



*We all have to start
somewhere.*





Consensus Standards for UAV Systems: Present & Future
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ASTM's primary objective

...is to be the foremost developer and provider of consensus standards, related technical information, and services having globally recognized quality and market relevance.



Why ASTM?

- A proven and practical system
 - Established in 1898
 - 136 Committees & 12,000+ Standards
 - 30,000 members
 - 4,400+ International Members from 100+ Countries
 - 'Audited Designator' accreditation by American National Standards Institute (ANSI)
 - All stakeholders involved (Public & Private Sector Cooperation)
 - Neutral forum
 - Consensus-based procedures
- Development and delivery of information made uncomplicated
- A common sense approach driven by industry
- Market relevant globally
- No project costs



ASTM Committee F38 on UAV Systems

- Organized July 2003
by Industry
- Current Roster: 200+
Individuals &
Organizations
- 2 Approved Standards
 - 6 Work Items
- 3 Technical
Subcommittees
 - F38.01 on
Airworthiness
 - F38.02 on Flight
Operations
 - F38.03 on Operator
Qualifications



Committee F38 Structure



F38 Membership Breakdown

- Government (DoD, FAA, DHS, NASA): 34%
- Manufacturers: 20%
- Consultants: 20%
- Suppliers: 18%
- Trade Associations: 5%
- Universities: 3%





Committee F38 Scope

- 1.1 The Scope of the Committee shall be the development of standards and guidance materials for unmanned air vehicle systems. The work of this Committee will be coordinated with other ASTM Committees and organizations having mutual interest.
- 1.2 The focus of the committee shall be the development of technical publications including (but not necessarily limited to):
 - 1.2.1 Minimum safety, performance, and flight proficiency requirements.
 - 1.2.2 Quality assurance – to install manufacturing controls that will assure vehicles conform to design criteria.
 - 1.2.3 Production acceptance tests and procedures assuring that the completed vehicle systems meet reported performance as demonstrated in the prototype vehicle system. This includes limits such as: empty weight and center of gravity, performance specifications, controllability and maneuverability trim, stability, stall speed and handling characteristics, engine cooling and operating characteristics, propeller limits, systems functions, and folding or removable lifting surfaces.
 - 1.2.4 A baseline plan for continued airworthiness systems, including methods for monitoring and maintaining continued operational safety, and processes for identifying, reporting, and remedying safety-of-flight issues.



F38.01 on Airworthiness

- **Scope:** The development of ASTM standards for design, certification, and continuing airworthiness for the unmanned air vehicle system. This scope will include the air vehicle control interface. The work of this Subcommittee will be coordinated with the other ASTM UAV System Subcommittees.
- **Work Items:**
 - F2411 Standard Specification for Design and Performance Requirements for an Airborne Sense-and-Avoid System
 - Standard Guide for Mini-UAV Airworthiness
 - Standard Practices for Unmanned Aircraft System Design, Manufacture, and Test



F2411-04

■ Scope:

- 1.1 The following requirements apply to the design and performance of airborne sense-and-avoid (S&A) systems. This specification includes requirements to support detection of, and safe separation from, airborne objects such as manned or unmanned aircraft and air vehicles.
- 1.2. This specification applies to the manufacturer of an appliance seeking civil aviation authority approval, in the form of flight certificates, flight permits, or other like documentation, as providing an equivalent level of safety to the see-and-avoid capability of a manned aircraft.



F2411-04

- Scope (continued):
 - 1.3 This specification is not intended to apply to the design and performance of cooperative S&A systems. Existing standards and guidance should be referenced for specifications describing these transponder or broadcast-based systems (examples of existing guidance and standards for cooperative S&A systems include FAA 20-131A, RTCA DO-289, and TSO-C119B)
 - 1.4 This specification is not intended to apply to multiple airborne objects flying in formation flight.
 - 1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*



F38.02 on Flight Operations

- **Scope:** The development of standard practices for the operation of unmanned air vehicle systems. This scope will include orchestrating these practices with FAA requirements to operate in the NAS. The work of this Subcommittee will be coordinated with the other ASTM UAV System Subcommittees.
- **Work Items:**
 - **F2395 Standard Terminology for Unmanned Air Vehicle Systems**
 - Standard Guide for Mini-UAV Operations
 - Standard Practice/Guide for Unmanned Aerial Vehicle Flight Authorization
 - Standard operating procedures for the use of UAVs when the operation remains within Class G airspace and within visual range of the pilot
 - Standard operating procedures for the use of UAVs based on the limitations imposed by the airspace. A starting assumption is that there will be UAVs similar to restricted category airplanes with similar limitations
 - Standard operating practices to support a business operation using Remotely Operated Aircraft conducting special purpose operations according to 14 CFR Part 91
 - Standard UAV operations application to support UAV approval for certificate of authorization (similar to FAA Order 8700.1 Chapters 44-53)

F38.03 on Operator Qualifications

- Scope: The development of qualification standards necessary for individuals to pilot UAVs in the National Airspace System. As there is not an accepted, consistent means to evaluate proposals for UAV flight operators or pilots, operators can use these standards to prepare and apply for commercial flight operations. The FAA can use these standards as a means (but not the only means) to evaluate and manage the risks in non-military UAV operations. The work of this Subcommittee will be coordinated with the other ASTM UAV System Subcommittees.
- Work Items:
 - Standard Training and Experience for Light UAV Operators
 - Standard for UAV Aeronautical Knowledge
 - Standard Practice for ROA Pilot Certification Training
 - Standard Medical Requirements for UAV Pilots





F38/FAA Interaction

- ASTM met with AVR-1 in February 2004 to discuss ongoing ASTM interaction with FAA
 - 3 ASTM committees organized in last 3 years (F37, F38, F39)
- AVR-1 requested position statement from Committee F38 to outline the committee's view of the UAV industry from a standards perspective. Requested was a detailed and precise vision of F38's plan to facilitate the interaction of UAVs in the NAS.
- Statement initially drafted by F38.90 Executive Subcommittee
- Draft submitted to entire membership of F38 for review and feedback
- Final draft submitted to AVR-1 on May 10, 2004
- Document is posted on the F38 homepage:
<http://www.astm.org/COMMIT/COMMITTEE/F38.htm>
- Interaction with multiple technical advisors re: submission of F38 work product to support NPRM & SFAR (G. Rizner, E. Chalpin, P. Potter)

Evolution of Activity



- Organizational Outreach
 - Information sharing
 - Document Reference
- Membership Promotion
 - Improve International Membership – at present, 13 countries on F38 Roster (Australia, Bahamas, Canada, Chile, France, Germany, Japan, Singapore, South Korea, Sweden, Taiwan, UK, USA)
- Future Meetings
 - May 16-17, 2005, Reno, NV
 - Virtual Meetings Held Frequently

Questions?



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