

## Specification for CCSDS Documentation Style

# CCSDS PUBLICATIONS MANUAL

**CCSDS RECORD**

**CCSDS A20.0-Y-4**

Note:  
This current  
issue includes  
all updates through  
Corrigendum 1,  
dated February 2015

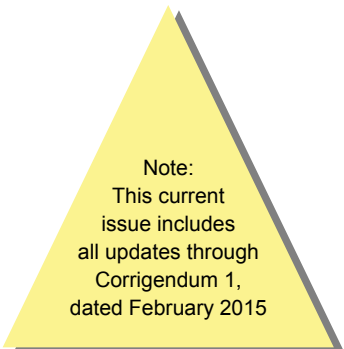
**YELLOW BOOK**  
April 2014

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April 2014

## AUTHORITY

Issue:	CCSDS Record, Issue 4
Date:	April 2014
Location:	Washington, DC, USA

This document has been approved for publication by the Management Council of the Consultative Committee for Space Data Systems (CCSDS). 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-4).

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

## FOREWORD

The CCSDS Publications Manual defines a set of style specifications intended to standardize the appearance and format of CCSDS publications.

The CCSDS Publications Manual is intended to serve as both a guide for CCSDS document developers and an editorial Manual for publishers of CCSDS Documents.

Through the process of normal evolution, it is expected that expansion, deletion, or modification of this document may occur. This Manual is therefore subject to CCSDS document management and change control procedures which are defined in *Organization and Processes for the Consultative Committee for Space Data Systems*, CCSDS A02.1-Y-4.

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 (DLR)/Germany.
- European Space Agency (ESA)/Europe.
- Federal Space Agency (FSA)/Russian Federation.
- Instituto Nacional de Pesquisas Espaciais (INPE)/Brazil.
- Japan Aerospace Exploration Agency (JAXA)/Japan.
- National Aeronautics and Space Administration (NASA)/USA.
- UK Space Agency/United Kingdom.

#### Observer Agencies

- Austrian Space Agency (ASA)/Austria.
- Belgian Federal Science Policy Office (BFSPPO)/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.
- Danish National Space Center (DNSC)/Denmark.
- Departamento de Ciência e Tecnologia Aeroespacial (DCTA)/Brazil.
- European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)/Europe.
- European Telecommunications Satellite Organization (EUTELSAT)/Europe.
- Geo-Informatics and Space Technology Development Agency (GISTDA)/Thailand.
- 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.
- Ministry of Communications (MOC)/Israel.
- National Institute of Information and Communications Technology (NICT)/Japan.
- National Oceanic and Atmospheric Administration (NOAA)/USA.
- National Space Agency of the Republic of Kazakhstan (NSARK)/Kazakhstan.
- National Space Organization (NSPO)/Chinese Taipei.
- Naval Center for Space Technology (NCST)/USA.
- Scientific and Technological Research Council of Turkey (TUBITAK)/Turkey.
- South African National Space Agency (SANSA)/Republic of South Africa.
- Space and Upper Atmosphere Research Commission (SUPARCO)/Pakistan.
- Swedish Space Corporation (SSC)/Sweden.
- Swiss Space Office (SSO)/Switzerland.
- United States Geological Survey (USGS)/USA.

**DOCUMENT CONTROL**

<b>Document</b>	<b>Title</b>	<b>Date</b>	<b>Status</b>
CCSDS A20.0-Y-1	CCSDS Publications Manual	May 1994	Original Issue (superseded)
CCSDS A20.0-Y-2	CCSDS Publications Manual	June 2005	Issue 2 (superseded)
CCSDS A20.0-Y-3	CCSDS Publications Manual, Issue 3	December 2011	Issue 3 (superseded)
CCSDS A20.0-Y-4	CCSDS Publications Manual, Issue 4	April 2014	Current issue: <ul style="list-style-type: none"> <li>– adds material indicated by CCSDS A02.1-Y-4, Organization and Processes for the Consultative Committee for Space Data Systems (Yellow Book, Issue 4, April 2014);</li> <li>– clarifies format for definitions;</li> <li>– replaces reference to ISO 31 with reference to BIPM specification for SI Units;</li> <li>– updates references format specification to be consistent for all document types.</li> </ul>
CCSDS A20.0-Y-4 Cor. 1	Corrigendum 1	February 2015	Modifies boilerplate text concerning patent rights.

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## **1 INTRODUCTION**

### **1.1 PURPOSE**

This Publications Manual is a guide for the preparation of documents published by the Consultative Committee for Space Data Systems (CCSDS). It specifies rules for preparing and publishing CCSDS documents in order to achieve uniformity of appearance and presentation among these documents.

### **1.2 SCOPE**

The organization, format, editorial style, page layout, and physical characteristics of CCSDS documents are defined by this Manual.

### **1.3 APPLICABILITY**

The contents of this Manual are the specifications that authors and editors apply during the preparation and printing of all documents published by CCSDS. Books published prior to adoption of this Manual will be edited to conform to its specifications whenever their next major revision takes place. Revisions of existing CCSDS documents will not be initiated for the sole purpose of achieving conformity.

Developers of draft CCSDS documents are encouraged to plan their documents to ensure that document organization, subordination structure, and general style are not in conflict with the specifications of this Manual. Adherence to the specifications of this Manual will ensure smooth transition of developmental drafts to published documents.

### **1.4 RATIONALE**

The CCSDS believes that it is important for documents published by the CCSDS to be consistent in content, appearance, and presentation. The contents of this Manual define styles that will enable editors to prepare and publish CCSDS documents that are consistent in content, appearance, and presentation.

### **1.5 DOCUMENT STRUCTURE**

All document specifications are contained in sections 3, 4, 5, and 6 of this Manual. Each specification is identified by a subsection number or a combination of a subsection number and list item number.

The responsibilities of the CCSDS Technical Editor and Document Editor are defined in annex A.

Comments in the form of notes and figures have been inserted to clarify the specifications.

## 1.6 DEFINITIONS

### 1.6.1 TERMS

For the purposes of this Manual, the following definitions apply:

**back matter:** The annexes and index of a document.

**front matter:** The title, Authority, Statement of Intent, foreword, document control, and table of contents of a document.

**section:** A primary division within the main text of a document.

**terse style:** Style of specification in which normal text is limited to concise statements of requirements. Discussions concerning rationale, background, and other ancillary topics are constrained to be brief and are set off from normal text, usually in a note, or sometimes in a subsection that is clearly labeled as being non-normative.

**title capitalization:** Style of capitalization in which, for a group of words, the first word and last word and all nouns, pronouns, adjectives, verbs, adverbs, and subordinate conjunctions have initial capitalization. Articles, coordinate conjunctions, and prepositions are lowercase, regardless of their length, unless they are the first or last word of the phrase.

### 1.6.2 NOMENCLATURE

#### 1.6.2.1 Normative Text

The following conventions apply for the normative specifications in this Manual:

- a) the words ‘shall’ and ‘must’ imply a binding and verifiable specification;
- b) the word ‘should’ implies an optional, but desirable, specification;
- c) the word ‘may’ implies an optional specification;
- d) the words ‘is’, ‘are’, and ‘will’ imply statements of fact.

NOTE – These conventions do not imply constraints on diction in text that is clearly informative in nature.

#### 1.6.2.2 Informative Text

In the normative sections of this document (sections 3-6 and annexes A-B), informative text is set off from the normative specifications either in notes or under one of the following subsection headings:

- Overview;

- Background;
- Rationale;
- Discussion.

### 1.6.3 CONVENTIONS

In this document,

- a) braces ({} ) indicate that the term within the braces is a variable that should be replaced, **along with the enclosing braces**, by a value within a given range;
- b) detailed specifications for specific kinds of CCSDS documents (e.g., Recommended Standards) may not be applicable to other kinds of CCSDS documents but may be used where appropriate;
- c) in discussions of subordination, sections are understood to be at level one, and subsections therefore begin at level two: ‘1.1’ identifies a level-two subsection, ‘1.6.3’ identifies a level-three subsection, etc.

## 1.7 REFERENCES

The following documents contain provisions which, through reference in this text, constitute provisions of this Manual. At the time of publication, the editions indicated were valid. All documents are subject to revision, and users of this Manual 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 Recommended Standards.

- [1] *Space Assigned Numbers Authority (SANA)—Role, Responsibilities, Policies, and Procedures*. Issue 1. CCSDS Record (Yellow Book), CCSDS 313.0-Y-1. Washington, D.C.: CCSDS, July 2011.
- [2] *Pantone Color Tint Selector*. Carlstadt, NJ: Pantone, 2000.
- [3] *Webster’s New Collegiate Dictionary*. Springfield, Mass.: G & C Merriam, latest edition.
- [4] *The Shorter Oxford English Dictionary*. Oxford: Clarendon, latest edition.
- [5] *The International System of Units (SI)*. 8th ed. Sèvres, France: BIPM, 2006.
- [6] *CCSDS Implementation Conformance Statements*. Issue 1. CCSDS Record (Yellow Book), CCSDS A20.1-Y-1. Washington, D.C.: CCSDS, April 2014.

## **2 OVERVIEW**

### **2.1 GENERAL**

This Publications Manual provides the CCSDS Technical Editors and Document Editors with the specifications needed to prepare and publish CCSDS documents that are consistent in content, appearance, and presentation. This Manual should be used when preparing drafts in order to minimize changes at time of publication.

This Manual conforms to the structure and format it defines.

### **2.2 CONTENT, APPEARANCE, AND PRESENTATION**

This Manual defines the following document elements:

- a) front cover;
- b) front matter;
- c) main text;
- d) back matter.

### 3 CONTENTS OF CCSDS BOOKS

#### 3.1 GENERAL

CCSDS documents shall contain the following elements, except as noted, in the order listed:

- a) front cover;
- b) front matter:
  - 1) title page,
  - 2) dedication—used only on instruction from CCSDS Management Council,
  - 3) Authority page,
  - 4) Statement of Intent page—normative-track documents only,
  - 5) foreword,
  - 6) preface—required for drafts of normative-track documents and for Experimental Specifications,
  - 7) document control,
  - 8) table of contents;
- c) main text:
  - 1) introduction, made up of the following subsections, in the order shown:
    - purpose,
    - scope,
    - applicability,
    - rationale,
    - document structure,
    - definitions — if needed,
    - patented technologies — if needed,
    - references — if needed;
  - 2) overview;
  - 3) technical specifications;
- d) back matter — if needed:
  - 1) normative annexes (normative-track documents only) — as many as needed,
  - 2) informative annexes — as many as needed,
  - 3) index — if needed.

## 3.2 FRONT COVER CONTENTS

### 3.2.1 GENERAL

The front cover contents that shall not be changed without Management Council authority are:

- a) the CCSDS logo;
- b) the series name.

Additionally, restrictions are placed on the title and issue data displayed on the cover.

### 3.2.2 SERIES NAME

Series names are defined for the following CCSDS document types:

- a) for Recommended Standards:

**Recommendation for Space Data System Standards**

- b) for Informational Reports:

**Report Concerning Space Data System Standards**

- c) for Experimental Specifications:

**Research and Development for Space Data Systems**

- d) for Recommended Practices:

**Recommendation for Space Data System Practices**

### 3.2.3 TITLE

The document title shall concisely identify the subject of the document.

### 3.2.4 DOCUMENT IDENTIFICATION

#### 3.2.4.1 General

The document identification data displayed on the covers of CCSDS documents shall conform to the specifications of 3.2.4.2–3.2.4.4 (refer to figure 6-2 for the layout and format of document identification data).

### 3.2.4.2 Document Number

The document number shall appear on the cover in the form

CCSDS {number}-{letter}-{issue}

where

number	is the document number supplied by the CCSDS Secretariat;
letter	is the uppercase first letter of the book color;
issue	is the issue number.

NOTE – The issue number shall be determined by the CCSDS Secretariat.

### 3.2.4.3 Book Color

If a book color is explicitly indicated, it shall appear on the cover in the form

{COLOR} BOOK

where COLOR is a valid CCSDS book color corresponding to the document type.

### 3.2.4.4 Issue Date

The issue date shall appear on the cover in the form

{Mmmm YYYY}

where

Mmmm	is the full name of the month;
YYYY	is the four-digit year.

NOTE – The issue date indicates the month and year of CCSDS Management Council approval to publish the document.

## 3.2.5 CCSDS LOGO

The position, size, and appearance of the CCSDS logo are fixed (see figure 6-2).

## 3.3 FRONT MATTER CONTENTS

### 3.3.1 TITLE PAGE

The title page shall be identical in layout and content to the front cover.

**3.3.2 DEDICATION PAGE**

**3.3.2.1** A dedication page shall not be included except at the explicit instruction of the CCSDS Management Council.

**3.3.2.2** If a dedication page is included, its contents shall be text supplied by the CCSDS Management Council.

**3.3.3 AUTHORITY PAGE**

**3.3.3.1** An Authority page shall be included in all documents approved for publication by the CCSDS Management Council.

**3.3.3.2** The parts of the Authority page are

- the Authority text box;
- the statement of authorization;
- the address of the CCSDS Secretariat.

NOTE – An example of a Recommended Standard Authority page is shown in figure 3-1.

