



# Space product assurance

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## Software process assessment and improvement – Part 2: Assessor instrument

ECSS Secretariat  
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Noordwijk, The Netherlands

## Foreword

This Handbook is one document of the series of ECSS Documents intended to be used as supporting material for ECSS Standards in space projects and applications. ECSS is a cooperative effort of the European Space Agency, national space agencies and European industry associations for the purpose of developing and maintaining common standards.

The material in this Handbook gives a framework in terms of description and recommendation how to organize and perform the work for the S4S processes assessor.

This handbook has been prepared by the ECSS-Q-80-02 Working Group, reviewed by the ECSS Executive Secretariat and approved by the ECSS Technical Authority.

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Published by: ESA Requirements and Standards Division  
ESTEC, P.O. Box 299,  
2200 AG Noordwijk  
The Netherlands

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## Introduction

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This Standard provides the instruments needed by competent assessors to perform ECSS-Q-HB-80-02 assessments and to support improvement initiatives based on the framework described in Part 1.

The ECSS-Q-HB-80-02 assessment method is a space specific instantiation of ISO/IEC 15504-5. In turn, ISO/IEC 15504 provides a common internationally recognized framework for the terminology and reference process assessment description.

The instruments provided in this handbook, when applied by competent assessors, support application of the methods described in Part 1 and allow claiming conformance to those methods and to requirements in ECSS-Q-ST-80. Specific instruments are also provided to enable claiming conformance to the requirements in ISO/IEC 15504 for process assessments as an additional advantage of the application of this Standard.

While the instruments provided in this handbook may provide useful information to participants in process assessment and improvement in general, their use is intended specifically for competent assessors. This handbook does not pose any requirements on the organisations being assessed or carrying out process improvement programmes whether using the methods described in Part 1 or not.

# 1 Scope

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This handbook provides assessors with a number of instruments needed to perform software process capability assessments using the assessment method described in Part 1. It also provides instruments that help assessors to carry out their activities when performing assessments and supporting the implementation of software process improvement initiatives using the method for process improvement described in Part 1.

The instruments provided are:

- The Process Assessment Model (PAM) required to perform ECSS-Q-HB-80-02 assessments including process descriptions and process attribute indicators
- Conformance statement to the requirements in ISO/IEC 15504 Part 2
- A definition of the Process Reference Model (PRM) on which the ECSS-Q-HB-80-02 PAM is based (defined in ECSS-Q-HB-80-02 Part 1)
- Detailed traces from base practices in the ECSS-Q-HB-80-02 PAM to ECSS standards clauses and from ECSS-Q-HB-80-02 work products to ECSS expected outputs

## 2 References

ECSS-S-ST-00-01	ECSS System - Glossary of terms
ECSS-M-ST-10C rev.1	Space project management - Project planning and implementation
ECSS-M-ST-10-01C	Space project management - Organization and conduct of reviews
ECSS-M-ST-40C rev.1	Space project management - Configuration and information management
ECSS-M-ST-60C	Space project management - Cost and schedule management
ECSS-M-ST-80C	Space project management - Risk management
ECSS-Q-ST-10C	Space product assurance - Product assurance management
ECSS-Q-ST-10-04C	Space product assurance - Critical-item control
ECSS-Q-ST-10-09C	Space product assurance - Nonconformance control system
ECSS-Q-ST-20C	Space product assurance - Quality assurance
ECSS-Q-20-07A	Space product assurance - Quality assurance for test centres
ECSS-Q-ST-30C	Space product assurance - Dependability
ECSS-Q-ST-40C	Space product assurance - Safety
ECSS-Q-ST-80C	Space product assurance – Software product assurance
ECSS-E-ST-10C	System engineering general requirements
ECSS-E-ST-10-02C	Space engineering - Verification
ECSS-E-10-03A	Space engineering - Testing
ECSS-E-ST-40C	Space engineering – Software
ISO/IEC 15504: 2003-2006	Information technology – Process assessment Part 1: Concepts and vocabulary (normative) Part 2: Performing an assessment (normative) Part 3: Guidance on performing an assessment (informative) Part 4: Guidance on use for process improvement and process capability determination (informative) Part 5: An exemplar process assessment model (informative)
ISO/IEC 12207: 2004 Amd 1/Amd 2	Information Technology – Software life cycle processes

## 3

# Terms, definitions and abbreviated terms

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## 3.1 Terms and definitions

For the purpose of this document, the terms and definitions from ECSS-S-ST-00-01 and ECSS-Q-HB-80-02 Part 1 apply.

## 3.2 Abbreviated terms

For the purpose of this document, the abbreviated terms from ECSS-S-ST-00-01, ECSS-Q-HB-80-02 part 1 and the following apply:

<b>Abbreviation</b>	<b>Meaning</b>
ISVV	Independent Software Verification and Validation
PAM	Process Assessment Model
PRM	Process Reference Model

# 4

## Process Assessment Model

### 4.1 Process dimension

#### 4.1.1 Introduction

This clause defines the process dimension of the process assessment model (PAM). The process dimension is directly mapped to the process list defined in the Process Reference Model (PRM) which is based on ISO/IEC 12207 Amendment 1+Amendment 2 and adds a number of space specific processes to it.

The PRM is defined in ECSS-Q-HB-80-02 Part 1.

The process dimension contains three categories organized in the groups of processes listed in Table 1. Processes added in this Standard over the ones in ISO/IEC 15504 Part 5 are marked in bold.

**Table 1 ECSS-Q-HB-80-02 set of processes**

Primary life cycle processes		
Acquisition process group(ACQ)	ACQ.1	Acquisition preparation
	ACQ.2	Supplier selection
	ACQ.3	Contract agreement
	ACQ.4	Supplier monitoring
	ACQ.5	Customer acceptance
	ACQ.6 <sup>(*)</sup>	Contract maintenance
Supply process group (SPL)	SPL.1	Supplier tendering
	SPL.2	Product release
	SPL.3	Product acceptance support
Operation process group (OPE)	OPE.1	Operational use
	OPE.2	Customer support
Engineering process group (ENG)	ENG.1	Requirements elicitation
	ENG.2	System requirements analysis
	ENG.3	System architecture design
	ENG.4	Software requirements analysis
	ENG.5	Software Design
	ENG.6	Software construction

	ENG.7	Software integration
	ENG.8	Software testing
	ENG.9	System integration
	ENG.10	System testing
	ENG.11	Software installation
	ENG.12	Software and system maintenance
<b>Supporting life cycle processes</b>		
Supporting process (SUP)	SUP.1	Quality assurance
	SUP.2	Verification
	SUP.3	Validation
	SUP.4	Joint review
	SUP.5	Audit
	SUP.6	Product evaluation
	SUP.7	Documentation
	SUP.8	Configuration management
	SUP.9	Problem resolution management
	SUP.10	Change request management
	SUP.11 <sup>(*)</sup>	Safety and dependability assurance
	SUP.12 <sup>(*)</sup>	Independent software verification and validation
<b>Organizational life cycle processes</b>		
Management process group (MAN)	MAN.1	Organizational alignment
	MAN.2	Organization management
	MAN.3	Project management
	MAN.4	Quality management
	MAN.5	Risk management
	MAN.6	Measurement
	MAN.7 <sup>(*)</sup>	Information management
Process improvement process group (PIM)	PIM.1	Process establishment
	PIM.2	Process assessment
	PIM.3	Process Improvement
Resource and infrastructure process group (RIN)	RIN.1	Human resource management
	RIN.2	Training
	RIN.3	Knowledge management
	RIN.4	Infrastructure
Reuse process group (REU)	REU.1	Asset Management
	REU.2	Reuse program management
	REU.3	Domain engineering
(*) : processes added in this handbook w.r.t the ones in ISO/IEC 15504 Part 5		

These categories and basic processes correspond to all processes involved for the development of software for space. Requirements applied for their performance are mostly described in ECSS-Q-ST-80C and ECSS-E-ST-40C but also in other Management, Engineering and Quality ECSS Standards. The links between Base Practices of S4S PAM and ECSS requirements are provided in this document.

## 4.1.2 Process definitions

This clause provides definitions for all the processes in the PAM. The definitions provided here are mostly based on those in ISO/IEC 15504 Part 5. The definitions are an instrument for competent assessors when measuring the capability of processes in an organization. Other parties may use them as a source of information but they do not construe requirements for the implementation of processes. The definition of each process consists of:

- A process identifier consisting of a code for the process group and a process number within that group
- The process name
- The process purpose
- The process outcomes

The definition of each process is supported by a number of indicators to help assessors in rating the process:

- A set of base practices mapped to the process outcomes. These base practices are the activities and tasks that should be present in implementing the process. Some of these base practices are of special relevance for specific software criticality classes. This is reflected by specifying where relevant the classes to which the base practice is most relevant. The definition used here for those criticality classes is the same one used in the example target capability profiles proposed in Part 1 of this standard.
- Where relevant, notes that clarify the meaning, or show possible implementations of specific base practices either per se or in relation to ECSS. Notes originating from ISO/IEC 15504 are assigned a sequential number. Space or ECSS specific notes are assigned an uppercase letter. These notes are not intended to represent requirements but to provide assessors with additional information in interpreting the process definition in the context of space projects. The notes describe common practice in space projects. In some instances the notes give an indication that ECSS standards do impose specific requirements. Note that short references like ECSS-Q-80 refers to ECSS-Q-ST-80C as identified in chapter 2.
- Input and output work products associated to the process. Most work products originate in the ISO/IEC 15504-5 definition of the process but slight differences may have been introduced to better match to the ECSS PRM. A few of them have been added specifically to the PAM and are space specific.

Components of the process definitions taken from ISO/IEC 15504 are shown in normal text while ECSS-Q-HB-80-02 specific additions are shown in *italics*.

Please note that the material taken from ISO/IEC 15504 (normal text) may not always comply with standard terminology and conventions applicable to ECSS standards. The space specific material (in *italics*) in the process definitions has been written with the ECSS conventions in mind but sometimes these are not followed to keep the uniformity and consistency between ISO/IEC 15504 material and ECSS-Q-HB-80-02 specific material.

## 4.1.2.1 Acquisition process group (ACQ)

### 4.1.2.1.1 ACQ.1 Acquisition Preparation

<b>Process ID</b>	ACQ.1
<b>Process Name</b>	Acquisition Preparation
<b>Process Purpose</b>	The purpose of the Acquisition Preparation process is to establish the needs and goals of the acquisition and to communicate these with the potential suppliers.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Acquisition Preparation process:</p> <ol style="list-style-type: none"> <li>1) the concept or the need for the acquisition, development, or enhancement is established;</li> <li>2) the needed acquisition requirements defining the project needs are defined and validated;</li> <li>3) the customer's known requirements are defined and validated;</li> <li>4) an acquisition strategy is developed; and</li> <li>5) supplier selection criteria are defined.</li> </ol>
<b>Base Practices</b>	<p><b>ACQ.1.BP1: Establish the need.</b>                      Establish a need to acquire, develop, or enhance a system, software product or service. [Outcomes: 1]</p> <p><b>ACQ.1.BP2: Define the requirements.</b>                      Identify the customer/stakeholder requirements for a system and/or software product or service. [Outcomes: 2, 3]</p> <p><i>NOTE A: Establish requirements for each supplier. Project Requirements Documents (= Requests for proposal) are issued by the customer to all of his subordinate suppliers. The Project Requirements Documents includes requirements for all aspects of the project and not be limited to technical requirements. The customer releases the Functional Specification for the product. The customer should specify the technical budget target and margin philosophy. Here technical budgets refer to those associated with computer resources (CPU load, maximum memory size) and performance requirements.</i></p> <p><i>NOTE B: For space segment software, the criticality levels of the software elements are determined at the functional state of the project. For space segment software, the requirements of in-flight modification capabilities of the software elements are determined at this stage. The customer's need for a MMI mock-up is defined at this stage, and if so, general MMI standards and guidelines applicable to the project are established.</i></p> <p><b>ACQ.1.BP3: Review requirements.</b>                      Analyze and validate the defined requirements against the identified needs. Validate the requirements to reduce risk of misunderstanding by the potential suppliers. [Outcomes:3]</p> <p><b>ACQ.1.BP4: Develop acquisition strategy.</b>                      Develop a strategy for the acquisition of the product according to the acquisition needs. [Outcomes: 4]</p> <p><b>NOTE 1:</b> The strategy may include reference to the lifecycle model, schedule,</p>



	budget and selection criteria.  <i>NOTE C: ECSS-Q-20 defines requirements for procurement.</i>  <i>NOTE D: When necessary, engage in assessment work or technology qualification, as well as starting long-lead procurements and Support System development.</i>  <i>NOTE E: Note that when purchasing COTS products, the acquisition process should be tailored. See PIM.1.BP.5.</i>  <b>ACQ.1.BP5: Define selection criteria.</b> Establish and agree on supplier selection criteria and the means of evaluation to be used [Outcomes: 4, 5].  <b>ACQ.1.BP6: Communicate the need.</b> Communicate the need for acquisition to interest parties through the identified channels. [Outcomes: 1]  <b>ACQ.1.BP7: Tailor the standard requirements.</b> Tailor requirements according to the project context, needs and objectives. [Outcomes:3]	
<b>Work Products</b>		
<b>Input Work Products</b>	<b>Output Work Products</b>	
WP15-04 Market analysis report [Outcomes: 2] WP15-19 Product needs assessment [Outcomes: 1, 3, 4] WP18-00 Standard [Outcomes: 7]	WP08-02 Acquisition plan [Outcomes: 4] WP12-01 Request for proposal [Outcomes: 4, 5] WP13-19 Review records [Outcomes: 3] WP15-01 Analysis report [Outcomes: 1, 2] WP15-19 Product needs assessment [Outcomes: 2, 3] WP17-03 Customer requirements [Outcomes: 3] WP17-09 Product requirements [Outcomes: 3] WP18-01 Acceptance criteria [Outcomes: 2] WP18-08 Supplier selection criteria [Outcomes: 5] WP50-01 Software system specification [Outcomes: 3] WP50-02 Software requirements specification [Outcomes: 3] WP18-00 Standard [Outcomes: 7]	

#### 4.1.2.1.2 ACQ.2 Supplier Selection

<b>Process ID</b>	ACQ.2
<b>Process Name</b>	Supplier Selection
<b>Process Purpose</b>	The purpose of the Supplier Selection process is to choose the organization that is to be responsible for the delivery of the requirements of the project.
<b>Process Outcomes</b>	As a result of successful implementation of the Supplier Selection process: <ol style="list-style-type: none"> <li>1) the supplier selection criteria are established and used to evaluate potential suppliers;</li> <li>2) the supplier is selected based upon the evaluation of the supplier's proposals, process capabilities, and other factors; and</li> <li>3) an agreement is established and negotiated between the customer and the supplier.</li> </ol>



<b>Base Practices</b>	<p><b>ACQ.2.BP1: Evaluate stated or perceived supplier capability.</b>                  Evaluate stated or perceived supplier capability against the stated requirements, according to the supplier selection criteria. [Outcomes: 1]</p> <p>NOTE 1: See Acquisition Preparation process (ACQ.1) for definition of supplier selection criteria.</p> <p><i>NOTE A: The assessment of the supplier's continuous capability to furnish software product and services of the type and quality level being procured may be performed based on internationally recognised approaches such as those based on ISO/IEC 155504 (e.g. this standard).</i></p> <p><b>ACQ.2.BP2: Evaluate supplier's proposal.</b>                  Evaluate supplier's proposal against the stated requirements, according to the supplier selection criteria. [Outcomes: 2]</p> <p><b>ACQ.2.BP3: Prepare and negotiate agreement.</b>                  Negotiate a supplier agreement that clearly expresses the customer expectations and the relative responsibilities of the supplier and customer. [Outcomes: 3]</p> <p>NOTE B: All work necessary for completing the project is covered by a contract / agreement.</p> <p>NOTE C: The customer approves the supplier's Implementation Document (= Supplier proposal response).</p> <p>NOTE D: Although this is not normal practice in the space domain, in other domains a preliminary agreement is established at this stage that is different from the one referred to in ACQ.3.BP1.</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP09-04 Supplier selection policy [Outcomes: 2] WP12-01 Request for proposal [Outcomes: 2] WP12-04 Supplier proposal response [Outcomes: 3] WP13-09 Meeting support record [Outcomes: 3] WP15-13 Assessment / audit report [Outcomes: 2] WP17-09 Product requirements [Outcomes: 2] WP17-10 Service requirements [Outcomes: 2] WP18-08 Supplier selection criteria [Outcomes: 2]	WP02-01 Commitment / agreement [Outcomes: 1, 3] WP08-02 Acquisition plan [Outcomes: 1] WP09-04 Supplier selection policy [Outcomes: 1] WP13-04 Communication record [Outcomes: 3] WP13-05 Contract Review records [Outcomes: 3] WP13-09 Meeting support record [Outcomes: 3] WP13-19 Review records [Outcomes: 2] WP14-05 Preferred suppliers register [Outcomes: 2] WP15-01 Analysis report [Outcomes: 2] WP15-13 Assessment / audit report [Outcomes: 1] WP15-21 Supplier evaluation report [Outcomes: 1, 2] WP18-08 Supplier selection criteria [Outcomes: 1]

#### 4.1.2.1.3 ACQ.3 Contract Agreement

<b>Process ID</b>	ACQ.3
<b>Process Name</b>	Contract Agreement
<b>Process Purpose</b>	The purpose of the Contract Agreement process is to negotiate and approve a contract / agreement that clearly and unambiguously specifies the expectations, responsibilities, work products / deliverables and liabilities of both the supplier(s) and the acquirer.
<b>Process Outcomes</b>	As a result of successful implementation of the Contract Agreement process:

	<p>1) a contract or agreement is negotiated, reviewed, approved and awarded to the supplier(s);</p> <p>2) mechanisms for monitoring the capability and performance of the supplier(s) and for mitigation of identified risks are reviewed and considered for inclusion in the contract conditions; and</p> <p>3) proposers / tenderers are notified of the result of proposal/tender selection.</p>
<b>Base Practices</b>	<p><b>ACQ.3.BP1: Negotiate the contract/agreement.</b>                  Negotiate all relevant aspects of the contract/agreement with the supplier. [Outcomes: 1]</p> <p><b>NOTE 1:</b> Clarify intellectual right relationship. In the contract, address patent, copyright, confidentiality, proprietary, usage, ownership, warranty and licensing rights associated with the developed products and the reusable off-the-shelf software products.</p> <p><b>NOTE A:</b> <i>An aspect of negotiation is the level of control on work breakdown structure.</i></p> <p><b>NOTE B:</b> <i>Implementation Documents are often part of the contract.</i></p> <p><b>NOTE C:</b> <i>Although this is not normal practice in the space domain, in other domains a preliminary agreement is established after supplier selection (see ACQ.2.BP3) that is different from the one referred to here.</i></p> <p><b>ACQ.3.BP2: Approve contract.</b>                  The contract is approved by relevant stakeholders. [Outcomes: 1]</p> <p><b>ACQ.3.BP3: Review contract for supplier capability monitoring.</b>                  Review and consider a mechanism for monitoring the capability and performance of the supplier in the contract conditions [Outcomes: 2].</p> <p><b>ACQ.3.BP4: Review contract for risk mitigation actions.</b>                  Review and consider a mechanism for the mitigation of identified risk in the contract conditions. [Outcomes: 2]</p> <p><b>ACQ.3.BP5: Award contract.</b>                  The contract is awarded to the successful proposer / tenderer [Outcomes: 1]</p> <p><b>ACQ.3.BP6: Communicate results to tenderers.</b>                  Notify the results of the proposal/ tender selection to proposers/tenders. After contract award inform all tenderers of the decision [Outcomes: 3].</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
<p>WP08-19 Risk management plan [Outcomes: 2]</p> <p>WP12-01 Request for proposal [Outcomes: 1]</p> <p>WP12-04 Supplier proposal response [Outcomes: 1]</p> <p>WP15-18 Process performance report [Outcomes: 2]</p> <p>WP17-09 Product requirements [Outcomes: 1]</p> <p>WP17-10 Service requirements [Outcomes: 1]</p> <p>WP50-02 <i>Software requirements specification</i>                  [Outcomes: 1]</p> <p>WP50-11 <i>Software development plan</i> [Outcomes: 2]</p>	<p>WP02-00 Contract [Outcomes: 1]</p> <p>WP02-01 Commitment / agreement [Outcomes: 1, 3]</p> <p>WP13-04 Communication record [Outcomes: 1, 3]</p> <p>WP13-05 Contract Review records [Outcomes: 1]</p> <p>WP15-08 Risk analysis report [Outcomes: 2]</p>

4.1.2.1.4 ACQ.4 Supplier Monitoring

<b>Process ID</b>	ACQ.4
<b>Process Name</b>	Supplier Monitoring
<b>Process Purpose</b>	The purpose of the Supplier Monitoring process is to track and assess performance of the supplier against agreed requirements.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Supplier Monitoring process:</p> <ol style="list-style-type: none"> <li>1) joint activities between the customer and the supplier are performed as needed;</li> <li>2) information on technical progress is exchanged regularly with the supplier;</li> <li>3) performance of the supplier is monitored against the agreed requirements; and</li> <li>4) agreement changes, if needed, are negotiated between the acquirer and the supplier and documented in the agreement.</li> </ol>
<b>Base Practices</b>	<p><b>ACQ.4.BP1: Establish and maintain communications.</b>                      Establish and maintain communications between customer and supplier (i.e. define interfaces, schedule, messages, documents, meetings, joint review). [Outcomes: 1, 2]</p> <p><b>ACQ.4.BP2: Exchange information on technical progress.</b>                      Use the communication link to exchange information on technical progress of the supply, also covering costs and risks to successful completion. [Outcomes: 1, 2]</p> <p><b>ACQ.4.BP3: Review development with supplier.</b>                      Review the aspects of the development (technical, quality, cost and schedule) on a regular basis with the supplier, against the agreed requirements. [Outcomes: 3]</p> <p><i>NOTE A: The customer should ensure the coherence of design, testing, verification, and acceptance plans provided by multiple suppliers.</i></p> <p><b>ACQ.4.BP4: Monitor the acquisition.</b>                      Monitor the acquisition against the agreed acquisition documentation so that progress can be reviewed and audited to ensure that specified constraints such as cost, schedule, and quality are met. [Outcomes: 3]</p> <p><i>NOTE B: Examples of monitoring means include assessment and audits.</i></p> <p><i>NOTE C: One specific aspect of monitoring is ensuring compliance with product assurance requirements.</i></p> <p><i>NOTE D: One specific aspect of monitoring is ensuring that subcontracted software is correctly classified for dependability and safety criticality.</i></p> <p><b>ACQ.4.BP5: Agree on changes.</b>                      Changes proposed by either party are negotiated and the results are documented in the agreement. [Outcomes: 4]</p> <p><i>NOTE E: This Base Practice is further detailed in the Contract Maintenance process (ACQ.6).</i></p>



<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP02-00 Contract [Outcomes: 1]                      WP02-01 Commitment / agreement [Outcomes: 3, 4]                      WP12-04 Supplier proposal response [Outcomes: 1]                      WP13-09 Meeting support record [Outcomes: 1]                      WP13-14 Progress Status record [Outcomes: 2]                      WP13-17 Customer request [Outcomes: 4]                      WP14-08 Tracking system [Outcomes: 3]</p>	<p><b>Output Work Products</b></p> <p>WP02-01 Commitment / agreement [Outcomes: 4]                      WP13-01 Acceptance record [Outcomes: 3]                      WP13-04 Communication record [Outcomes: 1]                      WP13-08 Installation record [Outcomes: 3]                      WP13-09 Meeting support record [Outcomes: 1]                      WP13-14 Progress status record [Outcomes: 2]                      WP13-17 Customer request [Outcomes: 3]                      WP13-19 Review records [Outcomes: 2]                      WP15-01 Analysis report [Outcomes: 3]</p>

#### 4.1.2.1.5 ACQ.5 Customer Acceptance

<b>Process ID</b>	ACQ.5
<b>Process Name</b>	Customer Acceptance
<b>Process Purpose</b>	The purpose of the Customer Acceptance process is to approve the supplier's deliverable when all acceptance criteria are satisfied.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Customer Acceptance process:</p> <ol style="list-style-type: none"> <li>1) the delivered software product and/or service are evaluated with regard to the agreement;</li> <li>2) the customer's acceptance is based on the agreed acceptance criteria; and</li> <li>3) the software product and/or service are accepted by the customer.</li> </ol>
<b>Base Practices</b>	<p><b>ACQ.5.BP1: Define acceptance criteria.</b>                      Acceptance criteria are defined on the basis of agreed requirements. [Outcomes: 2]  <i>NOTE A: E.g. ECSS-E-40 requires verification of the generation of software from configured code.</i></p> <p><b>NOTE 1:</b> Refer to the Software Testing process (ENG.8) and the System Testing process (ENG.10) to complete acceptance criteria with software/system test definition and execution activities.</p> <p><b>ACQ.5.BP2: Evaluate the delivered product.</b>                      Carry out the evaluation of the product and/or service using the defined acceptance criteria. [Outcomes: 1, 2]  <i>NOTE B: This evaluation includes the acceptance test reports.</i></p> <p><b>ACQ.5.BP3: Compliance with agreement.</b>                      Resolve any acceptance issues in accordance with the procedures established in the agreement and confirm that the delivered product or service complies with the agreement. [Outcomes: 2]</p> <p><b>ACQ.5.BP4: Accept product.</b>                      Accept the delivered product or service and communicate acceptance to the supplier. [Outcomes: 3]  <i>NOTE C: Purchased commercial software should be inspected at reception.</i></p>

<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP02-00 Contract [Outcomes: 1]                      WP02-01 Commitment / agreement [Outcomes: 1]                      WP08-01 Acceptance test plan [Outcomes: 1, 2]                      WP08-02 Acquisition plan [Outcomes: 1]                      WP11-00 Product [Outcomes: 3]                      WP12-04 Supplier proposal response [Outcomes: 1]                      WP17-03 Customer requirements [Outcomes: 2]                      WP50-01 <i>Software system specification</i> [Outcomes: 2]</p>	<p><b>Output Work Products</b></p> <p>WP13-01 Acceptance record [Outcomes: 3]                      WP13-07 Problem report [Outcomes: 1]                      WP15-10 Test incident report [Outcomes: 2]                      WP18-01 Acceptance criteria [Outcomes: 2]</p>

#### 4.1.2.1.6 ACQ.6 Contract Maintenance

<b>Process ID</b>	<i>ACQ.6</i>
<b>Process Name</b>	<i>Contract Maintenance</i>
<b>Process Purpose</b>	<i>The purpose of the Contract Maintenance process is to maintain and change the business agreements during the development process. Either the customer or the supplier may propose contract modifications, while the complementary actor responds to the proposal.</i>
<b>Process Outcomes</b>	<p><i>As a result of successful implementation of the Contract Maintenance process:</i></p> <ol style="list-style-type: none"> <li><i>1) each business agreement is clearly identified and accomplished;</i></li> <li><i>2) the need for a contract change is identified, with the reason and scope defined;</i></li> <li><i>3) a contract change is proposed;</i></li> <li><i>4) the impact of the change on all aspects of the product is assessed; and</i></li> <li><i>5) the customer and supplier negotiate the contract modification reflecting the agreed requirements.</i></li> </ol>
<b>Base Practices</b>	<p><b>ACQ.6.BP1: Propose contract modifications.</b>  <i>Identify the need, scope and impact of modification of the original contract. [Outcomes: 1, 2, 3]</i></p> <p><b>NOTE A:</b> <i>ECSS-M-40 requires that for an evolution requested by the customer, the corresponding change proposal include the description of the change to the requirement documents, when they are affected, derived from the customer's request and as a result from the changes of requirements</i></p> <p><b>NOTE B:</b> <i>ECSS-M-40 requires that for an evolution proposed by a supplier, the corresponding change proposal contains:</i></p> <ul style="list-style-type: none"> <li><i>• The change descriptions related to the desired change</i></li> <li><i>• Description of any modification to business agreement provisions (e.g. cost, schedule, special clauses, data requirements, etc.)</i></li> </ul> <p><b>ACQ.6.BP2: Respond to contract modification request.</b>  <i>Review the reason and scope and conduct an impact assessment on all products, including contractual, technical, quality, dependability and safety aspects. [Outcomes: 4]</i></p> <p><b>ACQ.6.BP3: Agree on contract modification.</b>  <i>Review reply to change request. Negotiate and incorporate changes into new contractual agreement. [Outcomes: 5]</i></p>



<b>Work Products</b>	
<b>Input Work Products</b> WP02-01 Commitment / agreement [Outcomes: 1, 5] WP13-16 Change request [Outcomes: 3] WP17-00 Requirements specification [Outcomes: all] WP60-01 Request for waiver [Outcomes: 2, 3]	<b>Output Work Products</b> WP02-01 Commitment / agreement [Outcomes: 5] WP13-16 Change request [Outcomes: 3] WP15-01 Analysis report [Outcomes: 4]

## 4.1.2.2 Supply process group (SPL)

### 4.1.2.2.1 SPL.1 Supplier Tendering

<b>Process ID</b>	SPL.1
<b>Process Name</b>	Supplier Tendering
<b>Process Purpose</b>	The purpose of the Supplier Tendering process is to establish an interface to respond to the customer inquires and requests for proposal, prepare and submit proposals, and confirm assignments through the establishing of a relevant agreement / contract.
<b>Process Outcomes</b>	As a result of successful implementation of the Supplier Tendering process: <ol style="list-style-type: none"> <li>1) a communication interface is established and maintained in order to respond to customer inquires and requests for proposal;</li> <li>2) requests for proposal are evaluated according to defined criteria to determine whether or not to submit a proposal;</li> <li>3) the need to undertake preliminary surveys of feasibility studies is determined;</li> <li>4) suitable resources are identified to perform the proposed work;</li> <li>5) a supplier proposal is prepared and submitted in response to the customer request; and</li> <li>6) formal confirmation of agreement is obtained.</li> </ol>
<b>Base Practices</b>	<p><b>SPL.1.BP1: Establish communication interface.</b>                      A communication interface is established and maintained in order to respond to customer inquires or requests for proposal. [Outcomes: 1].</p> <p><b>SPL.1.BP2: Perform customer enquiry screening.</b>                      Perform customer enquiry screening to ensure source of lead is genuine, the nature of type of product or service is clearly established, and the right person is quickly identified to progress the lead. [Outcomes: 1]</p> <p><b>SPL.1.BP3: Establish customer proposal evaluation criteria.</b>                      Establish evaluation criteria to determine whether or not to submit a proposal based on appropriate criteria. [Outcomes: 2]</p> <p><b>SPL.1.BP4: Evaluate customer request for proposal.</b>                      Requests for Proposal are evaluated according to appropriate criteria. [Outcome 2]</p> <p><b>SPL.1.BP5: Determine need for preliminary evaluations or feasibility studies.</b>                      Determine need for preliminary evaluations or feasibility studies to ensure that a firm quotation can be made based on available requirements. [Outcomes: 3]</p>

	<p><b>SPL.1.BP6: Identify and nominate staff.</b>                  Identify and nominate staff with appropriate competency for the assignment.                  [Outcomes: 4]</p> <p><b>SPL.1.BP7: Perform preliminary overall estimation.</b>                  Estimate total costs, resources and needed delivery date. [Outcomes: 4]</p> <p><b>SPL.1.BP8: Prepare supplier proposal or tender response.</b>                  A supplier proposal or tender is prepared in response to the customer request.                  [Outcomes: 5]</p> <p>NOTE 1: This may involve the selection of an appropriate solution (organisational or technical) amongst several alternatives in order to best meet requirements.</p> <p>NOTE A: <i>ECSS-M-10 requires the supplier to produce, based on customer inputs:</i></p> <ul style="list-style-type: none"> <li>• <i>Function tree</i></li> <li>• <i>Product tree</i></li> <li>• <i>Work breakdown structure</i></li> <li>• <i>Work package descriptions</i></li> <li>• <i>Cost breakdown structure</i></li> <li>• <i>Business agreement structure</i></li> <li>• <i>Interface allocation</i></li> <li>• <i>Documentation management plan</i></li> </ul> <p>NOTE B: <i>In the response, compliance with ECSS standards and coherence throughout all disciplines and functions within the organisation is expected to be maintained.</i></p> <p>NOTE C: <i>For space segment software, the supplier completely specifies the methods and means to fulfil the criticality related requirements.</i></p> <p><b>SPL.1.BP9: Negotiate contract/agreement with acquirer.</b>                  Negotiate all relevant aspects of the contract/agreement with the acquirer.                  [Outcomes: 5, 6]</p> <p><b>SPL.1.BP10: Establish confirmation of contract/agreement.</b>                  Formally confirm the contract/agreement to protect the interests of both parties.                  [Outcomes: 6]</p> <p>NOTE 2: The nature of the commitment should be agreed and evidence in writing. Only authorised signatories should be able to commit to a contract.</p>
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**Work Products**

