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The Consultative Committee for Space Data Systems

Recommendation for Space Data System Practices

SPACECRAFT ONBOARD INTERFACE SERVICES—MESSAGE TRANSFER SERVICE

RECOMMENDED PRACTICE

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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* (CCSDS A02.1-Y-3), 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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FOREWORD

This document is a technical Recommended Practice for use in developing flight and ground systems for space missions and has been prepared by the Consultative Committee for Space Data Systems (CCSDS). The Message Transfer Service described herein is intended for missions that are cross-supported between Agencies of the CCSDS, in the framework of the Spacecraft Onboard Interface Services (SOIS) CCSDS area.

This Recommended Practice specifies services and service interfaces provided by the SOIS Message Transfer Service, which provides a standard service for mediating the transfer of discrete data, i.e., messages, between onboard software users in a (potentially) distributed onboard system regardless of the particular type of data link or protocol being used for communication.

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1 INTRODUCTION

1.1 PURPOSE AND SCOPE OF THIS DOCUMENT

This document is one of a family of documents specifying the Spacecraft Onboard Interface Services (SOIS)-compliant services to be provided in support of onboard applications.

The purpose of this document is to define services and service interfaces provided by the SOIS Message Transfer Service. Its scope is to specify the service only and not to specify methods of providing the service, although use of the SOIS subnetwork services is assumed.

This document conforms to the principles set out in the SOIS Green Book (reference [C2]) and should not be applied without first consulting this reference.

1.2 APPLICABILITY

This document applies to any mission or equipment claiming to provide a SOIS-compatible Message Transfer Service.

1.3 RATIONALE

SOIS provides service interface specifications in order to promote interoperability and development reuse via peer-to-peer and vertical standardization.

1.4 DOCUMENT STRUCTURE

This document has six major sections and five annexes:

- this section, containing administrative information, definitions, and references;
- section 2, containing general concepts and assumptions;
- section 3, containing the Message Transfer Service specification;
- section 4, containing the protocol definition, i.e., interoperable protocol between service implementations, so as to allow interoperability between them;
- section 5, containing the Protocol Data Units (PDUs) associated with the protocol definition in section 4;
- section 6, containing the Management Information Base (MIB) for this service;
- annex A, comprising the Service Conformance Statement Proforma;
- annex B, discussing security considerations;
- annex C, containing a list of informative references;

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– annex D, containing an example ANSI C Application Programming Interface for Message Transfer Service;

– annex E, containing an onboard software example of the use of Message Transfer Service, in particular with regard to the suggested interpretation of the adopted Asynchronous Message Service (AMS) primitives.

1.5 CONVENTIONS AND DEFINITIONS

1.5.1 DEFINITIONS

1.5.1.1 General

For the purpose of this document the following definitions apply.

1.5.1.2 Definitions from the Open Systems Interconnection Reference Model

This document is defined using the style established by the Open Systems Interconnection (OSI) Basic Reference Model (reference [C1]). This model provides a common framework for the development of standards in the field of systems interconnection.

The following terms used in this Recommended Practice are adapted from definitions given in reference [C1]:

layer: Subdivision of the architecture, constituted by subsystems of the same rank.

protocol data unit: Unit of data specified in a protocol and consisting of Protocol Control Information (PCI) and possibly user data.

service: Capability of a layer (a service provider) together with the layers beneath it, which is provided to the service users.

1.5.1.3 Terms Defined in this Recommended Practice

For the purposes of this Recommended Practice, the following definitions also apply.

application: Component of the onboard software that makes use of the Message Transfer Service.

NOTE – Such components include flight software applications and higher-layer services.

message: Discrete unit of data with a defined length that is sent and received atomically between tasks using Message Transfer Service.

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