

Kites
Balloons
Models

Ultralight Vehicles
Gliders

Light Sport *Aircraft*

Large Aircraft
Airlines
Pilots

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***

F38.01: Subcommittee on Airworthiness

- **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

F38.02 Subcommittee on Flight Operations

- **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

F38.03 Subcommittee on Personnel

- **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 aircrewmen
    - Eligibility, Knowledge, Experience, Test Standards
  - Criteria to certify maintainers
  - Others, of course

How We Can Help You: Published Standards

F2395-07	Standard Terminology for Unmanned Aircraft Systems
F2501-06	Standard Practices for UAS Airworthiness
F2585-06	Design & Performance of Pneumatic-Hydraulic Launch System
F2500-07	Standard Practice for UAS Visual Range Flight Operations
F2584-06	Standard Practice for Maintenance & Manuals for Light UAS
F2612-07	Standard Practice for Design and Manufacture of Turbine Engines for Unmanned Aircraft Systems
F2512-07	Standard Practice for Quality Assurance in the Manufacture of Light Airplane Unmanned Aircraft Systems
F2667-07	Standard Practice for Design and Manufacture of Reciprocating Compression Ignition Engines for Unmanned Aircraft Systems
F2635-07	Standard Classification for Unmanned Aircraft Pilot Certification
F2636-08	Commercial UAS Pilot Practical Test Standards

How We Can Help You: Items In Work

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

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.

140 Technical Committees

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)

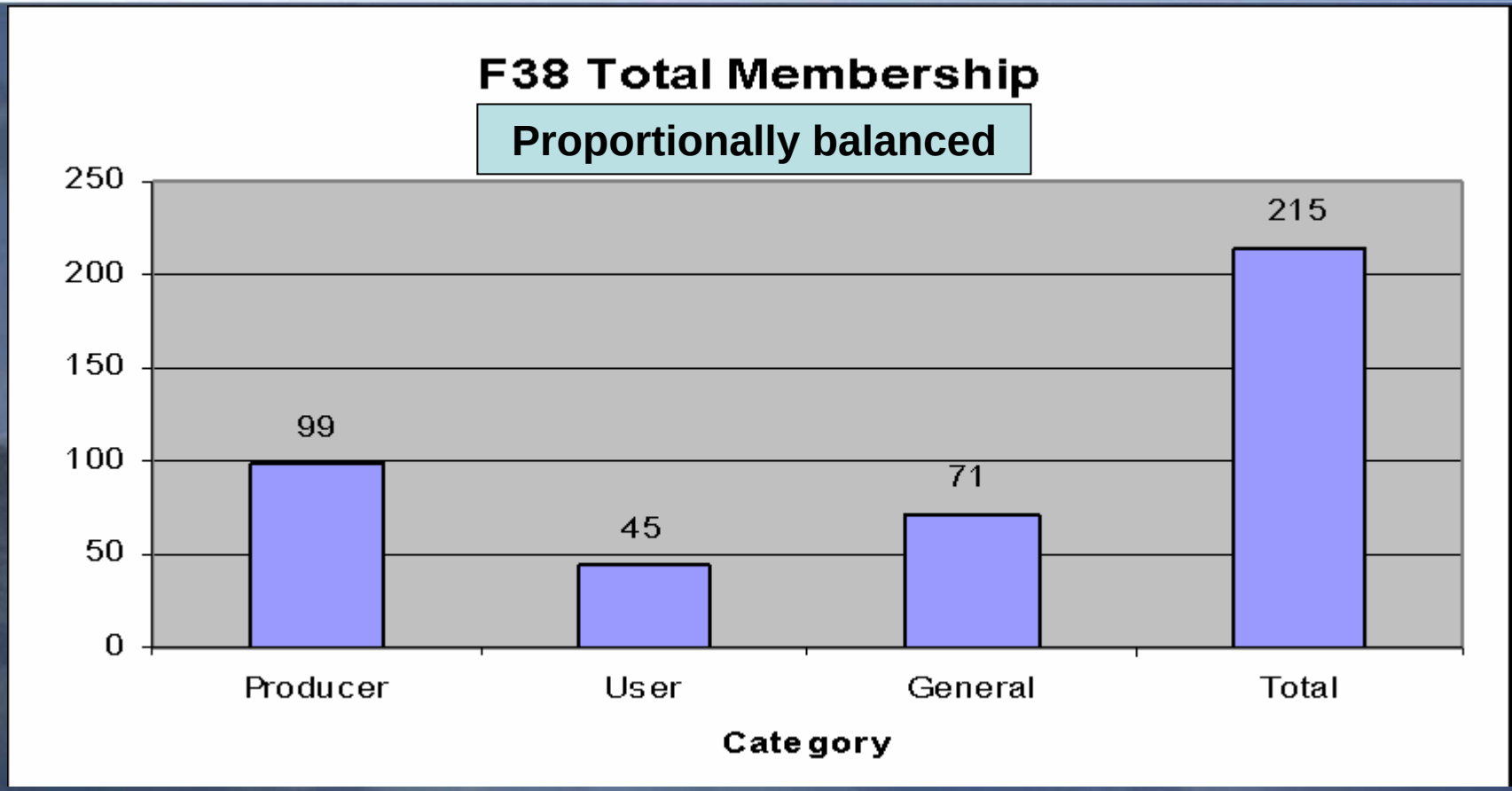
F38 Membership Report – Dec 07

- **215 Members**
  - **18 Countries / 4 Continents**

Australia	1
Bahamas	1
Canada	5
Chile	1
Finland	1
France	1
Germany	6
Israel	2
Japan	6

Republic of Korea	1
New Zealand	1
Singapore	4
Slovenia	1
Spain	1
Sweden	4
Taiwan	3
United Kingdom	2
United States	177

F38 Membership Report – Dec 07



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QUESTIONS?

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