Input Work Products	Output Work Products
WP12-01 Request for proposal [Outcomes: 1, 2, 3, 4, 5]	WP02-00 Contract [Outcomes: 5, 6]
WP13-04 Communication record [Outcomes: 1]	WP02-01 Commitment / agreement [Outcomes: 6]
WP13-11 Personnel performance Review records [Outcomes: 4]	WP12-01 Request for proposal [Outcomes 2]
WP13-17 Customer request [Outcomes: 1]	WP12-04 Supplier proposal response [Outcomes: 5]
WP17-03 Customer requirements [Outcomes: 2]	WP13-04 Communication record [Outcomes: 1]
WP50-01 <i>Software system specification [Outcomes: 2]</i>	WP13-05 Contract Review records [Outcomes: 6]
	WP13-15 Proposal Review records [Outcomes: 3]
	WP13-19 Review records [Outcomes: 4]
	WP60-16 <i>Product tree [Outcomes: 5]</i>

4.1.2.2.2 SPL.2 Product Release

<b>Process ID</b>	<b>SPL.2</b>
<b>Process Name</b>	<b>Product Release</b>
<b>Process Purpose</b>	The purpose of the Product Release process is to control the availability of a product to the intended customer.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Product Release process:</p> <ol style="list-style-type: none"> <li>1) the contents of the product release are determined;</li> <li>2) the release is assembled from configured items;</li> <li>3) the release documentation is defined and produced;</li> <li>4) the release delivery mechanism and media is determined;</li> <li>5) release approval is effected against defined criteria;</li> <li>6) release products are made available to the intended customer; and</li> <li>7) confirmation of release is obtained.</li> </ol>
<b>Base Practices</b>	<p><b>SPL.2.BP1: Define release products.</b>                  The products associated with the release are defined, on the basis of agreement or development strategy. [Outcomes: 1]                  NOTE 1: The software product release may include programming tools where these are stated.</p> <p><b>SPL.2.BP2: Prepare product for delivery.</b>                  Update and prepare the deliverable product. Establish baseline for the product including user documentation, designs and the product itself. [Outcomes: 2]                  NOTE 2: Product release may consist of software and hardware products constituting a system, or just a software product.</p> <p><b>SPL.2.BP3: Establish a product release classification and numbering scheme.</b>                  A product release classification is established based upon the intended purpose and expectations of the release. [Outcomes: 2]</p> <p><b>SPL.2.BP4: Define the build activities and build environment.</b>                  A consistent build process is established and maintained. [Outcomes: 2]                  NOTE 3: A consistent build environment should be used based on an environment specification that is communicated to all relevant parties.</p> <p><b>SPL.2.BP5: Build the release from configured items.</b>                  The release is built from configured items to ensure integrity. [Outcomes: 2]                  NOTE 4: Where relevant the software product release should identify the target hardware revision before release.</p> <p><b>SPL.2.BP6: The type, level and duration of support for a release are communicated.</b>                  The type, level and duration of a release is identified and communicated. [Outcomes: 3]</p> <p><b>SPL.2.BP7: Determine the delivery media type for the release.</b>                  The media type for product delivery is determined in accordance with the needs of the end user. [Outcomes: 4]                  NOTE 5: The media type for delivery may be intermediate (placed on a media and</p>



	<p>delivered to customer), or direct (such as delivered in firmware as part of the package) or a mix of both. The release may be delivered electronically by placement on a server. The release may also need to be duplicated before delivery.</p> <p><i>NOTE A: ECSS-Q-80 requires mechanisms to ensure the integrity of deliveries.</i></p> <p><b>SPL.2.BP8: Identify the packaging for the release media.</b>                  The packaging for different types of media is identified [Outcomes: 4]</p> <p><i>NOTE 6: The packaging for certain types of media may need physical or electronic protection for instance floppy disk mailers or specific encryption techniques.</i></p> <p><b>SPL.2.BP9: Define and produce the software product release documentation.</b>                  Ensure that all documentation to support the release is produced, reviewed, approved and available. [Outcomes: 3, 6].</p> <p><b>SPL.2.BP10: Ensure product release approval before delivery.</b>                  Criteria for the product release are satisfied before release takes place. [Outcomes: 5]</p> <p><b>SPL.2.BP11: Deliver the release to the intended customer.</b>                  The product is delivered to the intended customer, with positive confirmation of receipt. [Outcomes: 6, 7]</p> <p><i>NOTE 7: Confirmation of receipt may be achieved by hand, electronically, by post, by telephone or through a distribution service provider.</i></p> <p><i>NOTE 8: These practices are typically supported by the Configuration Management process (SUP.8).</i></p> <p><i>NOTE 9: Refer to ISO/IEC 9127 for guidance on packaging aspects of software product supply.</i></p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP01-00 Configuration item [Outcomes: 2]	WP06-01 Customer manual [Outcomes: 3]
WP11-00 Product [Outcomes: 1]	WP08-11 Logistics maintenance plan [Outcomes: 4]
WP17-03 Customer requirements [Outcomes: 1, 5]	WP08-16 Release plan [Outcomes: 3]
WP18-06 Product release criteria [Outcomes: 1]	WP11-03 Product release information [Outcomes: 1, 2]
WP19-04 Product release strategy [Outcomes: 4]	WP11-04 Product release package [Outcomes: 3]
WP50-01 Software system specification [Outcomes: 1, 5]	WP11-07 Temporary solution [Outcomes: 6]
WP50-12 Software product assurance plan [Outcomes: 1]	WP13-06 Delivery record [Outcomes: 6, 7]
	WP13-13 Product release approval record [Outcomes: 5]
	WP15-03 Configuration status report [Outcomes: 2]
	WP18-06 Product release criteria [Outcomes: 7]
	WP50-04 Software configuration file [Outcomes: 1, 2]
	WP50-05 Software release document [Outcomes: 1, 2]



4.1.2.2.3 SPL.3 Product Acceptance Support

<b>Process ID</b>	SPL.3	
<b>Process Name</b>	Product Acceptance Support	
<b>Process Purpose</b>	The purpose of the Product Acceptance Support process is to assist the customer to achieve confidence in taking ownership of the product.	
<b>Process Outcomes</b>	As a result of successful implementation of the Product Acceptance Support process: <ol style="list-style-type: none"> <li>1) the product is completed and delivered to the customer;</li> <li>2) the product is put into operation in the customer's environment; and</li> <li>3) customer acceptance tests and reviews are supported.</li> </ol> NOTE: Incremental delivery would be in completed increments.	
<b>Base Practices</b>	<p><b>SPL.3.BP1: Deliver product.</b>                  The product is completed and delivered to the customer with detailed configurations and technical/operational documents. [Outcomes: 1]</p> <p><b>SPL3.BP2: Adapt product to customer's environment.</b>                  The product is adapted and evaluated in parallel with the existing systems or processes until the acceptance test is passed. [Outcomes: 2]</p> <p><b>SPL.3.BP3: Support customer product evaluation.</b>                  Provide support for customer reviews and product testing [Outcomes: 3]</p> <p>NOTE 1 This base practice is closely related to the Joint Review process (SUP.4).</p> <p><b>SPL.3.BP4: Provide training to customer.</b>                  Provide training and support to the customer as specified in the contract. [Outcomes: 3]</p>	
<b>Work Products</b>		
	<b>Input Work Products</b>	<b>Output Work Products</b>
	WP02-00 Contract [Outcomes: 1] WP08-01 Acceptance test plan [Outcomes: 3] WP08-23 Validation test plan [Outcomes: 3] WP08-24 Training plan [Outcomes: 3] WP10-03 Customer support procedure [Outcomes: 3] WP11-00 Product [Outcomes: 1] WP11-03 Product release information [Outcomes: 1] WP11-04 Product release package [Outcomes: 1] WP17-03 Customer requirements [Outcomes: 2] WP50-01 Software system specification [Outcomes: 2] WP50-04 Software configuration file [Outcomes: 1] WP50-05 Software release document [Outcomes: 1] WP50-07 Software validation testing specification [Outcomes: 3] WP50-09 Software validation plan [Outcomes: 3] WP50-11 Software development plan [Outcomes: 3]	WP01-01 Product configuration [Outcomes: 1] WP06-03 Installation guide [Outcomes: 2] WP10-03 Customer support procedure [Outcomes: 3] WP13-01 Acceptance record [Outcomes: 3] WP13-06 Delivery record [Outcomes: 1] WP13-08 Installation record [Outcomes: 2] WP13-19 Review records [Outcomes: 3] WP17-04 Delivery instructions [Outcomes: 1] WP50-04 Software configuration file [Outcomes: 2]

### 4.1.2.3 Operation process group (OPE)

#### 4.1.2.3.1 OPE.1 Operational Use

<b>Process ID</b>	<b>OPE.1</b>
<b>Process Name</b>	<b>Operational Use</b>
<b>Process Purpose</b>	The purpose of the Operational Use process is to ensure the correct and efficient operation of the product for the duration of its intended usage and in its installed environment.
<b>Process Outcomes</b>	As a result of successful implementation of the Operational Use process: 1) operational risks for the product introduction and operation are identified and monitored; <i>1a) operations activities are planned;</i> <i>1b) the system is made ready for operation;</i> 2) the product is operated in its intended environment according to requirements; and 3) criteria for the operational use are developed that demonstrates compliance with the agreed requirements.
<b>Base Practices</b>	<p><b>OPE.1.BP1: Identify operational risks.</b>          Identify and monitor risks to product operation. [Outcomes: 1]  <i>NOTE A: The mission analysis for operations is performed by the customer and the supplier at first level.</i></p> <p><b>OPE.1.BP2: Perform operational testing.</b>          Perform operational testing of each release of the product, assessing satisfaction against specified criteria. [Outcomes: 2]</p> <p><b>OPE.1.BP3: Operate the product.</b>          Operate the product in its intended environment and in the specified way. [Outcome 2]</p> <p><b>OPE.1.BP4: Develop criteria for operational use.</b>          Criteria for operational use are developed such that compliance with the agreed requirements can be demonstrated. [Outcomes: 3]</p> <p><b>OPE.1. BP5: Monitor operational use.</b>          Provide the capability to monitor operational service on a regular basis, where appropriate against defined criteria. [Outcomes: 3]</p> <p><b>OPE.1.BP6: Develop and maintain an operational plan.</b>  <i>Set standards for the related activities and tasks of the operator. Establish procedures for testing the software product in its operation environment, for entering problem reports and modification requests to the maintenance process, and for releasing the software product for operational use. Update the plan with data from operation. [Outcomes: 1a]</i></p> <p><b>OPE.1.BP7: Prepare system for operational use.</b>  <i>Adapt the generic software to the specific operation. [Outcomes: 1b]</i>  <i>NOTE B: Adaptation of the software includes the customization of data.</i></p>



<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP06-01 Customer manual [Outcomes: 2]                      WP06-05 Product operation guide [Outcomes: 2]                      WP07-02 Field measure [Outcomes: 2]                      WP07-07 Risk measure [Outcomes: 1]                      WP11-03 Product release information [Outcomes: 1, 2, 3]                      WP13-02 Incident record [Outcomes: 1a]                      WP17-03 Customer requirements [Outcomes: 1, 2, 3]                      WP50-01 Software system specification [Outcomes: 1, 2, 3]                      WP50-04 Software configuration file [Outcomes: 1, 2, 3]                      WP50-05 Software release document [Outcomes: 1, 2, 3]</p>	<p><b>Output Work Products</b></p> <p>WP06-05 Product operation guide [Outcomes: 3]                      WP07-08 Service level measure [Outcomes: 3]                      WP08-09 Installation and maintenance plan [Outcomes: 1a]                      WP08-11 Logistics maintenance plan [Outcomes: 1a]                      WP15-08 Risk analysis report [Outcomes: 1]                      WP60-14 Operational plan [Outcomes: 1a]</p>

#### 4.1.2.3.2 OPE.2 Customer Support

<b>Process ID</b>	OPE.2
<b>Process Name</b>	Customer Support
<b>Process Purpose</b>	<p>The purpose of the Customer Support process is to establish and maintain an acceptable level of service through assistance and consultation to the customer to support effective use of the product.</p> <p><i>NOTE: This process also applies to the support of the performance of any other process during software operation.</i></p>
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Customer Support process:</p> <ol style="list-style-type: none"> <li>1) service needs for customer support are identified and monitored on an ongoing basis;</li> <li>2) customer satisfaction with both the support services being provided and the product itself is evaluated on an ongoing basis;</li> <li>3) operational support is provided by handling customer inquiries and requests and resolving operational problems; and</li> <li>4) customer support needs are met through delivery of appropriate services.</li> </ol>
<b>Base Practices</b>	<p><b>OPE.2.BP1: Establish product support.</b>                      Establish a service by which the customer can raise problems and questions encountered in use of the product, and receive help in resolving them. [Outcomes: 3]  <i>NOTE A: Services related to process support (e.g. engineering or management) during software operation may also be part of product support.</i></p> <p><b>NOTE 1:</b> The handling of problems will be performed by Problem Resolution Management process (SUP.9).</p> <p><b>OPE.2.BP2: Provide user training.</b>                      Provide training and documentation, as appropriate, to the user so that the product can be effectively used. [Outcomes: 4]</p> <p><b>OPE.2.BP3: Monitor performance.</b>                      Monitor the operational performance of the product in order to be aware of problems which might impact level of service. [Outcomes: 1]</p>



	<p><b>OPE.2.BP4: Determine customer satisfaction level.</b>                  Determine the level of customer satisfaction with the products and services received. [Outcomes: 2]</p> <p>NOTE 2: This may involve, as appropriate, field performance data, surveys, interviews, and studies. In some instances the end-user of the product may be different from the customer of the product. In this case, both the customer and end-user satisfaction levels should be determined.</p> <p><i>NOTE B: ECSS-Q-80 requires that during operations, the required quality of the mission products related to software are agreed upon with the customer and/or the users.</i></p> <p><b>OPE.2.BP5: Benchmark customer satisfaction.</b>                  Compare and monitor the level of customer satisfaction obtained for the product and services received relative to that of the relevant industry sector, and where possible, with competitors. [Outcomes: 2]</p> <p>NOTE 3: It may be necessary to obtain information on competitors from third party sources. It may also be necessary to include information of how competitors define:</p> <ul style="list-style-type: none"> <li>• Customer satisfaction</li> <li>• Measurement techniques</li> <li>• Criteria</li> <li>• Collection and evaluation methods</li> </ul> <p>to provide a meaningful comparison.</p> <p>Where comparative data is not available, absolute targets (e.g. % customers very satisfied, % repeat business) may be used as a basis for planning.</p> <p><b>OPE.2.BP6: Communicate customer satisfaction.</b>                  Communicate customer satisfaction data throughout the supplier organisation, in a manner appropriate to the staff involved and the nature of the findings, and communicate to the customer. [Outcomes: 2]</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP02-00 Contract [Outcomes: 1] WP07-08 Service level measure [Outcomes: 1] WP13-07 Problem report [Outcomes: 3] WP13-17 Customer request [Outcomes: 3] WP17-10 Service requirements [Outcomes: 2]	WP03-04 Customer satisfaction data [Outcomes: 2] WP07-01 Customer satisfaction survey [Outcomes: 2] WP13-07 Problem report [Outcomes: 3] WP15-20 Service level performance [Outcomes: 4] WP17-10 Service requirements [Outcomes: 1]

#### 4.1.2.4 Engineering process group (ENG)

##### 4.1.2.4.1 ENG.1 Requirements Elicitation

<b>Process ID</b>	ENG.1
<b>Process Name</b>	Requirements Elicitation
<b>Process Purpose</b>	The purpose of the Requirements Elicitation process is to gather, process, and track evolving customer needs and requirements throughout the life of the product and/or service so as to establish a requirements baseline that serves as the basis for defining the needed work products. Requirements elicitation may be performed by the acquirer or the developer of the system.
<b>Process Outcomes</b>	As a result of successful implementation of the Requirements Elicitation process: <ol style="list-style-type: none"> <li>1) continuing communication with the customer is established;</li> <li>2) agreed customer requirements are defined and baselined;</li> <li>3) a change mechanism is established to evaluate and incorporate changes to customer requirements into the baselined requirements based on changing customer needs;</li> <li>4) a mechanism is established for continuous monitoring of customer needs;</li> <li>5) a mechanism is established for ensuring that customers can easily determine the status and disposition of their requests; and</li> <li>6) enhancements arising from changing technology and customer needs are identified and their impact is managed.</li> </ol>
<b>Base Practices</b>	<p><b>ENG.1.BP1: Obtain customer requirements and requests.</b>                      Obtain and define customer requirements and requests through direct solicitation of customer and user input. [Outcomes: 1, 4]</p> <p>NOTE 1: Requirements may be obtained also through review of customer business proposals, target operating and hardware environment, and other documents bearing on customer requirements.</p> <p><b>ENG.1.BP2: Understand customer expectations.</b>                      Ensure that both supplier and customer understand each requirement in the same way. Review with customers and stakeholders their requirements and requests to better understand their needs and expectations and to check the feasibility and appropriateness of their requirements. [Outcomes: 6]</p> <p>NOTE 2: Environmental, legal and other constraints that may be external to the customer need to be considered.</p> <p>NOTE 3: Examples of techniques to review with customers their requirements and requests include observation of existing systems, prototypes, simulations, models, technology demonstrations, document excerpts, scenario descriptions and dialogues.</p> <p><b>ENG.1.BP3: Agree on requirements.</b>                      Obtain agreement across teams on the customer requirements, obtaining the appropriate sign-offs by representatives of all teams and other parties contractually bound to work to these requirements. [Outcomes: 2]</p> <p><b>ENG.1.BP4: Establish customer requirements baseline.</b>                      Formalize the customer requirements and establish as a baseline for project use and monitoring against customer needs. [Outcomes: 2, 3]</p>



	<p><b>ENG.1.BP5: Manage customer requirement changes.</b>                  Manage all changes made to the customer requirements against the customer requirements baseline to ensure enhancements resulting from changing technology and customer needs are identified and that those who are affected by the changes are able to assess the impact and risks and initiate appropriate change control and risk mitigation actions. [Outcomes: 4, 5]</p> <p>NOTE 4: The tracking of requirements is handled in the Configuration Management process (SUP.8).</p> <p>NOTE A: <i>Managing changes to customer requirements may invoke Contract Maintenance Process (ACQ.6), if contractual issues are implied.</i></p> <p><b>ENG.1.BP6: Establish customer query mechanism.</b>                  Provide a means by which the customer can be aware of the status and disposition of their requirements changes. [Outcomes: 5]</p> <p>NOTE 5: This may include joint meetings with the customer or formal communication to review the status for their requirements and requests. Refer to the Joint Review process (SUP.4).</p>	
<b>Work Products</b>		
	<p><b>Input Work Products</b></p> <p>WP02-01 Commitment / agreement [Outcomes: 2]                  WP13-16 Change request [Outcomes: 3, 6]                  WP13-17 Customer request [Outcomes: 1, 3]                  WP17-03 Customer requirements [Outcomes: 3]</p>	<p><b>Output Work Products</b></p> <p>WP13-00 Record [Outcomes: 4, 5]                  WP13-04 Communication record [Outcomes: 1, 4]                  WP13-21 Change control record [Outcomes: 3, 4]                  WP15-01 Analysis report [Outcomes: 2, 3, 6]                  WP17-03 Customer requirements [Outcomes: 2, 3]                  WP50-01 Software system specification [Outcomes: 2, 3]</p>

#### 4.1.2.4.2 ENG.2 System Requirements Analysis

<b>Process ID</b>	ENG.2
<b>Process Name</b>	System Requirements Analysis
<b>Process Purpose</b>	The purpose of the System Requirements Analysis process is to transform the defined stakeholder requirements into a set of desired system technical requirements that will guide the design of the system.
<b>Process Outcomes</b>	As a result of successful implementation of the System Requirements Analysis process: <ol style="list-style-type: none"> <li>1) a defined set of system functional and non-functional requirements describing the problem to be solved are established;</li> <li>2) the appropriate techniques are performed to optimize the preferred project solution;</li> <li>3) system requirements are analyzed for correctness and testability;</li> <li>4) the impact of the system requirements on the operating environment are understood;</li> <li>5) the requirements are prioritized, approved and updated as needed;</li> <li>6) consistency and traceability is established between the system requirements and the customer's requirements baseline;</li> <li>7) changes to the baseline are evaluated for cost, schedule and technical impact; and</li> </ol>

	8) the system requirements are communicated to all affected parties and baselined.	
<b>Base Practices</b>	<p><b>ENG.2.BP1: Establish system requirements.</b>                      Use the stakeholder requirements as the basis for defining the required functions and capabilities of the system and document in a system requirements baseline. Consider feasibility of the project solution using appropriate techniques. [Outcomes: 1, 2]</p> <p>NOTE 1: Appropriate techniques for solution analysis may include: feasibility studies, case studies, prototyping, formal languages and workshops.</p> <p>NOTE A: <i>The following aspects are relevant:</i></p> <ul style="list-style-type: none"> <li>• <i>Lessons learned reports from relevant past projects</i></li> <li>• <i>Requirements for the validation and verification process</i></li> <li>• <i>System level interface requirements and operational requirements</i></li> <li>• <i>System requirements for the operation of software products</i></li> </ul> <p><b>ENG.2.BP2: Optimize project solution.</b>                      Appropriate techniques are performed to optimize the preferred solution. Consider and analyze alternate solutions to achieve an optimum project solution. [Outcomes: 2]</p> <p><b>ENG.2.BP3: Analyse system requirements.</b>                      Prioritize requirements and analyze the prioritised requirements for correctness, completeness, consistency, feasibility and testability, identifying the necessary elements of the system. Identify changes to the operating environment. [Outcomes: 3, 4]</p> <p>NOTE 2: Any derived requirements are also identified.</p> <p>NOTE B: <i>Analysis aspects for space segment software are:</i></p> <ul style="list-style-type: none"> <li>• <i>Requirements related to criticality</i></li> <li>• <i>Requirements related to in-flight software modification</i></li> </ul> <p><b>ENG.2.BP4: Evaluate and update system requirements.</b>                      Evaluate the impact of proposed changes and new requirements for cost schedule, risk and technical impact, approve or reject changes and new requirements, and update the system requirements baseline. [Outcomes: 5, 7]</p> <p><b>ENG.2.BP5: Ensure consistency.</b>                      Ensure consistency of requirements elicitation to system requirements analysis. Consistency is supported by establishing and maintaining traceability between customer requirements and the system requirements when needed. [Outcomes: 6].</p> <p><b>ENG.2.BP6: Communicate system requirements.</b>                      Establish communication mechanisms for dissemination of system requirements, and updates to requirements to all parties who will be using them. [Outcomes: 8]</p>	
<b>Work Products</b>		
<b>Input Work Products</b>	<b>Output Work Products</b>	
WP13-16 Change request [Outcomes: 7] WP13-17 Customer request [Outcomes: 7] WP17-03 Customer requirements [Outcomes: 1, 6] WP50-01 <i>Software system specification [Outcomes: 1, 6]</i>	WP13-04 Communication record [Outcomes: 8] WP13-21 Change control record [Outcomes: 7] WP13-22 Traceability record [Outcomes: 6] WP15-01 Analysis report [Outcomes: 2, 3, 4, 7] WP17-08 Interface requirements [Outcomes: 4] WP17-12 System requirements [Outcomes: 1, 5] WP50-01 <i>Software system specification [Outcomes: 4]</i> WP50-02 <i>Software requirements specification [Outcomes: 4]</i>	

4.1.2.4.3      ENG.3 System Architectural Design

<b>Process ID</b>	ENG.3
<b>Process Name</b>	System Architectural Design
<b>Process Purpose</b>	The purpose of the System Architectural Design process is to identify which system requirements should be allocated to which elements of the system.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the System Architectural Design process:</p> <ol style="list-style-type: none"> <li>1) a system architecture design is defined that identifies the elements of the system and meets the defined requirements;</li> <li>2) the system's functional and non-functional requirements are addressed;</li> <li>3) the requirements are allocated to the elements of the system;</li> <li>4) internal and external interfaces of each system element are defined;</li> <li>5) verification between the system requirements and system architecture is performed;</li> <li>6) the requirements allocated to the system elements and their interfaces are traceable to the customer's requirements baseline;</li> <li>7) consistency and traceability between the system requirements and system architecture design is maintained; and</li> <li>8) the system requirements, the system architecture design, and their relationships are baselined and communicated to all affected parties.</li> </ol>
<b>Base Practices</b>	<p><b>ENG.3.BP1: Describe system architecture.</b>          Establish the top-level system architecture that identifies elements of hardware, software and manual-operations. [Outcomes: 1]</p> <p><i>NOTE A: ECSS-Q-80 requires that the ground computer equipment required for implementing the final system is selected according to the project requirements regarding:</i></p> <ul style="list-style-type: none"> <li>• Performance and Maintenance</li> <li>• Durability and technical consistency with the operational equipment</li> <li>• The assessment of the product with respect to requirements, including the criticality category</li> <li>• The available support documentation</li> <li>• The acceptance and warranty conditions</li> <li>• The conditions of installation, preparation, training and use</li> <li>• The maintenance conditions, including the possibilities of evolutions</li> <li>• Copyright constraints</li> <li>• Availability, Compatibility and Site operational constraints</li> </ul> <p><b>ENG.3.BP2: Allocate requirements.</b>          Allocate all system requirements to the elements of the top-level system architecture. [Outcomes: 2, 3]</p> <p><b>ENG.3.BP3: Define interfaces.</b>          Develop and document the internal and external interfaces of each system element [Outcomes: 4]</p> <p><b>ENG.3.BP4: Verify system architecture.</b>          Ensure that the system architecture meets all stakeholders and system requirements. [Outcomes: 5, 6]</p>



	<p><b>ENG.3.BP5: Evaluate alternative system architectures.</b>                  Define evaluation criteria for architecture design. Evaluate alternative system architectures according to the defined criteria. Record the rationale for choosing the current system architecture. [Outcomes: 1]</p> <p>NOTE 1: Evaluation criteria may include quality characteristics (modularity, maintainability, expandability, scalability, reliability, security and usability) and results of make-buy-reuse analysis.</p> <p><b>ENG.3.BP6: Ensure consistency.</b>                  Ensure consistency of system requirements analysis to system architectural design. Consistency is supported by establishing and maintaining traceability between system requirements and the system architecture design when needed. [Outcomes: 7]</p> <p><b>ENG.3.BP7: Communicate system architecture design.</b>                  Establish communication mechanisms for dissemination of the system architecture design to all parties who will be using them. [Outcomes: 8]</p>	
<b>Work Products</b>		
<b>Input Work Products</b>		<b>Output Work Products</b>
WP01-01 Product configuration [Outcomes: 1] WP17-03 Customer requirements [Outcomes: 6] WP17-08 Interface requirements [Outcomes: 6] WP17-12 System requirements [Outcomes: 1, 2, 3, 5, 6, 7, 8] WP50-01 Software system specification [Outcomes: 6] WP50-02 Software requirements specification [Outcomes: 6]		WP04-06 System architecture design [Outcomes: 1, 2, 3, 4] WP11-08 System element [Outcomes: 1, 3, 6] WP13-04 Communication record [Outcomes: 8] WP13-22 Traceability record [Outcomes: 6, 7, 8] WP13-25 Verification results [Outcomes: 5] WP60-15 Interface control document [Outcomes: 4]

#### 4.1.2.4.4 ENG.4 Software Requirements Analysis

<b>Process ID</b>	ENG.4
<b>Process Name</b>	Software Requirements Analysis
<b>Process Purpose</b>	The purpose of the Software Requirements Analysis process is to establish the requirements of the software elements of the system.
<b>Process Outcomes</b>	As a result of successful implementation of the Software Requirements Analysis process: <ol style="list-style-type: none"> <li>1) the requirements allocated to the software elements of the system and their interfaces are defined;</li> <li>2) software requirements are analyzed for correctness and testability;</li> <li>3) the impact of software requirements on the operating environment are understood;</li> <li>4) consistency and traceability are established between the software requirements and system requirements;</li> <li>5) prioritization for implementing the software requirements is defined;</li> <li>6) the software requirements are approved and updated as needed;</li> <li>7) changes to the software requirements are evaluated for cost, schedule and technical</li> </ol>

	<p>impact; and</p> <p>8) the software requirements are baselined and communicated to all affected parties.</p>
<p><b>Base Practices</b></p>	<p><b>ENG.4.BP1: Specify software requirements.</b></p> <p>Specify software requirements. Define and prioritize functional and non-functional requirements of the software elements of the system and their interfaces and document in a software requirements specification. Analyze the software requirements for correctness, completeness, consistency, feasibility and testability. Identify any derived requirements. [Outcomes: 1, 2, 5]</p> <p><i>NOTE A: ECSS-Q-80 requires that results from the dependability analysis including results from the HSIA shall be taken into account.</i></p> <p><i>NOTE B: ECSS-Q-80 requires that the software quality requirements shall be documented in the Requirements Baseline and in Technical Specification.</i></p> <p><i>NOTE C: ECSS-Q-80 requires that requirements are stated sufficiently precisely to allow verification and validation in measurable terms (e.g. with the use of metrics).</i></p> <p><i>NOTE D: ECSS-Q-80 requires that for each requirement the method for verification/validation is specified.</i></p> <p><i>NOTE E: Existing lessons learned reports from relevant past projects are an input</i></p> <p>NOTE 1: Software quality characteristics are described in ISO/IEC 9126.</p> <p><b>ENG.4.BP2: Determine operating environment impact.</b></p> <p>Determine the interfaces between the software requirements and other elements of the operating environment, and the impact that the requirements will have. [Outcomes: 3]</p> <p>NOTE 2: The operating environment includes tasks performed by, or other systems used by the intended users of the software product.</p> <p><b>ENG.4.BP3: Develop criteria for software testing.</b></p> <p>Use the software requirements to define acceptance criteria for the software product tests. Software product tests should demonstrate compliance with the software requirements. [Outcomes: 2]</p> <p><i>NOTE F: ECSS-Q-80 requires that provisions are made to allow witnessing of tests by supplier personnel independent of the development (e.g. specialist software product assurance personnel).</i></p> <p><i>NOTE G: ECSS-Q-80 requires that the supplier ensures that tests are repeatable by verifying the storage/recording of tested software, support software, test environment, supporting documents and problems found.</i></p> <p><b>ENG.4.BP4: Ensure consistency.</b></p> <p>Ensure consistency of system requirements analysis to software requirements analysis. Consistency is supported by establishing and maintaining traceability between system requirements and the software requirements when needed. [Outcomes: 4]</p> <p><b>ENG.4.BP5: Evaluate and update software requirements.</b></p> <p>Evaluate the requirements with the customer, evaluate the proposed changes for cost, schedule and technical impact, approve or reject changes, and update the software requirements specification. [Outcomes: 6, 7]</p> <p><b>ENG.4.BP6: Communicate software requirements.</b></p> <p>Establish communication mechanisms for dissemination of software requirements, and updates to requirements to all parties who will be using them. [Outcomes: 8]</p>



<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP04-06 System architecture design [Outcomes: 1]                      WP13-16 Change request [Outcomes: 6, 7]                      WP13-17 Customer request [Outcomes: 6, 7]                      WP17-12 System requirements [Outcomes: 1,4]</p>	<p><b>Output Work Products</b></p> <p>WP13-04 Communication record [Outcomes: 8]                      WP13-21 Change control record [Outcomes: 7]                      WP13-22 Traceability record [Outcomes: 4]                      WP15-01 Analysis report [Outcomes: 2, 3, 7]                      WP17-08 Interface requirements [Outcome: 1]                      WP17-11 Software requirements [Outcomes: 1, 2, 4, 5, 6]                      WP50-01 <i>Software system specification</i> [Outcomes: 1]                      WP50-02 <i>Software requirements specification</i> [Outcomes: 1]</p>

#### 4.1.2.4.5 ENG.5 Software Design

<b>Process ID</b>	ENG.5
<b>Process Name</b>	Software Design
<b>Process Purpose</b>	The purpose of the Software Design process is to provide a design for the software that implements and can be verified against the requirements.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Software Design process:</p> <ol style="list-style-type: none"> <li>1) a software architectural design is developed and baselined that describes the software elements that will implement the software requirements;</li> <li>2) internal and external interfaces of each software elements are defined;</li> <li>3) a detailed design is developed that describes software units than can be built and tested;</li> <li>4) consistency and traceability are established between software requirements and software design; and</li> <li>5) <i>Reuse of existing components and commercial software is considered in the production of the design.</i></li> </ol>
<b>Base Practices</b>	<p><b>ENG.5.BP1: Describe software architecture.</b>                      Transform the software requirements into a software architecture design that describes the top-level structure and identifies its major software elements. [Outcomes: 1]</p> <p><b>NOTE 1:</b> Examples of major software elements include data storage and access (e.g. Database), communication mechanisms, business logic and user interface.</p> <p><b>NOTE A:</b> <i>ECSS-E-40 requires the use of appropriate design methods to establish the static design.</i></p> <p><b>NOTE B:</b> <i>ECSS-Q-80 requires that the product is designed to the maximum extent to facilitate testing and to meet non-functional requirements.</i></p> <p><b>NOTE C:</b> <i>ECSS-Q-80 requires that software with long planned lifetime, during which it is planned to be maintained, is designed with minimum dependency on the operating system and the hardware, in order to aid portability.</i></p> <p><b>NOTE D:</b> <i>Where possible, different model solutions are developed.</i></p> <p><b>NOTE E:</b> <i>ECSS-Q-80 requires that the software design meets the non functional</i></p>

