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Generic Open Architecture (GOA) Framework

FOREWORD

The Generic Open Architecture (GOA) development was initiated to develop a framework which can be used to classify interfaces needed in airborne avionics systems. At the time of the development of the GOA, development of such a classification was considered a crucial part of transitioning open systems standards to military avionics. However, it was determined during the development of the GOA that the GOA Framework is applicable to domains other than avionics. For that reason the framework is entitled Generic Open Architecture instead of the original name, Generic Open Avionics Architecture (GOAA).

The GOA effort was fortunate that a suitable base document existed as a starting point for its definition. The base document for the GOA standard is the Space Generic Open Avionics Architecture (SGOAA), NASA CR-188269. The SGOAA was produced by Mr. Richard B. Wray and Mr. John R. Stovall of Lockheed Engineering and Sciences Company (LESC), the codevelopers of the avionics architectures and standards represented in NASA CR-188269. The contributions of Mr. Ben Doeckel of LESC who participated in early development of the concepts for the avionics architectures and standards represented in the SGOAA is acknowledged. Special acknowledgment is also given to Mr. Dave Pruett of the Johnson Space Center for his support of the Advanced Architecture Analysis, assistance in the development of the avionics architecture and constructive criticisms of the SGOAA.

The GOA is an evolution of the SGOAA. This evolution occurred through the work of several diligent people who made up the SAE AS-5 GOA Task Group. This standard was prepared under the direction of:

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1. SCOPE:

1.1   Scope:

This SAE Aerospace Standard (AS) establishes a Generic Open Architecture (GOA) Framework for application independent hardware/software systems. This document defines the interface classes for the GOA Framework. Supplemental documents define the guidelines for applying the GOA Framework to specific applications.

1.2   Purpose:

The purpose of this document is to provide a framework to identify interface classes for applying open systems interface standards to the design of a specific hardware/software system. This framework is used to define an abstract architecture based on a generic set of interface points. The generic set of system interface points facilitate identification of critical interfaces.

It is intended that the GOA Framework be specialized for varying domains. A domain specific implementation of the GOA Framework will increase the chance that components/capabilities produced independently will "plug and play" and evolve affordably within the domain. The GOA Framework provides a basis for commonality for both vendors and users of components/ capabilities. Application of the GOA Framework will impose constraints on individual domains and implementations. This will increase the likelihood that independently produced products will interoperate.

Application of the GOA Framework together with the appropriate open system interface standards is expected to provide the following benefits to future programs:

a. Provide the basis for establishing a set of specifications, standards and procedures that will become common to all elements of a major system.

b. Ensure that future systems can be upgraded and maintained with minimal redesign impact to the existing system by establishing the interfaces required to enable modular replacement of hardware and software.

c. Promote availability of multiple sources of needed software and hardware, especially commercial off-the-shelf components.

d. Provide a pool of hardware and software modules for multiple program commonality and re-use.

e. Insure access to the architecture and its design documentation for any vendor or agency desiring to propose new uses and applications, and to facilitate competition to contain cost growth.

1.3   Application Guidance:

This document is intended to be used by both system designers and system implementors in the development of open systems architectures. Domain specific guidelines should be developed to provide clarification for application of the GOA Framework.

1.4   Document Structure:

This document is structured as follows:

a.   Section 1 defines the scope and purpose of this document.

b.   Section 2 lists documents referenced within this document, and definitions and terminology used in this document.

c.   Section 3 presents GOA Framework requirements.

d.   Section 4 provides applicable notes to the GOA Framework standard.

2.   REFERENCES:

The following documents provide additional supplemental material applicable to this standard. They provide additional requirements or expand on requirements from this standard for generic open architectures.

2.1   Standards:

ISO   International Organization for Standardization 7498: Information Processing Systems - Open Systems Interconnection - Basic Reference Model

MIL-STD-499B   "Draft Systems Engineering Standard", AFMC, 1994

POSIX91   "Draft Guide to the POSIX Open Systems Environment", P1003.0/D14, IEEE Computer Society, November 1991

SYSB-1   "Systems Engineering", EIA Engineering Bulletin SYSB-1, Electronics Industries Association (EIA), December 1989

2.2   Specifications:

2.2.1   Government Specifications:

SGOAA   Space Generic Open Avionics Architecture (SGOAA) Standard Specification, LESC-30354-C (NASA CR-188290), Lockheed Engineering & Sciences Company, June 1994