INTERNATIONAL STANDARD

ISO 22647

Second edition
2010-09-15

Space data and information transfer systems — Space link identifiers

Systèmes de transfert des informations et données spatiales — Identificateurs de liaisons spatiales

Reference number
ISO 22647:2010(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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.

This second edition cancels and replaces the first edition (ISO 22647:2006), which has been technically revised.

ISO 22647 was prepared by the Consultative Committee for Space Data Systems (CCSDS) (as CCSDS 135.0-B-3, October 2006) 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*.

Space data and information transfer systems — Space link identifiers

1 Scope

This International Standard specifies the identifiers currently used by the space link protocols and shows how these identifiers are managed at the CCSDS level. It does not specify how these identifiers are managed in individual data systems of space projects.

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 135.0-B-3, October 2006, *Space link identifiers*

For the purposes of international standardization, the modifications outlined below shall apply to the specific clauses and paragraphs of publication CCSDS 135.0-B-3.

Pages i to v

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

Page 1-2

Add the following information to the reference indicated:

[2] Document CCSDS 121.0-B-1, May 1997, is equivalent to ISO 15887:2000.

[3] Document CCSDS 717.0-B-1, May 1999, is equivalent to ISO 15894:2000.

[4] Document CCSDS 727.0-B-3, June 2005, is equivalent to ISO 17355:2007.

[5] Document CCSDS 714.0-B-2, October 2006, is equivalent to ISO 15893:2010.

[6] Document CCSDS 133.0-B-1, September 2003, is equivalent to ISO 22646:2005.

[7] Document CCSDS 713.0-B-1, May 1999, is equivalent to ISO 15891:2000.

[8] Document CCSDS 132.0-B-1, September 2003, is equivalent to ISO 22645:2005.

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

[10] Document CCSDS 732.0-B-2, July 2006, is equivalent to ISO 22666:2007.

[11] Document CCSDS 211.0-B-4, July 2006, is equivalent to ISO 22663:2007.

[13] Document CCSDS 133.1-B-1, June 2006, is equivalent to ISO 10537:2010.

[14] Document CCSDS 131.0-B-1, September 2003, is equivalent to ISO 22641:2005.

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

3 Revision of publication CCSDS 135.0-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 135.0-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 IDENTIFIERS

RECOMMENDED STANDARD

CCSDS 135.0-B-3

BLUE BOOK
October 2006

(blank page)

CCSDS RECOMMENDED STANDARD FOR SPACE LINK IDENTIFIERS

AUTHORITY

Issue:	Blue Book, Issue 3
Date:	October 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.

This Recommendation is published and maintained by:

CCSDS Secretariat
Office of Space Communication (Code M-3)
National Aeronautics and Space Administration
Washington, DC 20546, USA

CCSDS RECOMMENDED STANDARD FOR SPACE LINK IDENTIFIERS

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

This document is a technical Recommendation for use in developing flight and ground systems for space missions and has been prepared by the Consultative Committee for Space Data Systems (CCSDS).

This Recommendation documents the identifiers used by the space link protocols developed by CCSDS, shows how these identifiers are managed, and lists the identifiers that are defined or reserved by CCSDS as part of the specification of the space link protocols.

Through the process of normal evolution, it is expected that expansion, deletion or modification to this document may occur. This Recommendation 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 SPACE LINK IDENTIFIERS

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 (BFSPO)/Belgium.
- Central Research Institute of Machine Building (TsNIIMash)/Russian Federation.
- Centro Tecnico Aeroespacial (CTA)/Brazil.
- Chinese Academy of Space Technology (CAST)/China.
- Commonwealth Scientific and Industrial Research Organization (CSIRO)/Australia.
- Danish Space Research Institute (DSRI)/Denmark.
- European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)/Europe.
- European Telecommunications Satellite Organization (EUTELSAT)/Europe.
- Hellenic National Space Committee (HNSC)/Greece.
- Indian Space Research Organization (ISRO)/India.
- Institute of Space Research (IKI)/Russian Federation.
- KFKI Research Institute for Particle & Nuclear Physics (KFKI)/Hungary.
- Korea Aerospace Research Institute (KARI)/Korea.
- MIKOMTEK: CSIR (CSIR)/Republic of South Africa.
- Ministry of Communications (MOC)/Israel.
- National Institute of Information and Communications Technology (NICT)/Japan.
- National Oceanic & Atmospheric Administration (NOAA)/USA.
- National Space Organization (NSPO)/Taipei.
- Space and Upper Atmosphere Research Commission (SUPARCO)/Pakistan.
- Swedish Space Corporation (SSC)/Sweden.
- United States Geological Survey (USGS)/USA.