**3.3.3.3 Authority Page Text Box**

Authority information shall be entered in a fixed-format text box as follows:

Issue:	{Issue}
Date:	{Approval Date}
Location:	{Location}

where

Issue	is a phrase identifying the document type, either by type name or by color (e.g., ‘Recommended Standard’ and ‘Blue Book’ are synonymous), and the current issue;
Approval Date	is the date of the Management Council approval of the document in the form of ‘Month Year’;
Location	If the document has been approved at a CCSDS Management Council meeting, then the location of the meeting is specified; otherwise, the current location of the CCSDS Secretariat is specified.



CCSDS RECOMMENDED STANDARD FOR CONJUNCTION DATA MESSAGES

**AUTHORITY**

Issue:	Recommended Standard, Issue 1
Date:	June 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

**Figure 3-1: Example of Authority Page**

### 3.3.3.4 Statement of Authorization

#### 3.3.3.4.1 The statement of authorization for normative-track documents shall be

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-4), and the record of Agency participation in the authorization of this document can be obtained from the CCSDS Secretariat at the address below.

#### 3.3.3.4.2 The statement of authorization for technical reports shall be

This document has been approved for publication by the Management Council of the Consultative Committee for Space Data Systems (CCSDS) and reflects the consensus of technical experts from 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-4).

#### 3.3.3.4.3 The statement of authorization for CCSDS Records and Experimental Specifications shall be

This document has been approved for publication by the Management Council of the Consultative Committee for Space Data Systems (CCSDS). 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-4).

### 3.3.3.5 Secretariat Address

For all documents containing an Authority page, the current address of the CCSDS Secretariat, and the phrase used to introduce it, shall be:

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

NOTE – The address of the CCSDS Secretariat changes periodically. It is the responsibility of the Document Editor to ensure that the correct current address is used (see annex A).

### 3.3.4 STATEMENT OF INTENT PAGE

The Statement of Intent page shall be used only in normative-track documents. The text for the Statement of Intent is provided by the Management Council and may be changed only by Management Council action. The exact text of the Statement of Intent is shown in figures 3-2 and 3-3.

**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:

- o 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.
- o 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.
- o 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.

**Figure 3-2: Recommended Standard Statement of Intent Text**

## 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 Recommendations and are not in themselves considered binding on any Agency.

CCSDS Recommendations take two forms: Recommended Standards that are prescriptive and are the formal vehicles by which CCSDS Agencies create the standards that specify how elements of their space mission support infrastructure shall operate and interoperate with others; and Recommended Practices that are more descriptive in nature and are intended to provide general guidance about how to approach a particular problem associated with space mission support. This Recommended Practice is issued by, and represents the consensus of, the CCSDS members. Endorsement of this Recommended Practice is entirely voluntary and does not imply a commitment by any Agency or organization to implement its recommendations in a prescriptive sense.

No later than five years from its date of issuance, this Recommended Practice 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 Practice is issued, existing CCSDS-related member Practices and implementations are not negated or deemed to be non-CCSDS compatible. It is the responsibility of each member to determine when such Practices or implementations are to be modified. Each member is, however, strongly encouraged to direct planning for its new Practices and implementations towards the later version of the Recommended Practice.

**Figure 3-3: Recommended Practice Statement of Intent Text**

### 3.3.5 FOREWORD

#### 3.3.5.1 Technical Content

The intended use and audience for the document shall be identified in the foreword.

NOTE – It is the responsibility of the Technical Editor to provide the technical content of the foreword (see annex A).

#### 3.3.5.2 Boilerplate

**3.3.5.2.1** In Recommended Standards and Experimental Specifications to which no patent rights are known to appertain, the following patent rights disclaimer text shall follow the technical content of the foreword:

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CCSDS has processes for identifying patent issues and for securing from the patent holder agreement that all licensing policies are reasonable and non-discriminatory. However, CCSDS does not have a patent law staff, and CCSDS shall not be held responsible for identifying any or all such patent rights.

**3.3.5.2.2** For all documents, the following boilerplate text shall follow the technical content of the foreword and, if present, the patent rights disclaimer (3.3.5.2.1):

Through the process of normal evolution, it is expected that expansion, deletion, or modification of this document may occur. This document is therefore subject to CCSDS document management and change control procedures which are defined in *Organization and Processes for the Consultative Committee for Space Data Systems* (CCSDS A02.1-Y-4). 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.

**3.3.5.2.3** On the next page following the text of the foreword, an up-to-date list of CCSDS Member and Observer Agencies shall be included.

#### NOTES

- 1 The list of CCSDS Member and Observer Agencies is the final part of the foreword.
- 2 It is the responsibility of the Document Editor to provide the boilerplate text and list of Agencies (see annex A).

#### **3.3.5.3 Content Limitations**

In CCSDS documents, **no reference** shall be made to any persons or corporations involved in the document-development process, regardless of any individual's particular contribution.

#### **3.3.6 PREFACE**

**3.3.6.1** A preface shall be included in

- a) all draft CCSDS Recommended Standards;
- b) all draft CCSDS Recommended Practices;
- c) all CCSDS Experimental Specifications.

**3.3.6.2** The text of the preface for draft CCSDS Recommended Standards shall be:

This document is a draft CCSDS Recommended Standard. Its ‘Red Book’ status indicates that the CCSDS believes the document to be technically mature and has released it for formal review by appropriate technical organizations. As such, its technical contents are not stable, and several iterations of it may occur in response to comments received during the review process.

Implementers are cautioned **not** to fabricate any final equipment in accordance with this document’s technical content.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**3.3.6.3** The text of the preface for draft CCSDS Recommended Practices shall be:

This document is a draft CCSDS Recommended Practice. Its ‘Red Book’ status indicates that the CCSDS believes the document to be technically mature and has released it for formal review by appropriate technical organizations. As such, its technical contents are not stable, and several iterations of it may occur in response to comments received during the review process.

Implementers are cautioned not to fabricate any final equipment in accordance with this document’s technical content.

**3.3.6.4** The text of the preface for CCSDS Experimental Specifications shall be:

This document is a CCSDS Experimental Specification. Its Experimental status indicates that it is part of a research or development effort based on prospective requirements, and as such it is not considered a Standards Track document. Experimental Recommendations are intended to demonstrate technical feasibility in anticipation of a ‘hard’ requirement that has not yet emerged. Experimental work may be rapidly transferred onto the Standards Track should a hard requirement emerge in the future.

**3.3.6.5** A preface is not normally included in final publications but may be included to provide issue-specific information.

**3.3.7 DOCUMENT CONTROL**

**3.3.7.1** The document control section shall contain a history of the published issues of the document (see figure 3-4).

**3.3.7.2** The following entries shall be made for **each issue** of the book, including the current issue:

- a) document number;
- b) title and issue;
- c) issue date;
- d) a summary of changes; if appropriate, changes shall be listed in two categories:
  - changes not compatible with the previous issue; and
  - changes compatible with the previous issue.

**3.3.7.3** Final publications shall not record draft issues on the document control page.

**3.3.7.4** Substantive changes in the text of the current book from those in the previous issue shall be identified by change bars in the margin, unless changes are so extensive that use of change bars would be prohibited.

NOTE – The Technical Editor is responsible for ensuring that these document control functions are implemented (see annex A).

### **3.3.8 TABLE OF CONTENTS**

The table of contents shall list the following document elements, along with the page number on which they appear, in the following order:

- a) main section headings and level-two subordinate headings (level-three subordinate headings may be listed if sufficient rationale exists to include them);
- b) annex main headings;
- c) index;
- d) figures;
- e) tables.

CCSDS RECOMMENDATION FOR TELECOMMAND: CHANNEL SERVICE

**DOCUMENT CONTROL**

<b>Document</b>	<b>Title and Issue</b>	<b>Date</b>	<b>Status</b>
CCSDS 201.0-B-1	Telecommand Part 1— Channel Service, Issue 1	January 1987	Original Issue
CCSDS 201.0-B-2	Telecommand Part 1— Channel Service, Issue 2	November 1995	Superseded <ul style="list-style-type: none"> <li>– the Tail Sequence was replaced with a new, more distinctive pattern, which is more reliably recognized at the end of a CLTU;</li> <li>– an option was added for randomizing the Telecommand data to increase bit transitions, for those command systems that require frequent bit transitions to maintain reliable bit synchronization;</li> <li>– minor format changes were made based on specifications of the CCSDS Publications Manual.</li> </ul>
CCSDS 201.0-B-3	Telecommand Part 1— Channel Service, Issue 3	June 2000	Current Issue <ul style="list-style-type: none"> <li>– codeblock length options have been eliminated in favor of a single standard length of 64 bits (the longest and most efficient of the options specified in the previous issue).</li> </ul>

NOTE – Substantive changes from the previous issue are indicated with change bars in the outside margin.

**Figure 3-4: Example of CCSDS Document Control Page**



## **3.4 MAIN TEXT CONTENTS**

### **3.4.1 DOCUMENT INTRODUCTION**

#### **3.4.1.1 General**

The introduction of the document shall identify and define the document, present conventions used in and definitions specific to the document, and provide a list of referenced documents. The introduction shall contain some or all of the following subsections in the given order.

NOTE – Not all subsections are required for a given document.

#### **3.4.1.2 Purpose and Scope Subsections**

**3.4.1.2.1** The statements of purpose and scope shall respectively identify the purpose of the document and define the area to which it applies. There is no prescribed text for these elements. The only requirement is that purpose and scope be stated concisely at the beginning of the document.

**3.4.1.2.2** The purpose and scope subsections may be merged into a single subsection entitled 'PURPOSE AND SCOPE' if appropriate.

#### **3.4.1.3 Applicability**

An applicability subsection is required for CCSDS normative-track documents and shall define the implementations to which the document applies. There is no prescribed text for this subsection.

#### **3.4.1.4 Rationale**

A rationale subsection should be included in CCSDS normative-track documents. The rationale subsection shall outline the reasons the book, or a new issue, was published. There is no prescribed text for this subsection.

#### **3.4.1.5 Document Structure**

A document structure subsection is recommended for all CCSDS documents. If included it shall outline the structure of the document and briefly identify the contents of each section and annex. There is no prescribed text for this subsection.

### 3.4.1.6 Definitions

**3.4.1.6.1 Terms.** Terms specific to the document shall be listed.

- a) The term being defined shall
  - be positioned on the left margin;
  - be set in boldface type;
  - have the same case as when used normally in text;
  - be followed by a colon.
- b) If the term has an abbreviated form, the abbreviation shall
  - be positioned following term, separated by a comma, before the colon introducing the definition;
  - be set in boldface type;
  - have the same case as when used normally in text.

NOTE – The style specified in 5.3.3.5 for calling out acronyms and abbreviations does not apply with abbreviations of formally defined terms.

- c) The principal definition of the term shall
  - begin on the same line as the term, following the colon and trailing white space;
  - be expressed as a phrase in the same grammatical form as the term (i.e., as the same part of speech);
  - be terminated with a period.
- d) Additional normative qualifying statements, if needed, shall
  - be placed, without break, after the principal definition;
  - be phrased as complete sentences terminated by periods.
- e) Informative statements related to a term or its definition, if needed, shall be rendered as notes on the next line following the respective term and definition.
- f) The text used to introduce the list of terms shall be:

“For the purposes of this document, the following definitions apply.”

**3.4.1.6.2 Nomenclature.** The nomenclature subsection shall identify any specific linguistic usages that apply in the document. For normative-track documents, the following boilerplate text shall be placed in this subsection:

## 1.{n} NOMENCLATURE

### 1.{n}.1 NORMATIVE TEXT

The following conventions apply for the normative specifications in this document:

- a) the words ‘shall’ and ‘must’ imply a binding and verifiable specification;
- b) the word ‘should’ implies an optional, but desirable, specification;
- c) the word ‘may’ implies an optional specification;
- d) the words ‘is’, ‘are’, and ‘will’ imply statements of fact.

NOTE – These conventions do not imply constraints on diction in text that is clearly informative in nature.

### 1.{n}.2 INFORMATIVE TEXT

In the normative sections of this document, informative text is set off from the normative specifications either in notes or under one of the following subsection headings:

- Overview;
- Background;
- Rationale;
- Discussion.

**3.4.1.6.3 Conventions.** If appropriate, a short list of conventions used in the text of the document shall be included in a conventions subsection.

### **3.4.1.7 Patented Technologies**

In Recommended Standards and Experimental Specifications that contain specifications that are known to be subject to patent rights, a Patented Technologies subsection containing the following text shall be included:

The Consultative Committee on Space Data Systems (CCSDS) draws attention to the fact that it is claimed that compliance with this document may involve the use of a patent concerning {subject matter} given in {subsection}.

The CCSDS takes no position concerning the evidence, validity, and scope of these patent rights.

The holders of these patent rights have assured the CCSDS that they are willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with CCSDS. Information can be obtained from the CCSDS Secretariat at the address indicated on page i. Contact information for the holders of these patent rights is provided in {Security, SANA, and Patent Considerations Annex}.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. CCSDS has processes for identifying patent issues and for securing from the patent holder agreement that all licensing policies are reasonable and non-discriminatory. However, CCSDS does not have a patent law staff, and CCSDS shall not be held responsible for identifying any or all such patent rights.

