

INTERNATIONAL STANDARD

IEC
61162-420

First edition
2001-11

**Maritime navigation and radiocommunication
equipment and systems –
Digital interfaces –**

**Part 420:
Multiple talkers and multiple listeners –
Ship systems interconnection –
Companion standard requirements
and basic comparison standards**

© IEC 2001 — Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission
Telefax: +41 22 919 0300

3, rue de Varembé Geneva, Switzerland
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE **XD**

For price, see current catalogue

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope and object.....	9
2 Normative references.....	10
3 Definitions	10
3.1 Terms and abbreviations	10
3.2 General typographical rules in this standard	12
4 General principles for the PCS.....	12
4.1 General structure.....	12
4.1.1 Purpose.....	12
4.1.2 Components of the PCSDL	12
4.1.3 Object based principles in the PCSDL	13
4.1.4 Generic and manufacturer specific companion standards	14
4.1.5 Generic companion standards (PFS).....	15
4.1.6 Manufacturer specific companion standards	15
4.1.7 Guidelines for using PCS	16
4.2 Products of the PCS	17
4.2.1 MAU name.....	17
4.2.2 Interface name.....	17
4.2.3 Interface class name.....	17
4.2.4 Data object name.....	18
4.2.5 Data object function	18
4.2.6 Data object structure.....	18
4.2.7 Data object information contents.....	18
4.2.8 Run-time library information items	18
4.2.9 PFS information items.....	19
4.3 The PISCES foundation specifications (PFS)	19
4.4 Generic interfaces in the PFS	19
5 The companion standard reference specification	19
5.1 Introduction	19
5.2 Basic concepts of the PCS.....	20
5.3 Conventions for companion standard specification files	21
5.3.1 General principles.....	21
5.3.2 Tokens	21
5.3.3 Name structure	23
5.3.4 Name scope	23
5.3.5 Configurable identifiers and literal	24
5.4 General structure of PCS specifications	24
5.4.1 General	24
5.4.2 The specification header	25
5.4.3 The specification body	26
5.5 Application specifications.....	26
5.5.1 Overview	26
5.5.2 General layout	26
5.5.3 Header	27
5.5.4 Body.....	28

5.6	Interface component specifications	30
5.6.1	Overview	30
5.6.2	General layout	31
5.6.3	Header specification	31
5.6.4	Body specification	32
5.7	Information specifications	33
5.7.1	Overview	33
5.7.2	General layout	33
5.7.3	Header	34
5.7.4	Body	34
5.8	Data types	35
5.8.1	Overview	35
5.8.2	General layout	35
5.8.3	Header	36
5.8.4	Body	36
6	PISCES foundation specification (PFS)	38
6.1	Introduction	38
6.2	Naming conventions	39
6.3	Application classes	39
6.3.1	Introduction	39
6.3.2	Application base class: PACApplication	40
6.3.3	LNA MAU application: PACLNA	40
6.3.4	Managed applications: PACFullApplication	40
6.3.5	IEC 61162-1 and IEC 61162-2 interface application: PACNMEARelay	40
6.3.6	Console application: PACConsole	40
6.3.7	General alarm and monitoring application: PACServerApp	40
7	Specification requirements for PCS component applications	41
7.1	Introduction and general documentation format	41
7.2	Function block	41
7.2.1	Function block graphical view	41
7.2.2	Physical effects	41
7.2.3	Input variables	41
7.2.4	Output variables	42
7.2.5	Events	42
7.2.6	Commands	42
7.2.7	Status	42
7.2.8	Parameters	42
7.2.9	Indication of accept or connect functionality	42
7.3	Functional description	42
7.4	Companion standard descriptions	43