DOCUMENT CONTROL

Document	Title and Issue	Date	Status
CCSDS 135.0-B-1	Space Link Identifiers, Issue 1	January 2002	Original issue, superseded.
CCSDS 135.0-B-2	Space Link Identifiers, Recommended Standard, Issue 2	November 2005	Issue 2 (superseded): – adds Proximity-1 port ID assignments.
CCSDS 135.0-B-3	Space Link Identifiers, Recommended Standard, Issue 3	October 2006	Current issue: – adds a security subsection (2.5); – adds protocol IDs for IPv4, Encapsulation Service, and Encapsulation Service Extended Protocol IDs; – expands, clarifies meaning of Proximity-1 port ID for Packets.

CCSDS RECOMMENDED STANDARD FOR SPACE LINK IDENTIFIERS

CONTENTS

CONTENTS (CONTINUED)

(blank page)

1 INTRODUCTION

1.1 PURPOSE

The purpose of this Recommendation is to document the identifiers used by the space link protocols developed by CCSDS, to show how these identifiers are managed, and to list the identifiers that are defined or reserved by CCSDS as part of the specification of the space link protocols.

1.2 SCOPE

This Recommendation documents the identifiers currently used by the space link protocols and shows how these identifiers are managed at the CCSDS level. It does not specify how these identifiers are managed in individual data systems of space projects.

1.3 APPLICABILITY

This Recommendation constitutes provisions of the CCSDS Recommendations that refer to this Recommendation as a normative reference, to the extent that is specified in those Recommendations.

1.4 RATIONALE

The goal of this Recommendation is to enable management of identifiers used by the space link protocols independently of management of protocol specifications themselves.

1.5 DOCUMENT STRUCTURE

This document is divided into seven numbered sections and four annexes:

a) section 1 presents the purpose, scope, applicability and rationale of this Recommendation and lists the definitions and references used throughout the document;

b) section 2 summarizes the methods used for managing space link identifiers;

c) sections 3 through 7 list the identifiers used by each of the space link protocols, show how these identifiers are managed, and list the identifiers that are defined or reserved by CCSDS;

d) annex A lists all acronyms used within this document;

e) annex B provides a list of informative references;

f) annex C summarizes the location of the length field of the packets for which Packet Version Numbers are defined by CCSDS.

1.6 DEFINITIONS

For the purposes of this Recommendation, the following definitions apply. Many other terms that pertain to specific items are defined in the appropriate sections.

Assigned by CCSDS: values of the identifier are assigned by CCSDS upon request by Agencies.

Defined by CCSDS: values of the identifier are defined by CCSDS as part of the specification of protocol.

Managed by projects: values of the identifier are managed independently by the projects that use the protocol.

space link: a communications link between a spacecraft and its associated ground system, or between two spacecraft.

space link protocol: a communications protocol designed to be used over a space link (see above). A space link protocol is not necessarily a protocol of the Data Link Layer of the OSI Basic Reference Model (reference [1]).

1.7 REFERENCES

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

[1] *Information Technology—Open Systems Interconnection—Basic Reference Model: The Basic Model*. International Standard, ISO/IEC 7498-1:1994. 2nd ed. Geneva: ISO, 1994.

[2] *Lossless Data Compression*. Recommendation for Space Data Systems Standards, CCSDS 121.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, May 1997.

[3] *Space Communications Protocol Specification—File Protocol (SCPS-FP)*. Recommendation for Space Data Systems Standards, CCSDS 717.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, May 1999.

[4] *CCSDS File Delivery Protocol (CFDP)*. Recommendation for Space Data System Standards, CCSDS 727.0-B-3. Blue Book. Issue 3. Washington, D.C.: CCSDS, June 2005.

