

Space data and information transfer systems — Parameter value language specification

ICS 49.140

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The UK participation in its preparation was entrusted to Technical Committee ACE/67, Data and information transfer standards for civil space applications, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO title page, page ii, pages 1 to 61 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

This British Standard, having been prepared under the direction of the Engineering Sector Board, was published under the authority of the Standards Board and comes into effect on 15 May 1998

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INTERNATIONAL STANDARD

**ISO
14961**

First edition
1997-12-15

Space data and information transfer systems — Parameter value language specification

*Systèmes de transfert des informations et données spatiales —
Spécification des valeurs paramétriques du langage*



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 14961 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 13, *Space data and information transfer systems*.

Descriptors: Navigation systems, space data systems, data processing, information interchange, telecommunications, data transfer, artificial languages, parameter value language, specifications.

1 Scope

This International Standard specifies the requirements for a parameter value language specification for space data and information transfer systems.

2 Requirements

The requirements are the same as the technical recommendations made in the following publication (reproduced on the following pages), which is adopted as an International Standard:

CCSDS 641.0-B-1, May 1992, *Recommendation for space data system standards — Parameter value language specification*.

For the purposes of international standardization, the modifications outlined below shall apply to the following pages of publication CCSDS 641.0-B-1.

Pages i to iv

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

Page vii

Add the following information to reference [8]:

Document CCSDS 301.0-B-2, April 1990 is equivalent to ISO 11104:1991.

3 Revision of publication CCSDS 641.0-B-1

It has been agreed with the Consultative Committee for Space Data Systems that Sub-Committee ISO/TC 20/SC 13 will be consulted in the event of any revision or amendment of publication CCSDS 641.0-B-1. To this end, NASA will act as a liaison body between CCSDS and ISO.

Consultative Committee for Space Data Systems

RECOMMENDATION FOR SPACE
DATA SYSTEM STANDARDS

PARAMETER VALUE LANGUAGE SPECIFICATION (CCSD0006)

CCSDS 641.0-B-1
BLUE BOOK

May 1992



Authority

Issue:	Blue Book, Issue 1
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This Recommendation reflects the consensus technical agreement of the following member Agencies of the Consultative Committee for Space Data Systems (CCSDS):

- British National Space Centre (BNSC)/United Kingdom
- Canadian Space Agency (CSA)/Canada
- Centre National D'Etudes Spatiales (CNES)/France
- Deutsche Forschungsanstalt für Luft und Raumfahrt (DLR)/FRG
- European Space Agency (ESA)/Europe
- Instituto de Pesquisas Espaciais (INPE)/Brazil
- National Aeronautics and Space Administration (NASA)/USA
- National Space Development Agency of Japan (NASDA)/Japan

The following observer Agencies also concur with this Recommendation:

- Department of Communication/Communications Research Centre (DOC/CRC)/Canada
- Institute for Space Astronautics and Science (ISAS)/Japan

This Recommendation is published and maintained by:

CCSDS Secretariat
Communications and Data Systems Division, (Code-OS)
National Aeronautics and Space Administration
Washington, DC 20546, USA

CCSDS Recommendation: Parameter Value Language Specification

Statement of intent

The Consultative Committee for Space Data Systems (CCSDS) is an organization officially established by the management of member space Agencies. 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 considered binding on any Agency.

This Recommendation is issued by, and represents the consensus of, the CCSDS Plenary body. Agency endorsement of this Recommendation is entirely voluntary. Endorsement, however, indicates the following understandings:

- Whenever an Agency establishes a CCSDS-related Standard, this Standard will be in accord with the relevant Recommendation. Establishing such a Standard does not preclude other provisions which an Agency may develop.
- Whenever an Agency establishes a CCSDS-related Standard, the Agency will provide other CCSDS member Agencies with the following information:
 - The Standard itself.
 - The anticipated date of initial operational capability.
 - The anticipated duration of operational service.
- Specific service arrangements shall be made via memoranda of agreement. Neither this Recommendation nor any ensuing Standard is a substitute for a memorandum of agreement.

No later than five years from the date of its issuance, this Recommendation 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.

Foreword

This document is a technical Recommendation for the specification of the Parameter Value Language (PVL) and has been prepared by the Consultative Committee for Space Data Systems (CCSDS).