Annex A (normative) Defined keywords	44
Annex B (normative) Basic IEC 61162-4 data types	46
Annex C (normative) General application companion standards	47
C.1 Introduction and general principles.....	47
C.2 Functionality overview.....	47
C.2.1 General data definitions	47
C.2.2 Version codes.....	47
C.2.3 Manufacturer and model identification	47
C.2.4 Interface and MCP information.....	47
C.2.5 Authentication.....	47
C.2.6 File overview.....	48
C.2.7 Data types General	48
C.2.8 Application PACSimpleApplication.....	52
C.2.9 Application PACFullApplication	52
C.2.10 Interface PCCVersionCodes.....	53
C.2.11 Interface PCCApplicationInfo	54
C.2.12 Data types UserAuth	55
C.2.13 Interface PCCUserAuth.....	56
Annex D (normative) LNA-MAU companion standard	59
D.1 General principles.....	59
D.2 Companion standards.....	60
D.2.1 Data types LnaMau	60
D.2.2 Interface PCCLNStats.....	62
Annex E (normative) General alarm and monitoring companion standards	64
E.1 Introduction and general principles.....	64
E.2 Alarm and monitoring system identifiers	64
E.3 Functionality overview.....	64
E.3.1 Companion standard for tag based monitoring and alarm system	64
E.3.2 Client-server architecture.....	65
E.3.3 Tag number	65
E.3.4 Tag sets	65
E.3.5 Tag information.....	65
E.3.6 Tag attributes	65
E.3.7 Tag data	65
E.3.8 Alarms.....	66
E.4 Application classes	66
E.5 Companion standard structure	67
E.6 File structure	67
E.7 Standard tag names	68
E.7.1 General	68
E.7.2 Structure of P tag name class	69
E.7.3 General structural rules.....	69
E.7.4 Main process codes	70
E.7.5 Process sub-codes	70
E.7.6 General sub-groups	70

E.7.7	Automation related sub-group	71
E.7.8	Navigation sub-groups	71
E.7.9	Data type indication group	71
E.7.10	Use of engineering units	72
E.7.11	Sequence number	72
E.8	Structure of standard tags (S class)	73
E.9	Structure of yard tags (Y class)	73
E.10	Structure of internal tags (I class)	73
E.11	New tag name classes	73
E.12	General quality indicators	73
E.13	Certification	73
E.14	Time stamp	73
E.15	Validity flag	74
E.16	Authentication	74
E.17	Companion standard specifications	74
E.17.1	DATA TYPES TagData	74
E.17.2	Application PACReadableServer	80
E.17.3	Application PACWritableServer	80
E.17.4	Application PACAlarmSystem	81
E.17.5	Interface PCCTagDatabase	82
E.17.6	Interface PCCTagText	84
E.17.7	Interface PCCTagStream	85
E.17.8	Interface PCCTagNetsearch	86
E.17.9	Interface PCCTagAttributes	87
E.17.10	Interface PCCTagSubscribe	88
E.17.11	Interface PCCTagWrite	89
E.17.12	Interface PCCTagAlarm	90
E.17.13	Interface PCCTagSet	91
E.17.14	Interface PCCTagAttributeWrite	92
Annex F (normative)	Navigation Interfaces	94
F.1	IEC 61162-1 related function	94
F.2	Interface PCCNMEAIn	94
F.2.1	READ NoOfPorts	94
F.2.2	FUNCTION GetPortDescription	94
F.2.3	FUNCTION NoOfSentences	94
F.2.4	FUNCTION GetListOfSentences	94
F.2.5	FUNCTION GetSentence	94
F.2.6	SUBSCRIBE Port_<nn>	95
F.2.7	SUBSCRIBE Port_<nn>_<fmt>	95
F.3	Interface PCCNMEAOut	95
F.3.1	READ NoOfPorts	95
F.3.2	FUNCTION GetPortDescription	95
F.3.3	NONACKED-WRITE Port_<nn>	95
F.4	The IEC 61162-1/2 related companion standard documents	96
F.4.1	The IEC 61162-1/2 data type description	96
F.4.2	Description of Interface PCCNMEAIn	97
F.4.3	Description of Interface PCCNMEAOut	100
F.4.4	Application Description	101

INTERNATIONAL ELECTROTECHNICAL COMMISSION

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 420: Multiple talkers and multiple listeners – Ship systems interconnection – Companion standard requirements and basic companion standards

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61162-420 has been prepared by IEC technical committee 80: Maritime navigation and radiocommunication equipment and systems.

The text of this standard is based on the following documents:

FDIS	Report on voting
80/312/FDIS	80/327/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 3.

The special typographical conventions and nomenclature used in this standard are defined in IEC 61162-400 annex A.

Annexes A, B, C, D, E and F form an integral part of this standard.