[5] *Space Communications Protocol Specification—Transport Protocol (SCPS-TP).* Recommendation for Space Data Systems Standards, CCSDS 714.0-B-2. Blue Book. Issue 2. Washington, D.C.: CCSDS, October 2006.

[6] *Space Packet Protocol*. Recommendation for Space Data System Standards, CCSDS 133.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, September 2003.

[7] *Space Communications Protocol Specification—Network Protocol (SCPS-NP).* Recommendation for Space Data Systems Standards, CCSDS 713.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, May 1999.

[8] *TM Space Data Link Protocol*. Recommendation for Space Data System Standards, CCSDS 132.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, September 2003.

[9] *TC Space Data Link Protocol*. Recommendation for Space Data System Standards, CCSDS 232.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, September 2003.

[10] *AOS Space Data Link Protocol*. Recommendation for Space Data System Standards, CCSDS 732.0-B-2. Blue Book. Issue 2. Washington, D.C.: CCSDS, July 2006.

[11] *Proximity-1 Space Link Protocol—Data Link Layer*. Recommendation for Space Data System Standards, CCSDS 211.0-B-4. Blue Book. Issue 4. Washington, D.C.: CCSDS, July 2006.

[12] *CCSDS Global Spacecraft Identification Field Code Assignment Control Procedures*. Recommendation for Space Data System Standards, CCSDS 320.0-B-4. Blue Book. Issue 4. Washington, D.C.: CCSDS, January 2006.

[13] *Encapsulation Service*. Recommendation for Space Data System Standards, CCSDS 133.1-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, June 2006.

[14] *TM Synchronization and Channel Coding*. Recommendation for Space Data System Standards, CCSDS 131.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, September 2003.

[15] *TC Synchronization and Channel Coding*. Recommendation for Space Data System Standards, CCSDS 231.0-B-1. Blue Book. Issue 1. Washington, D.C.: CCSDS, September 2003.

[16] *Information Technology—Protocol for Providing the Connectionless-Mode Network Service: Protocol Specification*. International Standard, ISO/IEC 8473-1:1998. 2nd ed. Geneva: ISO, 1998.

[17] J. Postel. *Internet Protocol*. STD 5, September 1981. [RFC 791, RFC 950, RFC 919, RFC 922, RFC 792, RFC 1112][1]

[18] S. Deering and R. Hinden. *Internet Protocol, Version 6 (IPv6) Specification*. Draft Internet Standard, December 1998. [RFC 2460]

NOTE – Informative references are listed in annex B.

[1] Internet Request for Comments (RFC) texts are available on line in various locations (e.g., http://ietf.org/rfc/); Internet standards are made up of one or more RFCs, which are identified in square brackets following the entry.

2 MANAGEMENT OF SPACE LINK IDENTIFIERS

2.1 GENERAL

The space link protocols developed by CCSDS use identifiers to identify protocols, addresses, and data formats. Even though some of these identifiers are defined in the Recommendations that specify the protocols, management of identifiers should be performed independently of management of protocol specifications so that values of the identifiers can be defined (or re-defined) without changing the protocol specifications themselves.

With the aim described above, this document lists the identifiers currently used by the space link protocols developed by CCSDS, shows how these identifiers are managed, and lists the identifiers that are defined or reserved by CCSDS as part of the specification of the space link protocols.

NOTE – Since no identifier is used by the following CCSDS space link protocols, these protocols are not included in the following sections.

a) Lossless Data Compression (reference [2]);

b) SCPS-FP (reference [3]);

c) TM Synchronization and Channel Coding (reference [14]);

d) TC Synchronization and Channel Coding (reference [15]).

Each identifier is managed by one of the three methods listed below depending on its characteristics:

a) defined by CCSDS as part of protocol specification;

b) assigned by CCSDS upon request by Agencies;

c) managed by individual projects.

The following subsections briefly describe these management methods.

2.2 IDENTIFIERS DEFINED BY CCSDS

The values of some identifiers are defined by CCSDS as part of the specification of protocols. This method for managing identifiers is denoted ‘Defined by CCSDS’ in this document.

The values of the identifiers of this category that are currently defined by CCSDS are listed in the following sections of this document.