	<p><i>requirements as documented in the technical specification.</i></p> <p><b>ENG.5.BP2: Define interfaces.</b>          Specify and document the external and internal interfaces between the software elements. [Outcomes: 2]</p> <p><b>ENG.5.BP3: Develop detailed design.</b>          Decompose the software architectural design into a detailed design for each software element describing all software units to be produced and tested. Document software units and interfaces in a software design document. [Outcomes: 3]</p> <p><i>NOTE F: ECSS-Q-80 requires that for software in which numerical accuracy has a functional importance relevant design rules are established.</i></p> <p><b>ENG.5.BP4: Evaluate alternative software architectures.</b>          Define evaluation criteria for software architecture design. Evaluate alternative software architectures according to the defined criteria. Record the rationale for choosing the current software architecture. [Outcomes: 3]</p> <p><i>NOTE 2: Evaluation criteria may include software quality characteristics (modularity, maintainability, expandability, scalability, reliability, security and usability) and results of make-buy-reuse analysis.</i></p> <p><b>ENG.5.BP5: Analyze the design for testability.</b>          Analyse the design for correctness and testability to ensure that the software units can be built and tested. [Outcomes: 3]</p> <p><b>ENG.5.BP6: Ensure consistency.</b>          Ensure consistency of software requirements analysis to software design. Consistency is supported by establishing and maintaining traceability between software requirements and the software design when needed. [Outcomes: 4]</p> <p><b>ENG.5.BP7: Verify the design.</b>  <i>Verify the design of software elements and interfaces to ensure internal consistency, proper implementation of requirements and feasibility of operations and maintenance. [Outcomes: 3]</i></p> <p><i>NOTE G: System interfaces are also considered in this verification.</i></p> <p><i>NOTE H: Suitably rigorous methods are used to verify parts of the design related to safety, security, and criticality.</i></p> <p><i>NOTE I: Numerical accuracy, where relevant, is verified.</i></p> <p><i>NOTE J: ECSS-Q-80 requires that the means, criteria and tools to ensure that the complexity and modularity of the design meet the quality requirements.</i></p> <p><b>ENG.5.BP8: Identify and analyse reusable components.</b>          Analyse the advantages to be obtained by using existing software and identify candidate components to be reused in the reusable components list. For each item in the list, corrective/adaptive actions to be implemented on the reused software have to be determined. [Outcomes: 5]</p> <p><i>NOTE K: This addresses:</i></p> <ul style="list-style-type: none"> <li>• The durability and validity of methods and tools, used in the initial development, that it is envisaged to use again;</li> <li>• For each reused component:             <ul style="list-style-type: none"> <li>▪ Its validation level or operational behaviour;</li> <li>▪ Its documentation status;</li> <li>▪ Its quality status, i.e. residual non-conformances, complexity analyses, waivers,, etc.</li> </ul> </li> </ul> <p><b>ENG.5.BP9: Identify and analyse commercially available software components.</b></p>
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	<p><i>Analyse of the advantages to be obtained by using commercial software (COTS) and identify candidate components in the software components list.</i></p> <p><b>NOTE L:</b>     <i>ECSS-Q-80 requires that the software component list includes specification of, at least:</i></p> <ul style="list-style-type: none"> <li>• <i>Ordering criteria (e.g. versions, options, extensions)</i></li> <li>• <i>Receiving inspection criteria</i></li> <li>• <i>Back-up solutions if the product becomes unavailable</i></li> <li>• <i>Contractual arrangements for the development, maintenance and upgrades to new releases</i></li> </ul> <p><b>NOTE M:</b>     <i>ECSS-Q-80 requires that the following aspects are considered:</i></p> <ul style="list-style-type: none"> <li>• <i>The assessment of the product with respect to quality requirements and objectives</i></li> <li>• <i>The available support documentation</i></li> <li>• <i>The acceptance and warranty conditions</i></li> <li>• <i>The maintenance conditions, including possibility of evolutions (example: portability)</i></li> <li>• <i>Copyright constraints</i></li> </ul>	
<b>Work Products</b>		
<b>Input Work Products</b>	<b>Output Work Products</b>	
WP03-02 <i>Asset use data [Outcomes: 5]</i> WP09-03 <i>Reuse policy [Outcomes: 5]</i> WP12-03 <i>Reuse proposal [Outcomes: 5]</i> WP15-05 <i>Evaluation report [Outcomes: 5]</i> WP16-05 <i>Reuse library [Outcomes: 5]</i> WP17-08 <i>Interface requirements [Outcomes: 2]</i> WP17-11 <i>Software requirements [Outcomes: 1, 4]</i> WP50-01 <i>Software system specification [Outcomes: 2]</i> WP50-02 <i>Software requirements specification [Outcomes: 2]</i>	WP04-01 <i>Database design [Outcomes: 3, 4]</i> WP04-04 <i>High level software design [Outcomes: 1, 2, 4]</i> WP04-05 <i>Low level software design [Outcomes: 2, 3, 4]</i> WP11-02 <i>Software element [Outcomes: 1]</i> WP12-03 <i>Reuse proposal [Outcomes: 5]</i> WP13-22 <i>Traceability record [Outcomes: 4]</i> WP15-05 <i>Evaluation report [Outcomes: 5]</i> WP50-03 <i>Software design document [Outcomes: 1, 2, 3, 4]</i> WP50-10 <i>Software reuse file [Outcomes: 5]</i> WP60-15 <i>Interface control document [Outcomes: 2]</i>	

#### 4.1.2.4.6     ENG.6 Software Construction

<b>Process ID</b>	ENG.6
<b>Process Name</b>	Software Construction
<b>Process Purpose</b>	The purpose of the Software Construction process is to produce executable software units that properly reflect the software design.
<b>Process Outcomes</b>	As a result of successful implementation of Software construction: <ol style="list-style-type: none"> <li>1) verification criteria are defined for all software units against their requirements;</li> <li>2) software units defined by the design are produced;</li> <li>3) consistency and traceability are established between software design and units;</li> <li>4) verification of the software units against the requirements and the design is accomplished.</li> </ol>



<b>Base Practices</b>	<p><b>ENG.6.BP1: Develop unit verification procedures.</b>                  Develop and document procedures and criteria for verifying that each software unit satisfies its design requirements. The verification procedure includes unit test cases, unit test data and code review. [Outcomes: 1]</p> <p><b>ENG.6.BP2: Develop software units.</b>                  Develop and document the executable representations of each software unit. Update test requirements and user documentation. [Outcomes: 2]</p> <p>NOTE 1: User documentation includes preliminary versions of installation, operation and maintenance documentation.</p> <p><b>ENG.6.BP3: Ensure consistency.</b>                  Ensure consistency of software design to software construction. Consistency is supported by establishing and maintaining traceability between software requirements and design and the software units when needed. [Outcomes: 3]</p> <p><b>ENG.6.BP4: Verify software units.</b>                  Verify that each software unit satisfies its design requirements by executing the specified unit verification procedures and document the results. [Outcomes: 4]</p> <p>NOTE 2: Code can be verified by various techniques such as static code analyses, code review, etc.</p> <p>NOTE A: <i>Suitably rigorous methods are used to verify parts of the code related to safety, security, and criticality.</i></p> <p>NOTE B: <i>Numerical accuracy, where relevant, is verified.</i></p> <p>NOTE C: <i>ECSS-Q-80 requires that unreachable or deactivated code is removed or that a justification for the decision of not removing it is provided.</i></p> <p><b>ENG.6.BP5: Reuse software units.</b>                  All the components identified as 'to be reused' are included from previous developments. Corrective/adaptive actions are to be performed as specified in the reuse software analysis. [Outcomes: 2]</p> <p>NOTE D: <i>This Base Practice responds to the fact, that the reuse repository is listed as input work product for the Software Construction process.</i></p> <p><b>ENG.6.BP6: Update work products as necessary.</b>                  Identify work products impacted by the results of unit verification and update them as needed. [Outcomes: 2, 4]</p> <p>NOTE E: <i>Examples of documents to update include the operations manual, the test requirements, and the integration test plan.</i></p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP04-04 High level software design [Outcomes: 2, 3] WP04-05 Low level software design [Outcomes: 2, 3] WP11-02 Software element [Outcomes: 2, 4] WP17-08 Interface requirements [Outcomes: 1, 3] WP17-11 Software requirements [Outcomes: 1, 3] WP18-03 Coding standards [Outcomes: 2, 3, 4] WP50-01 <i>Software system specification [Outcomes: 1, 3]</i> WP50-02 <i>Software requirements specification [Outcomes: 1, 3]</i> WP50-03 <i>Software design document [Outcomes: 2, 3]</i>	WP06-01 Customer manual [Outcomes: 2, 4] WP08-25 Unit test plan [Outcomes: 1] WP10-02 Test procedure [Outcomes: 1] WP11-05 Software unit [Outcomes: 2] WP13-19 Review records [Outcomes: 2] WP13-22 Traceability record [Outcomes: 3] WP14-04 Test log [Outcomes: 4] WP15-10 Test incident report [Outcomes: 4] WP17-13 Test script [Outcomes: 1, 4] WP50-06 <i>Software test plan [Outcomes: 1]</i> WP50-07 <i>Software validation testing specification [Outcomes: 1, 3, 4]</i>

4.1.2.4.7      **ENG.7 Software Integration**

<b>Process ID</b>	ENG.7
<b>Process Name</b>	Software Integration
<b>Process Purpose</b>	The purpose of the Software Integration process is to combine the software units, producing integrated software items, consistent with the software design, that demonstrate that the functional and non-functional software requirements are satisfied on an equivalent or complete operational platform.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Software Integration process:</p> <ol style="list-style-type: none"> <li>1) an integration strategy is developed for software units consistent with the software design and the prioritized software requirements;</li> <li>2) verification criteria for software items are developed that ensure compliance with the software requirements allocated to the items;</li> <li>3) software items are verified using the defined criteria;</li> <li>4) software items defined by the integration strategy are produced;</li> <li>5) result of integration testing are recorded;</li> <li>6) consistency and traceability are established between software design and software items; and</li> <li>7) a regression strategy is developed and applied for re-verifying software items when a change in software units (including associated requirements, design and code) occurs.</li> </ol> <p><i>NOTE: Integration testing as referred to in ECSS-E-40 would fall under the scope of this process.</i></p>
<b>Base Practices</b>	<p><b>ENG.7.BP1:      Develop software integration strategy.</b>                  Develop the strategy for integrating software units considering the software requirements. Identify software items based on the software architecture and define a sequence or order for testing them. [Outcomes: 1]</p> <p><b>NOTE 1:</b>      Examples for the order of software item integration include top-level items, bottom-level items, critical items, functional items, complete skeleton first and items as-available.</p> <p><i>NOTE A:      Testing generated code has specific aspects to consider.</i></p> <p><b>ENG.7.BP2:      Develop tests for integrated software items.</b>                  Describe the tests to be run against each integrated software item, including the verification of the interfaces, indicating software requirements being checked, input data and verification criteria. [Outcomes: 2]</p> <p><i>NOTE B:      Testing generated code has specific aspects to consider.</i></p> <p><b>ENG.7.BP3:      Integrate software items.</b>                  Integrate the software units according to the integration strategy to form a software item. [Outcomes: 4]</p> <p><b>ENG.7.BP4:      Test integrated software items.</b>                  Test each integrated software item on an operational platform or suitable equivalent platform, against the verification criteria, and record the results. Update the user documentation as necessary. [Outcomes: 3, 5]</p> <p><i>NOTE C:      ECSS-Q-80 requires that the level of coverage to be achieved shall be</i></p>



	<p style="text-align: center;"><i>agreed between the customer and the supplier.</i></p> <p><b>NOTE D:</b> <i>ECSS-Q-80 requires that critical software shall be regression tested after:</i></p> <ul style="list-style-type: none"> <li>• <i>Any change in functionality of the underlying platform hardware</i></li> <li>• <i>Any change of tools that affect directly or indirectly the generation of executable code</i></li> </ul> <p><b>ENG.7.BP5: Ensure consistency.</b>                  Ensure consistency of software design to software integration. Consistency is supported by establishing and maintaining traceability between software design and the software items when needed. [Outcomes: 6]</p> <p><b>ENG.7.BP6: Regression test integrated software items.</b>                  Develop a software regression test strategy for re-testing the integrated software items. If changes are made to software units, designs or requirements carry out regression testing according to this strategy. [Outcomes: 7]</p> <p><b>ENG.7.BP7: Update work products as necessary.</b>                  Identify work products impacted by the results of unit verification and update them as needed. [Outcomes: 3, 4]</p> <p><b>NOTE E:</b> <i>Examples of documents to update include the operations manual, the test requirements, and the integration test plan.</i></p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP01-03 Configuration item [Outcomes: 6]	WP01-03 (Software) Configuration item [Outcomes: 3, 4]
WP04-04 High level software design [Outcomes: 1, 6, 7]	WP06-01 Customer manual [Outcomes: 3, 4]
WP04-05 Low level software design [Outcomes: 1, 6, 7]	WP08-10 Software integration test plan [Outcomes: 1, 2, 3, 4]
WP04-06 System architecture design [Outcomes: 1, 6, 7]	WP08-15 Regression test plan [Outcomes: 2, 7]
WP10-02 Test procedure [Outcomes: 3]	WP10-02 Test procedure [Outcomes: 1]
WP11-05 Software unit [Outcomes: 1, 4, 7]	WP11-01 Software product [Outcomes: 4, 7]
WP17-02 Build list [Outcomes: 4, 7]	WP13-22 Traceability record [Outcomes: 6]
WP17-11 Software requirements [Outcomes: 1, 2, 7]	WP14-04 Test log [Outcomes: 3, 5]
WP50-03 Software design document [Outcomes: 1, 6, 7]	WP15-10 Test incident report [Outcomes: 3, 5]
WP50-04 Software configuration file [Outcomes: 4, 7]	WP17-02 Build list [Outcomes: 4, 6, 7]
WP50-06 Software test plan [Outcomes: 3]	WP50-04 Software configuration file [Outcomes: 4, 6, 7]
WP50-07 Software validation testing specification [Outcomes: 3]	WP50-06 Software test plan [Outcomes: 1, 2]
	WP50-07 Software validation testing specification [Outcomes: 1]

4.1.2.4.8      **ENG.8 Software Testing**

<b>Process ID</b>	ENG.8
<b>Process Name</b>	Software Testing
<b>Process Purpose</b>	The purpose of the Software Testing process is to confirm that the integrated software product meets its defined requirements.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Software Testing process:</p> <ol style="list-style-type: none"> <li>1) criteria for the integrated software is developed that demonstrates compliance with the software requirements;</li> <li>2) integrated software is verified using the defined criteria;</li> <li>3) test results are recorded; and</li> <li>4) a regression strategy is developed and applied for re-testing the integrated software when a change in software items is made.</li> </ol> <p><i>NOTE: Both validation against the Technical Baseline and Technical Specification, as described in ECSS-E-40, would fall under the scope of this process implying two independent instantiations of it.</i></p>
<b>Base Practices</b>	<p><b>ENG.8.BP1:      Develop tests for integrated software product.</b>                  Describe the tests to be run against the integrated software product, indicating software requirements being checked, input data, and verification criteria. The set of tests should demonstrate compliance with the software requirements. [Outcomes: 1]</p> <p><b>NOTE 1:</b>      Tests and test data can be developed during the Software Requirements Analysis process (ENG.4), the Software Design process (ENG.5), and the Software Construction process (ENG.6).</p> <p><b>NOTE A:</b>      <i>The validation tests are evaluated with respect to test coverage of software requirements, conformance to expected results, feasibility of system testing and integration, and feasibility of operations and maintenance.</i></p> <p><b>NOTE B:</b>      <i>Testing generated code has specific aspects to consider.</i></p> <p><b>ENG.8.BP2:      Test integrated software product.</b>                  Test the integrated software product against the verification criteria, and record the results. Update user documentation as necessary. [Outcomes: 2, 3]</p> <p><b>NOTE C:</b>      <i>ECSS-Q-80 either identifies level of coverage for high critical software or requires that the level of coverage shall be achieved shall be agreed between the customer and the supplier.</i></p> <p><b>NOTE D:</b>      <i>ECSS-Q-80 requires that readiness reviews are held before the commencement of key test activities.</i></p> <p><b>NOTE E:</b>      <i>ECSS-Q-80 requires that reviews are held after completion of key test phases.</i></p> <p><b>ENG.8.BP3:      Regression test integrated software.</b>                  Develop a software regression test strategy for re-testing the integrated software product. If changes are made to software items carry out regression testing according to the strategy. [Outcomes: 4]</p>



<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP06-01 Customer manual [Outcomes: 3]                      WP08-21 Software test plan [Outcomes: 2]                      WP11-01 Software product [Outcomes: 2, 4]                      WP17-11 Software requirements [Outcomes: 1, 4]</p>	<p><b>Output Work Products</b></p> <p>WP03-07 Test data [Outcomes: 1]                      WP06-01 Customer manual [Outcomes: 3]                      WP08-15 Regression test plan [Outcomes: 2, 4]                      WP08-21 Software test plan [Outcomes: 1]                      WP14-04 Test log [Outcomes: 3, 4]                      WP15-10 Test incident report [Outcomes: 3, 4]                      WP15-11 Test summary report [Outcomes: 3, 4]                      WP17-13 Test script [Outcomes: 2]                      WP50-07 <i>Software validation testing specification</i> [Outcomes: 2]</p>

#### 4.1.2.4.9 ENG.9 System Integration

<b>Process ID</b>	ENG.9
<b>Process Name</b>	System Integration
<b>Process Purpose</b>	The purpose of the System Integration process is to integrate the system elements (including software items, hardware items, manual operations, and other systems, as necessary) to produce a complete system that will satisfy the system design and the customer's expectations expressed in the system requirements.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the System Integration process:</p> <ol style="list-style-type: none"> <li>1) a strategy is developed to integrate the system according to the priorities of the system requirements;</li> <li>2) criteria is developed to verify compliance with the system requirements allocated to the system elements, including the interfaces between system elements;</li> <li>3) the system integration is verified using the defined criteria;</li> <li>4) a regression strategy is developed and applied for re-testing the system [elements] when changes are made;</li> <li>5) consistency and traceability are established between the system design and the integrated system elements; and</li> <li>6) an integrated system, demonstrating compliance with the system design and validation that a complete set of usable deliverable system elements exists, is constructed.</li> </ol>
<b>Base Practices</b>	<p><b>ENG.9.BP1: Develop system integration and regression test strategies.</b>                      Develop strategies for integrating system elements consistent with the system architecture and requirements, and for re-testing system elements should a given system element be changed. [Outcomes: 1, 4]</p> <p><i>NOTE A: Testing generated code has specific aspects to consider.</i></p> <p><b>ENG.9.BP2: Develop tests for system elements.</b>                      Describe the tests to be run against each system element, indicating requirements being checked, input data, system elements needed to perform the test, and verification criteria. [Outcomes: 2]</p> <p><b>ENG.9.BP3: Integrate system elements.</b>                      Integrate system elements according to the system integration strategy. [Outcomes: 3]</p>



	<p><b>ENG.9.BP4: Test system elements.</b>                  Test each system element and ensure that it satisfies its requirements, and document the results. [Outcomes: 3]   <i>NOTE B: ECSS-Q-80 requires that reviews are held after completion of key test phases.</i></p> <p><b>ENG.9.BP5: Regression test system elements.</b>                  If changes are made to system elements carry out regression testing as defined in the regression test strategy. [Outcomes: 4]</p> <p><b>ENG.9.BP6: Ensure consistency.</b>                  Ensure consistency of system architectural design to system integration. Consistency is supported by establishing and maintaining traceability between system designs and the system elements when needed. [Outcomes: 5]</p> <p><b>ENG.9.BP7: Build complete system of system elements.</b>                  Identify and integrate system elements to produce a complete system ready for system testing according to the system integration strategy. [Outcomes: 6]</p>	
<b>Work Products</b>		
<p><b>Input Work Products</b></p> <p>WP04-06 System architecture design [Outcomes: 1, 2, 4, 5]                  WP11-01 Software product [Outcomes: 3, 6]                  WP11-06 System [Outcomes: 3]                  WP11-08 System element [Outcomes: 4, 5, 6]                  WP17-02 Build list [Outcomes: 3, 4, 6]                  WP17-12 System requirements [Outcomes: 1, 2]                  WP50-04 <i>Software configuration file</i> [Outcomes: 3, 4, 6]</p>		<p><b>Output Work Products</b></p> <p>WP08-07 System integration test plan [Outcomes: 1, 2]                  WP08-15 Regression test plan [Outcomes: 4]                  WP08-22 System test plan [Outcomes: 1, 2]                  WP10-02 Test procedure [Outcomes: 1, 2, 4]                  WP11-06 System [Outcomes: 6]                  WP13-22 Traceability record [Outcomes: 5]                  WP14-04 Test log [Outcomes: 3, 4]                  WP15-10 Test incident report [Outcomes: 3, 4]                  WP15-11 Test summary report [Outcomes: 3, 4]                  WP17-02 Build list [Outcomes: 1]                  WP17-13 Test script [Outcomes: 2]                  WP50-04 <i>Software configuration file</i> [Outcomes: 1]                  WP50-06 <i>Software test plan</i> [Outcomes: 1, 2, 4]                  WP50-07 <i>Software validation testing specification</i> [Outcomes: 1, 2, 4]</p>

#### 4.1.2.4.10 ENG.10 System Testing

<b>Process ID</b>	ENG.10
<b>Process Name</b>	System Testing
<b>Process Purpose</b>	The purpose of the Systems Testing process is to ensure that the implementation of each system requirements is tested for compliance and that the system is ready for delivery.
<b>Process Outcomes</b>	As a result of successful implementation of the System Testing process: <ol style="list-style-type: none"> <li>1) criteria for the integrated system is developed that demonstrates compliance with system requirements;</li> <li>2) the integrated system is verified using the defined criteria;</li> <li>3) test results are recorded; and</li> <li>4) a regression strategy is developed and applied for re-testing the integrated system</li> </ol>



	should a change be made to existing system elements.	
<b>Base Practices</b>	<p><b>ENG.10.BP1: Develop tests for system.</b>                  Describe the tests to be run against the complete system, indicating system requirements being checked, input data, and validation criteria. [Outcomes: 1]                   NOTE 1: This can be performed during the System Requirements Analysis process (ENG.2).</p> <p><b>ENG.10.BP2: Test integrated system.</b>                  Test the integrated system and ensure that it satisfies the system requirements, and record the results. [Outcomes: 2, 3]</p> <p><b>ENG.10.BP3: Regression test integrated system.</b>                  Develop a system regression test strategy for re-testing the system should a system element be changed. If changes are made to system elements carry out regression testing as defined in the system regression test strategy. [Outcomes: 1, 4]</p> <p><b>ENG.10. BP4: Confirm system readiness.</b>                  Ensure that the system is ready for delivery and communicate system test results to all affected parties. [Purpose]</p>	
<b>Work Products</b>		
<b>Input Work Products</b>	<b>Output Work Products</b>	
WP06-01 Customer manual [Outcomes: 2] WP08-15 Regression test plan [Outcomes: 4] WP08-22 System test plan [Outcomes: 2] WP10-02 Test procedure [Outcomes: 2] WP11-06 System [Outcomes: 2, 4] WP17-02 Build list [Outcomes: 2, 4] WP17-12 System requirements [Outcomes: 1, 4] WP50-04 Software configuration file [Outcomes: 2, 4] WP50-06 Software test plan [Outcomes: 2] WP50-07 Software validation testing specification [Outcomes: 2]	WP08-15 Regression test plan [Outcomes: 4] WP08-22 System test plan [Outcomes: 1, 4] WP10-02 Test procedure [Outcomes: 1, 4] WP14-04 Test log [Outcomes: 3] WP15-10 Test incident report [Outcomes: 3, 4] WP17-13 Test script [Outcomes: 2] WP50-06 Software test plan [Outcomes: 1, 4] WP50-07 Software validation testing specification [Outcomes: 1, 2, 4]	

#### 4.1.2.4.11 ENG.11 Software Installation

<b>Process ID</b>	ENG. 11
<b>Process Name</b>	Software Installation
<b>Process Purpose</b>	The purpose of the Software Installation process is to install the software product that meets the agreed requirements in the target environment.
<b>Process Outcomes</b>	As a result of successful implementation of the Software Installation process: <ol style="list-style-type: none"> <li>1) a software installation strategy is developed;</li> <li>2) criteria for software installation is developed that demonstrates compliance with the software installation requirements;</li> <li>3) the software product is installed in the target environment; and</li> <li>4) assure that the software product is ready for use in its intended environment.</li> </ol>



<b>Base Practices</b>	<p><b>ENG.11.BP1: Develop installation strategy.</b>                  Develop a software installation strategy to install the software product in the target environment in agreement with the customer and the operating organization. [Outcomes:1]</p> <p><b>ENG.11.BP2: Establish installation criteria.</b>                  Based on the installation requirements, develop criteria for the environment where the software will be installed. [Outcomes: 2].</p> <p><b>ENG.11.BP3: Specify the requirements for adaptation.</b>                  Specify requirements for the adaptation of the system for its intended environment. [Outcomes: 2]</p> <p><b>ENG.11.BP4: Adapt the system.</b>                  Adapt the system to meet the requirements for operation. [Outcomes: 2]</p> <p><b>ENG.11.BP5: Install software product.</b>                  Install the software product according to the software installation strategy. Document the events and results. [Outcomes: 3]</p> <p><b>ENG.11.BP6: Confirm product readiness.</b>                  Assure that the software product is ready for use in its intended environment. [Outcomes:4]</p> <p>NOTE 1: Software installation process is linked to process SPL.3 Product Acceptance Support.</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP04-06 System architecture design [Outcomes: 1, 3] WP06-03 Installation guide [Outcomes: 3] WP08-09 Installation and maintenance plan [Outcomes: 3] WP10-02 Test procedure [Outcomes: 3, 4] WP11-01 Software product [Outcomes: 1, 3, 4] WP17-11 Software requirements [Outcomes: 1] WP17-12 System requirements [Outcomes: 1] WP50-04 <i>Software configuration file [Outcomes: 3]</i> WP50-06 <i>Software test plan [Outcomes: 3, 4]</i> WP50-07 <i>Software validation testing specification [Outcomes: 3, 4]</i>	WP06-03 Installation guide [Outcomes: 1] WP08-09 Installation and maintenance plan [Outcomes: 1, 2] WP10-02 Test procedure [Outcomes: 1, 2] WP13-01 Acceptance record [Outcomes: 4] WP13-07 Problem report [Outcomes: 4] WP13-08 Installation record [Outcomes: 3] WP13-19 Review records [Outcomes: 4] WP15-10 Test incident report [Outcomes: 4] WP50-04 <i>Software configuration file [Outcomes: 1, 2]</i> WP50-06 <i>Software test plan [Outcomes: 1, 2]</i> WP50-07 <i>Software validation testing specification [Outcomes: 1, 2]</i>

4.1.2.4.12 ENG.12 Software and System Maintenance

<b>Process ID</b>	ENG.12
<b>Process Name</b>	Software and System Maintenance
<b>Process Purpose</b>	The purpose of the Software and System Maintenance process is to modify a system/software product after delivery to correct faults, improve performance or other attributes, or to adapt to a changed environment.  NOTE: The objective is to modify and/or retire existing systems/software products while

	preserving the integrity of organizational operations.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Software and System Maintenance process:</p> <ol style="list-style-type: none"> <li>1) a maintenance strategy is developed to manage modification, migration and retirement of products according to the release strategy;</li> <li>2) the impact of changes to the existing system on organization, operations or interfaces are identified;</li> <li>3) affected system software documentation is updated as needed;</li> <li>4) modified products are developed with associated tests that demonstrate that requirements are not compromised;</li> <li>5) product upgrades are migrated to the customer's environment;</li> <li>6) on request, products are retired from use in a controlled manner that minimises disturbance to the customers; and</li> <li>7) the system/software modification is communicated to all affected parties.</li> </ol>
<b>Base Practices</b>	<p><b>ENG.12.BP1: Develop maintenance strategy.</b>                  Develop the strategy for managing modification, migration, and retirement of products consistent with the maintenance requirements, release strategy and possible warranty policies. [Outcomes: 1]</p> <p><i>NOTE A: The maintenance strategy includes, where relevant, the disposal of the products..</i></p> <p><i>NOTE B: Any evolution of the product shall follow configuration management practices.</i></p> <p><b>ENG.12.BP2: Analyse user problems and changes.</b>                  Analyse user problems and requests and required changes, evaluating the possible impact of different options for modifying the existing system and software, system interfaces, and requirements. Document the selected solution. [Outcomes: 2]</p> <p><i>NOTE 1: This Base Practice links to the Problem Resolution Management process (SUP.9).</i></p> <p><i>NOTE D: ECSS-E-40 requires that options for implementing the modifications are developed and an approval is obtained for the selected option in accordance with procedures agreed with the customer.</i></p> <p><b>ENG.12.BP3: Implement and test modifications.</b>                  Determine which products need to be changed. Implement, test and document the selected modifications, demonstrating that the system and software requirements and integrity will not be compromised by the upgrade. [Outcomes: 3, 4]</p> <p><b>ENG.12.BP4: Upgrade user system.</b>                  Migrate the upgraded system and software with applied modifications to the user's environment. Provide for, as appropriate:</p> <ul style="list-style-type: none"> <li>• Notification of the migration plans and activities</li> <li>• Parallel operation of the old and new systems</li> <li>• User training</li> </ul> <p>Perform a post-operation review to assess the impact of the modification. [Outcomes: 5]</p> <p><b>ENG.12. BP5: Retire software product.</b>                  Following approval, retire the obsolete system from the user environment, providing for, as appropriate notification of the retirement plans and activities; parallel operation with replacement systems; conversion of data to new or replacement systems; archiving of</p>



	<p>system and data files; and user training or support. [Outcomes: 6]</p> <p><i>NOTE E: ECSS-M -10 requires that the disposal phase (phase F) only starts after a decision by the user on the basis of a Disposal Plan, and with the collaboration of all the concerned actors.</i></p> <p><b>ENG.12. BP6: Communicate modifications.</b>                  Establish communication mechanisms for dissemination of system and software modifications to all parties who will be affected. [Outcomes: 7]</p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP08-16 Release plan [Outcomes: 1] WP11-06 System [Outcomes: 1] WP12-02 Retirement request [Outcomes: 6] WP13-07 Problem report [Outcomes: 1] WP13-16 Change request [Outcomes: 2] WP13-17 Customer request [Outcomes: 2] WP17-03 Customer requirements [Outcomes: 1] WP17-05 Documentation requirements [Outcomes: 3] WP17-11 Software requirements [Outcomes: 1] WP17-12 System requirements [Outcomes: 1] WP50-01 <i>Software system specification [Outcomes: 1]</i>	WP08-01 Acceptance test plan [Outcomes: 1] WP08-09 Installation and maintenance plan [Outcomes: 1, 5] WP08-15 Regression test plan [Outcomes: 1] WP08-16 Release plan [Outcomes: 1, 5] WP08-22 System test plan [Outcomes: 1] WP11-03 Product release information [Outcomes: 7] WP11-04 Product release package [Outcomes: 7] WP11-07 Temporary solution [Outcomes: 7] WP12-02 Retirement request [Outcomes: 6] WP13-01 Acceptance record [Outcomes: 7] WP13-04 Communication record [Outcomes: 7] WP13-21 Change control record [Outcomes: 7] WP13-22 Traceability record [Outcomes: 4] WP14-01 Change history [Outcomes: 7] WP15-01 Analysis report [Outcomes: 7] WP15-10 Test incident report [Outcomes: 4] WP19-04 Product release strategy [Outcomes: 1, 5] WP19-06 Maintenance strategy [Outcomes: 1] WP50-04 <i>Software configuration file [Outcomes: 7]</i> WP50-05 <i>Software release document [Outcomes: 7]</i>