The committee has decided that the contents of this publication will remain unchanged until June, 2005. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

INTRODUCTION

International Standard IEC 61162 is a four part standard which specifies four digital interfaces for applications in marine navigation, radiocommunication and system integration.

The four parts are:

- IEC 61162-1 Single talker and multiple listeners
- IEC 61162-2 Single talker and multiple listeners, high speed transmission
- IEC 61162-3 Multiple talkers and multiple listeners – Serial data instrument network
- IEC 61162-4 Multiple talkers and multiple listeners – Ship systems interconnection. Part 1 of this standard is sub-divided into a number of individual standards with part numbers in the 400 series.

IEC 61162-420 contains the specification of a description language for IEC 61162-4 series companion standards (user layer specifications), a framework for the organization of such companion standard descriptions and also the descriptions of basic components that can be used as a starting point to build IEC 61162-4 series components and networks.

Later standards in the companion standard series (IEC 61162-420) are expected to address more concrete interface requirements for specific navigational equipment.

Relationship with the other parts of the IEC 61162 series of standards is defined in annex B to IEC 61162-400.

MARITIME NAVIGATION AND RADIOCOMMUNICATION EQUIPMENT AND SYSTEMS – DIGITAL INTERFACES –

Part 420: Multiple talkers and multiple listeners – Ship systems interconnection – Companion standard requirements and basic companion standards

1 Scope and object

International Standard IEC 61162-420 specifies the requirement for and basic components of the IEC 61162-4 series companion standards. These components are referred to as follows:

- PCS** (PISCES companion standards) which contain the rules for creation of companion standards. The general principles underlying the PCS are described in clause 4.
- PCSDL** (PCS description language). Part of the PCS is the definition of the syntax for the various types of companion standard documents that make them readable by computer tools. The PCSDL is described in clause 5.
- function block** description. The function block description is a high level and graphical description of applications using the IEC 61162-4 series interface standard. The function block syntax is specified in clause 7.
- PFS** (PISCES foundation specifications) which contain a framework for classification of applications adhering to the IEC 61162-4 standard. The PFS will also provide a minimum level of interoperability between different manufacturers' applications using this framework. The PFS is described in clause 6.

Clause 5 contains the complete reference to the PCS description language. Subclause 5.2 explains the basic concept of the PCS which is given by the distinction between four types of specifications: applications, interfaces, information and data types. General conventions with respect to the syntax of the PCS can be found in 5.3. All PCS documents are based on a similar structure. This approach is intended to make it easier to become familiar with the syntax and semantics of the PCS which is defined in 5.3.1. The four subclauses thereafter explain in detail the syntax and semantics of the four different types of specifications generated by the PCS.

Clause 6 describes the relationship between the different classes of IEC 61162-4 applications and gives an overview of their functionality. The annexes contain the detailed PCS definitions for the classes.

The objective of companion standards is to provide definitions of the information that is transferred within an integrated ship control system and of how these information items can be accessed or provided. Furthermore, the standard shall allow the definition of the actual network interfaces which the applications use to connect to the system. The description format is machine-readable, allowing an automatic compilation of the description into interface software.

A companion standard allows the reader to, at will, shift the focus between a technical specification and a definition of interfaces and information items. The development team can determine information attributes like unit, power, accuracy and the structure of the system architecture and create a common interpretation basis for data before the system implementation. The formalisms underlying the specification language will at the same time provide an unambiguous and precise description of the equipment interfaces which allow the use of computer tools to automatically generate interface program codes or to inspect and manipulate interfaces on-line, for example for debugging and monitoring purposes.

2 Normative references

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of IEC 61162. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61162 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 61162-1:2000, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 1: Single talker and multiple listeners*

IEC 61162-2:1998, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 2: Single talker and multiple listeners, high speed transmission*

IEC 61162-3, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 3: Multiple talkers and multiple listeners – Serial data instruction network*¹

IEC 61162-400, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 400: Multiple talkers and multiple listeners – Ship systems interconnection – Introduction and general principles*

IEC 61162-401, *Maritime navigation and radiocommunication equipment and systems – Digital interfaces – Part 401: Multiple talkers and multiple listeners – Ship systems interconnection – Application profile*

ISO/IEC 8859-1:1998, *Information technology – 8-bit single-byte coded graphic character sets – Part 1: Latin alphabet No. 1*

¹ To be published.