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Systèmes de transfert des informations et données spatiales — Couche d'abstraction des messages des opérations de mission

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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
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The Consultative Committee for Space Data Systems

Recommendation for Space Data System Standards

MISSION OPERATIONS MESSAGE ABSTRACTION LAYER

RECOMMENDED STANDARD

CCSDS 521.0-B-2

BLUE BOOK

March 2013

CCSDS RECOMMENDED STANDARD FOR
MISSION OPERATIONS MESSAGE ABSTRACTION LAYER

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This document has been approved for publication by the Management Council of the Consultative Committee for Space Data Systems (CCSDS) and represents the consensus technical agreement of the participating CCSDS Member Agencies. The procedure for review and authorization of CCSDS documents is detailed in *Organization and Processes for the Consultative Committee for Space Data Systems*, and the record of Agency participation in the authorization of this document can be obtained from the CCSDS Secretariat at the address below.

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CCSDS RECOMMENDED STANDARD FOR
MISSION OPERATIONS MESSAGE ABSTRACTION LAYER

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DOCUMENT CONTROL

Document	Title	Date	Status
CCSDS 521.0-B-1	Mission Operations Message Abstraction Layer, Recommended Standard, Issue 1	October 2010	Original issue (superseded)
CCSDS 521.0-B-2	Mission Operations Message Abstraction Layer, Recommended Standard, Issue 2	March 2013	Current issue (note): – addresses the request to add a slight restriction to the MAL data model regarding polymorphism; – adds ability to use external data type specifications such as XML Schemas; – moves XML to the SANA registry; – changes type short forms to integers rather than strings; – shows optional fields in composites; – changes lists to a template rather than explicit types; – adds unsigned integer and File data types.

NOTE – Changes from the original issue are too numerous to permit markup.

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1 INTRODUCTION

1.1 GENERAL

This Recommended Standard defines the Mission Operations (MO) Message Abstraction Layer (MAL) in conformance with the service framework specified in reference [C1], Mission Operations Services Concept.

The MO MAL is a framework that provides generic service patterns to the Mission Operation services defined in reference [C1]. These Mission Operations services are defined in terms of the MAL.

1.2 PURPOSE AND SCOPE

This Recommended Standard defines, in an abstract manner, the MAL in terms of:

a) the concepts that it builds upon;

b) the basic types it provides;

c) the message headers required by the layer;

d) the relationship between, and the valid sequence of, the messages and resulting behaviours.

It does not specify:

a) individual implementations or products;

b) the implementation of entities or interfaces within real systems;

c) the methods or technologies required for communications.

1.3 DOCUMENT STRUCTURE

This Recommended Standard is organised as follows:

a) section 1 provides purpose and scope, and lists definitions, conventions, and references used throughout the Recommended Standard;

b) section 2 presents an overview of the concepts;

c) section 3 specifies the interaction patterns used to define services;

d) section 4 is a formal specification of the MAL data structures;

e) section 5 is a formal specification of the MAL errors;

f) section 6 is the formal service specification Extensible Markup Language (XML) schema;

g) section 7 is the formal compliance requirements of the MAL.

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1.4 DEFINITION OF TERMS

Software Component (component)**:** A software unit containing the business function. Components offer their function as Services, which can either be used internally or which can be made available for use outside the component through Provided Service Interfaces. Components may also depend on services provided by other components through Consumed Service Interfaces.

Hardware Component: A complex physical entity (such as a spacecraft, a tracking system, or a control system) or an individual physical entity of a system (such as an instrument, a computer, or a piece of communications equipment). A Hardware Component may be composed from other Hardware Components. Each Hardware Component may host one or more Software Components. Each Hardware Component has one or more ports where connections to other Hardware Component are made. Any given Port on the Hardware Component may expose one or more Service Interfaces.

Service: A set of capabilities that a component provides to another component via an interface. A Service is defined in terms of the set of operations that can be invoked and performed through the Service Interface. Service specifications define the capabilities, behaviour, and external interfaces, but do not define the implementation.

Service Interface: A set of interactions provided by a component for participation with another component for some purpose, along with constraints on how they can occur. A Service Interface is an external interface of a Service where the behaviour of the Service Provider Component is exposed. Each Service will have one defined ‘Provided Service Interface’, and may have one or more ‘Consumed Service Interface’ and one ‘Management Service Interface’.

Provided Service Interface: A Service Interface that exposes the Service function contained in a component for use by Service Consumers. It receives the MAL messages from a Consumed Service Interface and maps them into API calls on the Provider component.

Consumed Service Interface: The API presented to the consumer component that maps from the Service operations to one or more Service Data Units(s) contained in MAL messages that are transported to the Provided Service Interface.

Management Service Interface: A Service Interface that exposes management functions of a Service function contained in a component for use by Service Consumers.

Service System: The set of Hardware and Software Components used to implement a Service in a real system. Service Systems may be implemented using one or more Hardware and Software Components.

Service Provider (provider)**:** A component that offers a Service to another by means of one of its Provided Service Interfaces.

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