## 4.1.2.5 Supporting process group (SUP)

### 4.1.2.5.1 SUP.1 Quality Assurance

<b>Process ID</b>	SUP.1
<b>Process Name</b>	Quality Assurance
<b>Process Purpose</b>	The purpose of the Quality Assurance process is to provide assurance that work products and processes comply with predefined provisions and plans.
<b>Process Outcomes</b>	As a result of successful implementation of the Quality Assurance process: 1) a strategy for conducting quality assurance is developed; 2) evidence of quality assurance is produced and maintained; 3) problems and/or non-conformance with agreed requirements are identified and recorded; and 4) adherence of products, processes and activities to the applicable standards, procedures and requirements are verified.
<b>Base Practices</b>	<p><b>SUP.1.BP1: Develop a strategy for product and process quality assurance.</b>                  A project level strategy for conducting quality assurance is developed. [Outcomes: 1]</p> <p>NOTE 1: A project level strategy would normally be developed, that is consistent with the organizational Quality Management strategy.</p> <p>NOTE 2: The Quality Assurance process determines the objectives for, and monitors the execution of the related processes: Verification process (SUP.2), Validation process (SUP.3), Joint Review process (SUP.4) and Audit process (SUP.5).</p> <p>NOTE A: <i>ECSS-Q-80 requires that the software product assurance plan is updated at each milestone in such a way that the activities to be undertaken in the following phase are fully defined.</i></p> <p>NOTE B: <i>ECSS-Q-80 requires that the software product assurance plan specify the point in the software life cycle from which the non-conformance procedures have to be applied.</i></p> <p><b>SUP.1.BP2: Define quality records.</b>                  Quality records are defined that demonstrate conformance of processes and work products to their quality requirements. [Outcomes: 3]</p> <p><b>SUP.1.BP3: Assure the quality of project process activities and project work products.</b>                  Carry out a series of activities to provide assurance, with the required level of confidence, that the project processes have followed specified standards and that the work products meet the quality requirements. [Outcome: 2, 4]</p> <p>NOTE C: <i>ECSS-Q-80 requires that software lifecycle is reviewed for suitability and availability of resources as well as against contractual requirements.</i></p> <p>NOTE E: <i>ECSS-Q-80 requires that process measurements shall be performed throughout development.</i></p> <p>NOTE F: <i>ECSS-Q-80 requires that the means and organisation to perform the tasks</i></p>



	<p><i>are described in the Software Product Assurance Plan.</i></p> <p><b>SUP.1.BP4: Identify and record problems and non-conformances.</b>                  Problems and non-conformances are identified and recorded and then reported to appropriate stakeholders for information and action. [Outcomes: 3]   <i>NOTE G: See also MAN.4.BP5 for quality assessment (class C or higher).</i></p> <p><b>SUP.1.BP5: Act on non-conformance.</b>                  Deviations or non-conformance with agreed requirements or organizational quality goals are analyzed and resolved. [Outcomes: 4]</p>	
<b>Work Products</b>		
<p><b>Input Work Products</b></p> <p>WP07-04 Process measure [Outcomes: 2, 3, 4]                  WP07-06 Quality measures [Outcomes: 2, 3, 4]                  WP08-13 Quality plan [Outcomes: 1]                  WP09-02 Quality policy [Outcomes: 1]                  WP10-00 Process description [Outcomes: 4]                  WP13-18 Quality record [Outcomes: 2, 3, 4]                  WP14-02 Corrective action register [Outcomes: 3]                  WP14-08 Tracking system [Outcomes: 3, 4]                  WP18-00 Standard [Outcomes: 4]                  WP18-07 Quality criteria [Outcomes: 4]                  WP19-09 Quality strategy [Outcomes: 2, 3, 4]                  WP21-00 Work product [Outcomes: 4]                  WP50-06 <i>Software test plan [Outcomes: 4]</i>                  WP50-12 <i>Software product assurance plan [Outcomes: 1, 4]</i></p>		<p><b>Output Work Products</b></p> <p>WP10-00 Process description [Outcomes: 2]                  WP13-07 Problem report [Outcomes: 3, 4]                  WP13-18 Quality record [Outcomes: 2, 3, 4]                  WP13-19 Review records [Outcomes: 2, 3, 4]                  WP14-02 Corrective action register [Outcomes: 3]                  WP15-03 Configuration status report [Outcomes: 2]                  WP18-07 Quality criteria [Outcomes: 4]                  WP19-09 Quality strategy [Outcomes: 1]                  WP50-12 <i>Software product assurance plan [Outcomes: 4]</i></p>

#### 4.1.2.5.2 SUP.2 Verification

<b>Process ID</b>	SUP.2
<b>Process Name</b>	Verification
<b>Process Purpose</b>	The purpose of the Verification process is to confirm that each software work product and/or service of a process or project properly reflects the specified requirements.
<b>Process Outcomes</b>	As a result of successful implementation of the Verification process: <ol style="list-style-type: none"> <li>1) a verification strategy is developed and implemented;</li> <li>2) criteria for verification of all required software work products is identified;</li> <li>3) required verification activities are performed;</li> <li>4) defects are identified and recorded; and</li> <li>5) results of the verification activities are made available to the customer and other involved parties.</li> </ol>

<b>Base Practices</b>	<p><b>SUP.2.BP1: Develop verification strategy.</b>                  Develop and implement a verification strategy, including verification activities with associated methods, techniques, and tools, work product or processes under verification, degrees of independence for verification and schedule for performing these activities. [Outcomes: 1]</p> <p><b>NOTE 1:</b> Software verification provides objective evidence that the design outputs of a particular phase of the software development life cycle meet all of the specified requirements for that phase.</p> <p><b>NOTE A:</b> <i>ECSS-Q-80 requires that the testing strategy considers the specific aspects of testing of generated code.</i></p> <p><b>NOTE B:</b> <i>ECSS-Q-80 requires that in particular, the requirements on testing applicable to the generated code ensure the achievement of the same objectives as those for manually generated code unless different objectives are specifically stated in the verification requirements.</i></p> <p><b>NOTE C:</b> <i>ECSS-Q-80 requires that if code generation tools are used to skip code verification, the tool shall be verified at least to the same level as that intended for the code.</i></p> <p><b>NOTE D:</b> <i>ECSS-Q-80 requires that tests are organised as activities in terms of planning, resources and team composition; the necessary resources be identified as early as possible in the life cycle taking into account the operating and maintenance requirements; and test tool development or acquisition (hardware and software) be planned for in the overall project plan.</i></p> <p><b>NOTE E:</b> <i>ECSS-Q-80 requires that the supplier establishes and reviews the test procedures and data before starting testing activities; and also documents the constraints of the tests concerning physical, performance, functional, controllability and observability limitations.</i></p> <p><b>NOTE F:</b> <i>ECSS-Q-80 requires that before offering the product for delivery and customer acceptance, the supplier validates its operation as a complete product, when possible under conditions similar to the application environment as specified in the requirements specification.</i></p> <p><b>NOTE G:</b> <i>ECSS-Q-80 requires that where testing under field conditions occurs, the following concerns shall be addressed:</i></p> <ul style="list-style-type: none"> <li>• <i>The feature to be tested in the field environment</i></li> <li>• <i>The specific responsibilities of the supplier and customer for carrying out and evaluating the test</i></li> <li>• <i>Restoration of the user environment (after test)</i></li> </ul> <p><b>NOTE H:</b> <i>ECSS-Q-80 requires that the criteria for the completion of the test documentation and any contingency steps shall be specified.</i></p> <p><b>NOTE I:</b> <i>ECSS-Q-80 requires that test procedures, data and expected results shall be specified.</i></p> <p><b>SUP.2.BP2: Develop criteria for verification.</b>                  Develop the criteria for verification of all required work products. [Outcomes: 2]</p> <p><b>SUP.2.BP3: Conduct verification.</b>                  Verify identified work products according to specified strategy. [Outcomes: 3]</p> <p><b>NOTE J:</b> <i>ECSS-Q-80 requires that for any requirements not covered by testing, a verification report shall be drawn up documenting or referring to the</i></p>
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	<p style="text-align: center;"><i>verification activities performed.</i></p> <p><b>NOTE K:</b> <i>ECSS-E-40 requires verification activities such as:</i></p> <ul style="list-style-type: none"> <li>• <i>Requirements Baseline and Technical Specification</i></li> <li>• <i>Design (also complexity and modularity)</i></li> <li>• <i>Code (also checking numerical precision, use of coding language and tools)</i></li> <li>• <i>Unit, Integration, Validation Test cases</i></li> <li>• <i>Test and verification reports</i></li> <li>• <i>Test coverage</i></li> <li>• <i>Documentation adequacy, compliance, consistency and completeness (including project plan, test plans, configuration management plan, software verification plan, installation plan, operation and maintenance plan)</i></li> <li>• <i>Schedulability analysis for Real-Time software</i></li> <li>• <i>Technical budgets (memory, CPU)</i></li> </ul> <p><b>SUP.2.BP4: Determine actions for verification results.</b>                  Defects detected by the verification should be identified, recorded and entered into the Problem Resolution Process (SUP.9). [Outcomes: 4]</p> <p><b>SUP.2.BP5: Make verification results available to the stakeholders.</b>                  The verification results should be made available to the stakeholders, including customers and other involved parties. [Outcomes: 5]</p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP07-04 Process measure [Outcomes: 2] WP07-06 Quality measures [Outcomes: 2] WP08-13 Quality plan [Outcomes: 1] WP09-02 Quality policy [Outcomes: 1] WP13-18 Quality record [Outcomes: 3, 4] WP13-22 Traceability record [Outcomes: 3] WP14-02 Corrective action register [Outcomes: 4] WP14-08 Tracking system [Outcomes: 4] WP15-10 Test incident report [Outcomes: 2, 3] WP18-07 Quality criteria [Outcomes: 2] WP50-12 <i>Software product assurance plan [Outcomes: 1, 2]</i>	WP13-04 Communication record [Outcomes: 5] WP13-07 Problem report [Outcomes: 3, 4, 5] WP13-16 Change request [Outcomes: 3, 4] WP13-18 Quality record [Outcomes: 4, 5] WP13-25 Verification results [Outcomes: 2, 3, 4, 5] WP14-02 Corrective action register [Outcomes: 4] WP18-07 Quality criteria [Outcomes: 2] WP19-10 Verification strategy [Outcomes: 1] WP50-08 <i>Software verification plan [Outcomes: 1]</i> WP50-12 <i>Software product assurance plan [Outcomes: 2]</i>



4.1.2.5.3 SUP.3 Validation

<b>Process ID</b>	SUP.3
<b>Process Name</b>	Validation
<b>Process Purpose</b>	<p>The purpose of the Validation process is to confirm that the requirements for a specific intended use of the software work product are fulfilled.</p> <p><i>NOTE: This process involves validation against the Requirements Baseline (RB), one of the two steps described in ECSS-E-40 as Validation.</i></p>
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Validation process:</p> <ol style="list-style-type: none"> <li>1) a validation strategy is developed and implemented;</li> <li>2) criteria for validation of all required work products is identified;</li> <li>3) required validation activities are performed;</li> <li>4) problems are identified and recorded;</li> <li>5) evidence is provided that the software work products as developed are suitable for their intended use; and</li> <li>6) results of the validation activities are made available to the customer and other involved parties.</li> </ol>
<b>Base Practices</b>	<p><b>SUP.3.BP1: Develop validation strategy.</b>                  Develop and implement a validation strategy including validation activities with associated methods, techniques, and tools, work product or processes under validation, degrees of independence for validation and schedule for performing these activities. [Outcomes: 1]</p> <p><b>NOTE 1:</b> Validation aims to confirm by examination and provision of objective evidence that software or system specifications conform to user needs and intended uses, and the particular requirements implemented through the software product can be consistently fulfilled.</p> <p><b>NOTE A:</b> <i>ECSS-Q-80 requires that validation of software for flight equipment includes tests of the equipment model without "patching" the software under test.</i></p> <p><b>SUP.3.BP2: Develop validation criteria.</b>                  Develop the criteria for validation of all required work products. [Outcomes: 2]</p> <p><b>SUP.3.BP3: Perform validation activities.</b>                  Conduct validation activities using identified techniques, processes, and test cases against requirements and quality standards. The results of validation activities are recorded. [Outcome: 3]</p> <p><b>NOTE B:</b> <i>Verification of the user documentation is part of the ECSS validation activities.</i></p> <p><b>NOTE C:</b> <i>ECSS-E-40 requires that the validation of the software is performed against the Requirements Baseline and the Technical Specification.</i></p> <p><b>SUP.3.BP4: Identify problems.</b>                  Issues detected by the validation process should be identified, recorded and entered into the Problem Resolution Management process (SUP.9). [Outcomes: 4]</p>



	<p><b>SUP.3.BP5: Provide validation data.</b>                  Provide validation data resulting from carrying out validation activities. Validate that the product satisfies its intended use by review of validation activities results, and the resolution of issues raised. [Outcomes: 5]</p> <p><b>SUP.3.BP6: Make validation results available to the customer and other involved parties.</b>                  The validation results should be made available to the customer and other involved parties. [Outcomes: 6]</p>	
<b>Work Products</b>		
<p><b>Input Work Products</b></p> <p>WP08-13 Quality plan [Outcomes: 1]                  WP08-23 Validation test plan [Outcomes: 1]                  WP09-02 Quality policy [Outcomes: 1]                  WP13-07 Problem report [Outcomes: 4]                  WP13-22 Traceability record [Outcomes: 3, 5]                  WP14-02 Corrective action register [Outcomes: 3, 4, 5]                  WP14-08 Tracking system [Outcomes: 3, 4, 5]                  WP17-00 Requirements specification [Outcomes: 5]                  WP18-07 Quality criteria [Outcomes: 2]                  WP50-07 <i>Software validation testing specification</i> [Outcomes: 1]                  WP50-09 <i>Software validation plan</i> [Outcomes: 1]                  WP50-12 <i>Software product assurance plan</i> [Outcomes: 1, 2]</p>		<p><b>Output Work Products</b></p> <p>WP13-04 Communication record [Outcomes: 6]                  WP13-07 Problem report [Outcomes: 4]                  WP13-16 Change request [Outcomes: 3, 4]                  WP13-18 Quality record [Outcomes: 2, 3]                  WP13-24 Validation results [Outcomes: 3, 4, 5, 6]                  WP18-07 Quality criteria [Outcomes: 2]                  WP19-11 Validation strategy [Outcomes: 1]                  WP50-09 <i>Software validation plan</i> [Outcomes: 1]</p>

#### 4.1.2.5.4 SUP.4 Joint Review

<b>Process ID</b>	SUP.4
<b>Process Name</b>	Joint Review
<b>Process Purpose</b>	The purpose of the Joint Review process is to maintain a common understanding with the stakeholders of the progress against the objectives of the agreement and what should be done to help ensure development of a product that satisfies the stakeholders. Joint reviews are at both project management and technical levels and are held throughout the life of the project.
<b>Process Outcomes</b>	As a result of successful implementation of the Joint Review process: <ol style="list-style-type: none"> <li>1) management and technical reviews are held based on the needs of the project;</li> <li>2) the status and products of an activity of a process are evaluated through joint review activities between the stakeholders;</li> <li>3) review results are made known to all affected parties;</li> <li>4) action items resulting from reviews are tracked to closure; and</li> <li>5) problems are identified and recorded.</li> </ol>

<b>Base Practices</b>	<p><b>SUP.4.BP1: Identify reviews.</b> Identify the schedule, scope and participants of management and technical reviews, based on the needs of the project. [Outcomes: 1]</p> <p><b>SUP.4.BP2: Prepare joint review.</b> Collect, prepare and distribute review material as appropriate in preparation for the review. [Outcomes: 1]</p> <p><b>SUP.4.BP3: Conduct joint review.</b> Conduct joint management and technical reviews. Record the review results as planned. [Outcomes: 2]</p> <p><i>NOTE A: See ECSS specifications for the following mandatory reviews:</i></p> <ul style="list-style-type: none"><li>• <i>Mission Definition Review</i></li><li>• <i>Preliminary Requirements Review</i></li><li>• <i>System Requirements Review</i></li><li>• <i>Preliminary Design Review</i></li><li>• <i>Critical Design Reviews</i></li><li>• <i>Test Readiness Review</i></li><li>• <i>Qualification Review</i></li><li>• <i>Acceptance Review</i></li><li>• <i>Operational Readiness Review</i></li><li>• <i>Flight Readiness Review</i></li><li>• <i>Launch Readiness Review</i></li><li>• <i>Commissioning Result Review/Flight Qualification Review</i></li><li>• <i>End of Life Review</i></li><li>• <i>Mission Close-out Review</i></li></ul> <p><i>NOTE B: Software reviews are synchronized with system reviews in a way that is project dependent.</i></p> <p><b>SUP.4.BP4: Distribute the results.</b> The review results should be made available to the all affected parties. [Outcomes: 3]</p> <p><b>SUP.4.BP5: Determine actions for review results.</b> Analyze review report; identify and record the problems; propose resolution(s) for the review results; determine priority for actions. [Outcomes: 5]</p> <p><b>SUP.4.BP6: Track actions for review results.</b> Track actions for resolution of identified problems in a review; report and document changes to work products and processes. [Outcomes: 4]</p>
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<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP02-00 Contract [Outcomes: 1, 2]                      WP07-06 Quality measures [Outcomes: 2]                      WP08-13 Quality plan [Outcomes: 1, 2]                      WP08-18 Review plan [Outcomes: 1, 2]                      WP08-19 Risk management plan [Outcomes: 1, 2]                      WP08-20 Risk mitigation plan [Outcomes: 1, 2]                      WP09-02 Quality policy [Outcomes: 1, 2]                      WP13-07 Problem report [Outcomes: 2]                      WP13-14 Progress status record [Outcomes: 2]                      WP13-17 Customer request [Outcomes: 1, 2]                      WP13-19 Review records [Outcomes: 2]                      WP14-08 Tracking system [Outcomes: 3, 4, 5]                      WP15-13 Assessment / audit report [Outcomes: 1, 2]                      WP50-08 Software verification plan [Outcomes: 1, 2]                      WP50-09 Software validation plan [Outcomes: 1, 2]                      WP50-11 Software development plan [Outcomes: 1, 2]                      WP50-12 Software product assurance plan [Outcomes: 1, 2]</p>	<p><b>Output Work Products</b></p> <p>WP13-01 Acceptance record [Outcomes: 3, 4, 5]                      WP13-04 Communication record [Outcomes: 3]                      WP13-05 Contract review records [Outcomes: 1, 2, 3]                      WP13-07 Problem report [Outcomes: 3, 5]                      WP13-09 Meeting support record [Outcomes: 1, 2]                      WP13-19 Review records [Outcomes: all]                      WP14-02 Corrective action register [Outcomes: 3, 4, 5]                      WP15-01 Analysis report [Outcomes: 3, 5]                      WP15-16 Improvement opportunity [Outcomes: 3, 4]</p>

4.1.2.5.5 SUP.5 Audit

<b>Process ID</b>	SUP.5
<b>Process Name</b>	Audit
<b>Process Purpose</b>	The purpose of the Audit process is to independently determine compliance of selected products and processes with the requirements, plans and agreement, as appropriate.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Audit process:</p> <ol style="list-style-type: none"> <li>1) an audit strategy is developed and implemented;</li> <li>2) compliance of selected software work products and/or services or processes with requirements, plans, and agreement is determined according to the audit strategy;</li> <li>3) the conduct of audits by an appropriate independent party are performed; and</li> <li>4) problems detected during an audit are identified and communicated to those responsible for corrective action and resolution.</li> </ol>
<b>Base Practices</b>	<p><b>SUP.5.BP1: Develop and implement an audit strategy.</b>                      An audit strategy is implemented defining purpose, scope, milestones, audit criteria and audit team. [Outcomes: 1]</p> <p><b>SUP.5.BP2: Select auditors.</b>                      Independent, impartial and objective auditors are selected. [Outcomes: 3]</p> <p><b>SUP.5.BP3: Audit for conformance against the requirements.</b>                      Selected work products, services or processes are audited to determine their conformance with their requirements and planned arrangements. Non-conformances are recorded. [Outcomes: 2]</p> <p><b>SUP.5.BP4: Prepare and distribute an audit report.</b>                      Auditor develops and distributes an audit report. [Outcomes: 3, 4]</p>



	<p><b>SUP.5.BP5: Take corrective action.</b>                  Corrective action is taken to address non-conformances by the assigned responsible person. The corrective action may result in immediate action to resolve the non-conformity. It may also result in other corrective action after root cause analysis has been undertaken. [Outcomes: 4]</p> <p><b>SUP.5.BP6: Track resolution.</b>                  Corrective actions are tracked to resolution. The auditor may review non-conformance resolutions and their results. [Outcomes: 4]</p>	
<b>Work Products</b>		
<b>Input Work Products</b>	<b>Output Work Products</b>	
WP05-01 Assessment goals [Outcomes: 1, 2] WP07-04 Process measure [Outcomes: 2] WP08-13 Quality plan [Outcomes: 1] WP09-02 Quality policy [Outcomes: 1] WP10-00 Process description [Outcomes: 2] WP13-00 Record [Outcomes: 3, 4] WP13-07 Problem report [Outcomes: 3, 4] WP13-22 Traceability record [Outcomes: 2] WP14-02 Corrective action register [Outcomes: 4] WP18-07 Quality criteria [Outcome: 2] WP19-12 Audit strategy [Outcomes: 1] WP50-12 <i>Software product assurance plan [Outcomes: 1]</i>	WP13-04 Communication record [Outcomes: 4] WP14-02 Corrective action register [Outcomes: 4] WP15-01 Analysis report [Outcomes: 2, 4] WP15-13 Assessment / audit report [Outcomes: 3, 4] WP19-12 Audit strategy [Outcomes: 1]	

#### 4.1.2.5.6 SUP.6 Product Evaluation

<b>Process ID</b>	SUP.6
<b>Process Name</b>	Product Evaluation
<b>Process Purpose</b>	The purpose of the Product Evaluation process is to ensure through systematic examination and measurement that a product meets the stated and implied needs of the users of that product.
<b>Process Outcomes</b>	As a result of successful implementation of the Product Evaluation process: <ol style="list-style-type: none"> <li>1) the requirements for evaluation are established;</li> <li>2) the criteria for product evaluation is identified;</li> <li>3) the methods to be employed for evaluation are defined and the activities needed are identified and performed;</li> <li>4) measures are collected and the results assessed against defined criteria; and</li> <li>5) results of the product evaluation activities are made available to the interested parties.</li> </ol>

<b>Base Practices</b>	<p><b>SUP.6.BP1: Establish general requirements for product evaluation.</b>                  Establish the general requirements for product evaluation, including the purpose of the evaluation and the types of products to be evaluated, based on the stated and implied needs of the users of that product. [Outcomes: 1]</p> <p><b>SUP.6.BP2: Specify measures.</b>                  Identify and develop an appropriate set of measures based on the general requirements and the quality model(s) for product evaluation. [Outcomes: 2]</p> <p>NOTE 1: Measures for product evaluation are provided by ISO/IEC 9126.</p> <p><i>NOTE A: For space products the SPEC quality model is available.</i></p> <p><b>SUP.6.BP3: Specify the criteria.</b>                  Specify the criteria for the evaluation, based on a selected set of measurements and the rating levels for those measurements. [Outcomes: 2]</p> <p><b>SUP.6.BP4: Identify methods for the evaluation.</b>                  Identify a set of methods to be used for the evaluation. [Outcomes: 3]</p> <p>NOTE 2: Processes for software product evaluation are provided by ISO/IEC 14598.</p> <p><b>SUP.6.BP5: Identify the activities.</b>                  Identify the activities to be performed for the product evaluation, based on the general requirements, criteria and the methods. [Outcomes: 3]</p> <p><b>SUP.6.BP6: Perform the evaluation.</b>                  Perform the identified activities for product evaluation. [Outcomes: 3]</p> <p><b>SUP.6.BP7: Analyse results against defined criteria.</b>                  Analyse the results from the evaluation and compare them against the defined criteria. [Outcomes: 4]</p> <p><b>SUP.6.BP8: Communicate results.</b>                  Disseminate the results from the product evaluation to all interested. [Outcomes: 5]</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP03-03 Benchmarking data [Outcomes: 2, 4] WP07-05 Project measure [Outcomes: 2, 4] WP07-06 Quality measures [Outcomes: 2, 4] WP07-07 Risk measure [Outcomes: 2, 4] WP07-08 Service level measure [Outcomes: 2, 4] WP13-07 Problem report [Outcomes: 4] WP13-17 Customer request [Outcomes: 1, 2] WP14-08 Tracking system [Outcomes: 5] WP15-19 Product needs assessment [Outcomes: 1, 3, 4] WP17-09 Product requirements [Outcomes: 1, 2, 4] WP18-07 Quality criteria [Outcomes: 2] WP50-02 <i>Software requirements specification</i> [Outcomes: 1, 2, 4]	WP03-03 Benchmarking data [Outcomes: 2, 4] WP13-04 Communication record [Outcomes: 5] WP13-07 Problem report [Outcomes: 5] WP13-19 Review records [Outcomes: 3, 5] WP15-01 Analysis report [Outcomes: 3, 5] WP15-05 Evaluation report [Outcomes: 2, 4, 5] WP16-03 Configuration management library [Outcomes: 5] WP50-10 <i>Software reuse file</i> [Outcomes: 2, 4, 5]

4.1.2.5.7 SUP.7 Documentation

<b>Process ID</b>	SUP.7
<b>Process Name</b>	Documentation
<b>Process Purpose</b>	The purpose of the Documentation process is to develop and maintain the recorded information produced by a process.
<b>Process Outcomes</b>	<p>As result of successful implementation of the Documentation process:</p> <ol style="list-style-type: none"> <li>1) a strategy identifying the documentation to be produced during the life cycle of a product or service is developed;</li> <li>2) the standards to be applied for the development of documentation are identified;</li> <li>3) documentation to be produced by the process or project is identified;</li> <li>4) the content and purpose of all documentation is specified, reviewed, and approved;</li> <li>5) documentation is developed and made available in accordance with identified standards;</li> <li>6) documentation is maintained in accordance with defined criteria; and</li> <li>7) <i>documents are stored and protected appropriately.</i></li> </ol>
<b>Base Practices</b>	<p><b>SUP.7.BP1: Develop documentation management strategy.</b>                  Determine documentation management strategy which addresses what should be documented within which organisational entity, at which stages in the lifecycle of the product/service. [Outcomes: 1]</p> <p>NOTE 1: Refer to ISO/IEC 9294 for guidelines for management of software documentation.</p> <p>NOTE A: <i>ECSS-Q-80 requires that the information related to re-usable components is separated from others in the technical specification, design, justification file, design definition file and the product assurance file..</i></p> <p>NOTE B: <i>ECSS-Q-80 requires that the information related to re-usable components in the technical specification, the design justification file, the design definition file, and the product assurance file is self-contained.</i></p> <p><b>SUP.7.BP2: Establish standards for documents.</b>                  Establish standards for developing, modifying and maintaining documents. [Outcomes: 2]</p> <p>NOTE C: <i>Data format shall conform, where available, to international standards. Agreed data format and structures are defined for multi-location use</i></p> <p><b>SUP.7.BP3: Specify document requirements.</b>                  Specify requirements for documents such as format, title, date, identifier, version history, author(s), reviewer, authorizer, outline of contents, purpose and distribution list. [Outcomes: 2, 4]</p> <p>NOTE D: <i>ECSS define Document Requirements Description. DRD from ECSS-E-40 and ECSS-Q-80 are considered requirements</i></p> <p>NOTE E: <i>ECSS-Q-80 requires specific development and design constraints to be used including the use of development standards</i></p> <p><b>SUP.7.BP4: Identify the documents to be produced.</b>                  For any given life cycle development, identify the documents to be produced. [Outcomes: 3]</p>



	<p><b>SUP.7.BP5: Develop documents.</b>                  Develop documents at required process points according to established standards and policy. [Outcomes: 5]</p> <p><b>SUP.7.BP6: Check documents.</b>                  Review documents before distribution and authorise documents before distribution or release. [Outcomes: 5]</p> <p>NOTE 2: Documents should be checked through the Verification process (SUP.2) or the Validation process (SUP.3) with stakeholders.</p> <p><b>SUP.7.BP7: Distribute documents.</b>                  In order to make documents available, distribute documents according to determined modes of distribution via appropriate media to specified audiences, confirming delivery of documents, where necessary. [Outcomes: 5]</p> <p>NOTE F: <i>ECSS-M-40 requires that documents are protected according to the appropriate level of confidentiality.</i></p> <p><b>SUP.7.BP8: Maintain documents.</b>                  Maintain documents in accordance with the determined documentation strategy. [Outcomes: 6]</p> <p>NOTE 3: If the document is part of a product baseline or if its control and stability are important, it should be modified and distributed in accordance with the Configuration Management process (SUP.8). If the document is part of a product baseline under maintenance, its maintenance is covered by the Software and System Maintenance process (ENG.12).</p> <p><b>SUP.7.BP9: Store and protect documents.</b>                  Store documents in a manner that they are protected from destruction by foreseeable hazards, such as fire, flood, earthquake, etc. Keep hard copies of documents according to national/international laws. [Outcomes: 7]</p> <p>NOTE G: <i>All required project documentation should be readily available for the contract duration.</i></p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP10-00 Process description [Outcomes: 1, 2, 3]	WP08-14 Recovery plan [Outcomes: 7]
WP10-01 Life cycle model [Outcomes: 1]	WP08-26 Documentation plan [Outcomes: 1, 2]
WP13-16 Change request [Outcomes: 6]	WP13-01 Acceptance record [Outcomes: 4, 5]
WP13-17 Customer request [Outcomes: 1, 2, 4]	WP13-19 Review records [Outcomes: 4, 5]
WP14-10 Work product distribution register [Outcomes: 5]	WP14-01 Change history [Outcomes: 5, 6]
WP17-04 Delivery instructions [Outcomes: 5]	WP14-11 Work product list [Outcomes: 3]
WP17-05 Documentation requirements [Outcomes: 5, 6]	WP16-02 Assets repository [Outcomes: 7]
WP18-00 Standard [Outcomes: 2]	WP17-05 Documentation requirements [Outcomes: 1, 2, 3]
WP18-07 Quality criteria [Outcomes: 4]	WP17-07 Infrastructure requirements [Outcomes: 7]
WP21-00 Work product [Outcomes: 6]	WP20-00 Template [Outcomes: 2]
WP50-06 Software test plan [Outcomes: 2]	WP21-00 Work product [Outcomes: 5, 6]
WP50-11 Software development plan [Outcomes: 1]	WP50-11 Software development plan [Outcomes: 1, 2]
WP50-12 Software product assurance plan [Outcomes: 1]	

4.1.2.5.8 SUP.8 Configuration Management

<b>Process ID</b>	SUP.8
<b>Process Name</b>	Configuration Management
<b>Process Purpose</b>	The purpose of the Configuration Management process is to establish and maintain the integrity of the work products / items of a process or project and make them available to concerned parties.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Configuration Management process:</p> <ol style="list-style-type: none"> <li>1) a configuration management strategy is developed;</li> <li>2) work products/items generated by the process or project are identified, defined and baselined;</li> <li>3) modifications and releases of the work products/items are controlled;</li> <li>4) modifications and releases are made available to affected parties;</li> <li>5) the status of the work products/items and modifications are recorded and reported;</li> <li>6) the completeness and consistency of the work products/items is ensured; and</li> <li>7) storage, handling, and delivery of the work products/items are controlled.</li> </ol>
<b>Base Practices</b>	<p><b>SUP.8.BP1: Develop configuration management strategy.</b>                  Determine configuration management strategy, including configuration management activities and schedule for performing these activities. [Outcomes: 1]</p> <p><i>NOTE A:</i> ECSS-Q-80 requires that the software configuration file is submitted to the customer for approval at acceptance testing.</p> <p><i>NOTE B:</i> ECSS-Q-80 requires that the software configuration file is available and up to date for each project milestone.</p> <p><i>NOTE C:</i> ECSS-E-40 requires that procedures be defined that guarantee the consistency of the system interfaces.</p> <p><b>SUP.8.BP2: Identify configuration items.</b>                  Identify configuration items that need to be independently identified, stored, tested, reviewed, used, changed, delivered and/or maintained. [Outcomes: 2]</p> <p><i>NOTE 1:</i> In order to provide an efficient means of accessing and storing the entities required, a file and directory structure and hierarchies may be established.</p> <p><i>NOTE D:</i> ECSS-M-40 requires that suppliers identify configuration items in the Product Tree and agree them with the customer.</p> <p><i>NOTE E:</i> ECSS-M-40 considers three types of definitions for a Configuration Item depending on whether it is developed for space application or it is an off-the-shelf product or it is a product defined by a standard.</p> <p><i>NOTE F:</i> ECSS-M-40 requires that suppliers identify the configuration items and their applicable specifications.</p> <p><i>NOTE G:</i> ECSS-M-40 requires that the list of project required documents is kept under configuration control. This lists indicates the document type, the identifier (reference, issue/revision), the provisional and actual publication dates, the document class and category.</p>