### 3.4.1.8 References

A references subsection shall be included to list publications referenced directly in the text of the document.

#### a) Normative Track Documents and Experimental Specifications

- 1) The list shall include publications whose provisions are required for implementing the specifications contained in the document.
- 2) If normative references exist, the text used to introduce the list shall be as follows:

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

- 3) The list shall not include the following:
  - materials that are not publicly available;
  - publications to which only informative reference is made;
  - publications that provided only source material in the development of the Recommended Standard, Practice, or Experimental Specification.
- 4) If the document contains no normative references, the text of the References subsection shall be  
“This document contains no normative references.”

NOTE – An informative annex can be used to list documents whose provisions are not required for implementing the specifications contained in the document.

**b) Non-Normative Documents**

- 1) The list shall include all documents referenced in the text of the document.
- 2) Documents that are not directly referenced in the text shall not be included.

NOTE – An informative annex can be used to list documents that are not directly referenced in the text.

- 3) The boilerplate text used to introduce the list of documents shall be as follows:

The following documents are referenced in this document. At the time of publication, the editions indicated were valid. All documents are subject to revision, and users of this document 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 publications.

- 4) If the document contains no referenced publications, a References subsection shall not be included.

**c) Content, Form, and Structure**

The content, form, and structure of bibliographic references shall conform to the formats described in annex B.

**3.4.2 OVERVIEW SECTION**

**3.4.2.1** The overview section shall contain general text on the subject of the document. Sufficient text and/or tables and figures should be used to provide the reader with a clear understanding of the scope of the technical content of the book within the overall system.

**3.4.2.2** No requirements or specifications shall be contained in the overview section.

**3.4.3 DOCUMENT MAIN TEXT**

**3.4.3.1** The main text for the document may be spread over many sections and subsections as defined in section 4.

**3.4.3.2** Each section of the document shall be devoted to a particular division of the subject.

**3.4.3.3** For normative-track documents,

- a) specifications shall begin in section 3 and continue through as many subsequent sections as needed;

- b) each specification shall be explicitly identified by a unique subsection or paragraph number;
- c) text shall be written in terse style;
- d) comments and explanatory material shall be clearly identified as non-normative:
  - 1) the NOTE format as defined in section 4 shall be used for brief non-normative comments;
  - 2) non-normative text requiring one or more paragraphs of text shall be set off in special subsections having one of the following reserved titles:
    - Overview;
    - Background;
    - Rationale;
    - Discussion;
  - 3) descriptive text shall not introduce implicit or hidden requirements, or modify the meaning or obligations of existing requirements;
  - 4) normative text shall not appear in subsections whose titles are identified as reserved in 3.4.3.3d)2).

NOTE – In general, non-normative text is to be avoided in normative sections (sections 3 through *n*) of CCSDS normative-track documents. CCSDS Informational Reports are the proper repository of non-normative text intended to aid in understanding or acceptance of normative-track documents.

**3.4.3.4** For Informational Reports, all detailed report material shall begin in section 3 and continue through as many subsequent sections as needed.

## **3.5 BACK MATTER CONTENTS**

### **3.5.1 GENERAL**

Back matter includes the following elements:

- normative annexes (normative documents only);
- informative annexes;
- index.

NOTE – Because CCSDS documents are published electronically with full text search capability, indexes are often superfluous.

## **3.5.2 ANNEXES**

### **3.5.2.1 Normative Annexes**

#### **3.5.2.1.1 Overview**

Normative annexes contain technical information which, because of its length, detail, or specificity, is inappropriate for inclusion in the main sections, but which is necessary for implementation of the specifications in the document.

#### **3.5.2.1.2 PICS Proforma**

Recommended Standards shall contain an Implementation Conformance Statement (ICS) proforma as the first normative annex.

NOTE – The requirements for CCSDS ICS proformas are specified in reference [6].

### **3.5.2.2 Informative Annexes**

#### **3.5.2.2.1 Overview**

Informative annexes provide ancillary information that is not necessary for implementation of specifications.

#### **3.5.2.2.2 Security, SANA, and Patent Considerations Annex**

##### **3.5.2.2.2.1 General**

**3.5.2.2.2.1.1** Recommended Standards, Recommended Practices, and Experimental Specifications shall contain an informative annex that addresses one or more of the following considerations:

- Security;
- Space Assigned Numbers Authority (SANA);
- Patents.

**3.5.2.2.2.1.2** The title of the annex shall reflect its content; i.e.; if the annex contains only security considerations, then its title shall be ‘Security Considerations’.

**3.5.2.2.2.1.3** If present, the Security, SANA, and Patent Considerations Annex shall be the first informative annex.

### **3.5.2.2.2.2 Security Considerations**

**3.5.2.2.2.2.1** A discussion of security considerations shall be included in the annex for Recommended Standards, Recommended Practices, and Experimental Specifications.

**3.5.2.2.2.2.2** The scope of the discussion shall be security considerations related to implementation of the specifications contained in the document and shall observe the following outline:

- Introduction;
- Security Concerns with Respect to the CCSDS Document:
  - Data Privacy;
  - Data Integrity;
  - Authentication of Communicating Entities;
  - Control of Access to Resources;
  - Availability of Resources;
  - Auditing of Resource Usage;
- Potential Threats and Attack Scenarios:  
(how could someone break the technology and why);
- Consequences of Not Applying Security to the Technology:  
(e.g., loss of life, loss of mission).

### **3.5.2.2.2.3 SANA Considerations**

Recommended Standards shall contain SANA considerations as defined in reference [1].

### **3.5.2.2.2.4 Patent Considerations**

**3.5.2.2.2.4.1** Recommended Standards and Experimental Specifications shall identify all known patents appertaining to their respective specifications and provide complete contact information for license applications.

**3.5.2.2.2.4.2** If no patents are known to apply, a statement to that effect shall be contained in the Patent Considerations annex subsection.

### **3.5.2.3 Annex Presentation**

**3.5.2.3.1** If an annex is present, it shall have the following information at the beginning of the first annex page:



- a) an annex designator in the form ‘ANNEX {L}’, where L is the annex letter;
- b) the annex title;
- c) for normative-track documents, one of the following two statements:
  - ‘(Normative)’,
  - ‘(Informative)’;
- d) a brief statement of the purpose of the annex.

**3.5.2.3.2** In most cases, the first paragraph of an annex should state the purpose of that annex.

**3.5.2.3.3** If definitions of terms used throughout the document are provided as an aid to the reader, lists of these terms shall be placed in the first informative annex following the Security, SANA, and Patent Considerations Annex, if present.

### **3.5.3 INDEX**

An index is not required in CCSDS documents but may be included at the discretion of the Technical Editor.

## **4 FORMAT**

### **4.1 GENERAL**

CCSDS documents shall conform to the subordination and format conventions defined in the following subsections.

NOTE – Layout and typesetting of major text elements are defined in section 6.

### **4.2 PRIMARY TEXT DIVISIONS**

#### **4.2.1 SECTIONS**

##### **4.2.1.1 General**

A section shall consist of a section heading followed by at least one paragraph of text.

##### **4.2.1.2 Section Headings**

**4.2.1.2.1** A section heading shall consist of two parts, a section number, which identifies the position of the section in relation to other sections, and a section title, which identifies the contents of the section.

**4.2.1.2.2** The section number shall be Arabic and stand first.

**4.2.1.2.3** The section title shall begin at the first tab stop to the right of the section number.

**4.2.1.2.4** No punctuation shall be used either between section number and title or at the end of the title.

##### **4.2.1.3 Section Numbering**

All sections shall be numbered consecutively beginning with 1.

#### **4.2.2 SUBSECTIONS**

##### **4.2.2.1 Usage**

**4.2.2.1.1** Subsections shall be subdivisions of sections or higher-level subsections.

**4.2.2.1.2** The number of subsection levels shall be constrained to make it easier to read the document.

**4.2.2.1.3** A subsection shall consist of a subsection heading followed by one or more paragraphs, subordinate subsections, or combinations of such elements.

#### **4.2.2.2 Subsection Headings**

A subsection heading shall consist of a number and a title:

- a) the subsection number shall be Arabic and stand first;
- b) the subsection title shall begin at the first tab stop to the right of the number;
- c) no punctuation shall be used either between number and title or at the end of the title.

#### **4.2.2.3 Subsection Numbering**

**4.2.2.3.1** The first subsection level shall be numbered consecutively beginning with ‘{S}.1’, where S is the section number.

**4.2.2.3.2** The first subsection at a given level shall immediately follow the heading to which it is subordinate; i.e., there shall be no intervening paragraph or list between {S} and {S}.1.

**4.2.2.3.3** Subsequent subsection levels shall be numbered consecutively beginning with ‘{S.N}.1’, where S.N is the number of the next higher subsection.

**4.2.2.3.4** All subsection numbers shall reset to 1 whenever the next higher level number is incremented.

### **4.2.3 PARAGRAPHS**

#### **4.2.3.1 Usage**

**4.2.3.1.1** Paragraphs are the basic text unit and shall generally contain a unique single specification, item, or thought.

**4.2.3.1.2** A paragraph shall consist of one or more sentences.

#### **4.2.3.2 Paragraph Numbering**

**4.2.3.2.1** A single paragraph under a subsection heading shall not be numbered.

**4.2.3.2.2** Multiple paragraphs under a single subsection heading shall be numbered:

- a) the numbers of the paragraphs shall follow the format of subsection numbering, where the paragraph is assumed to be one level subordinate to the current subsection level;
- b) paragraphs that are subordinate to a numbered paragraph shall be numbered at the next lower level of subordination;

NOTE – E.g., a level-3 paragraph under a level-2 subsection heading could introduce a group of two or more level-4 numbered paragraphs.

- c) the first numbered paragraph at a given level shall immediately follow the heading or higher-level paragraph to which it is subordinate;
- d) list numbering and format (refer to 4.3.1) shall be used for lists that are subordinate to numbered paragraphs.

**4.2.3.2.3** ‘Run-in’ style may be used for successive subsection headings (at the same level) followed by single paragraphs of text:

- a) if one subsection heading at a given level is run-in, all contiguous subsections at that level must also be run-in;
- b) paragraphs that are subordinate to a run-in numbered paragraph shall be numbered at the next level of subordination;
- c) list numbering and format (refer to 4.3.1) shall be used for lists that are subordinate to a run-in paragraphs.

## **4.3 SECONDARY TEXT DIVISIONS**

### **4.3.1 LISTS**

#### **4.3.1.1 List Usage**

**4.3.1.1.1** Lists may be used at any level of subordination. The items of a list may be words, phrases, or clauses, but all items of a given list shall be grammatically parallel.

**4.3.1.1.2** Paragraphs containing multiple clauses should be numbered as specified in 4.2.3.2.

#### **4.3.1.2 List Subordination**

**4.3.1.2.1** Lists may be either numbered or unnumbered (bulleted):

- numbered lists may have subordinate numbered or unnumbered lists;
- unnumbered lists may have subordinate numbered or unnumbered lists.

**4.3.1.2.2** List item identifiers for numbered lists shall be

- a) at the highest level, lowercase letters indented one tab position from the left margin of the preceding paragraph or higher-level unnumbered list item, followed by a closing parenthesis;
- b) at the next lower level, Arabic numerals indented one tab position from the list letter and aligned with the text of the preceding list item at the level above, followed by a closing parenthesis:

- 1) lists numbered with Arabic numerals shall be used only as lists subordinate to lists numbered with lowercase letters;
- 2) the first list item in a list numbered with Arabic numerals shall immediately follow a list item in a list numbered with lowercase letters;
- c) at the next lower level, roman numerals indented one tab position from the Arabic list number and aligned with the text of the preceding list item at the level above, followed by a closing parenthesis:
  - 1) lists numbered with roman numerals shall be used only as lists subordinate to lists numbered with Arabic numerals;
  - 2) the first list item in a list numbered with roman numerals shall immediately follow a list item in a list numbered with Arabic numerals.

**4.3.1.2.3** List item identifiers for unnumbered (bulleted) lists shall be

- a) at the highest level, an en dash (‘–’) indented one tab position from the left margin of the preceding paragraph or list item identifier at the next higher level;
- b) at the next level, a solid bullet character (‘•’) indented one tab position from the en dash and aligned with the text of the preceding list item at the next higher level;
- c) lists marked with solid bullet characters (‘•’) shall be used only as lists subordinate to lists marked with en dashes (‘–’).

**4.3.1.2.4** For all list items,

- a) the text of the list item shall begin at the next tab position following the list item identifier;
- b) if the text of the list item requires more than one line, it shall align with the beginning of the text on the first line (see figure 4-1).

**4.3.1.2.5** For numbered lists, at least two items at a given level must exist.

**4.3.1.3 List Introduction**

**4.3.1.3.1** A list shall be introduced in one of two ways:

- a) a grammatically complete statement followed by a colon; or
- b) the beginning of a statement which is completed grammatically by the list items that follow.

**4.3.1.3.2** Lists that are not explicitly introduced as specified in 4.3.1.3.1 should be grammatically independent structures forming complete sentences.

