INTERNATIONAL STANDARD

ISO 22671

Third edition
2011-11-15

Space data and information transfer systems — Space link extension (SLE) — Forward communications link transmission unit (CLTU) service

Systèmes de transfert des informations et données spatiales — Extension de liaisons spatiales (SLE) — Service de l'unité de transmission pour la liaison d'envoi de télécommande (CLTU)

Reference number
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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 22671 was prepared by the Consultative Committee for Space Data Systems (CCSDS) as CCSDS 912.1-B-3, July 2010 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*.

This third edition cancels and replaces the second edition (ISO 22671:2007), which has been technically revised.

Space data and information transfer systems — Space link extension (SLE) — Forward communications link transmission unit (CLTU) service

1 Scope

1.1 This International Standard defines the Communications Link Transmission Unit (CLTU) service in conformance with the transfer services specified in CCSDS 910.4-B-2 (equivalent to ISO 15396). The Forward CLTU service is a Space Link Extension (SLE) transfer service that enables a mission to send Communications Link Transmission Units (CLTUs) to a spacecraft.

1.2 This International Standard defines, in an abstract manner, the Forward CLTU service in terms of

a) the operations necessary to provide the transfer service,

b) the parameter data associated with each operation,

c) the behaviors that result from the invocation of each operation, and

d) the relationship between, and the valid sequence of, the operations and resulting behaviors.

1.3 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 to radiate data to a spacecraft and to acquire telemetry frames from the signals received from that spacecraft for extraction of the Operational Control Field,

d) the methods or technologies required for communications, or

e) the management activities necessary to schedule, configure, and control the Forward CLTU service.

1.4 The scope and field of application are furthermore detailed in subclause 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 912.1-B-3, July 2010, *Space link extension — Forward CLTU service specification*.

For the purposes of international standardization, the modifications outlined below shall apply to the specific clauses and paragraphs of publication CCSDS 912.1-B-3.

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

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Add the following information to the reference indicated:

[1] Document CCSDS 910.4-B-2, October 2005, is equivalent to ISO 15396:2007.

[2] Document CCSDS 231.0-B-1, September 2003, is equivalent to ISO 22642:2005.

[3] Document CCSDS 232.0-B-1, September 2003, is equivalent to ISO 22664:2005.

[4] Document CCSDS 232.1-B-1, September 2003, is equivalent to ISO 22667:2005.

[5] Document CCSDS 301.0-B-3, January 2002, is equivalent to ISO 11104:2003.

[6] ISO/IEC 8824-1:2002 has been cancelled and withdrawn. It has been replaced by ISO/IEC 8824-1:2008, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation*.

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Add the following information to the reference indicated:

[G4] Document CCSDS 201.0-B-3, June 2000, is equivalent to ISO 12171:2002.

[G5] Document CCSDS 202.0-B-3, June 2001, is equivalent to ISO 12172:2003.

[G6] Document CCSDS 202.1-B-2, June 2001, is equivalent to ISO 12173:2003.

[G7] Document CCSDS 203.0-B-2, June 2001, is equivalent to ISO 12174:2003.

3 Revision of publication CCSDS 912.1-B-3

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 912.1-B-3. To this end, NASA will act as a liaison body between CCSDS and ISO.

The Consultative Committee for Space Data Systems

Recommendation for Space Data System Standards

SPACE LINK EXTENSION—FORWARD CLTU SERVICE SPECIFICATION

RECOMMENDED STANDARD

CCSDS 912.1-B-3

BLUE BOOK

July 2010

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CCSDS RECOMMENDED STANDARD FOR SLE FCLTU SERVICE

AUTHORITY

Issue:	Recommended Standard, Issue 3
Date:	July 2010
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 documents 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.

This document is published and maintained by:

CCSDS Secretariat
Space Communications and Navigation Office, 7L70
Space Operations Mission Directorate
NASA Headquarters
Washington, DC 20546-0001, USA

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:

- 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.
- 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.
- 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.

FOREWORD

Through the process of normal evolution, it is expected that expansion, deletion, or modification of this document may occur. This Recommended Standard is therefore subject to CCSDS document management and change control procedures, which are defined in the *Procedures Manual for the Consultative Committee for Space Data Systems*. 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.

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

Member Agencies

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

Observer Agencies

- Austrian Space Agency (ASA)/Austria.
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- Naval Center for Space Technology (NCST)/USA.
- Scientific and Technological Research Council of Turkey (TUBITAK)/Turkey.
- Space and Upper Atmosphere Research Commission (SUPARCO)/Pakistan.
- Swedish Space Corporation (SSC)/Sweden.

– United States Geological Survey (USGS)/USA.

DOCUMENT CONTROL

Document	Title	Date	Status
CCSDS 912.1-B-1	Space Link Extension—Forward CLTU Service Specification	April 2002	Original issue, superseded
CCSDS 912.1-B-2	Space Link Extension—Forward CLTU Service Specification	November 2004	Issue 2, superseded
CCSDS 912.1-B-3	Space Link Extension—Forward CLTU Service Specification, Recommended Standard, Issue 3	July 2010	Current issue: – corrects/clarifies/ updates text and adds the option of picosecond resolution to the earth-receive-time parameter

NOTE – Substantive changes from the previous issue are indicated by change bars in the inside margin.

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1 INTRODUCTION

1.1 PURPOSE OF THIS RECOMMENDED STANDARD

This Recommended Standard defines the Communications Link Transmission Unit (CLTU) service in conformance with the transfer services specified in reference [1], *Cross Support Reference Model—Part 1: SLE Services*. The Forward CLTU service is a Space Link Extension (SLE) transfer service that enables a mission to send Communications Link Transmission Units (CLTUs) to a spacecraft.

1.2 SCOPE

This Recommended Standard defines, in an abstract manner, the Forward CLTU service in terms of:

a) the operations necessary to provide the transfer service;

b) the parameter data associated with each operation;

c) the behaviors that result from the invocation of each operation; and

d) the relationship between, and the valid sequence of, the operations and resulting behaviors.

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 to radiate data to a spacecraft and to acquire telemetry frames from the signals received from that spacecraft for extraction of the Operational Control Field;

d) the methods or technologies required for communications; or

e) the management activities necessary to schedule, configure, and control the Forward CLTU service.

1.3 APPLICABILITY

1.3.1 APPLICABILITY OF THIS RECOMMENDED STANDARD

This Recommended Standard provides a basis for the development of real systems that implement the Forward CLTU service. Implementation of the Forward CLTU service in a real system additionally requires the availability of a communications service to convey invocations and returns of Forward CLTU service operations between service users and