	<p><b>NOTE H:</b> <i>ECSS-Q-80 requires that all the purchased software are identified as configuration item.</i></p> <p><b>NOTE I:</b> <i>ECSS-Q-80 requires that the firmware devices are marked to allow the identification (by reference) of the hardware component and of the software component.</i></p> <p><b>SUP.8.BP3: Establish branch management strategy.</b>                  Develop a branch management strategy for parallel development efforts that use the same source base. [Outcomes: 1]</p> <p><b>NOTE 2:</b> A branch management strategy will include branch management, merging strategies, file versioning in a branching system, branch parenting strategies and tagging strategies.</p> <p><b>NOTE 3:</b> A branching strategy will define why and when branches will be created, what activities will occur in the branches, and how the branches will complete and/or migrate into the main source base.</p> <p><b>SUP.8.BP4: Establish baselines.</b>                  Establish the internal and delivery baselines. High- level baselines are achieved by the accumulation of all the requisite configured items at their respective low-level baseline formal issues. [Outcomes: 3]</p> <p><b>NOTE 4:</b> Baselines cover all related work products, including requirements, design documentation, user documentation and test specifications where appropriate. Examples of work products that should be baselined include requirements, designs, plans and products.</p> <p><b>SUP.8.BP5: Maintain configuration item description.</b>                  Maintain an up-to-date description of each configuration item. [Outcomes: 2, 3, 4]</p> <p><b>NOTE J:</b> <i>ECSS-M-40 requires that the consumer maintains the Configuration Item baseline throughout its use or its operation.</i></p> <p><b>SUP.8.BP6: Control modifications and releases.</b>                  Establish a mechanism for logging the items, submitting and releasing them. [Outcomes: 4]</p> <p><b>NOTE 5:</b> Controls for source code control may include check in/out, file access permissions, version identification and increment, change commenting, files locking/commit.</p> <p><b>NOTE K:</b> <i>Configuration baselines are approved through reviews described in ECSS-M-10 and ECSS-Q-80.</i></p> <p><b>SUP.8.BP7: Maintain configuration item history.</b>                  Maintain a history of each configuration item in sufficient detail to recover a previously baselined version when required. [Outcomes: 3, 4]</p> <p><b>SUP.8.BP8: Report configuration status.</b>                  Report status of each configuration item and their relationship in the current system integration. [Outcomes: 5]</p> <p><b>SUP.8.BP9: Verify the information about configured items.</b>                  Verify that the information about configured items and their structures, supplied through status accounting reporting is complete and ensure the consistency of the items. [Outcomes: 6]</p> <p><b>SUP.8.BP10: Manage the backup, storage, archiving, handling and delivery of configured items.</b></p>
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	<p>Ensure the integrity and consistency of configured items through appropriate scheduling and resourcing of backup, storage and archiving. Control the handling and delivery of configured items. [Outcomes: 4, 6, 7]</p> <p><b>NOTE 6:</b> Backups are maintained under the Infrastructure process (RIN.4).</p> <p><b>NOTE L:</b> <i>ECSS-Q-80 requires that mechanisms to protect all supplied software (source, executable, data, etc.) against corruption are defined and implemented, as well as the way to mark the software media deliverable to the customer.</i></p> <p><b>NOTE M:</b> <i>ECSS-Q-80 requires that tests for components developed for reuse shall be performed on all platforms for which they are intended..</i></p> <p><b>NOTE N:</b> <i>ECSS-Q-80 requires that code is put under configuration control before formal testing started immediately after successful unit testing.</i></p>
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**Work Products**

Input Work Products	Output Work Products
WP01-00 Configuration item [Outcomes: 2] WP01-01 Product configuration [Outcomes: 1] WP08-04 Configuration management plan [Outcomes: 2, 3, 4, 5, 6] WP08-16 Release plan [Outcomes: 1, 4] WP14-08 Tracking system [Outcomes: 5] WP16-03 Configuration management library [Outcomes: 7]	WP01-00 Configuration item [Outcomes: 2, 3] WP06-02 Handling and storage guide [Outcomes: 7] WP08-04 Configuration management plan [Outcomes: 1, 2, 7] WP13-00 Record [Outcomes: 5, 6] WP13-06 Delivery record [Outcomes: 7] WP13-10 Configuration management record [Outcomes: 5] WP13-13 Product release approval record [Outcomes: 7] WP14-01 Change history [Outcomes: 3] WP50-04 Software configuration file [Outcomes: 5] WP60-16 Product tree [Outcomes: 2]

4.1.2.5.9 SUP.9 Problem Resolution Management

<b>Process ID</b>	SUP.9
<b>Process Name</b>	Problem Resolution Management
<b>Process Purpose</b>	The purpose of the Problem Resolution Management process is to ensure that all discovered problems are identified, analyzed, managed and controlled to resolution.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Problem Resolution Management process:</p> <ol style="list-style-type: none"> <li>1) a problem management strategy is developed;</li> <li>2) problems are recorded, identified and classified;</li> <li>3) problems are analysed and assessed to identify acceptable solution(s);</li> <li>4) problem resolution is implemented;</li> <li>5) problems are tracked to closure; and</li> <li>6) the status of all problem reports is known.</li> </ol> <p>NOTE: Problem resolution management may initiate a change request.</p>
<b>Base Practices</b>	<p><b>SUP.9.BP1: Develop problem resolution strategy.</b>                      Determine the problem resolution strategy for ensuring that problems are described, recorded, analysed, and corrected. [Outcomes: 1]</p>

	<p><b>NOTE A:</b> <i>For Non-conformances ECSS-Q-10-09 (non-conformance control system) is applicable. This standard:</i></p> <ul style="list-style-type: none"> <li>• <i>Recommends that the system be supported by an electronic tool</i></li> <li>• <i>Defines two severity classes (major/minor)</i></li> <li>• <i>Define 5 disposition classes (use as is /repair/ rework/return to supplier/scrap)</i></li> <li>• <i>Require that each non-conformance be fully documented and self-explanatory</i></li> <li>• <i>Provides requirements for raising alerts where relevant</i></li> </ul> <p><b>NOTE B:</b> <i>ECSS-Q-80 requires that a Software Review Board shall be established at all contractual levels.</i></p> <p><b>SUP.9.BP2: Identify and record the problem.</b>        Each problem is uniquely identified and recorded. [Outcomes: 2]</p> <p><b>SUP.9.BP3: Provide initial support and classification.</b>        Provide initial support and feedback on reported problems and classify problems according to the severity. [Outcomes: 2]</p> <p><b>NOTE 1:</b> Classification of problems may be in terms of criticality, urgency, relevance, etc.</p> <p><b>SUP.9.BP4: Investigate and diagnose the cause of the problem.</b>        Analyze problems in order to identify the cause of the problem. [Outcomes: 3]</p> <p><b>NOTE 2:</b> A problem may be a known error or may impact an application installed on multiple platform.</p> <p><b>SUP.9.BP5: Assess the impact of the problem to determine solution.</b>        Assess the impact of the problem to determine appropriate actions, and to determine and agree on a solution. [Outcomes: 3]</p> <p><b>NOTE C:</b> <i>ECSS-Q-10-09 requires that the customer assess whether higher-level customer requirements are impacted.</i></p> <p><b>NOTE D:</b> <i>ECSS-Q-10-09 requires that in case of actual or suspected impact, the customer SRB notifies all appropriate customers and involve them in the ensuing NRB.</i></p> <p><b>NOTE E:</b> <i>ECSS-Q-10-09 requires that appropriate actions are taken to eliminate or minimise reoccurrence of similar non-conformances. Typical corrective actions are changes of tools, processes, specification or procedures.</i></p> <p><b>SUP.9.BP6: Execute urgent resolution action, where necessary.</b>        If the problem warrants immediate resolution pending an actual change, it obtains authorisation for immediate fix. [Outcomes: 4]</p> <p><b>SUP.9.BP7: Raise alert notifications, where necessary.</b>        If the problem is of high severity and impacts other systems or users, an alert notification may need to be raised, pending a fix or change. [Outcomes: 4, 6]</p> <p><b>NOTE F:</b> <i>ECSS-Q-20 requires that preliminary alert information shall be prepared and notified to the final customer through the contractual chain.</i></p> <p><b>SUP.9.BP8: Implement problem resolution.</b>        Implement problem resolution actions to resolve the problem and review the implementation. [Outcomes: 4]</p> <p><b>SUP.9.BP9: Initiate change request.</b></p>
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	<p>Initiate change request for diagnosed errors. [Outcomes: 5]</p> <p><b>SUP.9.BP10: Track problem status.</b>                  Track to closure the status of identified problems. [Outcomes: 5, 6]</p> <p><b>SUP.9.BP11: Prepare preliminary alert information.</b>  <i>Establish communication mechanisms supporting the alert system under the control of an alert coordinator. Prepare preliminary alert information and release to the final customer, giving him the opportunity to raise an alert. Alerts received from the final customer have to be disseminated throughout the organisational unit. [Outcomes: 2]</i></p> <p><i>NOTE G: ECSS-Q-20 requires that the Alert System is established by the final customer.</i></p> <p><b>SUP.9.BP12: Support processing of incoming Alerts.</b>                  Distribute incoming relevant Alerts to all possible affected users within the project organisation. [Outcomes: 4]</p>
<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP13-07 Problem report [Outcomes: 3]                  WP13-16 Change request [Outcomes: 2]                  WP14-08 Tracking system [Outcomes: 4, 5, 6]                  WP60-03 Alert [Outcomes: 4]</p>	<p><b>Output Work Products</b></p> <p>WP08-27 Problem management plan [Outcomes: 1]                  WP13-07 Problem report [Outcomes: 3, 5]                  WP15-01 Analysis report [Outcomes: 3]                  WP15-05 Evaluation report [Outcomes: 3]                  WP15-12 Problem status report [Outcomes: 6]                  WP50-04 Software configuration file [Outcomes: 6]                  WP50-05 Software release document [Outcomes: 6]                  WP50-10 Software reuse file [Outcomes: 3]                  WP60-02 Preliminary alert information [Outcomes: 4]                  WP60-03 Alert [Outcomes: 4]</p>

#### 4.1.2.5.10 SUP.10 Change Request Management

<b>Process ID</b>	SUP.10
<b>Process Name</b>	Change Request Management
<b>Process Purpose</b>	The purpose of the Change Request Management process is to ensure that change requests are managed, tracked and controlled.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Change Request Management process:</p> <ol style="list-style-type: none"> <li>1) a change management strategy is developed;</li> <li>2) requests for changes are recorded and identified;</li> <li>3) dependencies and relationships to other change requests are identified;</li> <li>4) criteria for conforming implementation of the change request are defined;</li> <li>5) requests for change are prioritized, and resource requirements estimated;</li> <li>6) changes are approved on the basis of priority and availability of resources;</li> <li>7) approved changes are implemented and tracked to closure; and</li> <li>8) the status of all change requests is known.</li> </ol>

<p><b>Base Practices</b></p>	<p><b>SUP.10.BP1: Develop a change management strategy.</b>                  A change management strategy is established and implemented to ensure changes can be described, recorded, analyzed, and actioned. [Outcomes: 1]</p> <p><b>SUP.10.BP2: Record the request for change.</b>                  Each change request is uniquely identified, and recorded. [Outcomes: 2]</p> <p><i>NOTE A: ECSS-M-40 requires that proposed changes are classified by the originator. ECSS defines two classes of changes: Class 1 concerns any change affecting the technical specifications or the terms of the business agreement between customer and supplier. Class 2 concerns any other change. Depending on the class different protocols are described for the approval decision.</i></p> <p><b>SUP.10.BP3: Record the status of change requests.</b>                  Change request and changes are allocated a status indication to facilitate tracking. [Outcomes: 8]</p> <p><i>NOTE 1: Provide traceability to the reason for the change. Change requests submitted as a resolution to a problem or error report should retain a link to the originating problem or error report. [Outcome 3]</i></p> <p><b>SUP.10.BP4: Establish the dependencies and relationships to other change requests.</b>                  Identify the relationship of a change request to other change requests to establish dependencies (e.g. towards another change to the same software element or for a set of changes related to a planned release). [Outcomes: 3]</p> <p><b>SUP.10.BP5: Assess the impact of the change.</b>                  Assess the impact, resources, risks and potential benefits of the change request and establish criteria for confirming implementation. [Outcomes: 4, 5]</p> <p><i>NOTE 2: A Change Request Board (CRB) is a common mechanism used to assess change requests. When conducting impact and resource assessment, the effect on the infrastructure and users must be considered together with the resources required for implementing the change, including likely costs, the number and availability of people and the elapsed time to implement.</i></p> <p><b>SUP.10.BP6: Identify the verification and validation activities to be performed for implemented changes.</b>                  Before implementing a change the scope of verification and validation activities to be undertaken are identified [Outcomes: 7]</p> <p><b>SUP.10.BP7: Approve changes.</b>                  All changes are approved before implementation. [Outcomes: 6]</p> <p><b>SUP.10.BP8: Implement the change.</b>                  Approved changes are implemented. [Outcomes: 5, 7]</p> <p><i>NOTE 3: Scheduled changes may be incorporated into target releases. A packaged release may incorporate corrective and adaptive changes.</i></p> <p><b>SUP.10.BP9: Review the implemented change.</b>                  All changes are reviewed after implementation and before closure to ensure that they had the desired effect and met their objectives. [Outcomes: 7, 8]</p>
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<b>Work Products</b>	
<b>Input Work Products</b> WP13-16 Change request [Outcomes: 3] WP14-08 Tracking system [Outcomes: 2, 7, 8] WP21-00 Work product [Outcomes: 7]	<b>Output Work Products</b> WP08-28 Change management plan [Outcomes: 1] WP13-16 Change request [Outcomes: 2, 3, 5, 6, 7] WP13-21 Change control record [Outcomes: 8] WP21-00 Work product [Outcomes: 7]

#### 4.1.2.5.11 SUP.11 Safety and Dependability Assurance

<b>Process ID</b>	<i>SUP.11</i>
<b>Process Name</b>	<i>Safety and Dependability Assurance</i>
<b>Process Purpose</b>	<i>The purpose of the Safety and Dependability Assurance process is to ensure the required degree of safety and dependability of the software products.</i>
<b>Process Outcomes</b>	<p><i>As a result of successful implementation of the Safety and Dependability Assurance process:</i></p> <ol style="list-style-type: none"> <li><i>1) the requirements on safety and dependability are defined;</i></li> <li><i>2) the criticality of each software module is analysed;</i></li> <li><i>3) safety and dependability analyses are updated along with modifications to the software design; and</i></li> <li><i>4) measures are defined and implemented to assure the dependability and safety of critical items.</i></li> </ol>
<b>Base Practices</b>	<p><b>SUP.11.BP1: Define dependability and safety strategy.</b>  <i>Define a strategy for dependability and safety assurance that identifies criticality classes, measures for each criticality class, and selects the methods to be used to ensure the conformance with the safety and dependability requirements. [Outcomes: 1, 2, 3]</i></p> <p><b>NOTE A:</b> <i>The dependability and safety requirements concern software products involved in fulfilling critical functions, as determined by the system level functional analysis (see ECSS-Q-30).</i></p> <p><b>NOTE B:</b> <i>Various analyses of safety and reliability (e.g. FMECA, HSIA, fault tree analysis) are available for software components. The supplier ensures that the methods used are appropriate, that the software designs used are accurate and that the analyses are updated along with any modifications to the software design.</i></p> <p><b>SUP.11.BP2: Perform dependability and safety analysis.</b>  <i>Perform dependability and safety analysis initially to establish the conceptual design, and the software requirements. Thereafter, update the analyses at each milestone, to support the development and the testing phases. Maintain a list of critical modules throughout the life cycle. [Outcomes: 2]</i></p> <p><b>NOTE C:</b> <i>Dependability and safety analysis for SW are always based on the corresponding system level dependability and safety analyses.</i></p> <p><b>NOTE D:</b> <i>ECSS-Q-80 requires that the system dependability analyses take into account the interaction of the software with its environment (system hardware, human intervention, etc.).</i></p> <p><b>SUP.11.BP3: Identify measures for handling critical modules.</b></p>

	<p><i>Define measures to assure the reliability of critical modules. [Outcomes: 4]</i></p> <p><b>NOTE E:</b> <i>ECSS-Q-80 requires that the supplier designs critical software components to facilitate dependability and safety analysis and software testing.</i></p> <p><b>NOTE F:</b> <i>ECSS-Q-80 requires that on the basis of the results of the software criticality analysis, the supplier minimizes the number of critical software components by appropriate software design, to the maximum extent without introducing undesirable software complexity,.</i></p> <p><b>NOTE G:</b> <i>ECSS-Q-80 requires that the supplier defines and apply measures to assure the reliability of critical software. Examples of measures:</i></p> <ul style="list-style-type: none"> <li>• <i>Use of software design or methods which have performed successfully in a similar application</i></li> <li>• <i>Failure–mode analysis of the software, with the insertion of appropriate features for failure isolation and handling</i></li> <li>• <i>Defensive programming techniques, such as input verification and consistency checks</i></li> <li>• <i>Prohibiting the use of language commands and features which are known to be unpredictable or difficult to program</i></li> <li>• <i>Use of formal design language for formal proof and/or automatic code generation</i></li> <li>• <i>Full inspection of source code</i></li> <li>• <i>Witnessed or independent testing</i></li> <li>• <i>Gathering and analysis of failure statistics</i></li> </ul> <p><b>NOTE H:</b> <i>ECSS-Q-80 requires that the application of the chosen measures to critical components is verified.</i></p> <p><b>NOTE I:</b> <i>ECSS-Q-80 requires that the measures taken and their justification are documented in the design.</i></p> <p><b>SUP.11.BP4:</b> <b>Verify dependability and safety of the product.</b>  <i>Ensure, throughout the software life cycle, that reliability, availability, maintainability and safety targets are met. Verify the list of critical modules at each milestone. Verify the required fault tolerance by injecting faults during the system test. [Outcomes: 4]</i></p> <p><b>NOTE J:</b> <i>ECSS-Q-80 requires that measures are defined and implemented to avoid propagation of failures between software component of different criticality.</i></p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
<p>WP04-04 <i>High level software design [Outcomes: 1, 2, 3]</i></p> <p>WP04-05 <i>Low level software design [Outcomes: 1, 2, 3]</i></p> <p>WP04-06 <i>System architecture design [Outcomes: 1, 2, 3]</i></p> <p>WP08-25 <i>Unit test plan [Outcomes: all]</i></p> <p>WP14-06 <i>Schedule (inspection and review schedule) [Outcomes: 1, 3]</i></p> <p>WP15-01 <i>Analysis report (system level functional analysis) [Outcomes: 2, 3]</i></p> <p>WP17-08 <i>Interface requirements [Outcomes: 1]</i></p> <p>WP17-11 <i>Software requirements [Outcomes: 1, 2, 3]</i></p> <p>WP17-12 <i>System requirements [Outcomes: 1, 2, 3]</i></p> <p>WP19-10 <i>Verification strategy [Outcomes: all]</i></p> <p>WP60-04 <i>Software safety plan [Outcomes: 1]</i></p> <p>WP60-05 <i>Higher level safety plan [Outcomes: 1]</i></p> <p>WP60-06 <i>List of critical components [Outcomes: 2, 3, 4]</i></p>	<p>WP15-01 <i>Analysis report (dependability and safety analysis, human dependability analysis, software RAMS analysis) [Outcomes: 2, 3, 4]</i></p> <p>WP60-04 <i>Software safety plan [Outcomes: 1]</i></p> <p>WP60-06 <i>List of Critical Components [Outcomes: 2, 3]</i></p>

4.1.2.5.12 SUP.12 Independent Software Verification and Validation

<b>Process ID</b>	SUP.12	
<b>Process Name</b>	Independent Software Verification and Validation	
<b>Process Purpose</b>	The purpose of the Independent Software Verification and Validation process is to ensure that independent software verification is performed by a team of specialists from all disciplines including software product assurance.	
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Independent Software Verification and Validation process:</p> <ol style="list-style-type: none"> <li>1) ISVV activities are defined taking into account the criticality of the software;</li> <li>2) an ISVV team is set up; and</li> <li>3) ISVV activities are performed throughout the development process.</li> </ol>	
<b>Base Practices</b>	<p><b>SUP.12.BP1: Define scope of ISVV.</b>                  The work products to be verified independently are identified. The level of independence is defined. [Outcomes: 1]</p> <p><i>NOTE: The degree of independence of the ISVV team is agreed with the customer.</i></p> <p><b>SUP.12.BP2: Plan ISVV.</b>                  Define ISVV activities and setup an ISVV team. [Outcomes: 1, 2]</p> <p><b>NOTE A:</b> The following are examples of ISVV activities:</p> <ul style="list-style-type: none"> <li>• Work product reviews</li> <li>• Software testing</li> <li>• Dependability and safety analysis</li> </ul> <p><b>SUP.12.BP3: Perform ISVV.</b>                  Perform ISVV according to the plan. [Outcomes: 3]</p> <p><b>SUP.12.BP4: Report ISVV activities and results.</b>                  The report describes the results of ISVV, for example reviews, audits, inspections.. [Outcomes: 3]</p>	
<b>Work Products</b>		
	<b>Input Work Products</b>	<b>Output Work Products</b>
	<p>WP01-03 Software Configuration item [Outcomes: 3]                  WP04-06 System architecture design [Outcomes: 1, 3]                  WP08-07 System integration test plan [Outcomes: all]                  WP08-10 Software integration test plan [Outcomes: all]                  WP08-21 Software test plan [Outcomes: all]                  WP08-23 Validation test plan [Outcomes: all]                  WP08-25 Unit test plan [Outcomes: all]                  WP09-02 Quality policy [Outcomes: 1]                  WP17-11 Software requirements [Outcomes: 1, 3]                  WP17-12 System requirements [Outcomes: 1, 3]                  WP18-07 Quality criteria [Outcomes: 1, 3]                  WP60-07 Software Product Assurance Report [Outcomes: 1]</p>	<p>WP07-06 Quality measures [Outcomes: 3]                  WP08-10 Software integration test plan [Outcomes: 1, 3]                  WP08-18 Review plan [Outcomes: 1]                  WP08-22 System test plan [Outcomes: 1, 3]                  WP08-25 Unit test plan [Outcomes: 1, 3]                  WP11-06 System [Outcomes: 3]                  WP13-07 Problem report [Outcomes: 3]                  WP13-19 Review records [Outcomes: 3]                  WP13-24 Validation results [Outcomes: 3]                  WP13-25 Verification results [Outcomes: 3]                  WP14-04 Test log [Outcomes: 3]                  WP15-01 Analysis report [Outcomes: 3]                  WP15-13 Assessment / audit report [Outcomes: 3]                  WP17-13 Test script [Outcomes: 1, 3]                  WP60-06 List of critical components [Outcomes: 3]                  WP60-07 Software product assurance report [Outcomes: 3]                  WP60-08 ISVV plan [Outcomes: 1]                  WP60-09 ISVV Report [Outcomes: 3]</p>

## 4.1.2.6 Management process group (MAN)

### 4.1.2.6.1 MAN.1 Organizational Alignment

<b>Process ID</b>	MAN.1
<b>Process Name</b>	Organizational Alignment
<b>Process Purpose</b>	The purpose of the Organizational Alignment process is to enable the software processes needed by the organization to provided software products and services, to be consistent with its business goals.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Organizational Alignment process:</p> <ol style="list-style-type: none"> <li>1) the organization's business goals are identified;</li> <li>2) the process framework is identified and defined that include a set of software processes needed to achieve the business goals of the organization;</li> <li>3) a strategy is defined for process definition, implementation and improvement support is provided to enable this strategy;</li> <li>4) the organization's mission, core values, vision, goals and objectives is made known to all employees;</li> <li>5) individuals in the organization share a common vision, culture, and understanding of the business goals to empower them to function effectively; and</li> <li>6) each individual in the organization understands their role in achieving the goals of the business and is able to perform that role.</li> </ol>
<b>Base Practices</b>	<p><b>MAN.1.BP1: Develop a strategic vision.</b>                  Develop a strategic vision for the organisation identifying its business goals and the relationship of system and software engineering functions to the core activities of the organization. [Outcomes: 1]</p> <p><b>MAN.1.BP2: Define the process framework.</b>                  Identify the processes that need to be performed in order to achieve the business goals. [Outcomes 2]</p> <p><b>MAN.1.BP3: Define a strategy for process deployment.</b>                  Define a strategy for process deployment, implementation and improvement in the organizational unit. [Outcomes: 3]</p> <p><b>MAN.1.BP4: Provide management commitment.</b>                  Provide management support for process deployment, implementation and improvement to enable achievement of business goals. [Outcomes: 3]</p> <p>NOTE 1: One way to perform this practice would be to implement a Quality Management System in accordance with ISO 9001.</p> <p><b>MAN.1.BP5: Communicate the vision and goals.</b>                  Explain the organization strategic vision and goals to all individuals working for the organization, using appropriate management and communication mechanisms. [Outcomes: 4, 5]</p>



	<p><b>MAN.1.BP6: Ensure sharing of common vision.</b>                  Ensure that each individual in the organisation understands the common vision and is committed and empowered to perform their function effectively. [Outcomes: 5]</p> <p><b>MAN.1.BP7: Enable active participation.</b>                  Enable each individual to contribute to the achievement of business goals and related process improvement initiatives. [Outcomes: 5, 6]</p>
<p><b>Work Products</b></p>	
<p><b>Input Work Products</b></p> <p>WP03-06 Process performance data [Outcomes: 3]                  WP04-07 Organizational structure [Outcomes: 2, 3]                  WP05-02 Business goals [Outcomes: 2, 4]                  WP05-03 Core values statement [Outcomes: 1, 4, 5]                  WP05-04 Mission statement [Outcomes: 1, 4]                  WP05-05 Vision statement [Outcomes: 1, 4, 5]                  WP08-13 Quality plan [Outcomes: 3]                  WP09-01 Personnel policy [Outcomes: 5, 6]                  WP09-02 Quality policy [Outcomes: 3]                  WP10-01 Life cycle model [Outcomes: 2]                  WP13-04 Communication record [Outcomes: 5]                  WP15-04 Market analysis report [Outcomes: 1]                  WP15-13 Assessment / audit report [Outcomes: 4]                  WP15-14 Customer satisfaction report [Outcomes: 1]                  WP16-06 Process repository [Outcomes: 3]                  WP18-05 Personnel performance criteria [Outcomes: 5]                  WP50-11 Software development plan [Outcomes: 2, 3]                  WP50-12 Software product assurance plan [Outcomes: 2, 3]</p>	<p><b>Output Work Products</b></p> <p>WP02-01 Commitment / agreement [Outcomes: 3]                  WP05-02 Business goals [Outcomes: 1]                  WP05-03 Core values statement [Outcomes: 1]                  WP05-04 Mission statement [Outcomes: 1]                  WP05-05 Vision statement [Outcomes: 1]                  WP08-13 Quality plan [Outcomes: 3]                  WP09-01 Personnel policy [Outcomes: 2, 4]                  WP13-04 Communication record [Outcomes: 4]                  WP15-04 Market analysis report [Outcomes: 1]                  WP15-19 Product needs assessment [Outcomes: 1]                  WP16-06 Process repository [Outcomes: 2]                  WP19-02 Process strategy [Outcomes: 3]                  WP50-12 Software product assurance plan [Outcomes: 3]</p>

4.1.2.6.2 MAN.2 Organization Management

<b>Process ID</b>	MAN.2
<b>Process Name</b>	Organization Management
<b>Process Purpose</b>	<p>The purpose of the Organization Management process is to establish and perform software management practices, during the performance of the processes, needed for providing software products and services that are consistent with the business goals of organization.</p> <p>NOTE: Although organizational operations in general have a much broader scope than that of software process, software processes are implemented in a business context and to be effective, require an appropriate organizational environment.</p>
<b>Process Outcomes</b>	<p>As a result of the successful implementation of Organization Management:</p> <ol style="list-style-type: none"> <li>1) the organization will invest in the appropriate management infrastructure;</li> <li>2) the best practices are identified to support the implementation of effective organization and project management; and</li> <li>3) provide a basis for evaluating the achievement of organization business goals based on these management practices.</li> </ol>
<b>Base Practices</b>	<p><b>MAN.2.BP1: Identify management infrastructure.</b>                  Identify management infrastructure appropriate to perform software management practices that are consistent with the business goals of the organization. [Outcomes: 1]                  NOTE 1: Management infrastructure may include organisational roles and responsibilities, decision-making system, communication mechanisms and planning / monitoring of business operations.</p> <p><b>MAN.2.BP2: Provide management infrastructure.</b>                  Provide the identified management infrastructure appropriate in organization's broader scope. [Outcomes: 1]</p> <p><b>MAN.2.BP3: Identify and implement software management practices.</b>                  Identify and implement effective software management practices to implement and improve competitive software processes and to construct effective enterprise project management. [Outcomes: 2]</p> <p><b>MAN.2.BP4: Perform identified management practices.</b>                  Perform management practices using management infrastructure. [Outcomes: 2]</p> <p><b>MAN.2.BP5: Evaluate effectiveness.</b>                  Evaluate the effectiveness of implemented software management practices to achieve the related organization business goals. [Outcomes: 3]</p> <p><b>MAN.2.BP6: Provide support to adopt best practices.</b>                  Use incentive approaches and software management infrastructure to support implementation of effective software management practices. [Outcomes: 2, purpose]                  NOTE 2: Best practice may be related to the achieved or next capability level. See the Knowledge Management process (RIN.3) to manage and disseminate best practices as part of organisational knowledge assets.</p>

<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP03-03 Benchmarking data [Outcomes: 3]                      WP04-07 Organizational structure [Outcomes: 3]                      WP05-02 Business goals [Outcomes: 1, 2, 3]                      WP15-13 Assessment / audit report [Outcomes: 3]                      WP19-00 Strategy [Outcomes: 1]                      WP50-11 <i>Software development plan [Outcomes: 3]</i></p>	<p><b>Output Work Products</b></p> <p>WP04-07 Organizational structure [Outcomes: 1]                      WP07-04 Process measure [Outcomes: 3]                      WP10-00 Process description [Outcomes: 2]                      WP14-08 Tracking system [Outcomes: 1]                      WP15-05 Evaluation report [Outcomes: 3]                      WP16-06 Process repository [Outcomes: 2]                      WP19-00 Strategy [Outcomes: 1]                      WP50-10 <i>Software reuse file [Outcomes: 3]</i>                      WP50-11 <i>Software development plan [Outcomes: 1]</i></p>

#### 4.1.2.6.3 MAN.3 Project Management

<b>Process ID</b>	MAN.3
<b>Process Name</b>	Project Management
<b>Process Purpose</b>	The purpose of the Project Management process is to identify, establish, coordinate, and monitor the activities, tasks, and resources necessary for a project to produce a product and/or service, in the context of the project's requirements and constraints.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Project Management process:</p> <ol style="list-style-type: none"> <li>1) the scope of the work for the project is defined;</li> <li>2) the feasibility of achieving the goals of the project with available resources and constraints are evaluated;</li> <li>3) the tasks and resources necessary to complete the work are sized and estimated;</li> <li>4) interfaces between elements in the project, and with other project and organisational units, are identified and monitored;</li> <li>5) plans for the execution of the project are developed and implemented;</li> <li>6) progress of the project is monitored and reported;</li> <li>7) actions to correct deviations from the plan and to prevent recurrence of problems identified in the project are taken when project targets are not achieved; and</li> <li>8) <i>lessons learned are collected and used.</i></li> </ol>
<b>Base Practices</b>	<p><b>MAN.3.BP1: Define the scope of work.</b>                      Identify the project's objectives, motivation and boundaries and define the work to be undertaken by the project. [Outcomes: 1]   <i>NOTE A: As part of this activity, ECSS-M-10 requires the elaboration of a function and a product tree.</i></p> <p><b>MAN.3.BP2: Define project life cycle.</b>                      Define a life cycle and strategy for the project, which is appropriate to its scope, context, magnitude and complexity. [Outcome 1]   <i>NOTE B: ECSS-Q-80 requires that quality objectives are taken into account</i>   <i>NOTE C: ECSS-Q-80 requires that the software life cycle shall be defined or referenced in the software product assurance plan.</i></p>

