

ISO TC20 SC16 UAS Standards

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Although modern standards organizations have their roots in the latter part of the 19th century, the use of weights and measures was standardized during the Qin Dynasty in China (221 to 206 BCE) and in India dating back to the 5th millennium BCE. Unfortunately, as empires rose and fell across the Eurasia Continent, uniformed standards were abandoned, especially in the developing European States. England's Henry Maudslay is recognized for his tool and die inventions in 1800 that enabled the Industrial Revolution to take form, especially with his standard screw thread design that was both revolutionary and allowed for mass production.

Today's international standards organizations have transformed our world from local and regional geographic sectors into a harmonized global market through effective standardization. For example, ASTM International was organized in the United States in 1898 while the British Standards Institute (BSI) was formed in 1901 and, SAE International in 1905. The International Organization for Standardization (ISO), RTCA and EUROCAE were all formed in the ensuing decades all contributing to industry/manufacturers need for uniformed standards, this was especially the case within the global aviation sector beginning in the Twentieth Century.

At the beginning of 21st Century a global aviation revolution descended into international standards organizations and national standards bodies, with the era of Remotely Piloted Aircraft Systems (RPAS). This transportation phenomenon is transforming all aviation sectors, including how international airspace and airports will be structured. Many international standards organizations, including the International Civil Aviation Organization (ICAO) have formed committees to develop RPAS standards for national Civil Aviation Authorities (CAA).

ISO is an independent, non-governmental international organization with a membership of 167 national standards bodies, based in Geneva, Switzerland. Through its members, ISO brings together experts from across the international community of experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards that support innovation and provide solutions to global challenges (<https://www.iso.org/about-us.html>).

Within ISO, Technical Committee (TC) 20 is responsible for Aircraft & Space Vehicle standards. The scope of TC20 includes standardization of materials, components and equipment for construction and operation of aircraft and space vehicles as well as equipment used in the servicing and maintenance of these vehicles. In 2014, ISO established ISO/TC20/Sub-Committee (SC) 16, Unmanned Aircraft Systems (UAS), which develops

standards in the field of unmanned aircraft systems (UAS) including, but not limited to, classification, design, manufacture, operation (including maintenance) and safety management of UAS operations. ISO TC20 / SC16 now includes 25 participating member States and 11 observing member States with 10 published ISO standards and 24 standards in development.

International standards organizations are uniting in meaningful ways to ensure quality standards are developed for the rapidly developing global UAS industrial market where duplication is prevented, and cooperation is championed. To that end ISO / TC20 / SC16 has established liaison relationships with other international standards organizations to ensure continuity with UAS standards development. These liaisons include:

- Airport Council International (ACI)
- Aerospace and Defense Industries Association of Europe – Standardization (ASD-STAN)
- European Union Aviation Safety Agency (EASA)
- The European Organisation for Civil Aviation Equipment (EUROCAE)
- Institute of Electrical and Electronics Engineers, Inc (IEEE)
- Open Geospatial Consortium, Inc. (OGC)
- SAE International (SAE)
- ASTM International (ASTM)
- Global UTM Association (GUTMA)

The ISO TC20/SC16 work program has expanded since being established in 2014 to include eight Work Groups that includes leadership from six States: China, Germany, Japan, Republic of Korea, United Kingdom, and United States of America. The specific work areas include:

- General
 - Convener – Frank Fuchs, Germany
Specifies general requirements for UAS for civil applications
- Product Manufacturing and Maintenance
 - Convener – Lance King, United States
Specifies quality & safety requirements for components of UAS design and manufacturing process.
- Operations and Procedures
 - Convener – Robert Garbett, United Kingdom
Details requirements for safe commercial UAS operations, vertiport standards, training standard and Advisory Group for Detect & Avoid.
- UAS Traffic Management
 - Convener – Okamoto Masahide, Japan
Establishes standards and guidelines for UAS traffic management.
- Testing & Evaluation
 - Convener – Hyun-Young Chang, Republic of Korea
Testing and evaluation of UAS for safety and quality of product

- UAS Sub-systems
 - Convener – Che Jiaying, China
Development of standards for UAS subsystems design and manufacturing process.
- Noise Measurements for UAS
 - Convener – Zhang Xin, China
Noise Measurements for UAS) Joint Work Group with TC43 WG7
- Counter UAS
 - Convener – Mark Lupton, United Kingdom
Counter UAS

The growing expansion of international UAS standards has touched other development areas that have an impact on emerging technology, including telecommunications, artificial intelligence, machine learning and data exchange.

Within ISO, the ISO/International Electrotechnical Commission (IEC) Joint Technical Committee (JTC) 1, Information Technology, is uniquely positioned as a singularly important organization within ISO related to standardization in the field of information technology. ISO/IEC JTC 1 has 43 Subcommittees, including Artificial Intelligence and Telecommunications and information exchange between systems. The ISO TC20 / SC16 UAS Committee enjoys a unique liaison relationship with both ISO/IEC JTC 1 Subcommittees with subject matter experts. To further enhance the liaison relationship between these two committees, ISO / IEC JTC 1 established Advisory Group 19 under the leadership of Mr. Lu Haiying for direct support of ISO TC20 / SC16's expanding UAS Committee standards development work plan. Mr. SHU Zhenjie, a member of the ISO TC20 SC16 leadership team is the TC 20/SC 16 representative to ISO/IEC JTC 1, Advisory Group 19.

Within the ICAO RPAS Section special attention is being made to bring international Standards Development Organizations (SDO) together to form a "Standards Roundtable" where RPAS technical standards may be discussed by SDO representatives related towards application for RPAS certification, airport/vertiport use, air traffic services, and use by CAA's. The Joint Authorities for Rulemaking on Unmanned Systems

(JARUS) Industry Stakeholders Body (ISB) includes a Standards Community of Interest that continues to bring International SDO participation (ISO, ASTM, EUROCAE, SAE, RTCA) into JARUS's work group programmes, including Operations, Airworthiness, Safety Risk Management and Automation.

ISO standards are developed by international experts that describe the best way to achieve successful solutions for difficult challenges. Within ISO TC20 SC16 experts from 36 countries have joined together to develop world class voluntary standards for the safe operation of Remotely Piloted Aircraft Systems within all continents throughout the world.

ISO Technical Committee 20-Subcommittee 16 is responsible for the "Standardization in the field of unmanned aircraft systems (UAS) including, but not limited to, classification, design, manufacture, operation, maintenance, and safety management of UAS operations".

Secretariat: ANSI, United States of America

Chair: John Walker

Manager: Chris Carnahan

<https://www.iso.org/committee/5336224.html>



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