2.3 IDENTIFIERS ASSIGNED BY CCSDS

The values of some identifiers are assigned by CCSDS upon request by Agencies. This method for managing identifiers is denoted 'Assigned by CCSDS' in this document.

The procedure for assigning values of each of the identifiers of this category is defined by a separate CCSDS Recommendation, which is referred to in the following sections of this document.

2.4 IDENTIFIERS MANAGED BY INDIVIDUAL PROJECTS

The values of some identifiers are managed independently by the projects that use the protocols. CCSDS does not specify how to manage these identifiers. This method for managing identifiers is denoted 'Managed by projects' in this document.

Some values of the identifiers in this category may be reserved by CCSDS to be used for some specific purposes across Agencies. The values of the identifiers reserved by CCSDS are listed in the following sections of this document.

2.5 SECURITY ASPECTS OF THE SPACE LINK IDENTIFIERS

2.5.1 SECURITY BACKGROUND/INTRODUCTION

The Space Link Identifiers Blue Book documents the identifiers used by the CCSDS space link protocols, CFDP, SCPS-TP and SCPS-NP, CCSDS space packet protocol, and the CCSDS encapsulation service. It documents how these identifiers are managed and provides a list of these identifiers along with their defined and/or reserved values.

2.5.2 STATEMENTS OF SECURITY CONCERNS

2.5.2.1 General

This subsection identifies Space Link Identifiers support for capabilities responding to security concerns in the areas of data privacy, data integrity, authentication, access control, availability of resources, and auditing.

2.5.2.2 Data Privacy (also known as Confidentiality)

This Space Link Identifiers specification does not define explicit data privacy requirements or capabilities to ensure data privacy. Data privacy is expected to be ensured either by encryption techniques applied at the data link layer or at a higher layer. For example, mission application processes might apply end-to-end encryption to the contents of the CCSDS space link data units carried as data by the applicable CCSDS data transfer service. Alternatively or in addition, the network connection between communicating entities might be encrypted to provide data privacy in the underlying communication network.

2.5.2.3 Data Integrity

The Space Link Identifiers specification does not define explicit data integrity requirements or capabilities to ensure data integrity. See the individual protocol specifications listed in the References subsection (1.7) for such requirements.

2.5.2.4 Authentication

The Space Link Identifiers specification does not define explicit authentication requirements or capabilities to ensure authentication. See the individual protocol specifications listed in the References subsection (1.7) for such requirements.

2.5.2.5 Access Control

The Space Link Identifiers specification does not define access control requirements or capabilities for access control. See the individual protocol specifications listed in the References subsection (1.7) for such requirements.

2.5.2.6 Availability of Resources

This Space Link Identifiers specification does not define explicit capabilities to prevent denial of service. See the individual protocol specifications listed in the References subsection (1.7) for such requirements.

2.5.2.7 Auditing

This Space Link Identifiers specification does not define explicit security auditing requirements or capabilities.

2.5.3 POTENTIAL THREATS AND ATTACK SCENARIOS

The Space Link Identifiers specification does not define potential threats and attack scenarios.

2.5.4 CONSEQUENCES OF NOT APPLYING SECURITY

The consequences of not applying security to the list of protocols whose identifiers are defined in the Space Link Identifiers Blue book is an issue covered by each individual protocol specification.

(blank page)

3 IDENTIFIERS USED BY CCSDS FILE DELIVERY PROTOCOL (CFDP)

Table 3-1 shows the identifier used by the CCSDS File Delivery Protocol (CFDP) (reference [4]) and how it is managed.

Table 3-1: Identifier Used by CCSDS File Delivery Protocol

Identifier	Management Method	Note
Entity ID	Managed by projects	No value is reserved

(blank page)

4 IDENTIFIERS USED BY SCPS-TP

Table 4-1 shows the identifier used by SCPS-TP (reference [5]) and how it is managed.

Table 4-1: Identifier Used by SCPS-TP

Identifier	Management Method	Note
Connection Identifier	Managed by projects	No value is reserved

(blank page)

5 IDENTIFIERS USED BY SPACE PACKET PROTOCOL

5.1 APPLICATION PROCESS IDENTIFIER

Table 5-1 shows the identifier used by the Space Packet Protocol (reference [6]) and how it is managed.