	<p><b>MAN.3.BP3: Evaluate feasibility of the project.</b>                  Evaluate the feasibility of achieving the goals of the project with available resources and constraints. [Outcomes: 2, 3]</p> <p><b>MAN.3.BP4: Determine and maintain estimates for project attributes.</b>                  Define and maintain baselines for project attributes [Outcomes: 2, 3]</p> <p>NOTE 1: Project attributes may include 1) business and quality goals for the project, 2) size and complexity of the project and 3) project effort, schedule and budget.</p> <p>NOTE 2: Project quality goals and risks should be considered when estimating project attributes. See the Quality Management process (MAN.4) and the Risk Management process (MAN.5) for details.</p> <p>NOTE D: <i>ECSS-Q-80 requires that the state of completion of phase outputs is specified when the life cycle is defined.</i></p> <p><b>MAN.3.BP5: Define project activities and tasks.</b>                  Identify project activities and tasks according to defined project lifecycle, and define dependencies between them. [Outcomes: 3]</p> <p>NOTE E: <i>ECSS-M-10 requires that the Work Breakdown Structure be based on customer inputs, contract negotiations and the Product Tree</i></p> <p>NOTE F: <i>ECSS-M-10 requires that work packages are uniquely identified.</i></p> <p><b>MAN.3.BP6: Define needs for experience, knowledge and skills.</b>                  Identify the experience, knowledge and skill requirements of the project and apply them to the selection of individuals and teams. [Outcomes: 3]</p> <p>NOTE G: <i>For the selection and training of personnel see RIN.1 Human Resource Management and RIN.2 Training.</i></p> <p><b>MAN.3.BP7: Define project schedule.</b>                  Allocate resources to activities and determine the sequence and schedule of performance of activities within the project [Outcomes: 5]</p> <p><b>MAN.3.BP8: Identify and monitor project interfaces.</b>                  Identify and agree interfaces of the project with other projects, organizational units and other affected parties and monitor agreed commitments. [Outcomes: 4]</p> <p><b>MAN.3.BP9: Allocate responsibilities.</b>                  Identify the specific individuals and groups contributing to, and impacted by, the project, allocate them their specific responsibilities, and ensure that the commitments are understood and accepted, funded and achievable. [Outcomes: 5]</p> <p>NOTE H: <i>In ECSS-Q-20, the “Delivery Review Board” or “Software Review Board” is established at all contractual levels and includes at least a representative from the software product assurance and the software engineering organisations.</i></p> <p><b>MAN.3.BP10: Establish project plan.</b>                  Define and maintain project master plan and other relevant plans to cover the project scope and goals, resources, infrastructure, interfaces and communication mechanisms. [Outcomes: 5]</p> <p>NOTE I: <i>ECSS-E-40 requires that reviews are scheduled in the project plan. The following joint reviews are the most common ones:</i></p> <ul style="list-style-type: none"> <li>• <i>System Requirements Review (SRR)</i></li> <li>• <i>Preliminary Design Review (PDR)</i></li> <li>• <i>Critical Design Review (CDR)</i></li> </ul>
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	<ul style="list-style-type: none"> <li>• <i>Test Readiness Review (TRR)</i></li> <li>• <i>Qualification Review (QR)</i></li> <li>• <i>Acceptance Review (AR)</i></li> </ul> <p><b>MAN.3.BP11: Implement the project plan.</b>                  Implement planned activities of the project, record status of progress and report the current status to affected parties. [Outcomes: 5, 6]</p> <p><b>MAN.3.BP12: Monitor project attributes.</b>                  Monitor project scope, budget, cost, resources and other necessary attributes and document significant deviations of them against the project baseline. [Outcomes: 6]</p> <p><b>MAN.3.BP13: Review progress of the project.</b>                  Regularly report and review the status of the project performance against the project plan. [Outcomes: 6]</p> <p><b>MAN.3.BP14: Act to correct deviations.</b>                  Take action when project goals are not achieved, to correct deviations from the plan and to prevent recurrence of problems identified in the project. Update project plans accordingly. [Outcomes: 7]</p> <p><i>NOTE J: ECSS-Q-80 requires that implemented corrective actions shall be described in software product assurance reports.</i></p> <p><b>MAN.3.BP15: Identify and report lessons learned.</b>                  Perform an end-of-project assessment of the lessons learned which can improve the management of projects. [Outcomes: 8]</p> <p><b>MAN.3.BP16: Develop a cost breakdown structure.</b>                  Provide the framework for cost summarization. [Outcomes: 3]</p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP02-00 Contract [Outcomes: 1, 2] WP03-06 Process performance data [Outcomes: 3, 7] WP07-05 Project measure [Outcomes: 6] WP08-06 Project activity network [Outcomes: 5] WP08-08 Human resource management plan [Outcomes: 2] WP08-12 Project plan [Outcomes: 3, 6, 7] WP08-19 Risk management plan [Outcomes: 6, 7] WP12-01 Request for proposal [Outcomes: 1] WP13-07 Problem report [Outcomes: 7] WP13-14 Progress status record [Outcomes: 7] WP13-16 Change request [Outcomes: 1] WP13-17 Customer request [Outcomes: 1] WP14-06 Schedule [Outcomes: 1, 3] WP14-08 Tracking system [Outcomes: 4, 6] WP14-09 Work breakdown structure [Outcomes: 5] WP17-03 Customer requirements [Outcomes: 2] WP19-07 Software development methodology [Outcomes: 5] WP50-01 Software system specification [Outcomes: 2] WP50-06 Software test plan [Outcomes: 3, 6, 7] WP50-11 Software development plan [Outcomes: 3, 5, 6, 7] WP60-10 Lessons learned report [Outcomes: 8]	WP08-06 Project activity network [Outcomes: 4] WP08-12 Project plan [Outcomes: 1, 2, 3, 4, 5] WP08-19 Risk management plan [Outcomes: 5] WP13-04 Communication record [Outcomes: 6] WP13-14 Progress status record [Outcomes: 6] WP13-16 Change request [Outcomes: 7] WP13-19 Review records [Outcomes: 7] WP14-02 Corrective action register [Outcomes: 7] WP14-06 Schedule [Outcomes: 5] WP14-09 Work breakdown structure [Outcomes: 3] WP15-06 Project status report [Outcomes: 4, 6] WP50-06 Software test plan [Outcomes: 1, 2, 3, 4, 5] WP50-11 Software development plan [Outcomes: 1, 2, 3, 4, 5] WP60-10 Lessons learned report [Outcomes: 8] WP60-11 Cost breakdown structure [Outcomes: 3] WP60-16 Product tree [Outcomes: 1]

4.1.2.6.4      MAN.4 Quality Management

<b>Process ID</b>	MAN.4
<b>Process Name</b>	Quality Management
<b>Process Purpose</b>	The purpose of the Quality Management process is to achieve customer satisfaction by monitoring the quality of the products and services, at the organizational and project level, to ensure they meet customer requirements.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Quality Management process:</p> <ol style="list-style-type: none"> <li>1) quality goals, based on the customer's stated and implicit quality requirements are established;</li> <li>2) an overall strategy is developed to achieve the defined goals;</li> <li>3) a quality management system is established to implement the strategy;</li> <li>4) identified quality control and assurance activities are performed and their performance confirmed;</li> <li>5) actual performance against the quality goals is monitored; and</li> <li>6) appropriate action is taken when quality goals are not achieved.</li> </ol>
<b>Base Practices</b>	<p><b>MAN.4.BP1: Establish quality goals.</b>                  Based on the customer's stated requirements for quality and implicit quality requirements relevant to the customer's environment, establish organizational quality goals and quality goals for the product and process that can be evaluated throughout the project, preferably in a quantitative manner. [Outcomes: 1]</p> <p>NOTE 1: Customer environment may include all affected parties, society at large, relevant legislation and regulations.</p> <p>NOTE 2: Quality goals depend on the type of business.</p> <p>NOTE A: <i>ECSS-Q-80 requires that the software quality objectives shall be derived from the reliability, safety, maintainability, and quality requirements of the system.</i></p> <p><b>MAN.4.BP2: Define overall strategy.</b>                  Develop an overall strategy including necessary resources and responsibilities to achieve the defined goals. [Outcomes: 2]</p> <p>NOTE 3: Continuous improvement in quality is one means to achieve the goals.</p> <p><b>MAN.4.BP3: Define quality criteria.</b>                  Define standards, references and metrics that will measure and verify achievement of quality goals and acceptance criteria that will help to assess whether the relevant quality goals have been achieved. [Outcomes: 2]</p> <p><b>MAN.4.BP4: Establish a quality management system.</b>                  Establish and maintain a quality management system to plan, implement, monitor and control necessary corrective and preventive actions. [Outcomes: 3]</p> <p>NOTE B: <i>ECSS-Q-80 requires the definition of a metrication programme to support the analysis that standards requirements, project rules on design, code and documentation are properly applied.</i></p> <p><b>MAN.4.BP5: Assess achievement of quality goals.</b>                  Review regularly the achievement of quality goals at higher management level using defined criteria and take appropriate action. [Outcomes: 4, 5]</p>

	<p><b>NOTE C:</b> <i>ECSS-Q-80 requires that a quality assessment shall be included in the software product assurance reports.</i></p> <p><b>NOTE D:</b> <i>ECSS-Q-80 requires that the outputs of each software life-cycle phase identify those characteristics of the product that are crucial to its safe and proper functioning.</i></p> <p><b>MAN.4.BP6: Take preventive or corrective action.</b>                  When defined quality goals are not achieved, take corrective or preventive action both at the project and organizational level. [Outcomes: 4, 6]</p> <p><b>NOTE 4:</b> The corrective action can involve fixing the product generated by a particular project activity or changing the planned set of activities in order to better achieve the quality goals or both. The preventive action can involve modifying product specifications or process definitions, or both, to prevent recurrence of the non-achievement.</p> <p><b>NOTE E:</b> <i>ECSS-Q-80 requires that corrective actions implemented shall be described in software product assurance reports.</i></p> <p><b>MAN.4.BP7: Collect feedback.</b>                  Collect feedback from customer, project, process and personnel to verify continuous improvement of quality situation at organisational and project level. [Outcomes: 6]</p> <p><b>MAN.4.BP8: Monitor actual performance of quality.</b>                  Measure and monitor actual performance of quality against the quality goals. [Outcomes: 5]</p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP02-00 Contract [Outcomes: 1, 5] WP03-01 Assessment data [Outcomes: 5] WP03-03 Benchmarking data [Outcomes: 5] WP03-04 Customer satisfaction data [Outcomes: 5] WP03-06 Process performance data [Outcomes: 5] WP08-12 Project plan [Outcomes: 1, 4, 5] WP08-13 Quality plan [Outcomes: 3, 4, 5] WP08-18 Review plan [Outcomes: 4] WP08-29 Improvement plan [Outcomes: 4] WP13-07 Problem report [Outcomes: 6] WP13-14 Progress status record [Outcomes: 5] WP13-18 Quality record [Outcomes: 5] WP13-19 Review records [Outcomes: 5] WP15-13 Assessment / audit report [Outcomes: 5] WP17-03 Customer requirements [Outcomes: 1] WP18-01 Acceptance criteria [Outcomes: 2] WP18-07 Quality criteria [Outcomes: 2] WP50-01 Software system specification [Outcomes: 1] WP50-06 Software test plan [Outcomes: 1, 4, 5] WP50-08 Software verification plan [Outcomes: 4] WP50-09 Software validation plan [Outcomes: 4] WP50-11 Software development plan [Outcomes: 1, 4, 5] WP50-12 Software product assurance plan [Outcomes: 3, 4, 5]	WP07-06 Quality measures [Outcomes: 5] WP08-13 Quality plan [Outcomes: 1, 2] WP08-18 Review plan [Outcomes: 5] WP09-02 Quality policy [Outcomes: 3] WP13-19 Review records [Outcomes: 4, 6] WP14-02 Corrective action register [Outcomes: 6] WP15-01 Analysis report [Outcomes: 4] WP16-06 Process repository [Outcomes: 3] WP18-01 Acceptance criteria [Outcomes: 1] WP18-07 Quality criteria [Outcomes: 1] WP19-09 Quality strategy [Outcomes: 2] WP50-08 Software verification plan [Outcomes: 5] WP50-09 Software validation plan [Outcomes: 5] WP50-12 Software product assurance plan [Outcomes: 1, 2, 5]

4.1.2.6.5 MAN.5 Risk Management

<b>Process ID</b>	MAN.5
<b>Process Name</b>	Risk Management
<b>Process Purpose</b>	The purpose of the Risk Management process is to identify, analyse, treat and monitor the risks continuously.
<b>Process Outcomes</b>	<p>As result of successful implementation of the Risk Management process:</p> <ol style="list-style-type: none"> <li>1) the scope of the risk management to be performed is determined;</li> <li>2) appropriate risk management strategies are defined and implemented;</li> <li>3) risks are identified as they develop during the conduct of the project;</li> <li>4) the risks are analysed and the priority in which to apply resources to treatment of these risks is determined;</li> <li>5) risk measures are defined, applied, and assessed to determine changes in the status of risk and the progress of the treatment activities; and</li> <li>6) appropriate treatment is taken to correct or avoid the impact of risk based on its priority, probability, and consequence or other defined risk threshold.</li> </ol>
<b>Base Practices</b>	<p><b>MAN.5.BP1: Establish risk management scope.</b>                  Determine the scope of risk management to be performed. [Outcomes: 1]</p> <p><b>MAN.5.BP2: Define risk management strategies.</b>                  Define appropriate strategies and risk measures to identify, analyze, treat and monitor each risk or set of risks, both at the project and organisational level. [Outcomes: 2, 5]</p> <p><i>NOTE A: ECSS-M-80 requires that a list of acceptable and unacceptable risks is established.</i></p> <p><b>MAN.5.BP3: Identify risks.</b>                  Identify risks to the project both initially within the project strategy and as they develop during the conduct of the project. [Outcomes: 3]</p> <p><i>NOTE 1: Examples of risks include cost, schedule, effort, resource, and technical risks.</i></p> <p><b>MAN.5.BP4: Analyse risks.</b>                  Analyze risks and apply risk measures to determine priority in which to apply resources to monitor risks. [Outcomes: 4, 5]</p> <p><i>NOTE 2: Issues to be considered in risk analysis include the likelihood and consequence of each identified risk.</i></p> <p><b>MAN.5.BP5: Define and perform risk treatment actions.</b>                  For each risk (or set of risks) define and perform the appropriate actions to reduce the risks to an acceptable level. [Outcomes: 5, 6]</p> <p><b>MAN.5.BP6: Monitor risks.</b>                  Monitor the current state of each risk, determine changes in the status of risks and assess the effectiveness of risk treatment actions. [Outcomes: 5, 6]</p> <p><b>MAN.5.BP7: Take preventive or corrective actions.</b>                  When expected progress in risk mitigation is not achieved, take appropriate preventive action to further reduce or avoid the impact of each risk. Where risk mitigation cannot reduce or avoid the risk, plan corrective action to resolve the problem arising from the</p>

	risk. [Outcomes: 6]  NOTE 3: Preventive action may involve developing and implementing new treatment strategies or adjusting the existing strategies.  <b>MAN.5.BP8: Recommend acceptance.</b> <i>Recommend that the acceptable, the resolved and the unresolved risks are approved by the appropriate level of management. [Outcomes: 4, 5]</i>  <b>MAN.5.BP9: Communicate risks.</b> <i>Communicate the risks and the risk trend to the responsible level of management. Identify risks for elevation to higher management or other team members. [Outcomes: 2, 3, 5]</i>  <b>MAN.5.BP10: Accept residual risks.</b> <i>Subject the residual risks to formal risk acceptance by the appropriate level of management. [Outcomes: 4, 5]</i>	
<b>Work Products</b>		
<b>Input Work Products</b>	<b>Output Work Products</b>	
WP08-12 Project plan [Outcomes: 1] WP08-19 Risk management plan [Outcomes: 4, 5] WP08-20 Risk mitigation plan [Outcomes: 6] WP13-20 Risk action request [Outcomes: 4] WP14-08 Tracking system [Outcomes: 3, 4, 5, 6] WP50-06 Software test plan [Outcomes: 1] WP50-11 Software development plan [Outcomes: 1, 4, 5]	WP07-07 Risk measure [Outcomes: 5] WP08-14 Recovery plan [Outcomes: 4, 6] WP08-19 Risk management plan [Outcomes: all] WP08-20 Risk mitigation plan [Outcomes: 3, 4] WP13-20 Risk action request [Outcomes: 2, 6] WP14-02 Corrective action register [Outcomes: 6] WP14-08 Tracking system [Outcomes: 2, 3, 4, 5, 6] WP15-08 Risk analysis report [Outcomes: 4] WP15-09 Risk status report [Outcomes: 4, 5] WP50-11 Software development plan [Outcomes: all]	

#### 4.1.2.6.6 MAN.6 Measurement

<b>Process ID</b>	MAN.6
<b>Process Name</b>	Measurement
<b>Process Purpose</b>	The purpose of the Measurement process is to collect and analyse data relating to the products developed and processes implemented within the organization and its projects, to support effective management of the processes and to objectively demonstrate the quality of the products.
<b>Process Outcomes</b>	As a result of successful implementation of the Measurement process: <ol style="list-style-type: none"> <li>1) organizational commitment is established and sustained to implement the measurement process;</li> <li>2) the measurement information needs of organizational and management processes are identified;</li> <li>3) an appropriate set of measures, driven by the information needs are identified and/or developed;</li> <li>4) measurement activities are identified and performed;</li> <li>5) the required data is collected, stored, analyzed, and the results interpreted;</li> <li>6) information products are used to support decisions and provide an objective basis for communication; and</li> </ol>

	<p>7) the measurement process and measures are evaluated and communicated to the process owner.</p>
<p><b>Base Practices</b></p>	<p><b>MAN.6.BP1: Establish organizational commitment for measurement.</b>                  A commitment of management and staff to measurement is established, sustained and communicated to the organizational unit. [Outcomes: 1]</p> <p><b>MAN.6.BP2: Develop a measurement strategy.</b>                  Define an appropriate measurement strategy to identify, perform and evaluate measurement activities and results, based on organizational and project needs. [Outcomes: 1]</p> <p><b>MAN.6.BP3: Identify measurement information needs.</b>                  Identify the measurement information needs of organizational and management processes. [Outcomes: 2]</p> <p><b>MAN.6.BP4: Specify measures.</b>                  Identify and develop an appropriate set of measures based on measurement information needs. [Outcomes: 3]</p> <p><i>NOTE A: The following are examples of common basic metrics:</i></p> <ul style="list-style-type: none"> <li>• Size (design, code)</li> <li>• Complexity (design, code)</li> <li>• Fault density and/or failure intensity</li> <li>• Test coverage</li> <li>• Number of failures</li> </ul> <p><b>MAN.6.BP5: Collect and store measurement data.</b>                  Identify, collect and store measurement data, including context information necessary to verify, understand, or evaluate the data. [Outcomes: 4, 5]</p> <p><b>MAN.6.BP6: Analyze measurement data.</b>                  Analyze and interpret measurement data, and develop information products [Outcomes: 5]</p> <p><i>NOTE B: ECSS-Q-80 requires that chosen metrics are collected, stored, analysed and reported on a regular basis.</i></p> <p><b>MAN.6.BP7: Use information products for decision-making.</b>                  Make accurate and current measurement information products accessible for any decision-making processes for which it is relevant. [Outcomes: 6]</p> <p><b>MAN.6.BP8: Communicate measurement results.</b>                  Disseminate measurement information products to all parties who will be using them and collect feedback to evaluate the appropriateness for intended use. [Outcomes: 6, 7]</p> <p><i>NOTE C: ECSS-Q-80 requires that the nature of the measurements, the aspects of the coding standards to be checked, the tools used and the relationship to the coding team are described in the software product assurance plan.</i></p> <p><i>NOTE D: ECSS-Q-80 requires that a synthesis of results obtained is described in software product assurance reports.</i></p> <p><i>NOTE E: ECSS-Q-80 requires that the results can be used to provide the customer with an insight into the level of quality obtained through software product assurance reports.</i></p> <p><b>MAN.6.BP9: Evaluate and communicate information products and measurement activities to process owners.</b>                  Evaluate information products and measurement activities against the identified information needs and measurement strategy, identify potential improvements in</p>

	measurements, and communicate any identified potential improvement to the process owners. [Outcomes: 7]
<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP03-01 Assessment data [Outcomes: 6]                  WP03-03 Benchmarking data [Outcomes: 5, 6]                  WP03-04 Customer satisfaction data [Outcomes: 6]                  WP03-05 Personnel performance data [Outcomes: 6]                  WP03-06 Process performance data [Outcomes: 6]                  WP07-01 Customer satisfaction survey [Outcomes: 3, 4, 5]                  WP07-02 Field measure [Outcomes: 5]                  WP07-03 Personnel performance measure [Outcomes: 5]                  WP07-04 Process measure [Outcomes: 5]                  WP07-05 Project measure [Outcomes: 5]                  WP07-06 Quality measures [Outcomes: 5]                  WP07-07 Risk measure [Outcomes: 5]                  WP07-08 Service level measure [Outcomes: 5]                  WP09-02 Quality policy [Outcomes: 1]                  WP10-00 Process description [Outcomes: 7]                  WP13-17 Customer request [Outcomes: 3]                  WP14-10 Work product distribution register [Outcomes: 7]</p>	<p><b>Output Work Products</b></p> <p>WP03-03 Benchmarking data [Outcomes: 5]                  WP03-04 Customer satisfaction data [Outcomes: 5]                  WP03-05 Personnel performance data [Outcomes: 5]                  WP07-01 Customer satisfaction survey [Outcomes: 3, 7]                  WP07-02 Field measure [Outcomes: 3, 7]                  WP07-03 Personnel performance measure [Outcomes: 3, 7]                  WP07-04 Process measure [Outcomes: 3, 7]                  WP07-05 Project measure [Outcomes: 3, 7]                  WP07-06 Quality measures [Outcomes: 3, 7]                  WP07-07 Risk measure [Outcomes: 3, 7]                  WP07-08 Service level measure [Outcomes: 3, 7]                  WP10-00 Process description [Outcomes: 7]                  WP13-07 Problem report [Outcomes: 5]                  WP15-01 Analysis report [Outcomes: 2, 5]                  WP15-05 Evaluation report [Outcomes: 5, 7]                  WP15-18 Process performance report [Outcomes: 5]                  WP50-10 <i>Software reuse file</i> [Outcomes: 5, 7]</p>

#### 4.1.2.6.7 MAN.7 Information Management

<b>Process ID</b>	MAN.7
<b>Process Name</b>	<i>Information Management</i>
<b>Process Purpose</b>	<p><i>The purpose of the Information Management process is to organise, control, monitor, and distribute information within the organisational unit. This information is captured in documents, which may be in the form of paper, electronic or other media.</i></p> <p><i>NOTE: Proper information management should not be confused with day-to-day information exchanges during the course of work.</i></p> <p><i>NOTE: The scope of this process can apply to the project or the organisational unit.</i></p>
<b>Process Outcomes</b>	<p><i>As a result of successful implementation of the Information Management process:</i></p> <ol style="list-style-type: none"> <li><i>1) the information necessary for work within the organisational unit and the actors needing access to the information is identified;</i></li> <li><i>2) an information system is established to organise the information;</i></li> <li><i>3) the content of all information made available on the system is verified;</i></li> <li><i>4) actors needing the information are informed of the means of access; and</i></li> <li><i>5) the information system is maintained and updated.</i></li> </ol>
<b>Base Practices</b>	<p><b>MAN.7.BP1: Identify necessary information.</b>  <i>Identify information that is essential to achieving goals within the organisation and the actors who need to access it. [Outcomes: 1]</i></p> <p><b>MAN.7.BP2: Establish information system.</b>  <i>Develop an information system that allows information to be accessed in an efficient manner. [Outcomes: 2]</i></p>

	<p><b>MAN.7.BP3: Make information system accessible.</b>  <i>Ensure that all actors who need access to information are aware of its availability and of the procedure to access it. [Outcomes: 3]</i></p> <p><b>MAN.7.BP4: Maintain and verify information.</b>  <i>Ensure that information on the system is complete, correct and up-to-date. [Outcomes: 3, 5]</i></p> <p><b>NOTE A:</b> <i>The author of the information is responsible for the quality of the information added into the system.</i></p> <p><b>MAN.7.BP5: Control access to information.</b>  <i>Ensure that information on the system can be accessed or changed only by appropriate actors. [Outcomes: 1, 2, 4]</i></p> <p><b>MAN.7.BP6: Distribute information.</b>  <i>Ensure that information is delivered to relevant users. [Outcomes: 2, 4]</i></p> <p><b>NOTE B:</b> <i>Alerts received from customers are disseminated to the organisational unit via the information system.</i></p> <p><b>MAN.7.BP7: Notify users when modifications occur.</b>  <i>Keep users of the information system informed of any relevant changes. [Outcomes: 5]</i></p> <p><b>MAN.7.BP8: Monitor system performance.</b>  <i>Regularly monitor performance of information system. [Outcomes: 5]</i></p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
<p>WP08-12 <i>Project plan [Outcomes: 1, 2]</i></p> <p>WP08-24 <i>Training plan [Outcomes: 1, 2, 4]</i></p> <p>WP13-23 <i>Training records [Outcomes: 1, 2, 4]</i></p> <p>WP60-12 <i>Information management plan [Outcomes: 1, 2]</i></p>	<p>WP06-04 <i>Training material [Outcomes: 4]</i></p> <p>WP13-23 <i>Training records [Outcomes: 1, 4]</i></p> <p>WP60-12 <i>Information management plan [Outcomes: 2]</i></p> <p>WP60-13 <i>Project information system [Outcomes: 2, 3, 5]</i></p>

### 4.1.2.7 Process improvement process group (PIM)

#### 4.1.2.7.1 PIM.1 Process Establishment

<b>Process ID</b>	PIM.1
<b>Process Name</b>	Process Establishment
<b>Process Purpose</b>	The purpose of the Process Establishment process is to establish a suite of organisational processes for all software life cycle processes as they apply to its business activities.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Process Establishment process:</p> <ol style="list-style-type: none"> <li>1) a defined and maintained standard set of processes are established, along with an indication of each process's applicability;</li> <li>2) the detailed tasks, activities and associated work products of the standard process are identified, together with expected performance characteristics;</li> <li>3) a strategy for tailoring the standard process for the product or service is developed in accordance with the needs of the project; and</li> <li>4) information and data related to the use of the standard process for specific projects exist and are maintained.</li> </ol>
<b>Base Practices</b>	<p><b>PIM.1.BP1: Define process architecture.</b>                  Define a standard set of processes, purpose of each process and interactions between them. [Outcomes: 1]</p> <p><b>PIM.1.BP2: Support deployment of processes.</b>                  Support the organisation-wide use of standard processes according to the purpose of each process. [Outcomes: 1]</p> <p><b>PIM.1.BP3: Define standard processes.</b>                  Define and maintain a description of each standard process according to the needs to establish processes in the organisation. [Outcomes: 2]</p> <p>NOTE 1: Effective, organisation-wide establishment of standard processes may require that they are documented.</p> <p><b>PIM.1.BP4: Identify performance expectations.</b>                  Identify expectations for process performance when using the organisations standard processes. [Outcomes: 2]</p> <p><b>PIM.1.BP5: Establish process tailoring guidelines.</b>                  Establish organisational guidelines for tailoring the organization's standard processes to meet the specific needs of projects. [Outcomes: 3]</p> <p><b>PIM.1.BP6: Maintain process data.</b>                  Capture and maintain information and data related to the use of standard processes. [Outcomes: 4]</p>



<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP03-03 Benchmarking data [Outcomes: 2]                      WP07-04 Process measure [Outcomes: 4]                      WP07-06 Quality measures [Outcomes: 4]                      WP10-00 Process description [Outcomes: 3, 4]                      WP16-06 Process repository [Outcomes: 4]                      WP17-00 Requirements specification [Outcomes: 2]</p>	<p><b>Output Work Products</b></p> <p>WP03-06 Process performance data [Outcomes: 4]                      WP09-00 Policy [Outcomes: 1, 3]                      WP09-02 Quality policy [Outcomes: 1, 3]                      WP10-00 Process description [Outcomes: 1, 2]                      WP13-18 Quality record [Outcomes: 4]                      WP13-19 Review records [Outcomes: 4]                      WP15-01 Analysis report [Outcomes: 4]                      WP16-06 Process repository [Outcomes: 4]</p>

#### 4.1.2.7.2 PIM.2 Process Assessment

<b>Process ID</b>	PIM.2
<b>Process Name</b>	Process Assessment
<b>Process Purpose</b>	The purpose of the Process Assessment process is to determine the extent to which the organization's standard processes contribute to the achievement of its business goals and to help the organization focus on the need for continuous process improvement.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Process Assessment process:</p> <ol style="list-style-type: none"> <li>1) information and data related to the use of the standard process for specific projects will exist and be maintained;</li> <li>2) the relative strengths and weaknesses of the organization's standard processes are understood; and</li> <li>3) accurate and accessible assessment records are kept and maintained.</li> </ol>
<b>Base Practices</b>	<p><b>PIM.2.BP1: Define assessment goals.</b>                      Define and validate the assessment goals based on the organization's business goals. Identify the criteria to verify achievement of the goals. [Outcomes: 1]</p> <p><b>PIM.2.BP2: Plan the assessment.</b>                      Develop and document a plan for the assessment. [Outcomes: 1]</p> <p><b>PIM.2.BP3: Obtain commitment.</b>                      Obtain the commitment of the sponsor and the organizational unit(s) to be assessed to the planned assessment(s), including an agreed schedule and resources. [Outcomes: 1]</p> <p><b>PIM.2.BP4: Perform the assessment to collect data.</b>                      Perform the assessment to collect the data required for evaluating the processes within the scope of the assessment. [Outcomes: 1]</p> <p><b>PIM.2.BP5: Validate the assessment data.</b>                      Validate the assessment data collected as appropriate, ensuring that the data sufficiently covers the assessment goal. [Outcomes: 3]</p> <p><b>PIM.2.BP6: Analyze the assessment data.</b>                      Analyze the validated assessment data to understand the relative strengths and weaknesses of the organization's processes. [Outcomes: 2]</p> <p><b>PIM.2.BP7: Report the assessment results.</b></p>



	Report the planned assessment outputs to the assessment sponsor. [Outcomes: 1, 3]  <b>PIM.2.BP8: Maintain assessment record.</b> Maintain accurate and current assessment results in an accessible location and format. [Outcomes: 1, 3]
<b>Work Products</b>	
<b>Input Work Products</b> WP03-01 Assessment data [Outcomes: 1] WP05-01 Assessment goals [Outcomes: 1] WP08-03 Process assessment plan [Outcomes: 1] WP13-00 Record [Outcomes: 1, 3] WP16-06 Process repository [Outcomes: 1] WP18-02 Assessment method standard [Outcomes: 2, 3] WP21-00 Work product [Outcomes: 1, 2]	<b>Output Work Products</b> WP03-01 Assessment data [Outcomes: 1] WP05-01 Assessment goals [Outcomes: 1] WP08-03 Process assessment plan [Outcomes: 1] WP13-03 Back-up / recovery record [Outcomes: 3] WP13-04 Communication record [Outcomes: all] WP13-19 Review records [Outcomes: 3] WP15-02 Assessment report [Outcomes: 3] WP15-13 Assessment / audit report [Outcomes: all] WP15-16 Improvement opportunity [Outcomes: 2, 3] WP16-01 Assessment results repository [Outcomes: 3]

#### 4.1.2.7.3 PIM.3 Process Improvement

<b>Process ID</b>	PIM.3
<b>Process Name</b>	Process Improvement
<b>Process Purpose</b>	The purpose of the Process Improvement process is to continually improve the organization's effectiveness and efficiency through the processes used and maintained aligned with the business need.
<b>Process Outcomes</b>	As a result of successful implementation of the Process Improvement process: <ol style="list-style-type: none"> <li>1) commitment is established to provide resources to sustain improvement actions;</li> <li>2) issues arising from the organization's internal/external environment are identified as improvement opportunities and justified as reasons for change;</li> <li>3) analysis of the current status of the existing process is performed, focusing on those processes from which improvement stimuli arise;</li> <li>4) improvement goals are identified and prioritized, and consequent changes to the process are defined and implemented;</li> <li>5) the effects of process implementation are monitored and confirmed against the defined improvement goals;</li> <li>6) knowledge gained from the improvements is communicated within the organization; and</li> <li>7) the improvements made are evaluated and consideration given for using the solution elsewhere within the organisation.</li> </ol> <p>NOTE 1: Information sources providing input for change may include: process assessment results, audits, customer's satisfaction reports, organizational effectiveness / efficiency, cost of quality.</p> <p>NOTE 2: The analysis may include process assessment.</p>

