



AEROSPACE STANDARD	AS6513™	REV. B
	Issued 2016-12 Revised 2022-03	
	Superseding AS6513A	
Unmanned Systems (UxS) Control Segment (UCS) Architecture: Conformance Specification		

RATIONALE

This revision of AS6513 concerns conformance to AS6512B (or later).

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1. SCOPE

This revision of AS6513 concerns conformance to the SAE Unmanned Systems (UxS) Control Segment (UCS) Architecture Revision B, designated AS6512B (or later). The superseded AS6513A concerned conformance to the previous UCS Architecture, designated AS6512A.

This document is the authoritative specification within the UCS Architecture for establishing conformance requirements for UCS products.

The conformance of UCS products is determined by assessing the conformance of the UCS Product Description to the UCS Architecture. The UCS Product Description includes test artifacts.

1.1 Purpose

The purpose of this specification is to establish verifiable conformance requirements for UCS Products.

1.2 Field of Application

This specification applies to all conformant UCS Software Components, UCS Software Configurations, and UCS Systems that are described in a UCS Product Registry or UCS Product Repository. The document is applicable to the complete lifecycle of UCS Products, including requirements definition, acquisition and development, deployment and maintenance, and obsolescence.

1.3 Precedence

This document is the authoritative source of conformance requirements for UCS products and takes precedence over all other documents in the UCS Architecture Library and all other references on the subject of UCS product conformance. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The stated issue of SAE publications shall apply. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AS6512B	Unmanned Systems (UxS) Control Segment (UCS) Architecture: Architecture Description
AS6518B	Unmanned Systems (UxS) Control Segment (UCS) Architecture: UCS Architecture Model
AS6522A	Unmanned Systems (UxS) Control Segment (UCS) Architecture: Architecture Technical Governance
AS6969B	Data Dictionary for Quantities Used in Cyber-Physical Systems

2.1.2 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO/IEC/IEEE 42010 Systems and Software Engineering - Architecture Description

2.1.3 OASIS Publications

soa-rm Reference Model for Service Oriented Architecture 1.0

2.2 Definitions

The following technical definitions apply to this publication.

AUTHORITATIVE: An agreed upon source of expert or official information.

COMPLIANCE: Completion of a statutory, regulatory, or contractual requirement. A UCS Product producer may have to comply with a contract article to conform to this specification. Compliance is outside the scope of this specification.

NORMATIVE: A statement against which conformance can be evaluated.

RESOURCE: An identifiable entity that has value to a stakeholder.

SERVICE: A mechanism to enable access to one or more capabilities, where the access is provided using a prescribed interface and is exercised consistent with constraints and policies as specified by the service description.¹

SERVICE DESCRIPTION: Represents the information needed in order to use a service. It enables potential participants to construct systems that use services and also offer compatible services. Specific components of a service description depend upon context. The components of a UCS Service Description are presented later in this document.²

SERVICE PACKAGE: A Unified Modeling Language (UML) package in the UCS model (AS6518B) that contains all elements that are needed to implement a single service. These include participants, service interfaces, interfaces, signals, interactions, and message structures. These can also include service use cases.

SERVICE REACHABILITY: The means by which service presence is known and the service is accessed, and the means by which service contracts are established.

UCS PRODUCT: A UCS product is a separately managed UCS system or Computer Software Configuration Item (CSCI) that may be acquired and used independently of other UCS products. A product may be a UCS Software Component, a UCS Software Configuration, or a UCS System.

UCS PRODUCT ARTIFACT: Software and documentation associated with a configuration item that is part of a UCS Product. These include, but are not limited to, drawings, models, source code, and software verification procedures.

UCS PRODUCT CONFORMANCE: Adherence of a UCS Product to this specification.

UCS PRODUCT DESCRIPTION: The identification and other metadata that summarize a UCS product for the purpose of searching in a registry or repository. It provides enough information to determine the suitability of the product for a particular usage.

UCS PRODUCT REGISTRY: A facility containing only UCS Product Descriptions. The UCS Product Registry is like a catalog that provides a complete description of products along with information on how to acquire UCS Products. A UCS Product Registry could form the catalog for a “UCS App Store”.

UCS PRODUCT REPOSITORY: A facility for the storage and distribution of UCS Products and related artifacts (such as conformance reports) that are associated with a UCS Product Description in a UCS Product Registry.

¹ OASIS. *Reference Model for Service Oriented Architecture 1.0*. [online] Available at <http://docs.oasis-open.org/soa-rm/v1.0/soa-rm.pdf>. Dated 2006-10-12. Last accessed on 2021-04-05.

² *Ibid.*

UCS SOFTWARE COMPONENT: A UCS Software Component is a unit of deployable UCS software that is not further decomposed into other separately managed software components described in a UCS Product Registry or UCS Product Repository. A UCS Software Component may be as small as a single UCS service participant or as large as a complete UCS domain or collection of UCS domains. A conformant UCS Software Component will be assigned at least one UCS Service Package as specified herein.

UCS SOFTWARE CONFIGURATION: A UCS Software Configuration is a unit of deployable UCS software that comprises one or more UCS Software Components. It can also contain other separately managed UCS Software Configurations described in a UCS Product Registry or UCS Product Repository.

UCS SYSTEM: A UCS System is a physical item that independently satisfies its system-of-interest use cases³, has external communication interfaces, and at least one Human-Machine Interface (HMI). UCS systems can be portable equipment, vehicle-transportable systems, or fixed facilities. UCS systems include one or more UCS Software Configurations. These should be described in a UCS Product Registry or UCS Product Repository.

VERIFICATION: The authoritative establishment that an item is conformant to a requirement.

VERIFICATION PROCEDURE: The means by which verification is achieved.

2.3 Terminology

The following terminology applies to this specification.

SHALL: This term requires that there is no deviation in conformance.

SHOULD: This term is to be used wherever the criterion for conformance is to meet a business objective. Failure to meet a "should" statement **SHALL** be justified.

MUST: This term is used for a legislative or regulatory requirement (e.g., safety or security) with which the parties shall comply. It is not used to express a requirement of the specification.

WILL: This term is used for the future tense. It does not express a requirement of the specification.

MAY: This term expresses a permissible practice or action. It does not express a requirement of the specification.

3. OVERVIEW

3.1 Background

Software systems provide capabilities in different ways. The software architecture itself can contribute to a more effective way of providing certain types of those capabilities. "Service Oriented Architecture (SOA) is a paradigm for organizing and utilizing distributed capabilities that may be under the control of different ownership domains."⁴ UCS uses SOA to access capabilities in different domains of Unmanned Systems Control. Operational examples include vehicle management, payload management, and mission planning. Different domains may also extend to the type of UxS platform supported. The aircraft domain has significant differences from the submarine domain.

In order for distributed services from different domains to operate together, they must be able to communicate unambiguously. New and existing services need a way to discover what other services are already available for their own use. Messages that carry information between services must contain common data types. These data types must define the same real-world physical quantities between services. UCS provides this structure through a Unified Modeling Language (UML) data model (AS6518B).

³ Conformance to the Use Case Model package in AS6518B is not required.

⁴ OASIS. (2006) *Reference Model for Service Oriented Architecture 1.0*.