Table 5-1: Identifier Used by Space Packet Protocol

Identifier	Management Method	Note
Application Process Identifier (APID)	Managed by projects	See 5.2 for reserved values

5.2 RESERVED APPLICATION PROCESS IDENTIFIERS

Some values of the Application Process Identifier (APID) defined by the Space Packet Protocol (reference [6]) are reserved by CCSDS for special uses. Table 5-2 lists the APIDs currently reserved by CCSDS.

Table 5-2: Reserved Application Process Identifiers

APID (decimal)	Utilization	Reference
2040 - 2044	Reserved for possible future use	
2045	CFDP	[4]
2046	ISO 8473	[16]
2047	Idle Packet	[6]

(blank page)

6 IDENTIFIERS USED BY SCPS-NP

Table 6-1 shows the identifiers used by SCPS-NP (reference [7]) and how they are managed.

Table 6-1: Identifiers Used by SCPS-NP

Identifier	Management Method	Note
Domain Identifier (D-ID)	Assigned by CCSDS	See NOTE below the table
End System Identifier (ES-ID)	Managed by projects	No value is reserved
Path Identifier (P-ID)	Managed by projects	No value is reserved
Transport Protocol Identifier (TP-ID)	Defined by CCSDS	See table 3-2 of reference [7] for defined values

NOTE – No procedure is defined for assigning values of the Domain Identifier. If SCPS-NP is intended to be used globally, one must be developed.

(blank page)

7 IDENTIFIERS USED BY SPACE DATA LINK PROTOCOLS

7.1 GENERAL

Table 7-1 shows the identifiers used by the Space Data Link Protocols (references [8]-[10]) and Proximity-1 Space Link Protocol (reference [11]), and how they are managed.

Table 7-1: Identifiers Used by Space Data Link Protocols

Identifier	Used by	Management Method	Note
Transfer Frame Version Number	TM [8], TC [9], AOS [10], Prox [11]	Defined by CCSDS	See 7.2 for defined values
Spacecraft Identifier (SCID)	TM [8], TC [9], AOS [10], Prox [11]	Assigned by CCSDS	See reference [12] for assignment procedure
Virtual Channel Identifier (VCID)	TM [8], TC [9], AOS [10], Prox [11]	Managed by projects	See 7.3 for reserved values
Frame Secondary Header Version Number	TM [8]	Defined by CCSDS	See 7.4 for defined values
MAP Identifier (MAP ID)	TC [9]	Managed by projects	No value is reserved
Port Identifier (Port ID)	Prox [11]	Defined by CCSDS	See tables 7-8a and 7-8b for defined values
CLCW Version Number	TC [9]	Defined by CCSDS	See 7.5 for defined values
Packet Version Number	TM [8], TC [9], AOS [10], Prox [11]	Defined by CCSDS	See 7.6 for defined values
Protocol Identifier	Encapsulation Packet [13]	Defined by CCSDS	See 7.7 for defined values

7.2 DEFINED TRANSFER FRAME VERSION NUMBERS

In the Transfer Frames defined by the Space Data Link Protocols (references [8]-[10]) and Proximity-1 Space Link Protocol (reference [11]), there is a field called the Transfer Frame Version Number to identify the Transfer Frame. This is a two-bit field and its values are defined by CCSDS as part of the protocol specifications.

Table 7-2 lists the Transfer Frame Version Numbers currently defined by CCSDS.

Table 7-2: Defined Transfer Frame Version Numbers

Version Number	Binary Encoded Version Number	Transfer Frame	Reference
1	00	TM Transfer Frame	[8]
1	00	TC Transfer Frame	[9]
2	01	AOS Transfer Frame	[10]
3	10	Version 3 Transfer Frame	[11]

NOTES

1 Version Number '1' is assigned to both TM Transfer Frame and TC Transfer Frame. These two Transfer Frames are distinguished by the Attached Sync Marker defined in reference [14] or the Start Sequence defined in reference [15].

2 In the field of Transfer Frame Version Number in the Transfer Frames, the Binary Encoded Version Number listed above must be used.

