INTERNATIONAL STANDARD

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Space data and information transfer systems — XML specification for navigation data messages

Systèmes de transfert des informations et données spatiales — Spécifications XML pour les messages de données de navigation

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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 17107 was prepared by the Consultative Committee for Space Data Systems (CCSDS) as CCSDS 505.0-B-1, December 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*.

Space data and information transfer systems — XML specification for navigation data messages

1 Scope

This International Standard specifies a format for use in exchanging spacecraft navigation data. Such exchanges are used for distributing attitude, orbit, and tracking data between space agencies. This International Standard specifies an integrated Extensible Markup Language (XML) schema set that applies to Navigation Data Messages (NDMs) defined in the CCSDS Recommended Standards for Attitude Data Messages (ADM), Orbit Data Messages (ODM), and Tracking Data Message (TDM).

This XML schema set is suited to inter-agency exchanges of any number of NDMs (ADM, ODM, and/or TDM).

This International Standard is applicable only to the schema content and layout, and to instantiations of the schema, but not to the transmission of any instantiation of the schema. The potential for compression/decompression of the message is an aspect of the transmission that is not part of this specification. The means of transmission of an XML-formatted NDM between agencies is beyond the scope of this International Standard; such arrangements require specification via other means, for example, in an Interface Control Document (ICD).

The scope and field of application are furthermore detailed in subclauses 1.2 to 1.4 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 505.0-B-1, December 2010, *XML Specification for Navigation Data Messages*.

For the purposes of international standardization, the modifications outlined below shall apply to the specific clauses and paragraphs of publication CCSDS 505.0-B-1.

Pages i to vi

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

Page 1-3

Add the following information to the reference indicated:

[1] Document CCSDS 504.0-B-1, May 2008, is equivalent to ISO 13541:2010.

[2] Document CCSDS 502.0-B-2, November 2009, is equivalent to ISO 26900:—[1)].

[3] Document CCSDS 503.0-B-1, November 2007, is equivalent to ISO 13526:2010.

1) To be published.

3 Revision of publication CCSDS 505.0-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 505.0-B-1. 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

XML SPECIFICATION FOR NAVIGATION DATA MESSAGES

RECOMMENDED STANDARD

CCSDS 505.0-B-1

BLUE BOOK
December 2010

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XML SPECIFICATION FOR NAVIGATION DATA MESSAGES

AUTHORITY

Issue:	Recommended Standard, Issue 1
Date:	December 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

XML SPECIFICATION FOR NAVIGATION DATA MESSAGES

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 Recommended Standard for an XML Specification for Navigation Data Messages (Orbit Data Messages, Attitude Data Messages, Tracking Data Messages). This Recommended Standard has been developed via consensus of the Navigation Working Group of the CCSDS Mission Operations and Information Management Services (MOIMS) area. The XML schema set described in this Recommended Standard represents the baseline concept for exchanging navigation data in XML format between Agencies of the CCSDS.

This Recommended Standard establishes a common framework and provides a common basis for the interchange of navigation data in XML format. It allows implementing organizations within each Agency to proceed coherently with the development of compatible derived standards for the flight and ground systems that are within their cognizance. Derived Agency standards may implement only a subset of the optional features allowed by the Recommended Standard and may incorporate features not addressed by 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:

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.

XML SPECIFICATION FOR NAVIGATION DATA MESSAGES

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.
- Federal Space Agency (FSA)/Russian Federation.
- UK Space Agency/United Kingdom.

Observer Agencies

- Austrian Space Agency (ASA)/Austria.
- Belgian Federal Science Policy Office (BFSPO)/Belgium.
- Central Research Institute of Machine Building (TsNIIMash)/Russian Federation.
- China Satellite Launch and Tracking Control General, Beijing Institute of Tracking and Telecommunications Technology (CLTC/BITTT)/China.
- Chinese Academy of Sciences (CAS)/China.
- Chinese Academy of Space Technology (CAST)/China.
- Commonwealth Scientific and Industrial Research Organization (CSIRO)/Australia.
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- 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.

XML SPECIFICATION FOR NAVIGATION DATA MESSAGES

DOCUMENT CONTROL

Document	Title	Date	Status
CCSDS 505.0-B-1	XML Specification for Navigation Data Messages, Recommended Standard, Issue 1	December 2010	Current issue

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