#### **4.3.1.4 List Punctuation**

**4.3.1.4.1** Lists shall be punctuated as though the introductory statement together with the items of the list form a sentence.

**4.3.1.4.2** Each list item except the last shall normally end with a semicolon; the last item shall end with a period. The following exceptions are observed:

- a) if a conjunction is used at the end of one list item to join it with the next list item, the semicolon shall precede the conjunction;
- b) lists that are subordinate to other lists may use commas as separators, in which case,
  - 1) each list item except the last ends with a comma,
  - 2) the last item ends with a semicolon (or period if it terminates the higher-level list);
- c) if any list item is so grammatically complex as to require internal colons, semicolons, or periods, each item of that list shall be terminated with a period.

NOTE – Lists that contain items requiring periods for termination are probably improper lists that should be restructured and/or renumbered using paragraph numbering (4.2.3.2).

#### **4.3.1.5 List Format Variations**

**4.3.1.5.1** List items may be titles serving as headings for paragraphs or subordinate lists:

- if a list item is a title, the title shall be bold and capitalized as a title, and it shall have no terminal punctuation;
- if one list item is a title, all items at the same level in the same list shall also be titles.

**4.3.1.5.2** List items may have titles with text run in (i.e., title and text stand on the same line):

- titles with run-in text shall be bold, capitalized as titles, and terminated with a period;
- if one list item comprises a title with run-in text, all items at the same level in the same list shall also comprise titles with run-in text.

**1 SECTION HEADING****1.1 LEVEL-TWO HEADING****1.1.1 LEVEL-THREE HEADING****1.1.1.1 Level-Four Heading**

Paragraphs are at least one complete sentence. The last sentence of a paragraph may introduce a list:

- a) list item;
- b) list item:
  - 1) subordinate list item at second numbered level, which aligns with the beginning of the text on the first line because the text of the list item requires more than one line;
  - 2) subordinate list item at second numbered level:
    - i) subordinate list item at third numbered level;
    - ii) subordinate list item introducing a bulleted list:
      - subordinate bulleted list item;
      - subordinate list bulleted list item introducing a second bulleted level:
        - subordinate list item,
        - subordinate list item;
      - subordinate list item;
    - iii) subordinate list item at third numbered level;
  - 2) subordinate list item at second numbered level;
- c) list item.

**1.1.1.2 Level-Four Heading**

The text of this paragraph introduces a bulleted list:

- list item;
- list item:
  - subordinate list item,
  - subordinate list item.

**Figure 4-1: Format of Selected Text Divisions**

**1.1.2 LEVEL-THREE HEADING**

**1.1.2.1 Level-Four Heading.** Paragraph text in this subsection is ‘run in’; i.e., it begins on the same line as the subsection heading. The paragraph text is full justified and the lines are filled to the left and right margin.

NOTE – This note refers to the paragraph immediately above it.

**1.1.2.2 Level-Four Heading.** If one subsection at a given level of subordination has run-in text, every subsection of the same level subordinate to the same next-higher subsection has the same style. An analogous structure with lists is as follows:

- a) **Titles with Lists.** A list item can have a title with run-in text.

NOTE 1 – In the list item above, the text is run in with the title.

- b) **Attributes.** The list-item title is bold and capitalized as a title.

- c) **Parallel Structure.** If one list item has a title, every item at the same level of the same list has a title.

NOTE 2 – In the list above, the run-in text following each title is a grammatically complete sentence punctuated as a sentence.

**1.1.3 LEVEL-THREE HEADING**

**1.1.3.1** If paragraphs are numbered, the numbers of the paragraphs follow the format of subsection numbering.

NOTE – The only justification for numbering notes in the style of NOTE 1 and NOTE 2 (see NOTE 1 and NOTE 2, above) is the need to reference such notes at another location.

**1.1.3.2** All paragraphs subordinate to the same subsection are numbered.

**1.1.3.3** A single paragraph following a section or subsection heading is not numbered.

**NOTES**

- 1 In standards track documents, paragraphs containing specifications are numbered.
- 2 Numbered paragraphs are assumed to be one level subordinate to the current subsection level.
- 3 At the lowest levels of subordination, list numbering style is sometimes used.

**Figure 4-1: Format of Selected Text Divisions (continued)**



## 4.3.2 NOTES

### 4.3.2.1 Usage of Notes

**4.3.2.1.1** Notes (as distinguished from footnotes) shall be used to supply information to aid the reader in understanding the document text.

**4.3.2.1.2** Notes shall not contain normative material.

**4.3.2.1.3** A note shall be placed after the paragraph to which it refers.

### 4.3.2.2 Note Format

There are three note formats:

- a) a single note begins with 'NOTE – ' followed by the text of the note:
  - 1) the text of the note shall be full justified, the left edge of the note text aligning to the right of the note title, the right edge aligning with the right margin;
  - 2) the note title shall align with the left edge of the preceding paragraph to which the note logically refers;
- b) two or more notes shall be grouped together under the title 'NOTES' with the text of the notes numbered consecutively, beginning with 1:
  - 1) the note number shall be aligned with the left edge of the note title;
  - 2) the text of the note shall be full justified, the left edge aligning on the next tab position following the note number, the right edge aligning with the right margin;
  - 3) the note title shall align with the left edge of the preceding paragraph to which the note logically refers;
- c) two or more single notes occurring in separate places within the same subdivision of text may be numbered in the style 'NOTE 1 - ', 'NOTE 2 - ', etc., while otherwise adhering to the format specified in 4.3.2.2a).

NOTE – Normally, the numbered note format described in 4.3.2.2c) would be used only if there were a necessity to reference particular notes.

## 4.3.3 FOOTNOTES

### 4.3.3.1 Footnote Usage

**4.3.3.1.1** Footnotes should be avoided in normal text.

**4.3.3.1.2** Footnotes may be used to provide supplementary transient information.<sup>1</sup>

**4.3.3.1.3** Footnotes may be used instead of notes in tables and figures.

NOTE – In tables and figures, space constraints and lack of text structure often make footnotes the clearest way to express a note that would otherwise be expressed in a form specified in 4.3.2.

**4.3.3.1.4** Footnotes shall not contain normative material.

### **4.3.3.2 Footnote Format**

**4.3.3.2.1** A single footnote on a page shall be designated in the page text with a superscript asterisk, obelisk, or Arabic number.

**4.3.3.2.2** The text of the footnote, beginning with the footnote designator, shall be placed at the bottom of the page on the left margin.

**4.3.3.2.3** A short separator line, aligned with the left margin, shall stand between the last line of text on the page and the note text.

**4.3.3.2.4** Two or more footnotes on a page

- a) shall be differentiated by superscript Arabic numerals in the text and at the beginning of the note text;
- b) otherwise the format of multiple footnotes is the same as that of a single footnote;
- c) separator lines between footnotes shall not be used.

**4.3.3.2.5** Footnotes in tables and figures shall be designated with asterisk or Arabic numerals in the same way as footnotes on text pages.

**4.3.3.2.6** For tables and figures, footnotes shall be positioned at the bottom of the table or figure rather than at the bottom of the page.

**4.3.3.2.7** For tables and figures enclosed in lines, footnotes shall be placed inside the lines that form the outer boundary of the table or figure.

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<sup>1</sup> Possible uses for footnotes include historical explanations that will be deleted from the next revision or transient information expected to be removed as unnecessary at the next revision.

## **4.3.4 TABLES**

### **4.3.4.1 Table Usage**

**4.3.4.1.1** Tables are used to present information in an easily understandable form.

**4.3.4.1.2** Tables shall not be standalone specifications but may be incorporated through reference into specifications stated in the main text.

### **4.3.4.2 Table Numbering**

**4.3.4.2.1** Tables shall be numbered consecutively beginning with ‘Table {S}-1: ’, where S is the number designator of a section or the letter designator of an annex.

**4.3.4.2.2** Table numbers shall be reset to 1 for each new section or annex.

### **4.3.4.3 Table Title**

The table title shall be centered horizontally above the table.

### **4.3.4.4 Table Position**

Each table shall be positioned following and as near as possible to the first reference to the table.

## **4.3.5 FIGURES**

### **4.3.5.1 Figure Usage**

**4.3.5.1.1** Figures are used to present information in an easily understandable form.

**4.3.5.1.2** Figures shall not be standalone specifications but may be incorporated through reference into specifications stated in the main text.

NOTE – Figures are normally illustrative and therefore non-normative.

### **4.3.5.2 Figure Numbering**

**4.3.5.2.1** Figures shall be numbered consecutively beginning with ‘Figure {S}-1: ’, where S is the number designator of a section or the letter designator of an annex.

**4.3.5.2.2** Figure numbers shall be reset to 1 for each new section or annex.

### 4.3.5.3 Figure Titles

The figure title shall be centered horizontally below the figure.

### 4.3.5.4 Figure Position

Each figure shall be positioned following and as near as possible to the first reference to the figure.

## 4.3.6 TEXT REFERENCES

Numbered figures and tables must be referenced in text. Sections, subsections, annexes, and notes may need to be referenced. When referenced,

- a) sections shall be referenced as ‘section {N}’, where N is the section number;
- b) subsections shall be referenced by subsection number only, except when reference to a subsection begins a sentence, in which case ‘Subsection’ shall precede the number;
- c) figures, tables, and annexes shall be referenced as ‘figure {S-N}’, ‘table {S-N}’, and ‘annex {L}’, respectively, where S-N and L are valid figure/table or annex designators;
- d) references to notes may require that the relative location of the note be supplied, as in ‘see note under 4.3.1’ or ‘refer to note 2 under 4.2’.

## 4.3.7 BIBLIOGRAPHIC REFERENCES

**4.3.7.1** References to other documents shall be made through reference to the references subsection in the style ‘refer to reference [{N}]’ or ‘. . . (reference [{N}])’, where N is the number of a reference in the references subsection.

**4.3.7.2** The specific applicable sections in the referenced document shall be cited where appropriate.

**4.3.7.3** All documents listed in the references subsection of a document shall be referenced in the text of that document.

**4.3.7.4** The list of documents referenced shall be numbered with Arabic numerals in square brackets on the left margin without closing parenthesis or other punctuation. (See 1.7 for an example of reference-list style.)

NOTE – Detailed specification of reference list format is contained in annex B.

## 5 STYLE

### 5.1 OVERVIEW

This section of the Manual defines the prose style of CCSDS documents, i.e., the specific or characteristic manner of expression in a language.

### 5.2 LANGUAGE CONVENTIONS

#### 5.2.1 PUBLICATION LANGUAGE

All CCSDS documents shall be published in English.

#### 5.2.2 DICTION AND SPELLING

##### 5.2.2.1 Discussion

For practical purposes, any mainstream dictionary of the English language can serve as a guide to spelling, word division, and word usage.

##### 5.2.2.2 Official Dictionaries

Because there is always a need for final authority, *Webster's New Collegiate Dictionary* (reference [3]), and *The Shorter Oxford English Dictionary* (reference [4]), shall be the official CCSDS dictionaries for American and British English, respectively.

NOTE – As with all publications of the Oxford University Press, *The Shorter Oxford English Dictionary* (reference [4]) preferentially uses *z* in words for which there may appear to be a choice in the use of *z* or *s*, e.g., ‘standardize’ or ‘standardise’, ‘utilize’ or ‘utilise’, etc.

##### 5.2.2.3 Consistency

After the American or British English style has been selected for a given CCSDS document, it shall be used throughout (without mixing).

#### 5.2.3 DISCUSSION—GRAMMAR AND OTHER ELEMENTS OF STYLE

There are many treatments of English grammar in general use, and many modern English-language dictionaries contain thorough and concise appendices on conventions for usage and punctuation.

## **5.3 PREFERRED STYLE**

### **5.3.1 OVERVIEW**

The single most important element of style is consistency. Consistent nonstandard style is preferable to inconsistent style. However, a few basic elements of style that need to be observed are specified in the following subsections.

### **5.3.2 PROSE STYLE**

**5.3.2.1** CCSDS Documents shall be written in the third person.

**5.3.2.2** The prose style shall be simple and straightforward enough to be easily understood by persons for whom English is a second language.

**5.3.2.3** Sentences shall be complete and as short as possible.

**5.3.2.4** Unnecessary repetition shall be avoided (particularly using different words to express the same idea many times).

**5.3.2.5** Use of obscure words and informal constructions shall be avoided.

**5.3.2.6** Contractions (e.g., it's, they're) shall not be used.

NOTE – Contractions are informal in English, and they invite confusion with the English genitive (e.g., 'the engineer's writing').

### **5.3.3 ACRONYMS AND ABBREVIATIONS**

**5.3.3.1** Excessive use of acronyms and abbreviations shall be avoided.

**5.3.3.2** Acronyms and abbreviations shall be 'called out' in the document text the first time they are used.

**5.3.3.3** Acronyms and abbreviations should not be called out in titles and headings.

**5.3.3.4** Acronyms and abbreviations shall not be called out repeatedly:

- a) after an acronym or abbreviation has been called out, that acronym or abbreviation shall be used in place of the expanded term for which the acronym or abbreviation stands;
- b) in titles and subsection headings, however, the expanded term should normally be used instead of its acronym or abbreviation.