7.3 RESERVED VIRTUAL CHANNEL IDENTIFIERS

A value of the Virtual Channel Identifier (VCID) is reserved by CCSDS for special use in the AOS Space Data Link Protocol (reference [10]). Table 7-3 lists the VCID currently reserved by CCSDS.

No value of VCID is reserved by CCSDS for the other Space Data Link Protocols.

Table 7-3: Reserved Virtual Channel Identifiers (AOS Space Data Link Protocol Only)

VCID (binary)	Utilization	Reference
111111	Idle Transfer Frames	[10]

7.4 DEFINED FRAME SECONDARY HEADER VERSION NUMBERS

In the optional Transfer Frame Secondary Header defined by the TM Space Data Link Protocol (reference [8]), there is a field called the Frame Secondary Header Version Number to identify the Transfer Frame Secondary Header. This is a two-bit field and its values are defined by CCSDS as part of the protocol specification.

Table 7-4 lists the Frame Secondary Header Version Number currently defined by CCSDS.

Table 7-4: Defined Frame Secondary Header Version Numbers

Version Number	Binary Encoded Version Number	Frame Secondary Header	Reference
1	00	Version 1 Frame Secondary Header	[8]

NOTE – In the field of Frame Secondary Header Version Number in the Transfer Frame Secondary Header, the Binary Encoded Version Number listed above must be used.

7.5 DEFINED CLCW VERSION NUMBERS

In the CLCW defined by the TC Space Data Link Protocol (reference [9]), there is a field called the CLCW Version Number to identify the CLCW. This is a two-bit field and its values are defined by CCSDS as part of the protocol specification.

Table 7-5 lists the CLCW Version Number currently defined by CCSDS.

Table 7-5: Defined CLCW Version Numbers

Version Number	Binary Encoded Version Number	CLCW	Reference
1	00	Version 1 CLCW	[9]

NOTE – In the field of CLCW Version Number in the CLCW, the Binary Encoded Version Number listed above must be used.

7.6 DEFINED PACKET VERSION NUMBERS

In the Packets carried by the Space Data Link Protocols, there is a field called the Packet Version Number to identify the Packets. This is a three-bit field (see NOTE 2 below) and its values are defined by CCSDS as part of the protocol specifications.

Table 7-6 lists the Packet Version Numbers currently defined by CCSDS.

Table 7-6: Defined Packet Version Numbers

Version Number	Binary Encoded Version Number	Packet	Reference
1	000	Space Packet	[6]
2	001	SCPS-NP	[7]
3	010 (See NOTE 2 below)	IP Version 4 Datagram	[17]
8	111	Encapsulation Packet	[13]

NOTES

1 In the field of Packet Version Number in the Packets, the Binary Encoded Version Number listed above must be used.

2 The version number field of the IP version 4 Packet has four bits and contains the binary values of '0100'. However, the CCSDS Space Data Link Protocols recognize only the first three bits of this field as the Packet Version Number.

7.7 PROTOCOL IDENTIFIERS

The Encapsulation Packet (reference [13]) is a data structure to encapsulate data units of some protocols so that they can be carried by a CCSDS Space Data Link Protocol. In the Encapsulation Packet, there is a field called the Protocol Identifier to identify the protocol whose data units are encapsulated. This is a three-bit field and its values are defined by CCSDS as part of the specification of the Encapsulation Packet.

When all of the values of the Protocol Identifier have been assigned, CCSDS has provided a mechanism for extending the Protocol Identifier: This is done by setting the Protocol Identifier field in the Encapsulation Packet header to '110', which signals that the 4-bit Extended Protocol ID field within the Encapsulation Packet header (see table 7-7b) is used to define the protocol encapsulated by the Encapsulation Packet.

Table 7-7a lists the Protocol Identifiers currently defined by CCSDS.

Table 7-7a: Defined Protocol Identifiers

Protocol Identifier (binary)	Protocol	Reference
000	Fill (no encapsulation data)	N/A
010	IP Version 4	[17]
011	CFDP	[4]
100	IP Version 6	[18]
110	Protocol Extension (signals the use of the Extended Protocol ID for Encapsulation Service	[13]
111	Arbitrary Aggregations of Octets	N/A

Table 7-7b lists the Extended Protocol Identifiers defined for the Encapsulation Service by CCSDS.

