

SAE International

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SAE Overview

SAE International has more than 90,000 members - engineers, business executives, educators, and students from more than 97 countries - who share information and exchange ideas for advancing the engineering of mobility systems. SAE is your one-stop resource for standards development, events, and technical information used in designing, building, maintaining, and operating self-propelled vehicles for use on land or sea, in air or space.

SAE Aerospace

In 1916, the U.S. National Advisory Committee on Aeronautics, U.S. National Bureau of Standards and Industrial Preparedness Committee of the U.S. Naval Consulting Board recognize need to address aeronautical issues. Rather than create a new organization, it agreed to address aeronautical technology in SAE and gain from the synergy between the automobile industry and fledgling aeronautical industry.

Under the auspices of the Aerospace Council, SAE published its first aeronautic standards (interchangeable spark plug) in 1917. Early aviation pioneers Elmer Sperry, Orville Wright, Glenn Curtiss and Glenn Martin helped to merge the American Society of Aeronautic Engineers into SAE and establish the Society's leadership role in aerospace. Since that time, SAE has developed over 6,700 standards and specifications and has grown to be the world's largest producer of non-government aerospace documents.

SAE's aerospace standards activities are guided by the Aerospace Council. The Council members are industry executives from the global aerospace community (i.e., commercial, regional, general aviation, military, space and government agencies). These leaders ensure that the program is well managed, progresses in a timely and cost efficient manner, meets user needs, and avoids duplication of effort.

SAE Aerospace Standards are utilized worldwide for the design and production of thousands of aircraft components and systems. SAE Aerospace Material Specifications (AMS) are specified for aerospace vehicles more than any other standards. These standards and specifications are drafted by industry experts and used on a voluntary basis by industry and government.

Participation in the development of SAE aerospace standards is open to all interested parties. SAE encourages all in the global aerospace community to take advantage of the opportunity to develop common consensus standards.

Unmanned Systems

Although most of SAE's 6700 aerospace standards are applicable to unmanned systems, the AS-4 Committee (Unmanned Systems) specializes in standards unique to them.

The primary goal of AS-4 is interoperability of unmanned

systems for military, civil and commercial use through the use of open systems standards and architecture development. A significant focus of SAE AS-4 committee is the logical interfaces necessary for communications between the distributed electronics components common to unmanned systems. A more recent addition to the scope of AS-4 includes the establishing of metrics specific to unmanned systems. This emergent effort aims to establish a framework for the measurement and classification of unmanned autonomous systems. The group is comprised of four committees and an executive board dedicated to creating, preparing and maintaining all relevant specifications, standards, and requirements for unmanned systems. The committees include:

AS-4A	Architecture Framework
AS-4B	Network Environment
AS-4C	Information Modeling and Definition
AS-4D	Performance Measures

The AS-4 committee was formed as a result of the US Department of Defense Joint Architecture for Unmanned Systems Working Group (JAUS WG) migration to SAE.

The JAUS WG was chartered by The Deputy Director, Office of the Undersecretary of Defense, Acquisition, Technology, and Logistics, Strategic & Tactical Systems/Land Warfare. Its objective was to develop, implement and sustain a joint architecture for the domain of unmanned systems. The architecture is component-based and specifies data formats and methods of communication among computing nodes. It defines messages and component behaviors that are independent of technology, computer hardware, operator use, and vehicle platforms, and isolated from mission. The documents that were developed in support of these efforts will now serve as the basis for SAE standards.

Modifications to the approach for the standards include moving to a services based approach, eliminating ambiguities, separation of transport from application layer concerns, and moving from a single, monolithic, standard to a set of manageable and logical service set definitions.

Participation in the SAE AS-4 committee includes OEMs, suppliers, robotics and unmanned systems integration companies, consulting firms, government, academic institutions and others across the unmanned systems industry.

AS-4 Standards Development/Revision Activities

Published	
• AIR5664	JAUS History and Domain Model (published 2006)
• AIR5645	Transport Considerations
• AIR5665A	Architecture Framework for Unmanned Systems
• AS5669A	JAUS Transport Specification
• ARP 6012	JAUS Compliance and Interoperability Policy
• AS5684A	JAUS Service Interface Definition Language

- AS5710A JAUS Core Service Set
- AS6009A JAUS Mobility Service Set
- AS6057 JAUS Manipulator Service Set

Works in Progress

- AS6060 JAUS Environment Sensing Service Set
- AS6062 JAUS Mission Spooling Service Set
- AS6063 JAUS USV Service Set
- AS6084 JAUS World Modeling Service Set
- AS6091 JAUS Unmanned Ground Vehicle Service Set
- AS6040 JAUS HMI Service Set
- ARP6083 JAUS World Modeling Service Recommended Practices

Other Unmanned Systems Activities

- SAE Committee G-10 (Aerospace Behavioral Engineering Technology) has recently established an Unmanned Aircraft Subcommittee to consider human factors related to pilots operating unmanned systems.
- SAE Committee AC-9 (Aircraft Environmental Systems), in conjunction with its AC-9C Subcommittee (Aircraft Icing Technology) has begun work on anti-icing systems standard for UAVs.
- SAE Committee AE-8A Wiring Systems Installation committee has recently published Revision C of AS50881 Wiring Aerospace Vehicle, which addresses all aspects of aircraft/unmanned aircraft wiring from selection through installation of wiring, wiring devices, and optical cabling and termination devices.
- SAE Committee A-6 Aerospace Actuation, Control, & Fluid Power Systems expanded its charter in 2003 to address new unmanned aircraft control technologies.

For Further Information

Visit www.sae.org for information on all of SAE's standards and related activities. If you are interested in participating in the SAE Standards Development effort, contact Edward M. Manns, Manger, Aerospace Standards, manns@sae.org.

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