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Systèmes de transfert des informations et données spatiales — Services d'interfaces à bord des véhicules spatiaux — Services de mémoire fichiers et mémoire paquets

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The Consultative Committee for Space Data Systems

Recommendation for Space Data System Practices

SPACECRAFT ONBOARD INTERFACE SERVICES—FILE AND PACKET STORE SERVICES

RECOMMENDED PRACTICE

CCSDS 873.0-M-1

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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 File and Packet Store Services 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 a set of related services to be used by space missions to access and manage files and packets within a spacecraft subnetwork. The SOIS File and Packet Store Services provide a common service interface 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 defines the Spacecraft Onboard Interface Services (SOIS) File and Packet Store Services (FPSS). The definition encompasses specification of the service interface exposed to onboard software (user applications and libraries) as well as the conceptual mapping of the FPSS primitives to the protocols implementing such services.

The SOIS File and Packet Store Services are for use by onboard software to:

– Access, and manage files residing in a file store. The files residing in the file store could contain any type of data, including for example telemetry, commands and command sequences, software updates, imagery, and other science observations.

– Access and manage packets residing in a packet store. It should be noted that the packet store may or may not be aware of, and its actions may or may not be informed by, the contents of a packet.

To achieve this, the FPSS comprise the following services:

– File Access Service (FAS);

– File Management Service (FMS);

– Packet Store Access Service (PSAS);

– Packet Store Management Service (PSMS).

It should be noted that the SOIS File and Packet Store Services do NOT define the file and packet stores themselves, but only their minimum provided service. The initialization and configuration of the file and packet stores is out of scope for this document.

1.2 APPLICABILITY

This document applies to any mission or equipment claiming to provide CCSDS SOIS-compatible File and Packet Store Services.

1.3 RATIONALE

SOIS provides service interface specifications in order to promote commonality of functionality amongst systems implementing well-defined services. These interfaces do not dictate implementation of interfaces or protocols supporting the services.

1.4 DOCUMENT STRUCTURE

This document has four major sections:

– section 1, this section, containing administrative information, definitions, and references;

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- section 2, containing the general concepts and assumptions;
- section 3, containing the File and Packet Store Services, in terms of the services provided, services expected from underlying layers, and the service interface;
- section 4, containing the Management Information Base (MIB) for this service.

In addition, one normative and four informative annexes are provided:

- annex A, comprising a Service Conformance Statement Proforma;
- annex B, containing a discussion security considerations with respect to the specifications of this document;
- annex C, containing a list of acronyms;
- annex D, containing a list of informative references;
- annex E, describing aspects of the POSIX API file functions which might be useful to implementers of the File Access and Management Services.

1.5 CONVENTIONS AND DEFINITIONS

1.5.1 BIT NUMBERING CONVENTION AND NOMENCLATURE

In accordance with modern data communications practice, spacecraft data fields are often grouped into eight-bit ‘words’ widely known as bytes. Throughout this Recommended Practice, such an eight-bit word is called an ‘octet’. The numbering for octets within a data structure starts with zero.

By CCSDS convention, any ‘spare’ bits shall be permanently set to ‘0’.

1.5.2 DEFINITIONS

1.5.2.1 Definitions from the Open Systems Interconnection (OSI) Reference Model

The document is defined using the style established by the Open Systems Interconnection (OSI) Basic Reference Model (reference [D1]). 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 [D1]):

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

(N)-protocol: A set of rules and formats (semantic and syntactic) which determines the communication behavior of (N)-entities in the performance of (N)-functions.

service: A capability of a layer, and the layers beneath it (service providers), provided to the service users at the boundary between the service providers and the service users.

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