This Recommendation defines the Parameter Value Language which provides a human readable, machine processable language for naming and expressing data values. It allows implementing organizations within each Agency to proceed coherently with the development of compatibly derived Standards for space data systems and widely dispersed data users that are within their cognizance. Derived Agency Standards may implement only a subset of the optional features allowed by the Recommendation and may incorporate features not addressed by the Recommendation.

Through the process of normal evolution, it is expected that expansion, deletion, or modification to this document may occur. This Recommendation is therefore subject to CCSDS document management and change control procedures which are defined in Reference [1].

Questions relative to the contents or status of this document should be addressed to the CCSDS Secretariat.

CCSDS Recommendation: Parameter Value Language Specification

Document Control

<i>Document</i>	<i>Title</i>	<i>Date</i>	<i>Status/Remarks</i>
CCSDS 641.0-B-1	Recommendation for Space Data System Standards: Parameter Value Language, Issue 1	May 1992	Current Issue

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References

- [1] “Procedures Manual for the Consultative Committee for Space Data Systems”, CCSDS A00.0-Y-4, Yellow Book, Issue 4, Consultative Committee for Space Data Systems, September 1990.
- [2] ISO 646-1991(E) Information Technology — ISO 7-bit coded character set for information interchange, Third Edition, 1991-12-15.
- [3] ISO 8859-1-1987 Information Processing — 8-bit Single-byte coded graphic character set, Part 1: Latin Alphabet no. 1.
- [4] ISO 6093-1985(E) Information Processing — Representation of numerical values in character strings for information interchange, First Edition, 1985-11-01.
- [5] ISO/IEC 8824:1990(E) Information Technology — Open System Interconnection — Specification of Abstract Syntax Notation One (ASN. 1), Second Edition, 1990-12-15.
- [6] Steedman, Douglas — Abstract Syntax Notation One (ASN.1) the Tutorial Reference, Technology Appraisals, London 1990.
- [7] “Report Concerning Space Data Systems: Parameter Value Language — A Tutorial”, CCSDS 641.0-G-1, Consultative Committee for Space Data Systems, Green Book, Issue 1, May 1992 or later.
- [8] “Recommendation for Space Data Systems: Time Code Formats”, CCSDS 301.0-B-2, Consultative Committee for Space Data Systems, Blue Book, Issue 2, April 1990 or later.

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1 Introduction

1.1 Purpose and Scope

The purpose of this document is to establish a common Recommendation for the specification of a standard keyword/value type language for naming and expressing data values in order to interchange data in a more uniform fashion within and among Agencies participating in the Consultative Committee for Space Data Systems (CCSDS). This Recommendation provides an overview and formal syntax specification of the Parameter Value Language (PVL).

1.2 Applicability

The specifications in this document are to be invoked through the normal standards program of each member Agency and are applicable to all space-related science and engineering data exchanges where a keyword/value language is desired.

1.3 Recommended Approach to Reading the Document

A proper understanding of this Recommendation requires familiarity with the terminology used in this document. Terms are defined as they are introduced in the text. Individuals who are accessing the document out of sequence may wish to refer to Annex A, which presents a complete summary of the acronyms and the terminology used in this document. Reference [7] is a tutorial which describes the requirements, the techniques used to fulfill the requirements, usage guidelines and parser implementation guidelines for PVL. Some readers may find it useful to read Reference [7] prior to reading this document.

The document is structured as follows:

- Chapter 2 describes the PVL language, using English text and syntax diagrams.
- Chapter 3 provides the formal syntax specification written in Abstract Syntax Notation One (ASN.1, see Reference [5]). The comments in the ASN.1 are part of the specification. This is the ruling form of the specification.
- Annex A contains acronyms and a glossary of terms used in this document.
- Annex B lists the ASCII codes for the characters used in PVL.

