
**Space data and information transfer
systems — Encapsulation service**

*Systèmes de transfert des informations et données spatiales — Service
d'encapsulation*

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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 10537 was prepared by the Consultative Committee for Space Data Systems (CCSDS) (as CCSDS 661.0-B-1, September 2008) 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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Space data and information transfer systems — Encapsulation service

1 Scope

This International Standard specifies the encapsulation service, which is used by space missions to transfer data units that are not directly transferred by the space data link protocols over a ground-to-space or space-to-space communications link.

The scope and field of application are further detailed in subclauses 1.2 and 1.3 of the enclosed CCSDS publication.

2 Requirements

Requirements are the technical recommendations made in the following publication (reproduced on the following pages), which is adopted as an International Standard:

CCSDS 133.1-B-1, June 2006, *Encapsulation service*

For the purposes of international standardization, the modifications outlined below shall apply to the specific clauses and paragraphs of publication CCSDS 133.1-B-1.

Pages i to v

This part is information which is relevant to the CCSDS publication only.

Page 1-5

Add the following information to the reference indicated:

- [1] Document CCSDS 132.0-B-1, September 2003, is equivalent to ISO 22645:2005.
- [2] Document CCSDS 232.0-B-1, September 2003, is equivalent to ISO 22664:2005.
- [3] Document CCSDS 732.0-B-2, July 2006, is equivalent to ISO 22666:2007.
- [4] Document CCSDS 211.0-B-4, July 2006, is equivalent to ISO 22663:2007.
- [5] Document CCSDS 133.0-B-1, September 2003, is equivalent to ISO 22646:2005.
- [7] Document CCSDS 135.0-B-1, January 2002, is equivalent to ISO 22647:2006.

Page B-1

Add the following information to the reference indicated:

[B3] Document CCSDS 102.0-B-5, November 2000, is equivalent to ISO 13419:2003.

[B4] Document CCSDS 203.0-B-2, June 2001, is equivalent to ISO 12174:2003.

3 Revision of publication CCSDS 133.1-B-1

It has been agreed with the Consultative Committee for Space Data Systems that Subcommittee ISO/TC 20/SC 13 will be consulted in the event of any revision or amendment of publication CCSDS 133.1-B-1. To this end, NASA will act as a liaison body between CCSDS and ISO.

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Recommendation for Space Data System Standards

ENCAPSULATION SERVICE

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Recommended Standard

CCSDS 133.1-B-1

Blue Book
June 2006

Note:
This current
issue includes
all updates through
Technical Corrigendum 1,
dated October 2006.

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CCSDS RECOMMENDED STANDARD FOR ENCAPSULATION SERVICE

AUTHORITY

Issue:	Recommended Standard, Issue 1
Date:	June 2006
Location:	Washington, DC, USA

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 Recommendations is detailed in the *Procedures Manual 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 Secretariat

Office of Space Communication (Code M-3)

National Aeronautics and Space Administration

Washington, DC 20546, USA

CCSDS RECOMMENDED STANDARD FOR ENCAPSULATION SERVICE

STATEMENT OF INTENT

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 **Recommended Standards** and are not considered binding on any Agency.

This **Recommended Standard** is issued by, and represents the consensus of, the CCSDS members. Endorsement of this **Recommendation** is entirely voluntary. Endorsement, however, indicates the following understandings:

- o Whenever a member establishes a CCSDS-related **standard**, this **standard** will be in accord with the relevant **Recommended Standard**. Establishing such a **standard** does not preclude other provisions which a member may develop.
- o Whenever a member establishes a CCSDS-related **standard**, that member will provide other CCSDS members with the following information:
 - The **standard** itself.
 - The anticipated date of initial operational capability.
 - The anticipated duration of operational service.
- o Specific service arrangements shall be made via memoranda of agreement. Neither this **Recommended Standard** nor any ensuing **standard** is a substitute for a memorandum of agreement.

No later than five years from its date of issuance, this **Recommended Standard** 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 Standard** is issued, existing CCSDS-related member standards and implementations are not negated or deemed to be non-CCSDS compatible. It is the responsibility of each member to determine when such standards or implementations are to be modified. Each member is, however, strongly encouraged to direct planning for its new standards and implementations towards the later version of the Recommended Standard.

CCSDS RECOMMENDED STANDARD FOR ENCAPSULATION SERVICE

FOREWORD

This document is a **Recommended Standard** 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 Encapsulation Service described herein is intended for missions that are cross-supported between Agencies of the CCSDS.

This **Recommended Standard** specifies a communications service to be used by space missions to transfer protocol data units that are not directly transferred by the Space Data Link Protocols (references [1]-[3]) over a ground-to-space or space-to-space communications link. The data units transferred with this service are encapsulated in either Space Packets, defined in reference [5], or Encapsulation Packets, defined in this document.

This **Recommended Standard** is developed from the Encapsulation Service that was defined in the Advanced Orbiting Systems (AOS) Recommended Standard (reference [B2]). In this **Recommended Standard**, that service is re-defined so that it can be used with any of the Space Data Link Protocols (references [1]-[3]). Also, the Encapsulation Packet that was defined in references [B2]-[B4] is included in this **Recommended Standard** as an alternative packet structure for encapsulation.

In order to define all Space Data Link Protocols in a unified way, a few technical specifications of the Encapsulation Service in reference [B2] have been changed. Also, some technical terms in references [B2]-[B4] have been changed in order to unify the terminology used in all the CCSDS Recommended Standards that define space link protocols. These changes are listed in annex C of this **Recommended Standard**.

Through the process of normal evolution, it is expected that expansion, deletion or modification to this document may occur. This Recommended Standard is therefore subject to CCSDS document management and change control procedures, as defined in reference [B1]. Current versions of CCSDS documents are maintained at the CCSDS Web site:

<http://www.ccsds.org/>

Questions relating to the contents or status of this document should be addressed to the CCSDS Secretariat at the address indicated on page i.

CCSDS RECOMMENDED STANDARD FOR ENCAPSULATION SERVICE

At time of publication, the active Member and Observer Agencies of the CCSDS were:

Member Agencies

- Agenzia Spaziale Italiana (ASI)/Italy.
- British National Space Centre (BNSC)/United Kingdom.
- Canadian Space Agency (CSA)/Canada.
- Centre National d'Etudes Spatiales (CNES)/France.
- Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR)/Germany.
- European Space Agency (ESA)/Europe.
- Federal Space Agency (Roskosmos)/Russian Federation.
- Instituto Nacional de Pesquisas Espaciais (INPE)/Brazil.
- Japan Aerospace Exploration Agency (JAXA)/Japan.
- National Aeronautics and Space Administration (NASA)/USA.

Observer Agencies

- Austrian Space Agency (ASA)/Austria.
- Belgian Federal Science Policy Office (BFSP/O)/Belgium.
- Central Research Institute of Machine Building (TsNIIMash)/Russian Federation.
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CCSDS RECOMMENDED STANDARD FOR ENCAPSULATION SERVICE

DOCUMENT CONTROL

Document	Title and Issue	Date	Status
CCSDS 133.1-B-1	Encapsulation Service, Recommended Standard, Issue 1	June 2006	Current issue

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