



National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 14160:2002

ICS 49.140

National Standards
Authority of Ireland
Dublin 9
Ireland

Tel: (01) 807 3800
Tel. (01) 807 3838

SPACE ENGINEERING - SOFTWARE

*This Irish Standard was
published under the
authority of the National
Standards Authority of
Ireland
and comes into effect on
March 1, 2002*

**NO COPYING WITHOUT NSAI
PERMISSION EXCEPT AS
PERMITTED BY COPYRIGHT
LAW**

© NSAI 2002

Price Code R

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 14160

December 2001

ICS 49.140

English version

Space engineering - Software

This European Standard was approved by CEN on 11 November 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

EN 14160:2001 (E)

Contents

	page
Foreword.....	5
Introduction	5
1 Scope.....	6
2 Normative references	6
3 Terms, definitions and abbreviated terms	7
3.1 Terms and definitions.....	7
3.2 Abbreviated terms	9
4 Space system software engineering	10
4.1 Introduction.....	10
4.2 Organization of this Standard.....	10
4.3 Space system software engineering processes.....	11
4.3.1 General	11
4.3.2 Software requirements engineering process	15
4.3.3 Software design engineering process.....	15
4.3.4 Software verification and validation (qualification) process	15
4.3.5 Software operations engineering process	16
4.3.6 Software maintenance process.....	16
4.4 Relation to space project management and space product assurance standards.....	16
4.4.1 General	16
4.4.2 Software product assurance	16
4.4.3 Software project management.....	16
4.5 Verification engineering.....	18
5 General requirements.....	18
5.1 Introduction.....	18
5.2 System engineering processes related to software	18
5.2.1 Introduction	18
5.2.2 System requirements analysis	19
5.2.3 System partitioning	19
5.2.4 System level requirements for software verification and validation	20
5.2.5 System level integration of software	20
5.2.6 Software operations	22
5.3 Software management	22
5.3.1 Introduction	22
5.3.2 Software life cycle	23
5.3.3 Interface management.....	25
5.3.4 Technical budget and margin management	25

5.4	Software requirements engineering process	26
5.4.1	Introduction.....	26
5.4.2	Software requirements analysis.....	26
5.4.3	Software top-level architectural design	27
5.4.4	Software verification and validation	28
5.5	Software design engineering process	29
5.5.1	Introduction.....	29
5.5.2	Design of software items.....	29
5.5.3	Coding and testing	30
5.5.4	Integration	31
5.6	Software verification and validation (qualification) process	33
5.6.1	Introduction.....	33
5.6.2	Milestones	33
5.6.3	Verification and validation processes.....	33
5.6.4	Verification process implementation	34
5.6.5	Validation process implementation	35
5.6.6	Verification process.....	36
5.6.7	Validation process.....	38
5.6.8	Joint technical review process	40
5.7	Software operations engineering process.....	40
5.7.1	Introduction.....	40
5.7.2	Operation process.....	41
5.7.3	Process implementation.....	41
5.7.4	Operational testing	41
5.7.5	System operation	42
5.7.6	User support.....	42
5.8	Software maintenance process.....	42
5.8.1	Introduction.....	42
5.8.2	Process implementation.....	43
5.8.3	Problem and modification analysis	43
5.8.4	Modification implementation.....	44
5.8.5	Maintenance review and acceptance.....	44
5.8.6	Software migration	45
5.8.7	Software retirement.....	46
6	Special requirements.....	46
6.1	Introduction.....	46
6.2	Space segment software.....	46
6.2.1	General.....	46
6.2.2	Critical functions.....	46
6.2.3	System interfaces.....	47
6.2.4	Inflight software modifications	47
6.3	Ground segment software.....	48
6.4	Software re-use	48
6.4.1	General.....	48
6.4.2	Developing software for intended re-use	48
6.4.3	Re-using software from other projects	48

EN 14160:2001 (E)

6.5	Man-machine interfaces.....	49
6.6	Critical software.....	50
Annex A (normative) Software documentation.....		51
A.1	Introduction.....	51
A.2	The requirements baseline (RB)	51
A.2.1	General	51
A.2.2	Requirements baseline contents at SRR.....	51
A.2.3	Interface requirements document (IRD)	52
A.3	Technical specification (TS)	53
A.3.1	General	53
A.3.2	Interface control document (ICD).....	54
A.3.3	Software maintenance plan	54
A.3.4	Operations manual.....	54
A.4	Design justification file (DJF).....	54
A.5	Design definition file (DDF)	56
A.6	System level documentation	57
A.6.1	Introduction	57
A.6.2	Operations, maintenance, migration and retirement documentation.....	57
Annex B (informative) Requirement cross references.....		59
Annex C (informative) References to other space standards.....		61
Bibliography.....		62
Figures		
Figure 1	— The recursive customer - supplier model	12
Figure 2	— Overview of the software development processes.....	13
Figure 3	— Process constraints	14
Figure 4	— Accommodation of different software life cycles.....	14

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-