**5.3.3.5** The style for calling out acronyms and abbreviations shall be to state the complete term first followed by its acronym or abbreviation in parentheses.

**5.3.3.6** Acronyms and abbreviations used in text should be defined in an acronyms and terminology annex. Definitions appearing in the annex shall agree with those in the text.

**5.3.3.7** In the case of acronyms or initials, the letters of the term used to form the acronym or initials shall be capitalized.

**5.3.3.8** Plurals of acronyms and abbreviations shall be formed in the same ways as for real words:

- a) for abbreviations that are not pronounced as words, an 's' shall be added to the abbreviation;
- b) for acronyms, 's' or 'es' shall be added depending on whether the acronym ends in a sibilant.

**5.3.3.9** The indefinite article used with an acronym or abbreviation depends on the pronunciation of the acronym or abbreviation. If the acronym or first letter of the abbreviation is pronounced with an English vowel sound, the indefinite article should be 'an'; otherwise it should be 'a'; for example, 'a VCDU-ID', 'an MSB', 'a TDRS', 'an EOS'.

NOTE – An acronym is a pronounceable word formed from the first (or first few) letters of words in a phrase, e.g., NASA. Many abbreviations are formed from the initial letters of words, but often the abbreviation is not a word but a simple collection of letters pronounced individually, e.g., ICD. Some abbreviations are pronounced as words by some and as individual letters by others. For such abbreviations, the use of the indefinite article depends on the most common pronunciation of the abbreviation.

## 5.3.4 MATHEMATICAL STYLE

**5.3.4.1** Equations shall be expressed in correct mathematical form with letter symbols as the equation parameters.

**5.3.4.2** A list explaining the letter symbols and their units shall follow the equation, unless the letter symbols used are defined in the acronyms and terminology annex.

**5.3.4.3** Descriptive names or names of quantities shall not be arranged in the form of an equation.

**5.3.4.4** The style used shall be based upon the following example:

$$I \geq \frac{R}{S}$$

where

$I$  is the number of convolutional encoders;

$R$  is the effective user data rate;

$S$  is the effective decoder rate.

**5.3.4.5** Equations may be numbered, if necessary, with Arabic numerals in parentheses on the right margin, as in the following example:

$$g(x) = \prod_{j=112}^{143} (x - \alpha^{11j}) = \sum_{i=0}^{32} G_i X^i \quad (1)$$

**5.3.4.6** The numbering shall be independent of the numbering of sections, subsections, figures, and tables.

### 5.3.5 QUANTITIES, UNITS, AND SYMBOLS

The International System of units (SI) as set out in reference [5] shall be used. If non-SI units are necessary (e.g., inches), the values shall be expressed first in SI units followed by the non-SI equivalent in parentheses.



## 6 PHYSICAL ELEMENTS

### 6.1 PAGE SIZE

**6.1.1** The page size for a given CCSDS document shall be either ISO A4 (297 × 210 mm; 11.7 × 8.3 inches) or ANSI A (216 × 280 mm; 8.5 × 11 inches).

**6.1.2** Larger page sizes may be included in an ISO A4- or ANSI A-sized document if there is a need to accommodate images that are too large for normal page sizes, e.g., oversized figures.

### 6.2 COLOR AND PAGE LAYOUT

#### 6.2.1 COLOR

##### 6.2.1.1 Covers

**6.2.1.1.1** CCSDS documents shall be published with colored covers.

NOTE – The colors used are defined according to the Pantone system (reference [2]).

**6.2.1.1.2** Recommended Standard, Recommended Practice, and Informational Report covers shall be reverse printed; i.e., the background color shall be the ink color, and the foreground color shall be white. The ink colors shall be

- Pantone 286 for Recommended Standards;
- Pantone 226 for Recommended Practices;
- Pantone 355 for Informational Reports.

**6.2.1.1.3** Covers of all other CCSDS document types shall be printed with black ink on colored background. The cover background colors shall be

- Pantone 393 for CCSDS Records;
- Pantone 186 for Draft Recommended Standards and Practices;
- Pantone 182 for Draft Revisions of Recommended Standards and Practices;
- Pantone 717 for Experimental Specifications.

##### 6.2.1.2 Pages with Text

For text pages, text shall be black on white background.

### 6.2.1.3 Pages with Figures

**6.2.1.3.1** Line art and half-tone art shall normally be black on white background. Colored graphics are permitted provided that all elements of such graphics are legible on black-on-white printed copies.

**6.2.1.3.2** Color shall not have significance in graphics in which color is used.

## 6.2.2 PAGE LAYOUT

### 6.2.2.1 Text Page Image Area Dimensions

The text page image area shall be  $160 \times 258$  mm ( $6.25 \times 10.17$  inches).

NOTE – In some cases it may be necessary to exceed the image area; e.g., it may be necessary to reproduce a figure that is wider than image area. In such cases the figure may be allowed to bleed into the outside margin, although at least eight mm (0.33 inch) of white space should remain between the extreme edge of the printed material and the page edge. It may be preferable to insert a larger page size to reproduce an extremely large figure rather than to reduce the figure to a size at which details are not legible (see 6.1.2).

### 6.2.2.2 Alignment of Image Area on Page

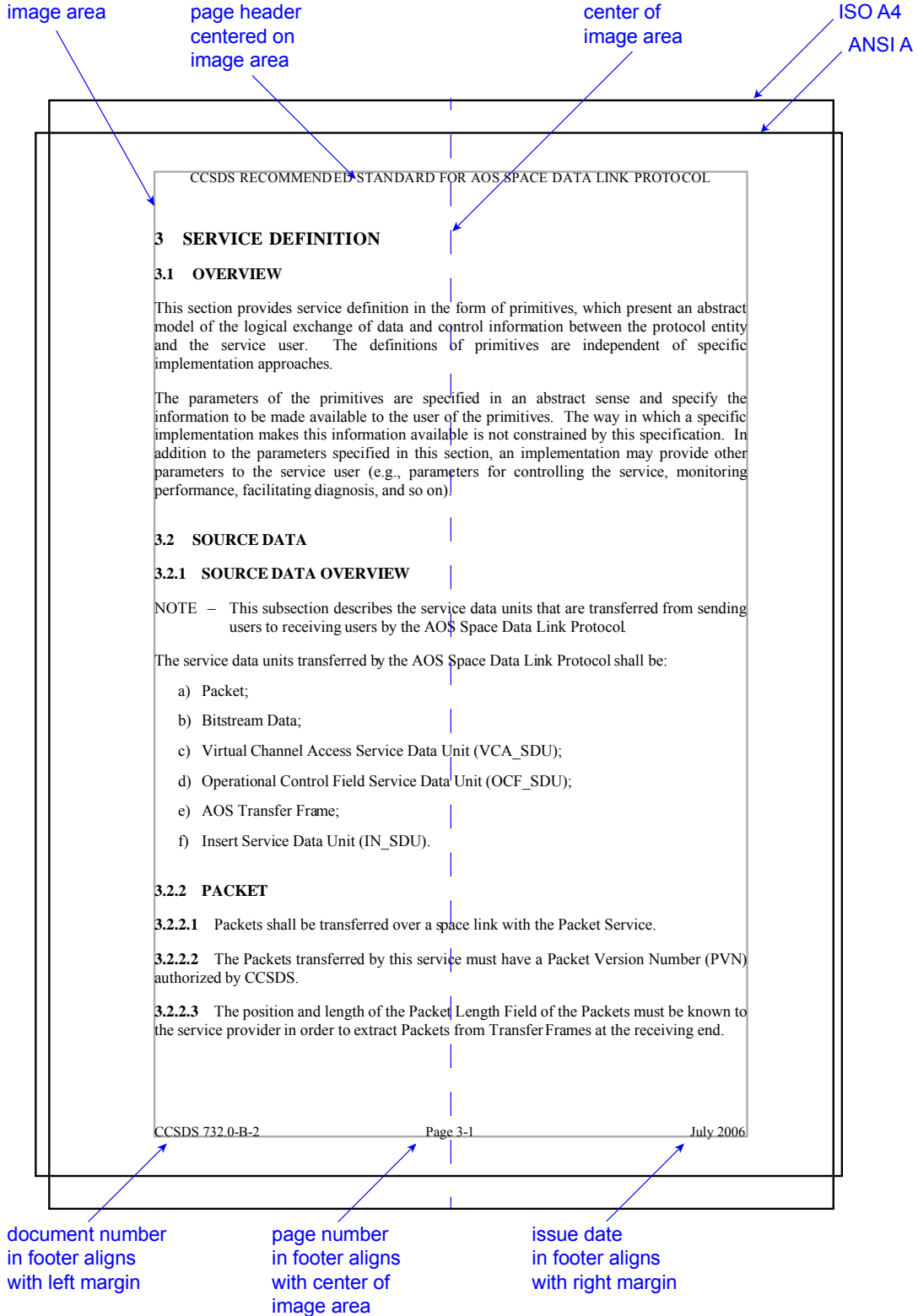
The text-page image area shall be positioned horizontally flush with the inside margin and centered vertically on the page.

### 6.2.2.3 Inside Margin Dimensions

The width of the inside margin shall be:

- a) for ISO A4 page sizes, between 28 mm (1.10 inches) and 29 mm (1.14 inches);
- b) for ANSI A page sizes, between 31 mm (1.22 inches) and 32 mm (1.26 inches).

NOTE – The relationship of the margins and image area to the page size and the locations of main page elements are shown in figure 6-1.



**Figure 6-1: Text Page Dimensions**

### **6.2.3 LAYOUT OF COVER ELEMENTS**

**6.2.3.1** CCSDS document covers shall contain the following elements:

- a) CCSDS logo;
- b) series name;
- c) document title in text box—for Blue, Magenta, and Green Books, the title background of the title box shall always be the foreground color of the cover with the title text displayed in the background color of the cover;
- d) document type, document number, statement of book color, issue date.

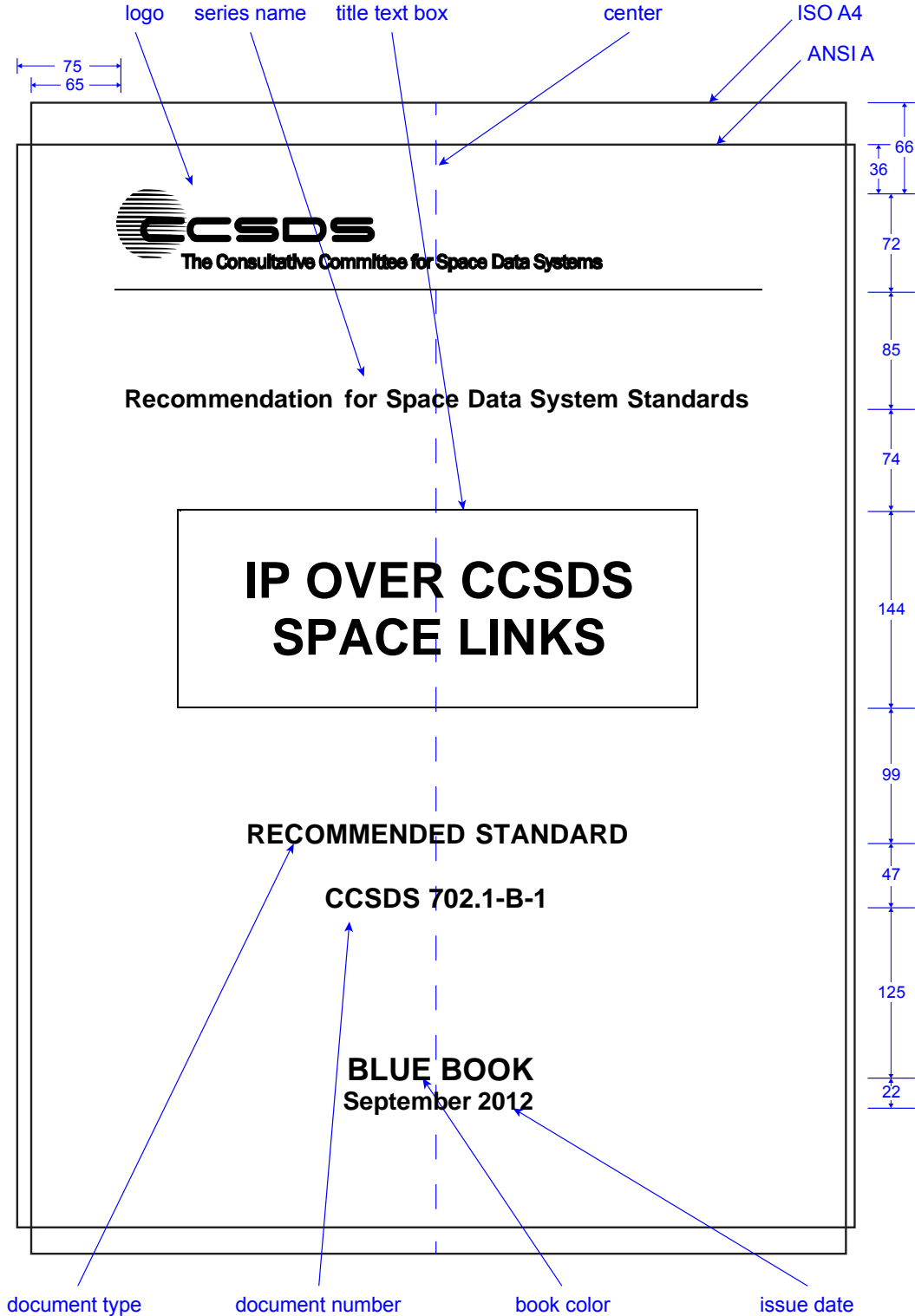
**6.2.3.2** The dimensions of the title text box shall be  $144 \times 378$  points.

