

Table of contents

- European Foreword.....7**
- 1 Scope.....8**
- 2 Normative references9**
- 3 Terms, definitions and abbreviated terms..... 10**
 - 3.1 Terms for other standards..... 10
 - 3.2 Terms specific to the present standard 10
 - 3.3 Abbreviated terms..... 16
 - 3.4 Nomenclature 18
- 4 Space system software product assurance principles 19**
 - 4.1 Introduction..... 19
 - 4.2 Organization of this Standard20
 - 4.3 Tailoring of this Standard22
- 5 Software product assurance programme implementation23**
 - 5.1 Organization and responsibility23
 - 5.1.1 Organization.....23
 - 5.1.2 Responsibility and authority23
 - 5.1.3 Resources.....24
 - 5.1.4 Software product assurance manager/engineer24
 - 5.1.5 Training.....24
 - 5.2 Software product assurance programme management.....25
 - 5.2.1 Software product assurance planning and control.....25
 - 5.2.2 Software product assurance reporting.....26
 - 5.2.3 Audits.....27
 - 5.2.4 Alerts.....27
 - 5.2.5 Software problems27
 - 5.2.6 Nonconformances.....28
 - 5.2.7 Quality requirements and quality models.....29

5.3	Risk management and critical item control.....	29
5.3.1	Risk management.....	29
5.3.2	Critical item control.....	29
5.4	Supplier selection and control.....	30
5.4.1	Supplier selection.....	30
5.4.2	Supplier requirements.....	30
5.4.3	Supplier monitoring.....	30
5.4.4	Criticality classification.....	31
5.5	Procurement.....	31
5.5.1	Procurement documents.....	31
5.5.2	Review of procured software component list.....	31
5.5.3	Procurement details.....	32
5.5.4	Identification.....	32
5.5.5	Inspection.....	32
5.5.6	Exportability.....	32
5.6	Tools and supporting environment.....	32
5.6.1	Methods and tools.....	32
5.6.2	Development environment selection.....	33
5.7	Assessment and improvement process.....	34
5.7.1	Process assessment.....	34
5.7.2	Assessment process.....	34
5.7.3	Process improvement.....	35
6	Software process assurance.....	37
6.1	Software development life cycle.....	37
6.1.1	Life cycle definition.....	37
6.1.2	Process quality objectives.....	37
6.1.3	Life cycle definition review.....	37
6.1.4	Life cycle resources.....	37
6.1.5	Software validation process schedule.....	38
6.2	Requirements applicable to all software engineering processes.....	38
6.2.1	Documentation of processes.....	38
6.2.2	Software dependability and safety.....	39
6.2.3	Handling of critical software.....	41
6.2.4	Software configuration management.....	43
6.2.5	Process metrics.....	45
6.2.6	Verification.....	46
6.2.7	Reuse of existing software.....	49

6.2.8	Automatic code generation.....	52
6.3	Requirements applicable to individual software engineering processes or activities.....	53
6.3.1	Software related system requirements process.....	53
6.3.2	Software requirements analysis	53
6.3.3	Software architectural design and design of software items	55
6.3.4	Coding	56
6.3.5	Testing and validation	57
6.3.6	Software delivery and acceptance.....	62
6.3.7	Operations	63
6.3.8	Maintenance	64
7	Software product quality assurance.....	66
7.1	Product quality objectives and metrication	66
7.1.1	Deriving of requirements	66
7.1.2	Quantitative definition of quality requirements.....	66
7.1.3	Assurance activities for product quality requirements.....	66
7.1.4	Product metrics	66
7.1.5	Basic metrics.....	67
7.1.6	Reporting of metrics	67
7.1.7	Numerical accuracy.....	67
7.1.8	Analysis of software maturity.....	68
7.2	Product quality requirements	68
7.2.1	Requirements baseline and technical specification	68
7.2.2	Design and related documentation.....	69
7.2.3	Test and validation documentation.....	69
7.3	Software intended for reuse	70
7.3.1	Customer requirements.....	70
7.3.2	Separate documentation	70
7.3.3	Self-contained information.....	70
7.3.4	Requirements for intended reuse	70
7.3.5	Configuration management for intended reuse.....	70
7.3.6	Testing on different platforms.....	71
7.3.7	Certificate of conformance	71
7.4	Standard ground hardware and services for operational system.....	71
7.4.1	Hardware procurement	71
7.4.2	Service procurement.....	71
7.4.3	Constraints.....	72

7.4.4	Selection	72
7.4.5	Maintenance	72
7.5	Firmware	72
7.5.1	Device programming	72
7.5.2	Marking	73
7.5.3	Calibration	73
Annex A (informative) Software documentation.....		74
Annex B (normative) Software product assurance plan (SPAP) - DRD		80
B.1	DRD identification	80
B.1.1	Requirement identification and source document	80
B.1.2	Purpose and objective.....	81
B.2	Expected response	82
B.2.1	Scope and content	82
B.2.2	Special remarks	86
Annex C (normative) Software product assurance milestone report (SPAMR) - DRD		87
C.1	DRD identification	87
C.1.1	Requirement identification and source document	87
C.1.2	Purpose and objective.....	88
C.2	Expected response	88
C.2.1	Scope and content	88
C.2.2	Special remarks	89
Annex D (normative) Tailoring of this Standard based on software criticality.....		90
D.1	Software criticality categories	90
D.2	Applicability matrix.....	91
Annex E (informative) List of requirements with built-in tailoring capability.....		102
Annex F (informative) Document organization and content at each milestone.....		103
F.1	Introduction.....	103
F.2	ECSS-Q-ST-80 Expected Output at SRR	103
F.3	ECSS-Q-ST-80 Expected Output at PDR	105
F.4	ECSS-Q-ST-80 Expected Output at CDR	110
F.5	ECSS-Q-ST-80 Expected Output at QR	112
F.6	ECSS-Q-ST-80 Expected Output at AR.....	113

F.7 ECSS-Q-ST-80 Expected Output not associated with any specific milestone review	115
--	-----

Bibliography.....117

Figures

Figure 4-1: Software related processes in ECSS Standards.....	20
Figure 4-2: Structure of this Standard.....	21
Figure A-1 : Overview of software documents	74

Tables

Table A-1 : ECSS-E-ST-40 and ECSS-Q-ST-80 Document requirements list (DRL)	75
Table B-1 : SPAP traceability to ECSS-E-ST-40 and ECSS-Q-ST-80 clauses	80
Table C-1 : SPAMR traceability to ECSS-Q-ST-80 clauses	87
Table D-1 : Software criticality categories.....	90
Table D-2 : Applicability matrix based on software criticality	91