SAE AS-4UCS TECHNICAL COMMITTEE

Fact Sheet

Updated May 2016

Charter

The AS-4UCS Technical Committee supports the charter of AS-4 (Unmanned Systems) in the field of the Unmanned Systems (UxS) Control Segment (UCS) Architecture. The UCS is defined as the system or family of systems that controls and monitors one or more unmanned systems and their payloads, where an unmanned system is defined as a robotic vehicle that does not convey its operator, and a payload is defined as a device carried by the unmanned system to support its assigned mission.

The scope of the AS-4UCS Technical Committee is to define UCS architectures and architecture frameworks, develop associated Technical Reports to support the ecosystem of UCS products, and support alignment of UCS architectures with peer architectures.

UCS Architecture

The UCS Architecture began as the Unmanned Aircraft System (UAS) Control Segment (UCS) Architecture and was initially developed by the UCS Working Group of the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, OUSD(AT&L). OUSD(AT&L) transitioned this effort to AS-4UCS Technical Committee in April 2015 with the publication of Release 3.4.

The DOD demonstrated that the operational efficiencies of unmanned aircraft systems can be improved by promoting and fielding interoperable systems. Prior to the UCS Architecture, interoperability was achieved between operational nodes, which were acquired as total systems under the policy of Performance-Based Acquisition (PBA). The typical operational nodes within a UAS are one or more unmanned systems, their launch and recovery element, and control segments.

Data link interface standards such as STANAG 4586 support the principles of compatibility, interchangeability, and commonality for control segments as operational nodes, and had a measure of success in facilitating effective competition in system acquisition. In accordance with DOD policy, many

systems were architected in accordance with a Modular Open System Approach (MOSA), although PBA worked against a shared architecture between programs of record (POR).

PBA was an effective strategy to initially acquire and field UAS capabilities in DOD, but as the UAS market grew and matured, PBA at the system level resulted in these unfavorable trends:

- reliance on large prime contractors and vertical integrators with little motivation for controlling cost and managing schedule after initial acquisition
- limited reusability, resulting in RDT&E funds being inefficiently utilized on duplicative development efforts across multiple systems
- difficulty in managing capability enhancements at the UxS portfolio level
- limited ability to directly access new technologies incubated in small business, academia, and adjacent markets

To address these trends OSD defined an Open Business Model (OBM) and UCS Architecture for UAS Ground Control Systems. The goals and objectives of the OBM are summarized below.

Business Goals	Architecture Supported Objectives	Warfighter Capability
 Target affordability & control cost growth	• Exercise IP rights to reuse components • Reduce obsolete technology and lifecycle support costs • Reduce T&E across portfolio	• Redirect savings to fund enhanced Warfighter capabilities
 Incentivize productivity & innovation in industry	• Reward adoption of OA principles • Disclose designs to foster innovation and collaboration • Invigorate R&D • Reduce tech insertion cycle	• Availability of new applications/services • Accelerated fielding of applications/services to counter threats
 Promote real competition	• Compete UCS applications/services • Remove obstacles to competition by disclosing designs	• Access to applications/ services not previously released in UCS market

The UCS Architecture supports the OBM by providing a Service Oriented Architecture (SOA) and modeling framework for the specification, integration, implementation, and deployment of control segment software. The architecture is centered on a service package Platform Independent Model (PIM)

and associated foundation models.

Platform independence (independence of the software operating environment) allows the UCS Architecture to be implemented on different computing infrastructures and with different communication protocols. This supports technology insertion and adoption by multiple UCS programs of record and other government-owned architectures.

The UCS Architecture is extensible and describes approximately 150 application software services to support the current capabilities of the DOD UxS portfolio. The architecture is deployable on any control station from a hand-held device to a fixed facility with multiple mission planners, operators, and analysts. The UCS Architecture was demonstrated on a variety of systems, mandated by Program Executive Offices, and being adopted by multiple PORs.

Works in Progress

In the short term, the AS-4UCS Technical Committee will re-issue a subset of the UCS Architecture Library R3.4 as SAE owned and managed Technical Reports. The re-issued documents will be:

AS6512 – Architecture Description

AIR6520 – Version Description Document

AS6522 – Architecture Technical Governance

AS6518 – Model

AIR6514 – Interface Control Document (ICD)

AIR6521 - Data Distribution Service (DDS) ICD

AIR6515 – EA Version of UCS ICD Model

AIR6516 – RSA Version of UCS ICD Model

AIR6517 – Rhapsody Version of UCS ICD Model

AS6513 – Conformance Specification

In addition, the AS-4UCS Technical Committee is developing:

AIR6523 – Data Dictionary for Quantities Used in Unmanned Systems

Program of Work (mid term)

The mid term program of work includes:

- integrate the AS-4 Joint Architecture for Unmanned Systems (JAUS) into the UCS Architecture Model to transition from the UAS Control Segment to the UxS Control Segment
- align The Open Group Future Airborne Capability Environment (FACE) Technical Standard under a Memorandum of Agreement, signed July 2015
- develop documentation to support the ecosystem of UCS products (both software and systems)
- update UCS services to support UCS programs of record
- evaluate opportunities to support the US Government National Information Exchange Model (NIEM)

Organization

The AS-4UCS Unmanned Systems Control Segment Technical Committee comprises three boards, two user groups and two ad hoc task groups.

The Executive Board (EB) is responsible for the promotion and management of the Technical Committee upon the advice of the Government Stakeholder Advisory Board (GSAB). Technical management and coordination of the UCS Architecture is provided by the Change Control Board (CCB). The user groups are:

AS-4UCS-1 – Architecture Framework User Group

AS-4UCS-2 – Architectural Model User Group

The task groups are:

AS-4UCS-3 – Data Dictionary

AS-4UCS-4 – Multi-domain Extensions