**6.2.3.3** The horizontal and vertical location of the CCSDS logo relative to the top and left edges of the cover shall be as detailed in figure 6-2.

**6.2.3.4** All cover elements except the CCSDS logo shall be centered horizontally on the cover.

**6.2.3.5** The vertical locations of all cover elements relative to the CCSDS logo and to each other shall be as detailed in figure 6-2.

NOTE – Templates for CCSDS document covers can be obtained from the CCSDS Secretariat.

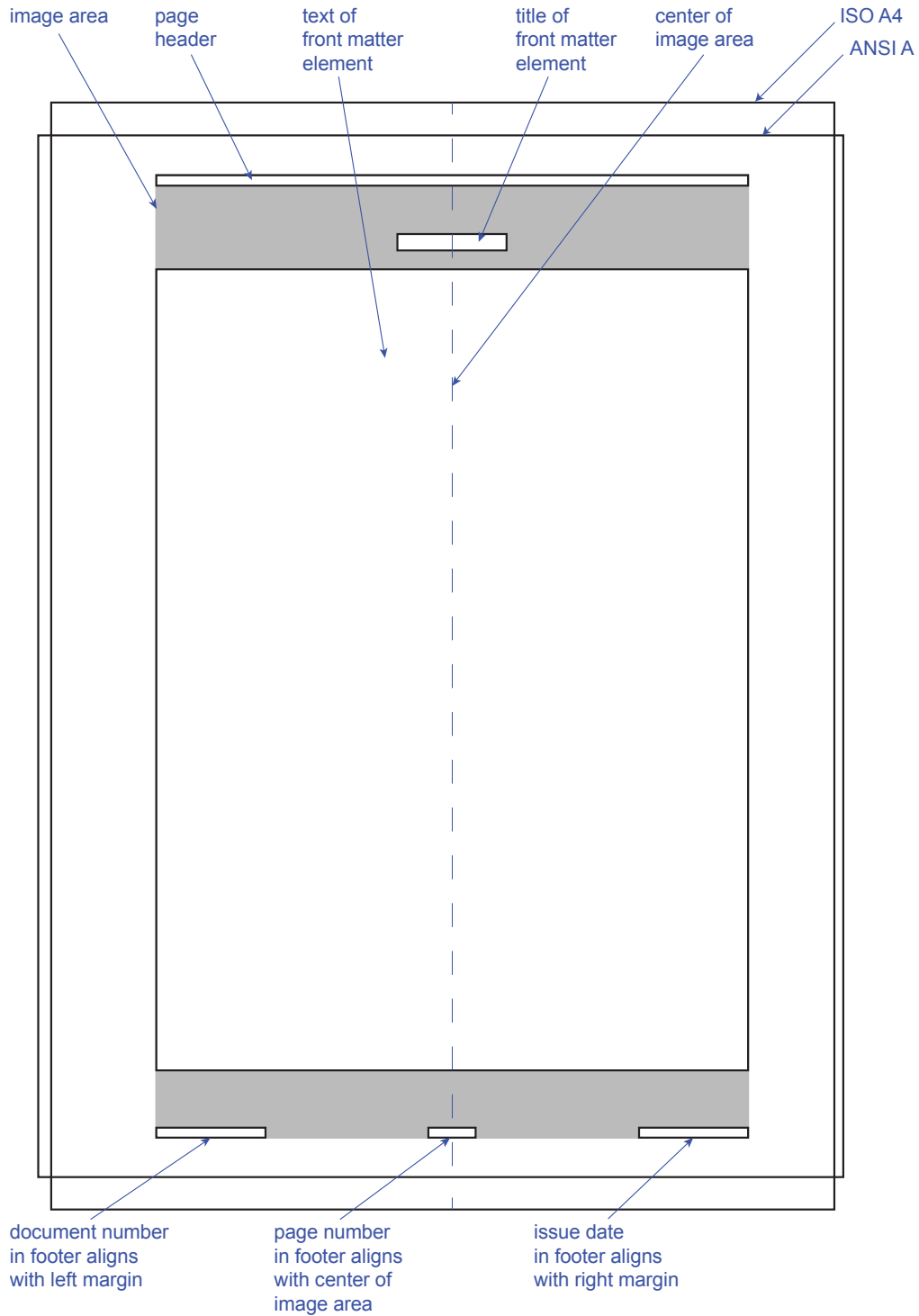


NOTE – Dimensions are in points. Measurements involving text elements reference the baselines of those text elements.

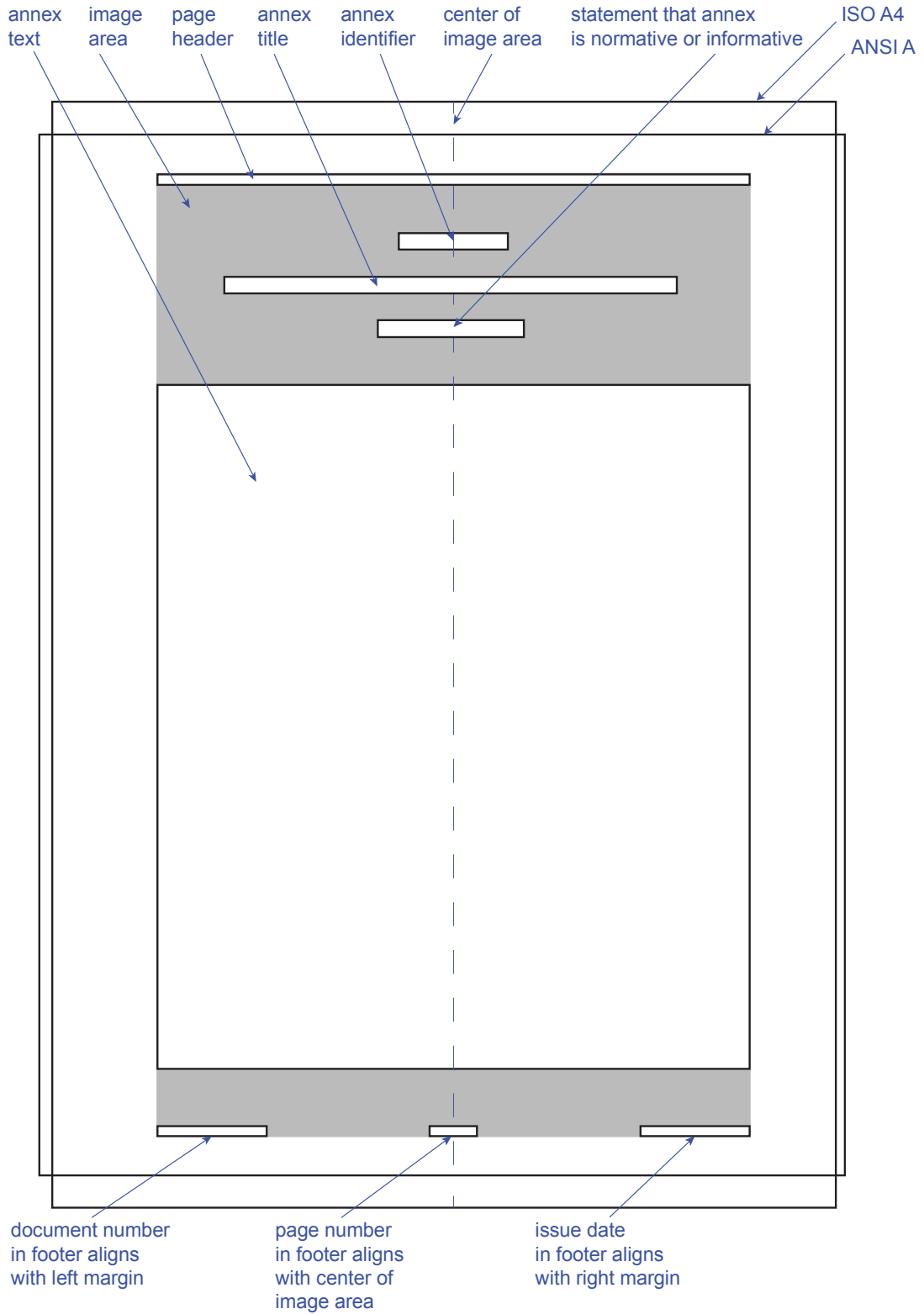
**Figure 6-2: CCSDS Cover Element Locations**

### 6.2.4 FRONT AND BACK MATTER LAYOUT

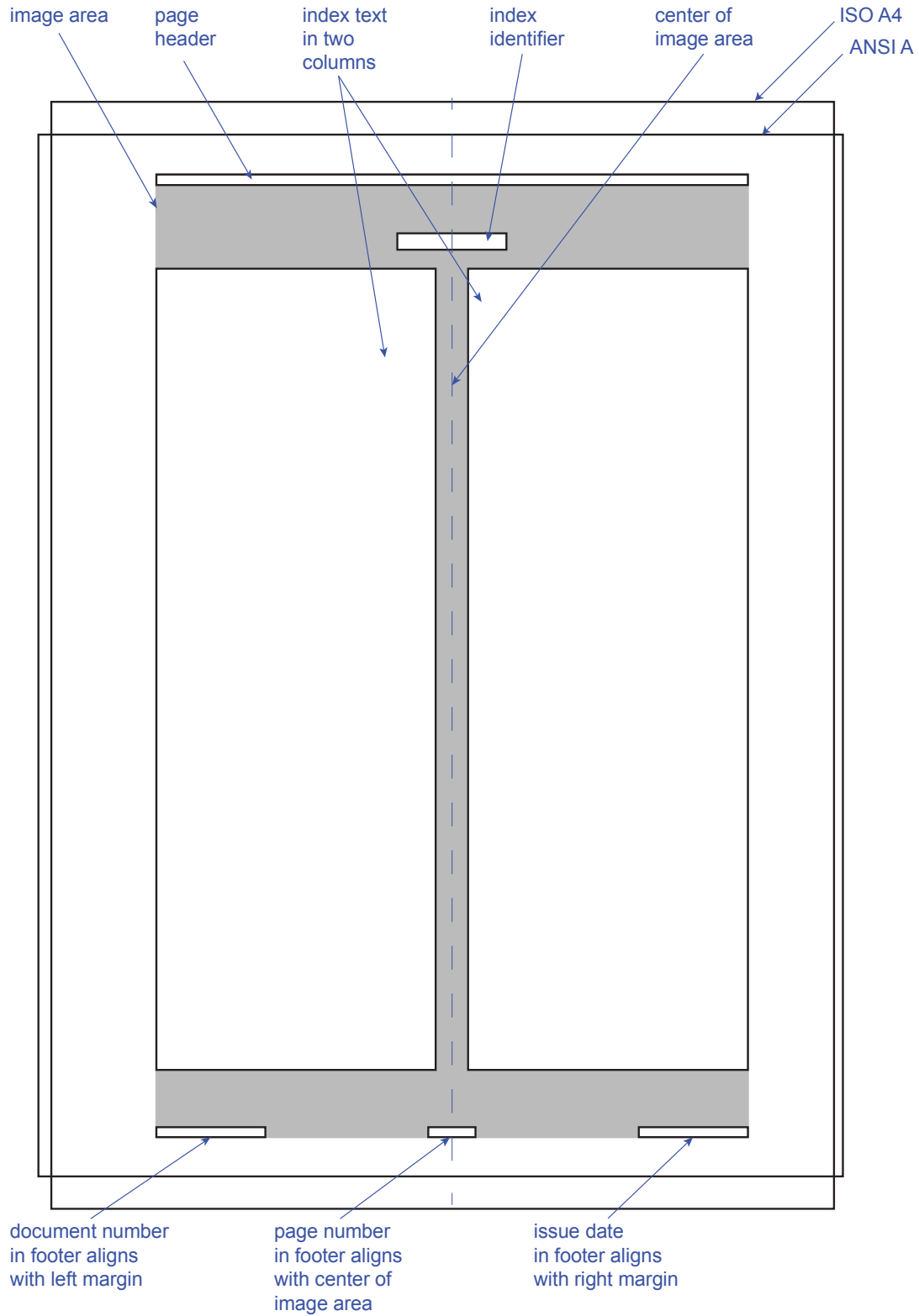
The general layout of front- and back-matter pages shall be as shown in figures 6-3 through 6-5.



**Figure 6-3: Layout of Front Matter Elements**



**Figure 6-4: Layout of Annex First Page**



**Figure 6-5: Layout of Index**



## **6.2.5 TYPESETTING OF MAJOR TEXT ELEMENTS**

### **6.2.5.1 Overview**

The format and usage of major text elements are defined in section 4. The various typesetting conventions used in the presentation of those elements are defined in the following paragraphs and are summarized in table 6-1.