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This document uses syntax diagrams to illustrate the syntax of the various language constructs. Components of the construct are called elements, are presented in boxes or circles and are connected by directional lines. The following conventions are used:

- Elements that are presented in uppercase and lowercase letters in rectangles are defined elsewhere in the document.
- Elements that are presented in a circle as a single bold character are delimiters or reserved characters.
- Elements that are presented in lowercase letters in a rectangle with rounded corners are basic items not further defined in the syntax diagrams of this document.
- Elements that are presented in bold characters in a rectangle with rounded corners are keywords.
- The item named on the left of the ::= symbol is the item being defined.
- The diagram on the right of the ::= symbol is the definition.
- A vertical branch represents a choice.
- A repetition is indicated by a loop back covering the object to be repeated.
- The termination of each structure is represented by the $\circ$ symbol.

For example:

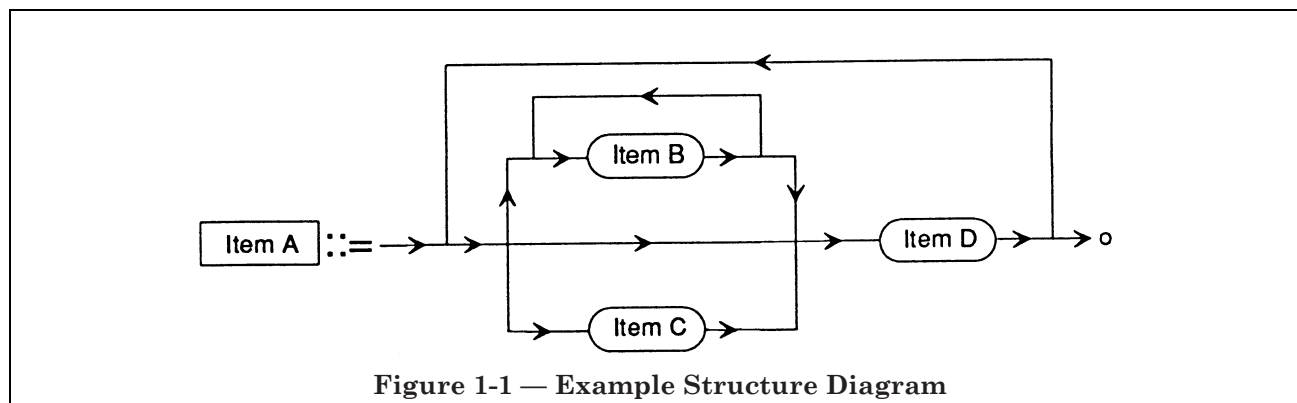


Figure 1-1 — Example Structure Diagram

In this example Item A is defined as first a choice between Items B or C or nothing, where Item B itself may be repeated any number of times. Then this structure is followed by one Item D. Once this structure is built up, it may then all be repeated any number of times, until the choice to pass onto the $\circ$ symbol is taken. Of course if any items on the right (B, C or D) contain an Item A, the definition is recursive. Recursive structure definitions are permitted in this Recommendation.

1.4 Character Set Definitions

The following sections contain character set definitions used in this specification. A clear understanding of these terms is necessary to understand this Recommendation.

1.4.1 PVL Character Set

The PVL Character Set is a subset of the ASCII character set. The specific subset is defined in Annex B. The PVL Character Set is split into three subsets: white space characters, reserved characters, and unrestricted characters.

1.4.1.1 White Space Character Set

The White Space Character Set is defined as the following characters: space, carriage return, line feed, horizontal tab, vertical tab, and form feed. A sequence of one or more of these characters is known as White Space. The semantic effect of White Space between syntactic elements is not affected by its length.

1.4.1.2 Reserved Character Set

The Reserved Character Set is a collection of characters reserved for specific purposes or future use. The Reserved Character Set is defined in Table 1-1.

Table 1-1 — Reserved Character Set

Symbol	Name	Symbol	Name	Symbol	Name
&	Ampersand	[	Left Square Bracket	%	Percent Sign
<	Less-Than Sign (Open Angle Bracket)	]	Right Square Bracket	+	Plus Sign
>	Greater-Than Sign (Close Angle Bracket)	=	Equal Sign	”	Quotation Mark
‘	Apostrophe	!	Exclamation Point	;	Semicolon
{	Left Curly Bracket (Left Brace)	#	Number Sign, (Hash)	~	Tilde
}	Right Curly Bracket, (Right Brace)	(	Left Parenthesis		Vertical Line
,	Comma	)	Right Parenthesis		