Table 7-7b: Extended Protocol Identifiers

Protocol Identifier (binary)	Protocol	Reference
0000 through 1111	Reserved by CCSDS	

7.8 RESERVED PROXIMITY-1 PORT IDENTIFIERS

The Proximity-1 Port Identifier (reference [11]) provides the means to route user data internally (at the transceiver's output interface) to specific logical ports, such as applications or transport processes, or to physical ports, such as on-board buses or physical connections (including hardware command decoders) on either the forward and/or return proximity links.

Table 7-8a: Proximity-1 Port ID Assignments for the Forward Link for Both Physical Channels

Port Identifier (binary)	Usage	Reference
000	Bitstream	N/A
001	Hardware Commands	N/A
010	Packets	[6], [7], [13], [17]
011	Reserved by CCSDS	N/A
100	Reserved by CCSDS	N/A
101	Reserved by CCSDS	N/A
110	Reserved by CCSDS	N/A
111	Reserved by CCSDS	N/A

Table 7-8b: Proximity-1 Port ID Assignments for the Return Link for Both Physical Channels

Port Identifier (binary)	Usage	Reference
000	Bitstream	N/A
001	Reserved by CCSDS	N/A
010	Packets	[6], [7], [13], [17]
011	Reserved by CCSDS	N/A
100	Reserved by CCSDS	N/A
101	Reserved by CCSDS	N/A
110	Reserved by CCSDS	N/A
111	Reserved by CCSDS	N/A

ANNEX A

ACRONYMS

(This annex **is not** part of the Recommendation)

This annex lists the acronyms used in this Recommendation.

AOS	Advanced Orbiting Systems
APID	Application Process Identifier
CCSDS	Consultative Committee for Space Data Systems
CFDP	CCSDS File Delivery Protocol
CLCW	Communications Link Control Word
D-ID	Domain Identifier
ES-ID	End System Identifier
ID	Identifier
IP	Internet Protocol
ISO	International Organization for Standardization
MAP	Multiplexer Access Point
N/A	Not Applicable
P-ID	Path Identifier
Prox	Proximity-1 Space Link Protocol
SCID	Spacecraft Identifier
SCPS	Space Communications Protocol Standards
SCPS-FP	Space Communications Protocol Standards File Protocol
SCPS-NP	Space Communications Protocol Standards Network Protocol
SCPS-SP	Space Communications Protocol Standards Security Protocol
SCPS-TP	Space Communications Protocol Standards Transport Protocol
TC	Telecommand
TM	Telemetry
TP-ID	Transport Protocol Identifier
VC	Virtual Channel
VCID	Virtual Channel Identifier

(blank page)

ANNEX B

INFORMATIVE REFERENCES

(This annex **is not** part of the Recommendation)

[B1] *Procedures Manual for the Consultative Committee for Space Data Systems*. CCSDS A00.0-Y-9. Yellow Book. Issue 9. Washington, D.C.: CCSDS, November 2003.

NOTE – Normative references are listed in 1.7.

(blank page)

ANNEX C

LOCATION OF PACKET LENGTH FIELD

(This annex **is not** part of the Recommendation)

Table C-1 summarizes the location of the length field of Packets for which Packet Version Numbers are defined by CCSDS.

NOTE – This information is used by the Space Data Link Protocols (reference [8]-[10]) and Proximity-1 Space Link protocol (reference [11]) to extract Packets from the Data Field of Transfer Frames.

Table C-1: Location of Packet Length Field

Version Number	Binary Encoded Version Number	Packet	Location of Length Field (See NOTE)	Interpretation of Length	Refer-ence
1	000	Space Packet	32-47	Binary count of number of octets in Packet Data Field minus 1. Must add 7 to get full packet length.	[6]
2	001	SCPS-NP	3-16	Binary count of total octets in Packet, including header. Shortest legal length is 4 (= 4 octets).	[7]
3	010	IP version 4	16-31	Binary count of total octets in Packet, including header.	[17]
8	111	Encapsulation Packet	8-15, 8-23, or 8-39	Binary count of total octets in Packet, including header.	[13]

NOTE – Counted in bits, from beginning of packet; first bit is numbered zero.

ICS 49.140
Price based on 22 pages