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Space data and information transfer systems — TC synchronization and channel coding

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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

ISO 22642

Second edition
2015-11-15

Space data and information transfer systems — TC synchronization and channel coding

Systèmes de transfert des données et informations spatiales — Synchronisation TC et codage de canal

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Foreword

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This International Standard cancels and replaces ISO 22642:2005 which has been technically revised. It also incorporates ISO 22642:2005/Cor.1:1997.

ISO 22642 was prepared by the Consultative Committee for Space Data Systems (CCSDS) (as CCSDS 231.0-B-2, September 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*.

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The Consultative Committee for Space Data Systems

Recommendation for Space Data System Standards

TC SYNCHRONIZATION AND CHANNEL CODING

RECOMMENDED STANDARD

CCSDS 231.0-B-2

BLUE BOOK

September 2010

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AUTHORITY

Issue:	Recommended Standard, Issue 2
Date:	September 2010
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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 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:

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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.

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FOREWORD

This document is a technical Recommended Standard for use in developing synchronization and channel coding systems and has been prepared by the Consultative Committee for Space Data Systems (CCSDS). The synchronization and channel coding concept described herein is intended for missions that are cross-supported between Agencies of the CCSDS.

This Recommended Standard establishes a common framework and provides a common basis for the synchronization and channel coding schemes to be used by space missions with the TC Space Data Link Protocol (reference [1]) over ground-to-space and space-to-space communications links. This Recommended Standard was developed from an older CCSDS Recommended Standard (reference [C2]), which defines essentially the same schemes but in a slightly different context.

This Recommended Standard does not change the major technical content defined in reference [C2], but the presentation of the specification has been changed so that:

a) these schemes can be used to transfer any data over any space link in either direction;

b) all CCSDS space link protocols are specified in a unified manner;

c) the layered model matches the Open Systems Interconnection (OSI) Basic Reference Model (reference [2]).

Together with the change in presentation, a few technical specifications in reference [C2] have been changed in order to define all Space Data Link Protocols in a unified way. Also, some technical terms in reference [C2] have been changed in order to unify the terminology used in all the CCSDS Recommended Standards that define space link protocols and to define these schemes as general communications schemes. These changes are listed in annex D of this Recommended Standard.

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:

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DOCUMENT CONTROL

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CCSDS 231.0-B-1	TC Synchronization and Channel Coding, Issue 1	September 2003	Original Issue
CCSDS 231.0-B-2	TC Synchronization and Channel Coding, Recommended Standard, Issue 2	September 2010	Current issue: – adds an option for repeated transmissions of Transfer Frames (note).

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

The purpose of this Recommended Standard is to specify synchronization and channel coding schemes used with the Telecommand (TC) Space Data Link Protocol (reference [1]). These schemes are to be used over ground-to-space or space-to-space communications links by space missions.

1.2 SCOPE

This Recommended Standard defines synchronization and channel coding schemes in terms of:

a) the services provided to the users of this specification;

b) data formats; and

c)

It does not specify:

a) individual implementations or products;

b) the methods or technologies required to perform the procedures; or

c) the management activities required to configure and control the system.

1.3 APPLICABILITY

This Recommended Standard applies to the creation of Agency standards and to the future data communications over space links between CCSDS Agencies in cross-support situations. This Recommended Standard includes comprehensive specification of the data formats and procedures for inter-Agency cross support. It is neither a specification of, nor a design for, real systems that may be implemented for existing or future missions.

The Recommended Standard specified in this document is to be invoked through the normal standards programs of each CCSDS Agency, and is applicable to those missions for which cross support, based on capabilities described in this Recommended Standard, is anticipated. Where mandatory capabilities are clearly indicated in sections of this Recommended Standard, they must be implemented when this document is used as a basis for cross support. Where options are allowed or implied, implementation of these options is subject to specific bilateral cross support agreements between the Agencies involved.

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