### **6.2.5.2 Normal Text**

**6.2.5.2.1** The text of normal paragraphs, notes, and lists shall be set in 12-point Times New Roman with two-point leading.

NOTE – Leading is an automatic feature on most modern word processors, and two-point leading is frequently the default.

**6.2.5.2.2** Text lines shall be full justified.

**6.2.5.2.3** All text, except in indexes, shall be laid out in single full-page columns.

### **6.2.5.3 Section Headings**

**6.2.5.3.1** Section headings shall be set in 14-point bold, uppercase Times New Roman.

**6.2.5.3.2** Section headings shall be left justified.

**6.2.5.3.3** For a section heading that exceeds a single line in length, all lines shall be left justified at the first tab position to the right of the heading number with 2-point leading applied between lines.

**6.2.5.3.4** Front- and back-matter main-element headings are analogous to section headings and have the same font characteristics. However, these headings shall be centered horizontally on the image area and positioned as shown in figures 6-3 through 6-5.

### **6.2.5.4 Subsection Headings**

**6.2.5.4.1** Subsection headings shall be set in 12-point bold Times New Roman.

**6.2.5.4.2** Subsection headings shall be left justified.

**6.2.5.4.3** For a subsection heading that exceeds a single line in length, all lines shall be left justified at the first tab position to the right of the heading number with 2-point leading applied between lines.

**6.2.5.4.4** Level-2 and level-3 subsection headings shall be set in uppercase.

**Table 6-1: Characteristics of Major Text Elements**

Text Element	Font	Size	Leading	Attributes	Capitalization	Justification
paragraph	Times New Roman	12	2	-	sentence	full
section heading	Times New Roman	14	2	bold	uppercase	left
level-2 heading	Times New Roman	12	2	bold	uppercase	left
level-3 heading	Times New Roman	12	2	bold	uppercase	left
level-n heading	Times New Roman	12	2	bold	title	left
notes	Times New Roman	12	2	-	sentence	full
lists	Times New Roman	12	2	-	sentence	full
page header	Times New Roman	11	n/a	-	uppercase	center
page footer	Times New Roman	11	n/a	-	title	n/a
figure titles	Times New Roman	12	2	bold	title	center
table titles	Times New Roman	12	2	bold	title	center
front matter headings	Times New Roman	14	2	bold	uppercase	center
annex headings	Times New Roman	14	2	bold	uppercase	center
index headings	Times New Roman	14	2	bold	uppercase	center
figure text	Arial	≥ 9	variable	variable	variable	variable
table text	Arial	≥ 9	variable	variable	variable	variable
table headings	Arial	≥ 9	variable	bold	title	variable
TOC headings	Times New Roman	12	n/a	underline	title	left/right
TOC text	Times New Roman	12	2	-	variable <sup>1</sup>	left <sup>2</sup>
index text	Arial	9	2	variable	variable	left
<b>Cover Elements</b>						
series name	Arial	varies	n/a	bold	uppercase	center
document title	Arial	varies	n/a	bold	uppercase	center
document type	Arial	20	n/a	bold	uppercase	center
document number	Arial	20	n/a	bold	uppercase	center
statement of book color	Arial	22	n/a	bold	uppercase	center
issue date	Arial	18	n/a	bold	title	center
<p><sup>1</sup> Capitalization is the same as that of the referenced heading or title.</p> <p><sup>2</sup> Page numbers are aligned on the right-hand side of the page; leader dots fill the space between the last character of entry text and the corresponding page number.</p>						

**6.2.5.4.5** Headings of subsection levels other than level 2 and level 3 shall have title capitalization.

**6.2.5.4.6** Subsection headings shall not be separated (e.g., by page breaks) from the text of that subsection.

### **6.2.5.5 Front Matter Element Headings**

Front matter element headings shall be set in 14-point bold, uppercase Times New Roman and centered horizontally on the image area.

### **6.2.5.6 Annex Headings**

**6.2.5.6.1** Annex identifiers in the form ‘ANNEX {L}’, where ‘{L}’ is the letter designator for the annex, shall be set in 14-point bold, uppercase Times New Roman and centered horizontally on the image area.

**6.2.5.6.2** Annex titles shall be set in 14-point bold, uppercase Times New Roman and centered horizontally on the image area two line spaces below the annex identifier.

**6.2.5.6.3** The parenthetical statement indicating whether the annex is normative or informative shall be set in 14-point bold, uppercase Times New Roman and centered horizontally on the image area two line spaces below the annex title.

### **6.2.5.7 Index Headings**

The index identifier in the form ‘INDEX’ shall be set in 12-point bold, uppercase Times New Roman and centered horizontally on the image area.

### **6.2.5.8 Figure and Table Titles**

**6.2.5.8.1** Titles of figures and tables shall be set in 12-point bold Times New Roman and capitalized as titles.

**6.2.5.8.2** The title shall be positioned

- a) for figures, centered horizontally below the figure; and
- b) for tables, centered horizontally above the table.

**6.2.5.8.3** For figure and table titles that exceed a single line in length, all lines shall be aligned on the left under the first character of the title (i.e., to the right of the figure or table number) with two-point leading applied between lines.

**6.2.5.8.4** For tables and figures that continue on successive pages, the title shall be repeated on each page in the same style as the first with '(continued)' added to the end of the title.

**6.2.5.8.5** For tables and figures occupying more than two pages, '(page {n<sub>1</sub>} of {n<sub>2</sub>})', where n<sub>1</sub> is the actual page and n<sub>2</sub> is the final page, may be appended to the title on all pages, in which case '(continued)' shall not be used.

### **6.2.5.9 Figure and Table Text**

**6.2.5.9.1** Text in figures and tables shall be set in Arial.

NOTE – The guiding principle for selection of point size is readability. Nine points is suggested as a practical minimum size for text in a figure or table.

**6.2.5.9.2** Row and column headings in a table shall be bold and capitalized as titles.

### **6.2.5.10 Page Headers and Footers**

**6.2.5.10.1** Page headers and footers shall be set in normal (i.e., not bold or italic) 11-point Times New Roman.

**6.2.5.10.2** The justification and positioning of page headers and footers shall be as shown in figure 6-1.

**6.2.5.10.3** Headers and footers shall be omitted from blank pages.

### **6.2.5.11 Cover and Title Page Text Elements**

**6.2.5.11.1 Series Name.** The series name shall be set in bold, uppercase Arial, and centered horizontally.

NOTE – Series name type size varies depending on the length of the series name.

**6.2.5.11.2 Document Title.** The document title shall be set in bold Arial and centered in the title box.

NOTE – Document title type size varies depending on the length of the title.

**6.2.5.11.3 Document Type.** The document type shall be set in 20-point bold, uppercase Arial and centered horizontally on the image area.

**6.2.5.11.4 Document Number.** The document number shall be set in 20-point bold, uppercase Arial and centered horizontally on the image area.

**6.2.5.11.5 Statement of Book Color.** The book color statement shall be set in 22-point bold uppercase Arial and centered horizontally on the image area.

**6.2.5.11.6 Issue Date.** The issue date shall be set in 18-point bold title-case Arial and centered horizontally on the image area.

NOTE – The layout of the front cover and title page is defined in 6.2.3 and shown in figure 6-2.

## **6.2.5.12 Other Text Elements**

### **6.2.5.12.1 Table of Contents Column Headings**

Table of contents column headings shall be set in 12-point Times New Roman, underlined, and capitalized as in titles.

### **6.2.5.12.2 Table of Contents Text**

**6.2.5.12.2.1** All text in the table of contents shall be set in 12-point Times New Roman with 2-point leading.

**6.2.5.12.2.2** Capitalization of the entries shall be the same as that of the referenced heading or title.

### **6.2.5.12.3 Index Text**

**6.2.5.12.3.1** Index text shall be set in nine-point Arial.

**6.2.5.12.3.2** Text attributes may vary according to the complexity of the index (e.g., an index having several subdivisions may differentiate those divisions by using different attributes for different levels).

**6.2.5.12.3.3** Index entries shall be left justified.

**6.2.5.12.3.4** The index entries that point to the page where the index item is defined shall be set in bold type.

## **6.2.5.13 Change Bars**

**6.2.5.13.1** Change bars shall be 4.5 points in width.

**6.2.5.13.2** Change bars shall be positioned horizontally in the inside margin 25-30 points from the edge of the image area.

**6.2.5.13.3** Change bars shall be positioned vertically so that the top end of the bar aligns with the beginning line of changed text and the bottom end of the bar aligns with the ending line of the changed text.

## **6.3 COLLATING ELEMENTS**

### **6.3.1 OVERVIEW**

CCSDS documents include the following four major elements:

- a) covers;
- b) front matter;
- c) main text;
- d) back matter (optional).

### **6.3.2 COVERS**

All published CCSDS documents shall have covers.

NOTE – Ink color, page size, image area, and layout of CCSDS document covers are specified in 6.2.

### **6.3.3 FRONT MATTER**

#### **6.3.3.1 Overview**

Front matter generally includes the following elements:

- a) title page;
- b) Authority page;
- c) Statement of Intent;
- d) foreword;
- e) document control;
- f) table of contents.

Not all CCSDS documents contain all these elements, and some contain additional elements; however, the order of the elements should be consistent for all CCSDS documents. The definitions and requirements for these elements may be found in 3.3.

#### **6.3.3.2 Pagination**

**6.3.3.2.1** Each front-matter element shall begin on the next page following the last page of the preceding element.

**6.3.3.2.2** The Document Editor may choose to begin certain longer elements on recto pages.

### **6.3.3.3 Page Numbering**

**6.3.3.3.1** Front matter pages following the title page shall be numbered consecutively with lowercase Roman numerals beginning with page i.

NOTE – Recto pages always have odd numbers; verso pages always have even numbers.

**6.3.3.3.2** Blank pages shall not be numbered.

## **6.3.4 MAIN TEXT**

### **6.3.4.1 Overview**

The main text generally includes the following elements:

- a) introduction;
- b) overview;
- c) main text.

The definitions and requirements for main text elements can be found in 3.4.

### **6.3.4.2 Pagination**

**6.3.4.2.1** The first section of main text shall begin on the first recto page following the last page of front matter.

**6.3.4.2.2** Subsequent sections shall begin on the first recto page following the last page of the preceding section.

### **6.3.4.3 Page Numbering**

**6.3.4.3.1** Each section of main text begins on a recto page designated page ‘{S}-1’, where S is the section number.

**6.3.4.3.2** Subsequent pages within each section shall be numbered consecutively in the same style.

**6.3.4.3.3** Only Arabic numerals shall be used.

**6.3.4.3.4** Blank pages shall not be numbered.

## **6.3.5 BACK MATTER**

### **6.3.5.1 Overview**

The back matter may include:

- a) annexes;
- b) index.

The definitions and requirements for back matter elements can be found in 3.5.

### **6.3.5.2 Pagination**

**6.3.5.2.1** The first back-matter element shall begin on the first recto page following the last page of main text.

**6.3.5.2.2** Subsequent elements shall begin on the first recto page following the last page of the preceding element.

### **6.3.5.3 Page Numbering**

**6.3.5.3.1** Each element of back matter shall begin on a recto page designated ‘{L}-1’, where L is one or more uppercase alphabetical characters corresponding to the designation of the particular back-matter element. (For example, annex A begins on page ‘A-1’.)

**6.3.5.3.2** The index, if present, shall begin on a page designated ‘I-1’. However, if a document includes both an index and an annex I, the index shall begin on page ‘IN-1’.

**6.3.5.3.3** Subsequent pages within each back-matter element shall be numbered consecutively in the same style.

**6.3.5.3.4** Only Arabic numerals shall be used for page numbers.

**6.3.5.3.5** Only uppercase alphabetical characters shall be used for back-matter element designators.

**6.3.5.3.6** Blank pages shall not be numbered.



## ANNEX A

### ACTIVITIES AND RESPONSIBILITIES OF CCSDS EDITORS

#### (NORMATIVE)

#### A1 OVERVIEW

This annex contains descriptions of the activities and responsibilities of the Technical Editor and Document Editor involved in the preparation of CCSDS documents.

Descriptions of two positions are included:

- a) Technical Editor;
- b) Document Editor.

#### A2 TECHNICAL EDITOR

**A2.1** The Technical Editor should be a member of one of the CCSDS Working Groups (WGs) developing a CCSDS technical document.

**A2.2** A Technical Editor is required to take a major role during the work that will result in the publication of any CCSDS Blue or Green Book.

**A2.3** The technical material appearing in a CCSDS document shall be coordinated by the Technical Editor.

**A2.4** The Technical Editor shall be responsible for preparing the document

- a) main text technical content as defined in the main text of this Manual;
- b) elements of front matter, including
  - 1) the technical contents of the foreword, and
  - 2) for revisions, status and change information under document control;
- c) back matter, including
  - 1) the technical contents of the annexes, and
  - 2) the index, including the decision whether to include an index.

**A2.5** He/she is responsible for organizing and presenting the technical material (text and graphics) to the best of his/her ability.

**A2.6** He/she shall follow the Manual wherever possible (particularly in the chosen wording), but does not have ultimate responsibility for conformance with the Manual.

