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**Space data and information transfer  
systems — Proximity-1 space link  
protocol — Data link layer**

*Systèmes de transfert des informations et données spatiales —  
Protocole pour liaisons spatiales de proximité 1 — Couche de liaisons  
de données*

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ISO 22663 was prepared by the Consultative Committee for Space Data Systems (CCSDS) (as CCSDS 211.0-B-5, December 2013) 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 of ISO 22663:2015 cancels and replaces the second edition (ISO 22663:2007), which has been technically revised.

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## **Recommendation for Space Data System Standards**

# **PROXIMITY-1 SPACE LINK PROTOCOL— DATA LINK LAYER**

**RECOMMENDED STANDARD**

**CCSDS 211.0-B-5**

**BLUE BOOK**  
**December 2013**

## AUTHORITY

|           |                               |
|-----------|-------------------------------|
| Issue:    | Recommended Standard, Issue 5 |
| Date:     | December 2013                 |
| 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 *Organization and Processes for the Consultative Committee for Space Data Systems* (CCSDS A02.1-Y-3), 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

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## DOCUMENT CONTROL

| Document           | Title                                                                                 | Date             | Status                                                                                                                                                                                                                                                                           |
|--------------------|---------------------------------------------------------------------------------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CCSDS<br>211.0-B-1 | Proximity-1 Space Link Protocol                                                       | October<br>2002  | Original issue,<br>superseded                                                                                                                                                                                                                                                    |
| CCSDS<br>211.0-B-2 | Proximity-1 Space Link Protocol—<br>Data Link Layer                                   | April 2003       | Superseded                                                                                                                                                                                                                                                                       |
| CCSDS<br>211.0-B-3 | Proximity-1 Space Link Protocol—<br>Data Link Layer                                   | May 2004         | Superseded                                                                                                                                                                                                                                                                       |
| CCSDS<br>211.0-B-4 | Proximity-1 Space Link Protocol—<br>Data Link Layer, Recommended<br>Standard, Issue 4 | July 2006        | Superseded                                                                                                                                                                                                                                                                       |
| CCSDS<br>211.0-B-5 | Proximity-1 Space Link Protocol—<br>Data Link Layer, Recommended<br>Standard, Issue 5 | December<br>2013 | Current issue:<br><br>This update includes<br>several improvements and<br>clarifications—<br>accomplishing better<br>alignment and<br>consistency with the other<br>Proximity-1 Blue<br>Books—and the addition<br>of an option for Low-<br>Density Parity-Check<br>(LDPC) codes. |

NOTE – Changes from the previous issue are too numerous to permit markup.

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# 1 INTRODUCTION

## 1.1 PURPOSE

The purpose of this Recommended Standard is to specify the Data Link Layer used with the Proximity-1 Data Link Coding and Synchronization Sublayer (reference [5]) and Physical Layer (reference [6]). Proximity space links are defined to be short-range, bi-directional, fixed or mobile radio links, generally used to communicate among probes, landers, rovers, orbiting constellations, and orbiting relays. These links are characterized by short time delays, moderate (not weak) signals, and short, independent sessions.

## 1.2 SCOPE

This Recommended Standard defines the Data Link Layer (Framing, Medium Access Control, Data Services, and Input/Output [I/O] Sublayers). The specifications for the protocol data units, framing, media access control, expedited and sequenced-controlled data transfer, timing service, I/O control, and the procedures for establishing and terminating a session between a caller and responder are defined in this document. The Coding and Synchronization Sublayer is defined in the separate CCSDS Recommended Standard entitled, *Proximity-1 Space Link Protocol—Coding and Synchronization Sublayer* (reference [5]). The Physical Layer is defined in the separate CCSDS Recommended Standard entitled, *Proximity-1 Space Link Protocol—Physical Layer* (reference [6]).

This Recommended Standard does not specify a) individual implementations or products, b) implementation of service interfaces within real systems, c) the methods or technologies required to perform the procedures, or d) the management activities required to configure and control the protocol.

## 1.3 APPLICABILITY

This Recommended Standard applies to the creation of Agency standards and to future data communications over space links between CCSDS Agencies in cross-support situations. It applies also to internal Agency links where no cross support is required. It includes specification of the services and protocols for inter-Agency cross support. It is neither a specification of, nor a design for, 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.