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Space data and information transfer systems — Spacecraft onboard interface services — Device enumeration service

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A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

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Space data and information transfer systems — Spacecraft onboard interface services — Device enumeration service

Systèmes de transfert des informations et données spatiales — Services d'interface à bord du vaisseau spatial — Service d'énumération du dispositif

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

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Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 20618 was prepared by the Consultative Committee for Space Data Systems (CCSDS) as CCSDS 871.3-M-1, October 2014 and was adopted without modifications except those stated in Clause 2 of this International Standard by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 13, *Space data and information transfer systems*.

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The Consultative Committee for Space Data Systems

Recommendation for Space Data System Practices

SPACECRAFT ONBOARD INTERFACE SERVICES—DEVICE ENUMERATION SERVICE

RECOMMENDED PRACTICE

CCSDS 871.3-M-1

MAGENTA BOOK

October 2014

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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-4), and the record of Agency participation in the authorization of this document can be obtained from the CCSDS Secretariat at the e-mail address below.

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The Consultative Committee for Space Data Systems (CCSDS) is an organization officially established by the management of its members. The Committee meets periodically to address data systems problems that are common to all participants, and to formulate sound technical solutions to these problems. Inasmuch as participation in the CCSDS is completely voluntary, the results of Committee actions are termed **Recommendations** and are not in themselves considered binding on any Agency.

CCSDS Recommendations take two forms: **Recommended Standards** that are prescriptive and are the formal vehicles by which CCSDS Agencies create the standards that specify how elements of their space mission support infrastructure shall operate and interoperate with others; and **Recommended Practices** that are more descriptive in nature and are intended to provide general guidance about how to approach a particular problem associated with space mission support. This **Recommended Practice** is issued by, and represents the consensus of, the CCSDS members. Endorsement of this **Recommended Practice** is entirely voluntary and does not imply a commitment by any Agency or organization to implement its recommendations in a prescriptive sense.

No later than five years from its date of issuance, this **Recommended Practice** will be reviewed by the CCSDS to determine whether it should: (1) remain in effect without change; (2) be changed to reflect the impact of new technologies, new requirements, or new directions; or (3) be retired or canceled.

In those instances when a new version of a **Recommended Practice** is issued, existing CCSDS-related member Practices and implementations are not negated or deemed to be non-CCSDS compatible. It is the responsibility of each member to determine when such Practices or implementations are to be modified. Each member is, however, strongly encouraged to direct planning for its new Practices and implementations towards the later version of the Recommended Practice.

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FOREWORD

Through the process of normal evolution, it is expected that expansion, deletion, or modification of this document may occur. This Recommended Practice is therefore subject to CCSDS document management and change control procedures, which are defined in the *Organization and Processes for the Consultative Committee for Space Data Systems* (CCSDS A02.1-Y-4). Current versions of CCSDS documents are maintained at the CCSDS Web site:

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- Instituto Nacional de Pesquisas Espaciais (INPE)/Brazil.
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- National Aeronautics and Space Administration (NASA)/USA.
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DOCUMENT CONTROL

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CCSDS 871.3-M-1	Spacecraft Onboard Interface Services—Device Enumeration Service, Recommended Practice, Issue 1	October 2014	Original issue

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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 service to be provided in support of applications.

The purpose of this document is to define services and service interfaces provided by the SOIS Device Enumeration Service (DES). 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 [D3]) and is intended to be applied together with it.

1.2 APPLICABILITY

This document applies to any mission or equipment claiming to provide a SOIS-compatible DES.

1.3 RATIONALE

SOIS provide 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 comprises three sections:

- this section, containing administrative information, definitions, and references;
- section 2 containing general concepts and assumptions;
- section 3 containing the DES specification.

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

- annex A, comprising a Protocol Implementation Conformance Proforma;
- annex B, discussing security considerations relating to the specifications of this document;
- annex C, containing a list of acronyms;
- annex D containing a list of informative references.

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1.5 DEFINITIONS

1.5.1 GENERAL

For the purpose of this document the following definitions apply.

1.5.2 DEFINITIONS FROM THE OPEN SYSTEMS INTERCONNECTION (OSI) BASIC REFERENCE MODEL

This document is defined using the style established by the Open Systems Interconnection (OSI) Basic Reference Model (reference [D2]). 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 [D2]:

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

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

1.5.3 TERMS DEFINED IN THIS RECOMMENDED PRACTICE

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

application: Any component of the onboard software that makes use of the DES. This includes flight software applications and higher-layer services.

device: A real hardware component of the spacecraft, such as a sensor or actuator, or a single register within such a component.

notification: A service interface provided by applications that is invoked by a service implementation to provide a means for the service implementation to deliver a message to a set of applications.

1.6 NOMENCLATURE

1.6.1 NORMATIVE TEXT

The following conventions apply for the normative specifications in this Recommended Practice:

a) the words ‘shall’ and ‘must’ imply a binding and verifiable specification;

b) the word ‘should’ implies an optional, but desirable, specification;

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c) the word 'may' implies an optional specification;

d) the words 'is', 'are', and 'will' imply statements of fact.

NOTE – These conventions do not imply constraints on diction in text that is clearly informative in nature.

1.6.2 INFORMATIVE TEXT

In the normative sections of this document, informative text is set off from the normative specifications either in notes or under one of the following subsection headings:

– Overview;

– Background;

– Rationale;

– Discussion.

1.7 REFERENCES

The following publications contain provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All publications are subject to revision, and users of this document are encouraged to investigate the possibility of applying the most recent editions of the publications indicated below. The CCSDS Secretariat maintains a register of currently valid CCSDS publications.

[1] *Spacecraft Onboard Interface Services—Device Access Service*. Issue 1. Recommendation for Space Data System Practices (Magenta Book), CCSDS 871.0-M-1. Washington, D.C.: CCSDS, March 2013.

[2] *Spacecraft Onboard Interface Services—Device Virtualization Service*. Issue 1. Recommendation for Space Data System Practices (Magenta Book), CCSDS 871.2-M-1. Washington, D.C.: CCSDS, March 2014.

[3] *Spacecraft Onboard Interface Services—Subnetwork Device Discovery Service*. Issue 1. Recommendation for Space Data System Practices (Magenta Book), CCSDS 854.0-M-1. Washington, D.C.: CCSDS, December 2009.

[4] *Spacecraft Onboard Interface Services—Subnetwork Memory Access Service*. Issue 1. Recommendation for Space Data System Practices (Magenta Book), CCSDS 852.0-M-1. Washington, D.C.: CCSDS, December 2009.

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