**A2.7** In particular, if he/she finds instances where there must be an intentional violation of the Manual, he/she shall bring this discrepancy to the attention of the Document Editor and explain why the discrepancy is necessary.

**A2.8** His/her final draft of a CCSDS document shall represent the technical consensus of his/her WG and Area before submission to the CCSDS Document Editor for publication.

**A2.9** The Technical Editor shall be responsible for ensuring that the document control functions, as defined in the main part of this Manual, are implemented.

**A2.10** The Technical Editor shall present the final draft of a CCSDS document to the Document Editor in electronic format.

### **A3 DOCUMENT EDITOR**

**A3.1** The CCSDS Document Editor should be a member of the staff responsible for publishing CCSDS documents.

**A3.2** The Document Editor shall be responsible for the preparation of the CCSDS document front cover and front matter as defined in the main text of this Manual.

**A3.3** The Document Editor shall review all CCSDS documents received from Technical Editors for unified appearance and conformance with the Manual.

**A3.4** Where exceptions are necessary, he/she shall use his/her good judgment to make a professional appearing document.

**A3.5** He/she shall be empowered:

- a) to adjust graphic appearance of a page;
- b) to correct grammatical, spelling, capitalization, and punctuation errors;
- c) to correct other document errors (e.g., cover colors, page numbers, index citations, document numbers, etc.);
- d) but not to change the meaning of any of the technical material without consulting the Technical Editor.

**A3.6** He/she shall ensure that the information on the Authority page is correct and complete.

**A3.7** He/she shall ensure that CCSDS documents are not released to the public until authority to do so is received from the CCSDS Management Council.

#### **A4 COOPERATION OF CCSDS TECHNICAL EDITORS AND DOCUMENT EDITORS**

The activities of CCSDS Technical Editors and Document Editors require coordination. For this reason, it is necessary that Technical Editors and Document Editors establish a close working relationship, and that they confer regularly throughout all phases of the CCSDS document-development process. CCSDS Technical Editors and Document Editors are expected to work together in the same spirit of cooperation that has characterized the work done by the CCSDS Agencies.

**ANNEX B****CONVENTIONS FOR REFERENCE LISTS****(NORMATIVE)****B1 OVERVIEW**

This annex specifies the reference list format for CCSDS documents. The reference entry format is based on a conventional academic reference format that is described in greater detail in several widely used reference works on publication style, and only those details that are most commonly used are described here.

Examples of references discussed in this annex are given in figure B-1.

**B2 REFERENCE LIST FORMAT**

**B2.1** The references in lists of referenced documents shall appear in the order in which those documents are cited in the text.

**B2.2** For the references subsection in section 1, references shall be numbered consecutively, beginning with 1.

**B2.3** For reference lists in annexes,

- a) for lists of documents cited in the text,
  - 1) references shall be numbered consecutively beginning with {A}1, where A is the letter of the annex in which the list appears;
  - 2) references shall appear in the order in which the citations occur in the text;
- b) for lists of documents not cited in the text, the entire list shall be ordered alphabetically and shall not be numbered.

**B2.4** Reference numbers for all numbered reference lists shall be enclosed in square brackets.

**B3 REFERENCE LIST ENTRIES FOR REFERENCED DOCUMENTS****B3.1 GENERAL**

Reference list entries for other referenced documents shall contain some or all of the following parts, separated by periods, in the following order:

- a) author(s);

- b) title(s);
- c) edition;
- d) series and/or document number;
- e) publication facts;
- f) URL (for Web pages).

## **B3.2 FORMAT OF LIST ENTRY PARTS FOR REFERENCED DOCUMENTS**

### **B3.2.1 Author(s)**

#### **B3.2.1.1 Discussion**

The first position of a list entry is by convention reserved for the names of persons responsible for writing, editing, or other preparatory role in the creation of the referenced work. If the work referenced was published with attribution to one or more authors, editors, or other preparers, the named individuals are included in the entry. In practice, documents referenced in CCSDS publications typically do not contain attribution to individuals, and therefore the typical entry begins with the title of the referenced work.

#### **B3.2.1.2 Format and Position of Personal Names**

**B3.2.1.2.1** If the referenced work is attributed to one or more authors, the names of those authors shall be listed first in the entry.

**B3.2.1.2.2** For numbered lists, the order of author first, middle, and last names shall *not* be inverted; i.e., the first name shall appear first, and the last name shall appear last.

**B3.2.1.2.3** For alphabetized lists,

- a) the author's name shall be inverted at the beginning of each entry, i.e., the last name shall appear first, followed by a comma and the rest of that author's name in normal order;
- b) if more than one author is given for a referenced document, only the first author's name shall be inverted.

**B3.2.1.2.4** The spelling of authors' names shall be the same as it appears in the work referenced; if the referenced work uses only initials for the author's given names, that author's actual given names, if known, may be substituted.

**B3.2.1.2.5** If attribution is given to more than one author:

- a) for two or three individuals, all names shall be used in the entry:

- 1) for two individuals, the format is ‘{Author 1} and {Author 2}’;
  - 2) for three individuals, the format is ‘{Author 1}, {Author 2}, and {Author 3}’;
- b) for more than three individuals, only the first author’s name shall be used, followed by a comma and ‘*et al.*’ (and others).

**B3.2.1.2.6** If the referenced work is attributed to one or more editors or other types of publication progenitors, rather than to an author, the author conventions in B3.2.1.2.1–B3.2.1.2.4 shall apply in addition to the following:

- a) for editors, a single name shall be followed by a comma and ‘ed.’ (editor), and a list of names shall be followed by a comma and ‘eds.’ (editors);
- b) for others, e.g., compilers, translators, etc., a single name or list of names shall be followed by a comma and an abbreviation identifying the role of the individual(s) in the publication’s development, e.g., ‘comp(s).’ for compiler(s), ‘trans.’ for translator(s), etc.

**B3.2.1.2.7** If the referenced work gives attribution to different individuals having different roles in the work’s production, e.g., to both an author and an editor, the individual or list of individuals having the role deemed most important in the context of the reference shall appear at the beginning of the entry, and individuals having other roles shall be given, along with identification of their role, after the title of the work; e.g.:

{Author}. {*Title*}. {Editor}, ed. . . .

{Editor}, ed. {*Title*}. By {Author}. . . .

## **B3.2.2 Titles(s)**

**B3.2.2.1** Title capitalization shall be used for all titles, regardless of how the title appears in the referenced work.

**B3.2.2.2** Titles of documents and other standalone publications shall be italicized.

**B3.2.2.3** For a reference to a work that is a part of larger publication, e.g., a report printed in a collection of reports:

- a) the title of the referenced part shall be placed first, in quotation marks, followed by the title, in italics, of the work in which it appears;
- b) the italicized title of the standalone publication may be preceded by ‘In’ or ‘Chapter *n* in’ or ‘Part *n* of’, as appropriate;
- c) the page numbers of the referenced part may be included by following the italicized title of the standalone publication with a comma and the inclusive page numbers, e.g., ‘133-471’ (no notation is used to identify these numbers as page numbers).

NOTE – The order in which multiple titles are presented in an entry can vary for different kinds of references, and other information, such as volume numbers, may be included. A more complete reference work should be consulted for variations on the conventions given here.

### **B3.2.3 Edition**

**B3.2.3.1** Edition information shall be given if an edition is identified in the referenced work.

**B3.2.3.2** For editions,

- a) the numeric abbreviation of the ordinal number, followed by ‘ed.’ (edition) shall be used, e.g., ‘2nd ed.’ for second edition;
- b) editions that are not indicated by ordinal numbers shall be given in abbreviated form, e.g., ‘Rev. ed.’ for revised edition;
- c) an entry for the first edition of a work shall not indicate that it is the first edition unless the work explicitly identifies itself as a first edition.

**B3.2.3.3** For issues,

- a) the issue number shall be given as ‘Issue *n*’ (without abbreviation), where *n* is the issue number;
- b) if the referenced issue is a draft, ‘Draft’ shall be included in the issue number (e.g., ‘Draft Issue 1.1’).

NOTE – By convention, the issue number is always included in references to CCSDS documents, including the first issue.

### **B3.2.4 Series**

**B3.2.4.1** The name of the series, in title capitalization, shall be given. If it is a numbered series, the series name shall be followed by a comma and the number of the referenced work within the series.

NOTE – Technical publications having document numbers are construed to be members of numbered series. E.g., an ISO standard with an IS number is construed to be a member of the series ‘International Standard’, and the ISO document number is construed to be its number within the International Standard series.

**B3.2.4.2** CCSDS series shall be given in the form, {Document Type} ({Document Color}), {Document Number}.

### **B3.2.5 Publication Facts**

Publication facts shall be given in the form, {Place of Publication}: {Publisher}, {date of publication}.

## **B4 REFERENCE LIST ENTRIES FOR REFERENCED PERIODICALS**

### **B4.1 GENERAL**

Reference list entries for references to material published in periodicals contain some or all of the following parts in the following order:

- a) author(s);
- b) title of referenced work;
- c) title of periodical;
- d) volume and issue numbers;
- e) issue date;
- f) inclusive page numbers.

### **B4.2 FORMAT OF LIST ENTRY PARTS FOR REFERENCED PERIODICALS**

#### **B4.2.1 Author(s)**

The format and placement for personal names shall follow the conventions described in B3.2.1.2. A period shall terminate the author part of the entry.

#### **B4.2.2 Title of Referenced Work**

The title of a referenced work published in a periodical shall be placed in quotation marks before the title of the periodical and terminated by a period.

#### **B4.2.3 Periodical Title, Volume and Issue Numbers, Issue Date, and Inclusive Page Numbers**

The periodical title, volume and issue numbers, issue date, and inclusive page numbers shall form a single syntactic unit; i.e., periods shall not be used between these parts, and a single period shall be placed after the last part used:

- a) the periodical title shall be placed first in italics;
- b) the volume number, if applicable, shall follow the periodical title without intervening punctuation;



- c) if an issue number applies,
  - 1) a comma shall be placed after the volume number,
  - 2) the issue number shall be placed next as ‘no.  $\{n\}$ ’, where  $n$  is the issue number;
- d) the issue date shall be placed in parentheses, after title, volume, and issue information;
- e) for inclusive page numbers, a colon shall be placed after the parenthetical date, and the beginning and ending pages shall be given as ‘ $\{n1\}$ - $\{n2\}$ ’, where  $n1$  is the first page and  $n2$  is the last page of the referenced work.

NOTE – Because references to periodicals are rare in CCSDS documents, a more complete reference work should be consulted for the many permutations relating to references to periodicals.

CCSDS Document

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

ISO Standard

- [2] *Information Technology—8-Bit Single-Byte Coded Graphic Character Sets—Part 1: Latin Alphabet No. 1*. International Standard, ISO/IEC 8859-1:1998. Geneva: ISO, 1998.

Article in Professional Journal

- [3] H. Gomaa, D. Menasc, and L. Kerschberg. “A Software Architectural Design Method for Large-Scale Distributed Information Systems.” *Distributed Systems Engineering* 3, no. 3 (1996): 162-172.

Paper in Proceedings Document

- [4] A. Sikora and V. F. Groza. “Coexistence of IEEE802.15.4 with Other Systems in the 2.4 GHz-ISM-Band.” In *Proceedings of the IEEE Instrumentation and Measurement Technology Conference* (16-19 May 2005, Ottawa, Ontario), 3:1786-1791. New York: IEEE, 2005.

Internet Standard

- [6] R. Braden, ed. *Requirements for Internet Hosts*. STD 3. Reston, Virginia: ISOC, October 1989.

Internet RFC

- [7] W. Simpson. *PPP in Frame Relay*. RFC 1973. Reston, Virginia: ISOC, June 1996.

Random Technical Document

- [8] Theodore S. Rappaport. *Wireless Communications: Principles and Practice*. 2nd ed. Prentice Hall Communications Engineering and Emerging Technologies Series. Upper Saddle River, New Jersey: Prentice Hall, 2001.

Random Web Site

- [8] “The NIST Reference on Constants, Units, and Uncertainty.” NIST Physics Laboratory. <http://physics.nist.gov/cuu/index.html>.

**Figure B-1: Reference Examples**

## ANNEX C

### ACRONYMS AND TERMINOLOGY

#### (INFORMATIVE)

This annex defines terms used in the Manual.

**boilerplate:** Text or other printed matter that is reused without change in successive publications.

**em:** A printing space approximately equal to that of the character M.

**en:** A printing space approximately equal to one-half of an *em*.

**inside margin:** The binding-edge margin; the left margin for recto pages; the right margin for verso pages.

**image area:** Portion of page on which printed material appears.

**leading** (pronounced *ledding*): White space, measured in points, added between lines of text.

**mm:** Millimeter.

**margins:** Areas of the page outside the image area.

**page:** Any recto or verso page. A page may contain printed matter or may be blank.

**point:** A unit of measure used in printing, approximately equal to 0.35 mm (1/72 inch).

**recto:** Traditional term for right-hand page. The left edge of a recto page is the binding edge.

**verso:** Traditional term for left-hand page. The right edge of a verso page is the binding edge.

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