<b>Base Practices</b>	<p><b>PIM.3.BP1: Establish commitment.</b>                  Commitment is established to provide resources to sustain improvement actions. [Outcomes: 1]</p> <p><b>PIM.3.BP2: Identify issues.</b>                  Issues arising from the organization's internal / external environment are identified as improvement opportunities and with justified reasons for change. [Outcomes: 2]</p> <p><b>PIM.3.BP3: Establish process improvement objectives.</b>                  Analysis of the current status of the existing processes is performed, focusing on those processes from which improvement stimuli arise and/or process based risk is reduced, resulting in improvement objectives for the process being established. [Outcomes: 3]</p> <p><b>PIM.3.BP4: Prioritise improvements.</b>                  The improvement objectives are prioritized. [Outcomes: 4]</p> <p><b>PIM.3.BP5: Plan process changes.</b>                  Consequent changes to the process are defined and planned. [Outcomes: 4]</p> <p><b>PIM.3.BP6: Implement process changes.</b>                  The improvements to the process are implemented. [Outcomes: 4]</p> <p><b>PIM.3.BP7: Confirm process improvement.</b>                  The effects of process implementation are monitored, measured and confirmed against the defined improvement goals. [Outcomes: 5]</p> <p><b>PIM.3.BP8: Communicate results of improvement.</b>                  Knowledge gained from the improvements is communicated outside of the improvement project across relevant parts of the organization. [Outcomes: 6]</p> <p><b>PIM.3.BP9: Evaluate the results of the improvement project.</b>                  Evaluate the results of the improvement project to see if the solution can be used elsewhere in the organisation. [Outcomes: 7]</p>
<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP03-03 Benchmarking data [Outcomes: 2, 3, 4]                  WP03-04 Customer satisfaction data [Outcomes: 2, 3, 4]                  WP03-06 Process performance data [Outcomes: 2, 3, 4, 5, 7]                  WP05-00 Goals [Outcomes: 4, 5]                  WP08-00 Plan [Outcomes: 2, 3, 4, 5]                  WP10-00 Process description [Outcomes: 3, 5]                  WP13-04 Communication record [Outcomes: 7]                  WP15-05 Evaluation report [Outcomes: 2, 3]                  WP15-13 Assessment / audit report [Outcomes: 2, 3, 4, 5, 7]                  WP15-16 Improvement opportunity [Outcomes: 4, 6, 7]                  WP16-06 Process repository [Outcomes: 3]                  WP50-10 Software reuse file [Outcomes: 2, 3]</p>	<p><b>Output Work Products</b></p> <p>WP02-01 Commitment / agreement [Outcomes: 1]                  WP05-00 Goals [Outcomes: 4]                  WP07-04 Process measure [Outcomes: 6]                  WP08-00 Plan [Outcomes: 2, 4, 7]                  WP08-29 Improvement plan [Outcomes: 4]                  WP10-00 Process description [Outcomes: 4]                  WP13-04 Communication record [Outcomes: 6]                  WP15-05 Evaluation report [Outcomes: 2, 3, 4, 7]                  WP15-13 Assessment / audit report [Outcomes: 3]                  WP15-16 Improvement opportunity [Outcomes: 2, 3, 4, 7]                  WP16-06 Process repository [Outcomes: 4]                  WP50-10 Software reuse file [Outcomes: 2, 3, 4, 7]</p>



## 4.1.2.8 Resource and infrastructure process group (RIN)

### 4.1.2.8.1 RIN.1 Human Resource Management

<b>Process ID</b>	RIN.1
<b>Process Name</b>	Human Resource Management
<b>Process Purpose</b>	The purpose of the Human Resource Management process is to provide the organization and projects with individuals who possess skills and knowledge to perform their roles effectively and to work together as a cohesive group.
<b>Process Outcomes</b>	As a result of successful implementation of the Human Resource Management process: <ol style="list-style-type: none"> <li>1) individuals with the required skills and competencies are identified and recruited;</li> <li>2) effective interaction between individuals and groups are supported;</li> <li>3) the work force have the skills to share information and co-ordinate their activities efficiently; and</li> <li>4) objective criteria are defined against which group and individual performance is monitored to provide performance feedback and to enhance performance.</li> </ol>
<b>Base Practices</b>	<p><b>RIN.1.BP1: Identify needed skills and competencies.</b>                  Identify and evaluate skills and competencies needed by the organization to achieve its goals. [Outcomes: 1]</p> <p><b>RIN.1.BP2: Define evaluation criteria.</b>                  Define objective criteria that can be used to evaluate candidates and assess staff performance. [Outcomes: 1, 4]</p> <p><b>RIN.1.BP3: Recruit qualified staff.</b>                  Establish a systematic program for recruitment of staff qualified to meet the needs of the organization. [Outcomes: 1]</p> <p><b>RIN.1.BP4: Develop staff skills and competencies.</b>                  Define and provide opportunities for development of the skills and competencies of staff. [Outcomes: 1, 3]</p> <p><b>RIN.1.BP5: Define project team organization.</b>                  Define the structure and operating rules under which project teams operate. [Outcomes: 2]</p> <p><b>RIN.1.BP6: Empower project teams.</b>                  Empower teams to perform their job, by ensuring that they have:</p> <ul style="list-style-type: none"> <li>• an understanding of their job;</li> <li>• a shared vision or sense of common interest;</li> <li>• appropriate mechanisms or facilities for communication; and</li> <li>• support from management for what they are trying to accomplish. [Outcomes: 2]</li> </ul> <p><b>RIN.1.BP7: Maintain project team interactions.</b>                  Obtain and maintain agreement on the management of interactions between teams. [Outcomes: 2]</p> <p><b>RIN.1.BP8: Evaluate staff performance.</b>                  Evaluate the performance of staff, either in respect of their contributions to the goals of the organization as a whole. Ensure that feedback is discussed with the staff. [Outcomes:</p>



	<p>1, 4]</p> <p><b>RIN.1.BP9: Provide feedback on performance.</b>                  Ensure that feedback is provided to staff on the results of any performance evaluations performed. [Outcomes: 4]</p> <p><b>RIN.1.BP10: Maintain staff records.</b>                  Maintain adequate records of staff, including not only personnel details, but also information on skills, training completed, and performance evaluations. [Outcomes: 4]</p>
<p><b>Work Products</b></p>	
<p><b>Input Work Products</b></p> <p>WP07-03 Personnel performance measure [Outcomes: 4]                  WP08-08 Human resource management plan [Outcomes: 2]                  WP09-01 Personnel policy [Outcomes: 1]                  WP13-12 Personnel record [Outcomes: 3]                  WP13-23 Training records [Outcomes: 3]                  WP15-15 Human resource needs analysis [Outcomes: 1]</p>	<p><b>Output Work Products</b></p> <p>WP02-01 Commitment / agreement [Outcomes: 1]                  WP07-03 Personnel performance measure [Outcomes: 3, 4]                  WP08-08 Human resource management plan [Outcomes: 1]                  WP08-24 Training plan [Outcomes: 3]                  WP13-04 Communication record [Outcomes: 2]                  WP13-11 Personnel performance Review records [Outcomes: 3, 4]                  WP13-12 Personnel record [Outcomes: 1]                  WP13-23 Training records [Outcomes: 3]                  WP15-15 Human resource needs analysis [Outcomes: 1]                  WP15-17 Personnel performance evaluation [Outcomes: 4]                  WP18-05 Personnel performance criteria [Outcomes: 4]                  WP50-11 <i>Software development plan</i> [Outcomes: 3]</p>



4.1.2.8.2 RIN.2 Training

<b>Process ID</b>	RIN.2
<b>Process Name</b>	Training
<b>Process Purpose</b>	The purpose of the Training process is to provide the organization and project with individuals who possess the needed skills and knowledge to perform their roles effectively.
<b>Process Outcomes</b>	As a result of successful implementation of Training process: 1) training is developed or acquired to address the organization and project training needs; and 2) training is conducted to ensure that all individuals have the skills required to perform their assignments, using mechanisms such as training strategies and materials.
<b>Base Practices</b>	<p><b>RIN.2.BP1: Develop a strategy for training.</b>                      Develop a strategy for training including how the training needs will be identified, how the needed training will be developed or acquired, and how the training will be performed. [Outcomes: 1]</p> <p><b>RIN.2.BP2: Identify needs for training.</b>                      Identify and evaluate skills and competencies to be provided or improved through training. [Outcomes: 1]</p> <p><b>RIN.2.BP3: Develop or acquire training.</b>                      Develop or acquire training that addresses the common training needs. [Outcomes: 1]</p> <p><b>RIN.2.BP4: Prepare for training execution.</b>                      Identify and prepare the execution of training sessions, including the availability of the training materials and the availability of personnel to be trained. [Outcomes: 1]</p> <p><b>RIN.2.BP5: Train personnel.</b>                      Train personnel to have the knowledge and skills needed to perform their roles. [Outcomes: 2]</p> <p><b>RIN.2.BP6: Maintain staff training records.</b>                      Maintain adequate records of the training completed by the staff. [Outcomes: 2]</p> <p><b>RIN.2.BP7: Evaluate training effectiveness.</b>                      Identify and evaluate added value provided by each training session, including the evaluation of training material. [Outcomes: 2]</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP06-04 Training material [Outcomes: 2] WP08-08 Human resource management plan [Outcomes: 1] WP08-24 Training plan [Outcomes: 2] WP09-01 Personnel policy [Outcomes: 1] WP15-15 Human resource needs analysis [Outcomes: 1] WP19-08 Training strategy [Outcomes: 2] WP50-11 Software development plan [Outcomes: 2]	WP06-04 Training material [Outcomes: 1] WP08-02 Acquisition plan [Outcomes: 1] WP08-24 Training plan [Outcomes: 1] WP13-23 Training records [Outcomes: 2] WP15-22 Training evaluation report [Outcomes: 2] WP19-08 Training strategy [Outcomes: 1] WP50-11 Software development plan [Outcomes: 1]



4.1.2.8.3 RIN.3 Knowledge Management

<b>Process ID</b>	RIN.3
<b>Process Name</b>	Knowledge Management
<b>Process Purpose</b>	The purpose of the Knowledge Management process is to ensure that individual knowledge, information and skills are collected, shared, reused and improved throughout the organization.
<b>Process Outcomes</b>	As a result of successful implementation of Knowledge Management process: 1) infrastructure is established and maintained for sharing common and domain information across the organization; 2) knowledge is readily available and shared throughout the organization; and 3) the organization will select an appropriate knowledge management strategy.
<b>Base Practices</b>	<p><b>RIN.3.BP1: Establish a knowledge management system.</b>                      Establish and maintain a knowledge management infrastructure and mechanism to support the activities to identify, classify, exchange and use knowledge assets. [Outcomes: 1, 2]</p> <p><b>RIN.3.BP2: Create the network of knowledge contributors.</b>                      Establish the network of experts and their mutual interaction. [Outcomes: 2, 3]</p> <p><b>RIN.3.BP3: Develop knowledge management strategy.</b>                      Define an appropriate knowledge management strategy based on organizational, individual, domain and project needs. [Outcomes: 4]</p> <p><b>RIN.3.BP4: Capture knowledge.</b>                      Identify and record each knowledge item according to the classification schema and asset criteria. [Outcomes: 2, 3]</p> <p><b>RIN.3.BP5: Disseminate knowledge assets.</b>                      Shared knowledge assets with experts, users and projects. [Outcome: 3]</p> <p><b>RIN.3.BP6: Improve knowledge assets.</b>                      Validate and enrich knowledge assets to ensure their appropriateness and value to the organization. [Outcomes: 2, 3]</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
WP05-02 Business goals [Outcomes: 3] WP13-04 Communication record [Outcomes: 2] WP16-04 Knowledge repository [Outcomes: 1, 2]	WP01-04 Knowledge item [Outcomes: 2] WP03-02 Asset use data [Outcomes: 2] WP13-04 Communication record [Outcomes: 2] WP16-04 Knowledge repository [Outcomes: 1] WP19-03 Knowledge management strategy [Outcomes: 3] WP50-10 Software reuse file [Outcomes: 2]

4.1.2.8.4 RIN.4 Infrastructure

<b>Process ID</b>	RIN.4
<b>Process Name</b>	Infrastructure
<b>Process Purpose</b>	The purpose of the Infrastructure process is to maintain a stable and reliable infrastructure that is needed to support the performance of any other process.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Infrastructure process:</p> <ol style="list-style-type: none"> <li>1) the requirements for infrastructure to support processes in the organizational unit are defined;</li> <li>2) the infrastructure elements are identified and specified;</li> <li>3) infrastructure elements are acquired;</li> <li>4) the elements of the infrastructure are implemented; and</li> <li>5) a stable and reliable infrastructure is maintained <i>and verified</i>.</li> </ol> <p>NOTE: The infrastructure may include hardware, software, methods, tools, techniques, standards and facilities for development, operational and maintenance.</p>
<b>Base Practices</b>	<p><b>RIN.4.BP1: Identify infrastructure process scope.</b>                  Identify the procedures, standards, tools and techniques that the infrastructure process should support. [Outcomes: 1]</p> <p>NOTE 1: The infrastructure may include hardware, software, methods, tools, techniques, standards, and facilities for development, operation, or maintenance.</p> <p><b>RIN.4.BP2: Define the infrastructure process requirements.</b>                  Define the infrastructure process requirements to support the performance of appropriate processes. [Outcomes: 1, 2]</p> <p>NOTE 2: Infrastructure process requirements may include:</p> <ul style="list-style-type: none"> <li>• Security</li> <li>• Throughput and data sharing requirements</li> <li>• Backup and recovery</li> <li>• Remote access facility</li> <li>• Physical workspace and equipment</li> <li>• User support requirements</li> <li>• Maintenance requirements</li> </ul> <p>NOTE A: <i>ECSS-Q-80 requires that the justification according to criteria leading to the choice of the development environment are described or referenced in the software development plan.</i></p> <p>NOTE B: <i>ECSS-Q-80 requires that if tools are used for automatic code generation, the following aspects are taken into account:</i></p> <ul style="list-style-type: none"> <li>• Evolution of tool with respect to other tools</li> <li>• Customization of tool to comply with project standards</li> <li>• Portability requirements of generated code</li> <li>• Collection of design and coding metrics</li> <li>• Verification of software components containing generated code</li> <li>• Configuration control including parameters customization</li> </ul>

	<p><b>RIN.4.BP3: Acquire infrastructure process.</b>                  Acquire an infrastructure process, which satisfies the requirements. [Outcomes: 3]</p> <p><b>RIN.4.BP4: Establish the infrastructure process.</b>                  Assemble and integrate the elements of the infrastructure process, providing an effective environment that supports implementation of the organisation's processes. [Outcomes: 4]</p> <p><b>RIN.4.BP5: Provide support for the infrastructure process.</b>                  Provide support for those who utilize the infrastructure process. [Outcomes: 4]</p> <p><b>RIN.4.BP6: Maintain the infrastructure process.</b>                  Perform maintenance on the infrastructure process for the purposes of correcting defects and improving performance. [Outcomes: 5]</p> <p><b>RIN.4.BP7: Verify infrastructure.</b>  <i>Verify the availability of the software development environment to developers and other users before the start of each development phase. Verify its correct use of methods and tools and report it for milestones. [Outcomes: 5]</i></p>
<b>Work Products</b>	
<p><b>Input Work Products</b></p> <p>WP08-02 Acquisition plan [Outcomes: 3]                  WP08-05 Development environment plan [Outcomes: 3]                  WP08-11 Logistics maintenance plan [Outcomes: 3]                  WP09-04 Supplier selection policy [Outcomes: 3]                  WP10-00 Process description [Outcomes: 1, 5]                  WP13-06 Delivery record [Outcomes: 4, 5]                  WP14-03 Hardware assets register [Outcomes: 4, 5]                  WP14-07 Software assets register [Outcomes: 4, 5]                  WP14-08 Tracking system [Outcomes: 4, 5]                  WP17-07 Infrastructure requirements [Outcomes: 2]                  WP50-11 Software development plan [Outcomes: 3]</p>	<p><b>Output Work Products</b></p> <p>WP08-05 Development environment plan [Outcomes: 2]                  WP08-11 Logistics maintenance plan [Outcomes: 2]                  WP13-03 Back-up / recovery record [Outcomes: 5]                  WP13-06 Delivery record [Outcomes: 3, 4]                  WP14-02 Corrective action register [Outcomes: 5]                  WP14-03 Hardware assets register [Outcomes: 3, 4, 5]                  WP14-07 Software assets register [Outcomes: 3, 4, 5]                  WP14-08 Tracking system [Outcomes: 3, 4, 5]                  WP17-07 Infrastructure requirements [Outcomes: 1]                  WP50-11 Software development plan [Outcomes: 2]</p>

#### 4.1.2.9 Reuse process group (REU)

##### 4.1.2.9.1 REU.1 Asset Management

<b>Process ID</b>	REU.1
<b>Process Name</b>	Asset Management
<b>Process Purpose</b>	The purpose of the Asset Management process is to manage the life of reusable assets from conception to retirement.
<b>Process Outcomes</b>	As a result of successful implementation of the Asset Management process: <ol style="list-style-type: none"> <li>1) an asset management strategy is documented;</li> <li>2) an asset classification scheme is established;</li> <li>3) a criteria for asset acceptance, certification and retirement are defined;</li> <li>4) an asset storage and retrieval mechanism is operated;</li> <li>5) the use of assets are recorded;</li> </ol>

	<p>6) changes to the assets are controlled; and</p> <p>7) users of assets are notified of problems detected, modifications made, new versions created and deletion of assets from the storage and retrieval mechanism.</p>
<b>Base Practices</b>	<p><b>REU.1.BP1: Define and document an asset management strategy.</b>                  Define and document an asset management strategy for reuse. [Outcomes: 1]</p> <p><b>REU.1.BP2: Establish classification scheme for assets.</b>                  Provide classification scheme for assets to support their reuse. [Outcomes: 2]</p> <p><b>REU.1.BP3: Define criteria for assets.</b>                  Define acceptance, certification and retirement criteria for assets. [Outcomes: 3]</p> <p><b>REU.1.BP4: Establish the asset storage and retrieval mechanisms.</b>                  Establish the asset storage and retrieval mechanisms, and make them available to users for storing and retrieving and providing information on reusable assets. [Outcomes: 4]</p> <p><b>REU.1.BP5: Identify reusable assets.</b>                  Identify assets to be made available for reuse. [Outcomes: 2]</p> <p><b>REU.1.BP6: Accept reusable assets.</b>                  Certify, classify, record and baseline assets that are submitted for storage and make them available for reuse. [Outcomes: 3, 4]</p> <p><b>REU.1.BP7: Operate asset storage.</b>                  Provide and control operation of asset storage, retrieval and distribution mechanisms. [Outcomes: 4]</p> <p><b>REU.1.BP8: Record use of assets.</b>                  Keep track of each reuse of assets and record information about actual reuse of assets. [Outcomes: 5]</p> <p><b>REU.1.BP9: Notify Reusers of asset status.</b>                  Notify all asset Reusers of any problems detected in the assets, modifications, new versions, and deletions from the asset storage and retrieval mechanism. [Outcomes: 7]</p> <p><b>REU.1.BP10: Retire assets.</b>                  Retire assets from the asset storage and retrieval mechanism following the defined asset management strategy. [Outcomes: 3, 6, 7]</p>
<b>Work Products</b>	
<b>Input Work Products</b>	<b>Output Work Products</b>
<p>WP05-02 Business goals [Outcomes: 1]                  WP13-07 Problem report [Outcomes: 7]                  WP13-21 Change control record [Outcomes: 6, 7]                  WP14-03 Hardware assets register [Outcomes: 1, 5, 7]                  WP14-07 Software assets register [Outcomes: 1, 5, 7]                  WP15-03 Configuration status report [Outcomes: 7]                  WP16-02 Assets repository [Outcomes: 4, 6]                  WP19-01 Asset management strategy [Outcomes: 2, 3]</p>	<p>WP01-02 Reusable object [Outcomes: 6, 7]                  WP03-02 Asset use data [Outcomes: 5]                  WP13-04 Communication record [Outcomes: 7]                  WP13-21 Change control record [Outcomes: 6]                  WP14-03 Hardware assets register [Outcomes: 5, 7]                  WP14-07 Software assets register [Outcomes: 5, 7]                  WP15-03 Configuration status report [Outcomes: 6]                  WP16-02 Assets repository [Outcomes: 2, 4]                  WP16-05 Reuse library [Outcomes: 4]                  WP17-01 Asset specification [Outcomes: 2, 3]                  WP19-01 Asset management strategy [Outcomes: 1]                  WP50-10 <i>Software reuse file</i> [Outcomes: 5]</p>



4.1.2.9.2 REU.2 Reuse Program Management

<b>Process ID</b>	REU.2
<b>Process Name</b>	Reuse Program Management
<b>Process Purpose</b>	The purpose of the Reuse Program Management process is to plan, establish, manage, control and monitor an organization's reuse program and to systematically exploit reuse opportunities.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Reuse Program Management process:</p> <ol style="list-style-type: none"> <li>1) the organization's reuse strategy, including its purpose, scope, goals and objectives, is defined;</li> <li>2) the domains for potential reuse opportunities are identified;</li> <li>3) the organization's systematic reuse capability is assessed;</li> <li>4) the reuse potential of each domain is assessed;</li> <li>5) reuse proposals are evaluated to ensure the reuse product is suitable for the proposed application;</li> <li>6) the reuse strategy is implemented in the organization;</li> <li>7) feedback, communication, and notification mechanisms are established, that operate between affected parties; and</li> <li>8) the reuse program is monitored and evaluated.</li> </ol> <p>NOTE: The affected parties may include reuse program administrators, asset managers, domain engineers, developers, operators, and maintainers.</p>
<b>Base Practices</b>	<p><b>REU.2.BP1: Define organisational reuse strategy.</b>                  Define the reuse program and necessary supporting infrastructure for the organization. [Outcomes: 1]</p> <p><b>REU.2.BP2: Identify domains for potential reuse.</b>                  Identify set(s) of systems and their components in terms of common properties that can be organized into a collection of reusable assets that may be used to construct systems in the domain. [Outcomes: 2]</p> <p><b>REU.2.BP3: Assess reuse capability.</b>                  Gain an understanding of the reuse readiness and capability of the organisation, to provide a baseline and success criteria for reuse program management. [Outcomes: 3]</p> <p><b>REU.2.BP4: Assess domains for potential reuse.</b>                  Assess each domain to identify potential use and applications of reusable components and products. [Outcomes: 4]</p> <p><b>REU.2.BP5: Evaluate reuse proposals.</b>                  Evaluate suitability of the provided reusable components and product(s) to proposed use. [Outcomes: 5]</p> <p><b>REU.2.BP6: Implement the reuse program.</b>                  Perform the defined activities identified in the reuse program. [Outcomes: 6]</p> <p><b>REU.2.BP7: Collect and manage learning.</b>                  Collect learning and information from project and related processes, analyze them and store them into the process repository. [Outcomes: 7]</p>

	<p><b>REU.2.BP8: Get feedback from reuse.</b>                  Establish feedback, assessment, communication and notification mechanism to control the progress of the reuse program. [Outcomes: 7, 8]</p> <p><b>REU.2.BP9: Monitor reuse.</b>                  Monitor the implementation of the reuse program periodically and evaluate its suitability to actual needs. [Outcomes: 6, 8]</p>	
<b>Work Products</b>		
<p><b>Input Work Products</b></p> <p>WP03-02 Asset use data [Outcomes: 4]                  WP04-02 Domain architecture [Outcomes: 2, 4]                  WP04-03 Domain model [Outcomes: 2]                  WP05-02 Business goals [Outcomes: 1]                  WP08-03 Process assessment plan [Outcomes: 3]                  WP08-17 Reuse plan [Outcomes: 5]                  WP09-03 Reuse policy [Outcomes: 6]                  WP12-03 Reuse proposal [Outcomes: 5]                  WP14-03 Hardware assets register [Outcomes: 1]                  WP14-07 Software assets register [Outcomes: 1]                  WP16-05 Reuse library [Outcomes: 3, 4]                  WP19-05 Reuse strategy [Outcomes: 2, 6, 7, 8]                  WP50-10 Software reuse file [Outcomes: 4, 5]</p>		<p><b>Output Work Products</b></p> <p>WP04-02 Domain architecture [Outcomes: 2]                  WP04-03 Domain model [Outcomes: 2]                  WP08-17 Reuse plan [Outcomes: 5, 6]                  WP09-03 Reuse policy [Outcomes: 1]                  WP12-03 Reuse proposal [Outcomes: 4]                  WP13-04 Communication record [Outcomes: 7]                  WP15-07 Reuse evaluation report [Outcomes: 5, 6, 8]                  WP15-13 Assessment / audit report [Outcomes: 3, 4]                  WP19-05 Reuse strategy [Outcomes: 1]                  WP50-10 Software reuse file [Outcomes: 4, 5, 6, 8]</p>

#### 4.1.2.9.3 REU.3 Domain Engineering

<b>Process ID</b>	REU.3
<b>Process Name</b>	Domain Engineering
<b>Process Purpose</b>	The purpose of the Domain Engineering process is to develop and maintain domain models, domain architectures and assets for the domain.
<b>Process Outcomes</b>	<p>As a result of successful implementation of the Domain Engineering process:</p> <ol style="list-style-type: none"> <li>1) the representation forms for the domain models and the domain architectures are selected;</li> <li>2) the boundaries of the domain and its relationships to other domains are established;</li> <li>3) a domain model that captures the essential common and different features, capabilities, concepts, and functions in the domain are developed;</li> <li>4) a domain architecture describing the family of systems within the domain is developed;</li> <li>5) assets belonging to the domain are specified;</li> <li>6) assets belonging to the domain are acquired or developed and maintained throughout their life cycles; and</li> <li>7) the domain models and architecture are maintained throughout their lifecycles.</li> </ol>
<b>Base Practices</b>	<p><b>REU.3.BP1: Define criteria for domain definition.</b>                  Select the domain representation forms, domain classifications and other needed description templates to be used for the domain models and domain architectures, in accordance with the organization's reuse standards. [Outcomes: 1]</p>



	<p><b>REU.3.BP2: Define domain models.</b>                  Develop domain descriptions according to the representation forms. [Outcomes: 2, 3, 4]</p> <p><b>REU.3.BP3: Define domain architectures.</b>                  Develop domain architectures and technical interfaces with other domains [Outcomes: 2, 4]</p> <p>NOTE 1: This base practice can be performed by executing the System Requirements Analysis process (ENG.2) and/or the Software Requirements Analysis process (ENG.4).</p> <p><b>REU.3.BP4: Develop asset specifications.</b>                  Develop asset specifications. [Outcomes: 5]</p> <p>NOTE 2: This Base Practice can be performed by executing the Software Requirements Analysis process (ENG.4) and/or the Software Design process (ENG.5).</p> <p><b>REU.3.BP5: Provide domain assets.</b>                  Submit specified domain assets for use in software products. [Outcomes: 6]</p> <p>NOTE 3: This Base Practice can be performed by executing Acquisition processes (ACQ.1...ACQ.5) and/or in Technical development processes (ENG.5...ENG.8).</p> <p><b>REU.3.BP6: Maintain domain assets.</b>                  Analyse and monitor change requests to maintain domain assets and perform required technical implementation activities. [Outcomes: 6]</p> <p>NOTE 4: This Base Practice can be performed by executing the Software and System Maintenance process (ENG.12) and/or the Problem Resolution Management process (SUP.9)</p>
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**Work Products**

<b>Input Work Products</b>	<b>Output Work Products</b>
WP01-02 Reusable object [Outcomes: 6]	WP01-02 Reusable object [Outcomes: 6]
WP04-02 Domain architecture [Outcomes: 1, 2, 7]	WP04-02 Domain architecture [Outcomes: 1, 2, 4, 7]
WP04-03 Domain model [Outcomes: 7]	WP04-03 Domain model [Outcomes: 3, 7]
WP08-02 Acquisition plan [Outcomes: 6]	WP13-21 Change control record [Outcomes: 6, 7]
WP08-12 Project plan [Outcomes: 6]	WP17-01 Asset specification [Outcomes: 5]
WP13-16 Change request [Outcomes: 6, 7]	WP17-06 Domain interface specification [Outcomes: 2]
WP14-03 Hardware assets register [Outcomes: 5]	WP18-04 Domain representation standard [Outcomes: 1]
WP14-07 Software assets register [Outcomes: 5]	
WP17-01 Asset specification [Outcomes: 6]	
WP17-06 Domain interface specification [Outcomes: 2, 6, 7]	
WP18-04 Domain representation standard [Outcomes: 1]	
WP50-06 Software test plan [Outcomes: 6]	
WP50-11 Software development plan [Outcomes: 6]	

## 4.2 Work product characteristics

Most of the work products in the process definitions in the previous subclause originate in ISO/IEC 15504 Part 5. Their ISO/IEC characteristics are not repeated here and can be found annex B of ISO/IEC 15504 Part 5.

New work products taken from the ECSS have been added, their numbering starting in the previous PAM by 50- and 60-.

Annexe B provides a link between the work products of the PAM and the expected outputs of the ECSS.

## 4.3 Capability dimension

The capability dimension of the PAM provided in this document is based on the 5 same levels than the one defined in ISO/IEC 15504 Part 5 (clause 6 of that document) and therefore it is not repeated here.

Each of the 5 levels has 1 or 2 process attributes for which a set of Generic Practices, Generic Resources and Generic Work Products are defined.

## 4.4 Related processes for process attributes

Certain processes support achievement of the capabilities addressed by a process attribute. Table 2 lists those processes and indicates the relation between those processes and each PA.

**Table 2 Related processes for process attributes**

Related process	Process Attribute							
	2.1	2.2	3.1	3.2	4.1	4.2	5.1	5.2
SUP.1 Quality Assurance	◆	◆						
SUP.2 Verification		◆						
SUP.4 Joint Review	◆	◆						
SUP.5 Audit			◆	◆				
SUP.7 Documentation		◆						
SUP.8 Configuration Management		◆						
SUP.9 Problem Resolution Management	◆	◆						
SUP.10 Change Request Management		◆				◆		
MAN.1 Organizational Alignment					◆	◆	◆	◆
MAN.2 Organization Management			◆	◆				
MAN.3 Project Management	◆			◆				
MAN.4 Quality Management			◆	◆	◆			
MAN.5 Risk Management					◆			
MAN.6 Measurement				◆	◆	◆	◆	
PIM.1 Process Establishment			◆					
PIM.2 Process Assessment				◆	◆	◆	◆	
PIM.3 Process Improvement							◆	◆
RIN.1 Human Resource Management	◆		◆	◆				
RIN.2 Training				◆				
RIN.3 Knowledge Management			◆				◆	
RIN.4 Infrastructure			◆	◆		◆		
REU.1 Asset Management			◆					◆
REU.3 Domain Engineering			◆					◆

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## Annex A

# Conformance with ISO/IEC 15504

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Clause 4.1 of this document sets out a Process Assessment Model that meets the requirements for conformance defined in ISO/IEC 15504 Part 2. The Process Assessment Model can be used in the performance of assessments that meet the requirements of ISO/IEC 15504.

This clause serves as the statement of conformance of the Process Assessment Model in this document to the requirements defined in ISO/IEC 15504 Part 2. For ease of reference, the requirements from clause 6.3 of ISO/IEC 15504 Part 2 are embedded verbatim (and presented in *italics*) in the text of this clause. They should not be considered as normative elements of this standard.

*In order to assure that assessment results are translatable into an ISO/IEC 15504 process profile in a repeatable and reliable manner, Process Assessment Models shall adhere to certain requirements. A Process Assessment Model shall contain a definition of its purpose, scope and elements; its mapping to the Measurement Framework and specified Process Reference Model(s); and a mechanism for consistent expression of results.*

*A Process Assessment Model is considered suitable for the purpose of assessing process capability by conforming to 6.3.2, 6.3.3, and 6.3.4.*

*[ISO/IEC 15504 Part 2, 6.3.1]*

Most of the processes of the present PAM have been taken from the ISO/IEC 15504. The additional processes of the PAM have adopted the same structure for their definition. The capability dimension of the ISO/IEC 15504 has been fully adopted.

This Process Assessment Model is then able to support assessment of software process capability in accordance with the requirements of ISO/IEC 15504 Part 2.

## Annex B

# Links between WP and ECSS expected outputs

The work products identified in the present S4S assessment model are mainly based on those from ISO/IEC 15504-5 model. For some work products, there is no direct correspondence to ECSS expected outcomes. Nevertheless it has been chosen to keep these work products in the S4S PAM, these remaining appropriate for software development although not requested as such in the ECSS. The following matrix provides links between work products and ECSS expected outcomes as a rough guide but does not claim to be exhaustive. The work products (identified 50-xx and 60-xx) related to best practices and processes added to the 15504-5 PAM because deemed important for space domain software development refer to the ECSS associated expected outcomes.

ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
01-00 Configuration item	M-ST-40C	Annex K Configuration Item Selection
	Q-ST-80C	Software Configuration Management Plan
01-01 Product configuration	E-ST-40C	Software configuration file
	E-ST-40C	Software Release Document
01-02 Reusable object	-	<i>Configuration management - Repository for Reusable Components</i>
01-03 Configuration item	-	<i>Design, traceability, configuration methods and tools</i>
01-04 Knowledge item	-	Knowledge management not detailed in space software engineering and product assurance ECSS
02-00 Contract	E-ST-40C	<i>Beyond the contract: Approved requirements baseline</i>
02-01 Commitment / agreement	M-ST-10C	Conducting tender comparisons and business agreement negotiations
03-01 Assessment data	Q-ST-80C	Software product assurance plan ( <i>process metrics</i> )
	Q-ST-80C	Internal metrics report
	Q-ST-80C	Software product assurance reports
03-02 Asset use data	-	Knowledge management not detailed in space software engineering and product assurance ECSS
03-03 Benchmarking data	E-ST-40C	Software logical model
03-04 Customer satisfaction data	Q-ST-80C	Software product assurance plan ( <i>quality objectives and metrication</i> )
03-05 Personnel performance data	Q-ST-80C	Software product assurance plan ( <i>quality objectives and metrication</i> )



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
03-06 Process performance data	Q-ST-80C	Software product assurance plan ( <i>process metrics</i> )
03-07 Test data	E-ST-40C	Software [unit/integration] test plan
	E-ST-40C	Software validation specification
04-01 Database design	E-ST-40C	System database content and allowed operational range
	E-ST-40C	Data definition and database requirements
	E-ST-40C	Software architectural design with configuration data
04-02 Domain architecture	-	Domain engineering not detailed in space software engineering and product assurance ECSS
04-03 Domain model	-	Domain engineering not detailed in space software engineering and product assurance ECSS
04-04 High level software design	E-ST-40C	Computational Model
	E-ST-40C	Software Architectural Design
	E-ST-40C	Software Architectural Design Method
	E-ST-40C	Computational model
	E-ST-40C	Software Behaviour
	E-ST-40C	Preliminary internal interface design
	Q-ST-80C	Justification Of Design Choices
04-05 Low level software design	E-ST-40C	Software Behavioural Design Model
	E-ST-40C	Software Behavioural Design Model Techniques
	E-ST-40C	Software Components Design Documents
	E-ST-40C	Software Static Design Model
	E-ST-40C	Software Dynamic Design Model
	E-ST-40C	Real-time software dynamic design model
	E-ST-40C	Internal interface design
	Q-ST-80C	Justification Of Design Choices
04-06 System architecture design	E-ST-10C	<i>System engineering process - Hw/Sw balance allocation</i>
04-07 Organizational structure	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
05-00 Goals	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
05-01 Assessment goals	Q-ST-80C	Audit plan and schedule
05-02 Business goals	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
05-03 Core values statement	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
05-04 Mission statement	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
05-05 Vision statement	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
06-01 Customer manual	E-ST-40C	Software User Manual
06-02 Handling and storage guide	Q-ST-80C	Software configuration management plan
06-03 Installation guide	E-ST-40C	Installation procedures
06-04 Training material	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
06-05 Product operation guide	E-ST-40C	Software user manual
07-01 Customer satisfaction survey	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
07-02 Field measure	Q-ST-80C	Software product assurance plan ( <i>quality objectives and metrication</i> )
07-03 Personnel performance measure	Q-ST-80C	Software product assurance plan ( <i>quality objectives and metrication</i> )
07-04 Process measure	Q-ST-80C	Software product assurance plan ( <i>process metrics</i> )
	Q-ST-80C	Internal Metrics Report
	Q-ST-80C	Software Product Assurance Reports
07-05 Project measure	Q-ST-80C	Software product assurance plan ( <i>process metrics</i> )
	Q-ST-80C	Internal Metrics Report
	Q-ST-80C	Software Product Assurance Reports
07-06 Quality measures	Q-ST-80C	Software product assurance plan ( <i>quality objectives and metrication</i> )
07-07 Risk measure	M-ST-80C	Risk management plan
07-08 Service level measure	-	Operation monitoring is not detailed in space software engineering and product assurance ECSS
08-00 Plan	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
08-01 Acceptance test plan	E-ST-40C	Acceptance Test Plan
08-02 Acquisition plan	E-ST-40C	Acceptance Test Plan
08-03 Process assessment plan	Q-ST-80C	Software Process Assessment Record: Assessment Method
	Q-ST-80C	Software Process Assessment Record: Assessment Model
	Q-ST-80C	Software Process Assessment Record: Evidence Of Conformance Of The Process Assessment Model
	Q-ST-80C	Software Process Assessment Records: Overall Assessments And Improvement Programme Plan
08-04 Configuration management plan	M-ST-40C	Annex A Configuration Management Plan
	E-ST-40C	Changes To Baselines Procedures
	Q-ST-80C	Configuration Management For Reusable Components
	Q-ST-80C	Software Configuration Management Plan



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
08-05 Development environment plan	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
08-06 Project activity network	E-ST-40C	Software development plan
08-07 System integration test plan	E-ST-10C	AIT Plan - AIV Plan
08-08 Human resource management plan	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
08-09 Installation and maintenance plan	E-ST-40C	Installation Procedure
	E-ST-40C	Maintenance Plan
	Q-ST-80C	Maintenance Plan
	Q-ST-80C	Software Project Plans
08-10 Software integration test plan	E-ST-40C	Software Integration Strategy
	E-ST-40C	Software Integration Test Plan
	Q-ST-80C	Test And Validation Documentation
	Q-ST-80C	Validation And Testing Documentation
08-11 Logistics maintenance plan	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
08-12 Project plan	E-ST-40C	Development Strategy, Standards, Techniques, Development And Testing Environments
	E-ST-40C	Identification Of Interface Between Development And Maintenance
	E-ST-40C	Software Design Method
	E-ST-40C	Software Life Cycle Definition
	E-ST-40C	Software Technical Reviews Included In The Software Life Cycle Definition
	E-ST-40C	Technical Reviews Process
	Q-ST-80C	Software Configuration Management Plan
	Q-ST-80C	Software Development Plan
	Q-ST-80C	Software Product Assurance Plan
	Q-ST-80C	Software Project Plans (Test and Verification)
08-13 Quality plan	Q-ST-80C	Software Product Assurance Plan
08-14 Recovery plan	M-ST-80C	Risk register
08-15 Regression test plan	E-ST-40C	Software Validation Test Plan
	Q-ST-80C	Test Documentation
	Q-ST-80C	Software Product Assurance Plan
08-16 Release plan	E-ST-40C	Delivery content and media
08-17 Reuse plan	E-ST-40C	Software intended for reuse - evaluation of reuse potential
08-18 Review plan	E-ST-40C	Review Plan



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
08-19 Risk management plan	M-ST-80C	Annex A Risk Management Policy
	M-ST-80C	Risk Management Plan
08-20 Risk mitigation plan	M-ST-80C	Risk Management Plan
08-21 Software test plan	E-ST-40C	Software [unit/integration] test plan
	E-ST-40C	Software Validation test plan
08-22 System test plan	E-ST-10C	AIT Plan - AIV Plan
08-23 Validation test plan	E-ST-40C	Software Validation test plan
08-24 Training plan	Q-ST-80C	Training Plan
08-25 Unit test plan	E-ST-40C	Software Unit Test Plan
	Q-ST-80C	Test And Validation Documentation
	Q-ST-80C	Validation And Testing Documentation
08-26 Documentation plan	E-ST-40C	Software Configuration Management Plan
	E-ST-40C	Software Development Plan
	E-ST-40C	Software Project Plans
	Q-ST-80C	Procedure and Standards
08-27 Problem management plan	Q-ST-80C	Identification Of SW Experts In NRB
	Q-ST-80C	Software Problem Reporting Procedures
08-28 Change management plan	Q-ST-80C	Software Configuration Management Plan
08-29 Improvement plan	Q-ST-80C	Software Process Assessment Records: Improvement Plan
	Q-ST-80C	Software Process Assessment Records: Improvement Process
09-00 Policy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
09-01 Personnel policy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
09-02 Quality policy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
09-03 Reuse policy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
09-04 Supplier selection policy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
10-00 Process description	Q-ST-80C	Software Product Assurance Plan (compliance)
	E-ST-40C	Software Development Plan (compliance)
10-01 Life cycle model	E-ST-40C	Software Development Plan
	E-ST-40C	Software Life Cycle definition
	Q-ST-80C	Software Product Assurance Plan



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
10-02 Test procedure	E-ST-40C	Software [unit/integration] test plan
	E-ST-40C	Software Validation Specification
10-03 Customer support procedure	E-ST-40C	Migration plan
11-00 Product	E-ST-40C	Acceptance Test Report
11-01 Software product	P--001B	<i>Software product definition</i>
11-02 Software element	E-ST-40C	<i>Software component definition</i>
11-03 Product release information	M-ST-40C	Annex C CIDL
	M-ST-40C	Annex D ABDL
	Q-ST-80C	Software Release Document
11-04 Product release package	E-ST-40C	Software Product
	Q-ST-80C	Labels
11-05 Software unit	E-ST-40C	Software Component Design Document And Code
11-06 System	P--001B	<i>System definition</i>
11-07 Temporary solution	E-ST-40C	User's request record - work around solution
11-08 System element	P--001B	<i>Item definition</i>
12-01 Request for proposal	M-ST-10C	Invitation to Tender
12-02 Retirement request	E-ST-40C	Retirement Plan
	M-ST-10C	<i>End of Life review</i>
12-03 Reuse proposal	E-ST-40C	Justification of reuse with respect to requirements baseline
12-04 Supplier proposal response	M-ST-60C	Annex D Company Price Breakdown Forms
	M-ST-60C	Annex E Geographical Distribution Report
	M-ST-60C	Annex F Cost Estimating Plan
	M-ST-60C	Annex H Milestone Payment Plan
	M-ST-10C	Technical and Managerial Proposal
13-00 Record	P--001B	<i>Record definition</i>
13-01 Acceptance record	Q-ST-80C	Acceptance Test Report
	Q-ST-80C	Receiving Inspection Report
13-02 Incident record	E-ST-40C	Software Operation Support Plan - Operational Testing Specifications
13-03 Back-up / recovery record	-	
13-04 Communication record	-	Notification
	-	Documentation
13-05 Contract review record	M-ST-10C	<i>Business agreement</i>
13-06 Delivery record	E-ST-40C	<i>(Delivery according to)</i> Delivery content and media



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
13-07 Problem record	E-ST-40C	Problem And Nonconformance Report
	E-ST-40C	User's Requests Record - Actions
	E-ST-40C	User's Requests Record - User's Request And Subsequent Actions
	E-ST-40C	User's Requests Record - Work-Around Solutions
	Q-ST-80C	Nonconformance Reports And Software Problem Reports
13-08 Installation record	E-ST-40C	Installation Report
13-09 Meeting support record	E-ST-40C	Software Review Plan
13-10 Configuration management record	E-ST-40C	Baseline For Changes
	Q-ST-80C	Software Release Document
13-11 Personnel performance review record	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
13-12 Personnel record	Q-ST-80C	Records Of Training And Experience
13-13 Product release approval record	Q-ST-80C	Acceptance Test Report
13-14 Progress Status record	M-ST-10C	Progress Report
13-15 Proposal review record	M-ST-10C	<i>Tender comparison</i>
13-16 Change request	M-ST-40C	Annex G Change Request
	M-ST-40C	Annex H Change Proposal
	M-ST-40C	Annex I Request For Deviation
	M-ST-40C	Annex J Request For Waiver
	M-ST-60C	Annex O CCN
13-17 Customer request	M-ST-40C	Cf 13-16
13-18 Quality record	Q-ST-80C	Product Assurance File
13-19 Review record	E-ST-40C	Accepted Software Product
	E-ST-40C	Approved Design Definition File And Design Justification File
	E-ST-40C	Approved Detailed Design, Interface Design And Budget
	E-ST-40C	Approved Requirements Baseline
	E-ST-40C	Approved Technical Specification And Interface
	E-ST-40C	Approved Technical Specification And Interface, Architecture And Plans
	E-ST-40C	Confirmation Of Readiness Of Activities
	E-ST-40C	Joint Review Reports
	E-ST-40C	Post Operation Review Report
	E-ST-40C	Qualified Software Product
	E-ST-40C	Software Project Reviews Included In The Software Life Cycle Definition



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
	Q-ST-80C	Review And Inspection Records
	Q-ST-80C	Test Readiness Review Reports
13-20 Risk action request	M-ST-80C	Risk Register
13-21 Change control record	M-ST-40C	Cf 13-16
13-22 Traceability record	E-ST-40C	Detailed Design Traceability Matrices
	E-ST-40C	Requirements Traceability Matrices
	E-ST-40C	Software Architectural Design To Requirements Traceability Matrices
	E-ST-40C	Software Code Verification Report
	E-ST-40C	Software Unit Tests Traceability Matrices
	E-ST-40C	Traceability Of Acceptance Tests To The Requirements Baseline
	E-ST-40C	Traceability Of The Requirements Baseline To The Validation Specification
	E-ST-40C	Traceability Of The Technical Specification To The Validation Specification
13-23 Training records	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
13-24 Validation results	E-ST-40C	Software Validation Report With Respect To The Requirements Baseline
	E-ST-40C	Software Validation Report With Respect To The Technical Specification
	Q-ST-80C	Validation Of The Operational Requirements
13-25 Verification results	E-ST-40C	Code Coverage Verification Report
	E-ST-40C	Detailed Design Verification Report
	E-ST-40C	Requirements Baseline Verification Report
	E-ST-40C	Requirements Verification Report
	E-ST-40C	Robustness Verification Report
	E-ST-40C	Software Architectural Design And Interface Verification Report
	E-ST-40C	Software Behaviour Verification
	E-ST-40C	Software Documentation Verification Report
	E-ST-40C	Software Integration Verification Report
	E-ST-40C	Software Unit Testing Verification Report
	E-ST-40C	Technical Budgets - Memory And CPU Estimation
	Q-ST-80C	Software Verification Report
14-01 Change history	M-ST-80C	Configuration Management Plan
14-02 Corrective action register	Q-ST-80C	Software problem reporting procedures



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
14-03 Hardware assets register	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
14-04 Test log	E-ST-40C	Acceptance Test Report
	E-ST-40C	Operational Testing Results
	E-ST-40C	Software Integration Test Report
	E-ST-40C	Software Unit Test Report
	Q-ST-80C	Software Product Assurance Reports
	Q-ST-80C	Testing And Validation Reports
	Q-ST-80C	Updated Test Documentation
	Q-ST-80C	Verification And Validation Documentation For Reusable Components
14-05 Preferred suppliers register	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
14-06 Schedule	M-ST-60C	Annex B Schedule
	E-ST-40C	Flight Software Review Phasing
	E-ST-40C	Ground Software Review Phasing
	E-ST-40C	Software Development Plan
	E-ST-40C	Software Test Plan
	E-ST-40C	Software Verification Plan
14-07 Software assets register	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
14-08 Tracking system	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
14-09 Work breakdown structure	M-ST-10C	Annex C WBS
14-10 Work product distribution register	M-ST-40C	<i>Information system definition</i>
14-11 Work product list	M-ST-40C	Annex B Configuration Item List
	M-ST-40C	Annex C CIDL
	M-ST-40C	Annex D ABDL
15-01 Analysis report	E-ST-40C	Modification Analysis Report And Problem Analysis Report
	E-ST-40C	Modification Approval
	E-ST-40C	Modification Documentation
	E-ST-40C	Schedulability Analysis
	E-ST-40C	Technical Budgets - Memory And CPU Estimation
	E-ST-40C	Technical Budgets And Margin Computation
	Q-ST-80C	Criticality Classification Of Software Products
	Q-ST-80C	Hardware Software Interaction Analysis



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
	Q-ST-80C	Justification Of Selection Of Operational Ground Equipment
	Q-ST-80C	Justification Of Selection Of Operational Support Services
	Q-ST-80C	Metrics Analysis
	Q-ST-80C	Numerical Accuracy Analysis
	Q-ST-80C	Receiving Inspection Report
	Q-ST-80C	Safety And Dependability Analyses Results For Lower Level Suppliers
	Q-ST-80C	Software Dependability And Safety Analysis Report
	Q-ST-80C	Software Product Assurance Milestone Report
	Q-ST-80C	Software Product Assurance Report
	Q-ST-80C	Software Reuse File
	Q-ST-80C	Software Verification Report
	Q-ST-80C	Traceability Analysis
15-02 Assessment report	Q-ST-80C	Software Process Assessment Record: Competent Assessor Justification
	Q-ST-80C	Software Process Assessment Record: Software Process Assessment Recognition Evidence
15-03 Configuration status report	M-ST-40C	Annex F Configuration Status Accounting
	Q-ST-80C	Software Release Document
15-04 Market analysis report	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
15-05 Evaluation report	E-ST-40C	Compatibility Of Real-Time Design Methods With The Computational Model
	Q-ST-80C	Software Product Assurance Milestone Report
	Q-ST-80C	Software Product Assurance Report
15-06 Project status report	M-ST-10C	Annex E Progress Report
	M-ST-60C	Annex C Schedule Progress Report
	M-ST-60C	Annex E Geographical Distribution Report
	M-ST-60C	Annex F Cost Estimating Report
	M-ST-60C	Cost And Manpower Report
15-07 Reuse evaluation report	-	Not enforced by ECSS
15-08 Risk analysis report	M-ST-80C	Risk Register
15-09 Risk status report	M-ST-80C	Annex C Risk Assessment Report
15-10 Test incident report	Q-ST-80C	Nonconformance reports and software problem reports



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
15-11 Test summary report	E-ST-40C	Software unit test reports
	E-ST-40C	Software integration test report
	E-ST-40C	Software validation report
15-12 Problem status report	Q-ST-80C	Software product assurance milestone report
15-13 Assessment / audit report	Q-ST-80C	Software process assessment records
15-14 Customer satisfaction report	-	
15-15 Human resource needs analysis	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
15-16 Improvement opportunity	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
15-17 Personnel performance evaluation	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
15-18 Process performance report	Q-ST-80C	Software process assessment records: evidence of improvements
15-19 Product needs assessment	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
15-20 Service level performance	-	
15-21 Supplier evaluation report	Q-ST-80C	Records Of Procurement Sources
	Q-ST-80C	Results Of Pre-award Audits And Assessments
15-22 Training evaluation report	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
16-01 Assessment results repository	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
16-02 Assets repository	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
16-03 Configuration management library	M-ST-40C	<i>Information system definition</i>
16-04 Knowledge repository	-	Knowledge management not detailed in space software engineering and product assurance ECSS
16-05 Reuse library	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
16-06 Process repository	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
17-00 Requirements specification	E-ST-40C	Software System Specification
17-01 Asset specification	E-ST-40C	Requirements For 'Software To Be Reused'
17-02 Build list	E-ST-40C	Software configuration file - build procedures
17-03 Customer requirements	E-ST-40C	Association Of Requirements To Versions
	E-ST-40C	Delivery Content And Media
	E-ST-40C	Software Procurement Process Documentation And Implementation
	E-ST-40C	System And Software Observability Requirements
	E-ST-40C	System Database Content And Allowed Operational Range



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
	E-ST-40C	System Level Integration Support Requirements
	E-ST-40C	Technical Budgets And Margin Philosophy For The Project
	E-ST-40C	Verification And Validation Process Requirements
	Q-ST-80C	Contractual requirements
	Q-ST-80C	Requirement Baseline
	Q-ST-80C	Software Product Assurance Requirements For Suppliers
17-04 Delivery instructions	E-ST-40C	Delivery content and media
17-05 Documentation requirements	Q-ST-80C	Contractual requirements
	Q-ST-80C	Procedures And Standards
	All	DRD - Document Requirement Definition
17-06 Domain interface specification	-	Domain engineering is not detailed in space software engineering and product assurance ECSS
17-07 Infrastructure requirements	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
17-08 Interface requirements	E-ST-40C	External interface requirements specification
	E-ST-40C	Format And Delivery Medium Of Exchanged Data
	E-ST-40C	Interfaces External To The Software Item
	E-ST-40C	Interfaces Requirements Document
17-09 Product requirements	E-ST-40C	Functions and performance system requirements allocated to software
	E-ST-40C	Association of requirements to versions
17-10 Service requirements	-	
17-11 Software requirements	E-ST-40C	Behavioural View In Software Logical Model
	E-ST-40C	Data Definition And Database Requirements
	E-ST-40C	Functional And Performance Specifications, Including Hardware Characteristics, And Environmental Conditions Under Which The Software Item Executes, Including Budgets Requirements
	E-ST-40C	Functions And Performance System Requirements Allocated To Software
	E-ST-40C	HMI Requirements
	E-ST-40C	Human Factors Engineering (Ergonomics) Specifications, Including Those Related To Manual Operations, Human-Equipment Interactions, Constraints On Personnel, And Areas Requiring Concentrated Human Attention, That Are Sensitive To Human Errors And Training
	E-ST-40C	Operational, Reliability, Safety, Maintainability, Portability, Configuration, Delivery, Adaptation And Installation Requirements, Design Constraints
	E-ST-40C	Quality Requirements
	E-ST-40C	Requirements For In Flight Modification Capabilities



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
	E-ST-40C	Requirements For Real- Time
	E-ST-40C	Requirements For Security
	E-ST-40C	Reuse Requirements
	E-ST-40C	Security Specifications, Including Those Related To Factors Which Can Compromise Sensitive Information
	E-ST-40C	Software Logical Model
	E-ST-40C	Software Maintenance Requirements
	E-ST-40C	Software Operations Requirements
	E-ST-40C	Software Product Quality Requirements
	E-ST-40C	Software Safety And Dependability Requirements
	E-ST-40C	Software Technical Specification
	E-ST-40C	Specifications For In Flight Software Modifications
	E-ST-40C	Validation Requirements
	E-ST-40C	Verification And Validation Product Requirements
17-12 System requirements	E-ST-10C	System requirements
17-13 Test script	E-ST-40C	<i>Test script definition</i>
18-00 Standard	Q-ST-80C	Design Standards
	Q-ST-80C	Procedures And Standards
18-01 Acceptance criteria	E-ST-40C	Acceptance Test Plan
18-02 Assessment method standard	Q-ST-80C	Software process assessment record: assessment method
18-03 Coding standard	Q-ST-80C	Coding Standards And Description Of Tools
18-04 Domain representation standard	-	Domain engineering is not detailed in space software engineering and product assurance ECSS
18-05 Personnel performance criteria	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
18-06 Product release criteria	E-ST-40C	Acceptance Test Plan
18-07 Quality criteria	Q-ST-80C	Software product assurance plan ( <i>Quality model</i> )
18-08 Supplier selection criteria	Q-ST-20C	<i>Section 5.4.1</i>
19-00 Strategy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
19-01 Asset management strategy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
19-02 Process strategy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
19-03 Knowledge management strategy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
19-04 Product release strategy	E-ST-40C	Maintenance plan



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
19-05 Reuse strategy	E-ST-40C	Requirements For 'Software To Be Reused'
19-06 Maintenance strategy	E-ST-40C	Maintenance Plan - Long Term Maintenance Solutions
	E-ST-40C	Migration Plan
	E-ST-40C	Retirement Plan
19-07 Software development methodology	E-ST-40C	Development strategy, standards, techniques, development and testing environment
	E-ST-40C	Software Development Plan
19-08 Training strategy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
19-09 Quality strategy	-	Organisational consideration is not detailed in space software engineering and product assurance ECSS
19-10 Verification strategy	E-ST-40C	Software Verification Plan - Activities, Methods And Tools
	E-ST-40C	Software Verification Plan - Organizational Independence, Risk And Effort Identification
	E-ST-40C	Software Verification Plan - Software Products Identification
	E-ST-40C	Software Verification Plan - Verification Process Identification[
19-11 Validation strategy	E-ST-40C	Software Validation Plan
19-12 Audit strategy	Q-ST-80C	Audit plan and schedule
20-00 Template	All	DRD - Document Requirement Definition
21-00 Work product	P--001B	<i>Software product definition</i>
50-01 Software System Specification	E-ST-40C	Design And Development Constraints
	E-ST-40C	Installation An Acceptance Requirements At The Operational And Maintenance Sites
	E-ST-40C	System And Software Observability Requirements
	E-ST-40C	System Database Content And Allowed Operational Range
	E-ST-40C	Validation Requirements And Scenario
	E-ST-40C	Verification And Validation Process Requirements
	Q-ST-80C	Requirement Baseline
50-02 Software requirements specification	E-ST-40C	Software Requirements Specification
	Q-ST-80C	Technical Specification
50-03 Software design document	E-ST-40C	Cf 04-04 High level design and 04-05 low level design
50-04 Software configuration file	M-ST-40C	Annex C CIDL
	M-ST-40C	Annex D ABDL
	E-ST-40C	Software Configuration File - Build Procedures
	Q-ST-80C	Authorized Changes - Software Configuration File
	Q-ST-80C	Software Configuration File



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
	Q-ST-80C	Software Product Assurance Plan
50-05 Software release document	E-ST-40C	Software Release Document
50-06 Software test plan	E-ST-40C	Software Test Plan
50-07 Software validation testing specification	E-ST-40C	Software Validation Plan - Effort And Independence
	E-ST-40C	Software Validation Plan - Methods And Tools
	E-ST-40C	Software Validation Plan - Validation Process Identification
	E-ST-40C	Software Validation Specification With Respect To The Technical Specification
	Q-ST-80C	Software Validation Specification
	Q-ST-80C	Test And Validation Documentation
	Q-ST-80C	Validation And Testing Documentation
50-08 Software verification plan	Q-ST-80C	Software Project Plans
	Q-ST-80C	Software Verification Plan
50-09 Software validation plan	E-ST-40C	Complement Of Validation At System Level
	E-ST-40C	Software Validation Plan - Effort And Independence
	E-ST-40C	Software Validation Plan - Methods And Tools
	E-ST-40C	Software Validation Plan - Validation Process Identification
	E-ST-40C	Software Validation Specification With Respect To The Requirements Baseline
	Q-ST-80C	Software Project Plans
	Q-ST-80C	Software Validation Specification
	Q-ST-80C	Test And Validation Documentation
50-10 Software Reuse File	E-ST-40C	Justification Of Reuse With Respect To Requirements Baseline
	E-ST-40C	Software Procurement Process Documentation And Implementation
	Q-ST-80C	Procurement Data
	Q-ST-80C	Software Reuse Approach, Including Approach To Delta Qualification
	Q-ST-80C	Software Reuse File
50-11 Software Development Plan	E-ST-40C	Software Development Plan
50-12 Software Product Assurance Plan	Q-ST-80C	Software Product Assurance Plan
60-01 Request for waiver	M-ST-40C	Annex J Request For Waiver
60-02 Preliminary Alert Information	Q-ST-80C	Preliminary Alert Information
60-03 Alert	Q-ST-80C	Alert Information
60-04 Software Safety Plan	Q-ST-80C	Software Product Assurance Plan
60-06 List of Critical Components	Q-ST-80C	Criticality Classification Of Software Components



ECSS-Q-HB-80-02 work product	ECSS	Expected Output Name
60-07 Software Product Assurance Report	Q-ST-80C	Internal Metrics Report
	Q-ST-80C	Software Product Assurance Milestone Report
	Q-ST-80C	Software Product Assurance Report
60-08 ISVV plan	E-ST-40C	Independent Software Validation Plan - Level Of Independence
	E-ST-40C	Independent Software Validation Plan - Organization Selection
	Q-ST-80C	ISVV Plan
60-09 ISVV Report	E-ST-40C	Code Coverage Verification Report
	E-ST-40C	Detailed Design Verification Report
	E-ST-40C	Requirements Baseline Verification Report
	E-ST-40C	Requirements Verification Report
	E-ST-40C	Robustness Verification Report
	E-ST-40C	Software Architectural Design And Interface Verification Report
	E-ST-40C	Software Integration Verification Report
	E-ST-40C	Software Unit Testing Verification Report
	E-ST-40C	Software Validation Verification Report
	Q-ST-80C	ISVV Report
60-10 Lessons learned report	M-ST-60C	Lessons learned
60-11 Cost breakdown structure	M-ST-60C	Annex A Cost Breakdown Structure
60-12 Information management plan	M-ST-80C	Configuration Management Plan
60-13 Project information system	M-ST-40C	<i>Information system definition</i>
60-14 Operational plan	E-ST-40C	Software Operation Support Plan - Operational Testing Specifications
	E-ST-40C	Software Operation Support Plan - Plans And Procedures
	E-ST-40C	Software Operation Support Plan - Procedures For Problem Handling
	Q-ST-80C	Software Operation Support Plan
60-15 Interface control document	E-ST-40C	External Interfaces Design
	E-ST-40C	Interface Management Procedures
	E-ST-40C	Internal Interfaces Design
	E-ST-40C	Software Interface Control Document
60-16 Product tree	M-ST-10C	Annex B Product Tree

## Annex C

# Traceability between BP and ECSS

The processes defined in the present S4S assessment model are mainly based on the ISO/IEC 15504-5 model which defines the most important processes applied in an industrial software life cycle. For some best practices, there is no direct correspondence to ECSS subclauses. Nevertheless it has been chosen to keep these best practices in the S4S PAM, these remaining appropriate practices for software development although not requested as such in the ECSS. The following matrix provides links between best practices and ECSS subclauses as a rough guide but does not claim to be exhaustive. The few best practices and processes added to the 15504-5 PAM because deemed important for space domain software development refers to the ECSS associated subclauses.

ECSS	Subclause	PAM BP	BP title
M-ST-10C	4.4.3.2.2	ACQ.1.BP1	Establish the need
E-ST-40C	5.2.2	ACQ.1.BP2	Define the requirements
E-ST-40C	5.2.3		
E-ST-40C	5.2.4		
E-ST-40C	5.3.7.1		
E-ST-40C	5.3.8		
M-ST-10C	4.4.3.2.2		
M-ST-10C	4.4.3.3.2		
M-ST-10C	4.4.3.4.1		
M-ST-10C	5.1.2		
Q-ST-80C	5.4.2		
Q-ST-80C	5.4.4		
E-ST-40C	5.3.4.1	ACQ.1.BP3	Review requirements
E-ST-40C	5.3.2.3.a	ACQ.1.BP4	Develop acquisition strategy
M-ST-10C	4.4.3.4.1		
Q-ST-20C	7		
Q-ST-80C	5.4.1.2		
Q-ST-80C	5.5.1		
Q-ST-80C	7.4.1		
Q-ST-20C	5.4.1.2	ACQ.1.BP5	Define selection criteria
Q-ST-80C	7.4.1.1		
Not detailed in ECSS		ACQ.1.BP6	Communicate the need
S-ST-00C	7.3	ACQ.1.BP7	Tailor the standard requirements
Q-ST-80C	5.7.1	ACQ.2.BP1	Evaluate stated or perceived supplier capability
Q-ST-80C	5.7.2.1		
Q-ST-80C	5.7.3.1		
Q-ST-80C	5.7.3.3		
M-ST-10C	5.1.2	ACQ.2.BP2	Evaluate supplier's proposal
M-ST-10C	5.3.f		
Q-ST-20C	5.4.1		
Q-ST-80C	5.4.1.1		
Q-ST-80C	5.4.1.2		
Q-ST-80C	5.5.6		
Q-ST-80C	6.2.7.6		
M-ST-10C	4.4.3.4.1	ACQ.2.BP3	Prepare and negotiate agreement
M-ST-10C	5.1.2		
M-ST-10C	4.4.3.4.1	ACQ.3.BP1	Negotiate the contract/agreement
M-ST-10C	5.1.2		
M-ST-40C	5.2.1.1.a		
M-ST-40C	5.2.1.1.b		
Not detailed in ECSS		ACQ.3.BP2	Approve contract
Not detailed in ECSS		ACQ.3.BP3	Review contract for supplier capability monitoring



ECSS	Subclause	PAM BP	BP title
Not detailed in ECSS		ACQ.3.BP4	Review contract for risk mitigation actions
Not detailed in ECSS		ACQ.3.BP5	Award contract
Not detailed in ECSS		ACQ.3.BP6	Communicate results to tenderers
M-ST-10C	5.2.2.1.a	ACQ.4.BP1	Establish and maintain communication
M-ST-10C	5.2.2.1.b		
M-ST-10C	5.2.2.1.d		
M-ST-10C	5.2.2.1.e		
M-ST-10C	5.2.2.1.f		
M-ST-10C	5.2.2.1.j		
M-ST-10C	5.2.2.2.a	ACQ.4.BP2	Exchange information on technical progress
M-ST-10C	5.2.2.1.e	ACQ.4.BP3	Review development with supplier
M-ST-10C	5.2.2.1.g		
Q-ST-80C	5.4.3		
M-ST-10C	5.2.2.1.g	ACQ.4.BP4	Monitor the acquisition
M-ST-10C	5.2.2.1.h	ACQ.4.BP5	Agree on changes
E-ST-40C	5.7.3.1	ACQ.5.BP1	Define acceptance criteria
E-ST-40C	5.7.3.3		
M-ST-10C	4.4.3.5.1		
Q-ST-80C	5.2.1.4		
Q-ST-80C	6.3.5.9		
Q-ST-80C	6.3.6.3		
E-ST-40C	5.7.3.2	ACQ.5.BP2	Evaluate the delivered product
E-ST-40C	5.7.3.3		
E-ST-40C	5.7.3.5		
E-ST-40C	5.9.3.2		
M-ST-10C	4.4.3.6.5		
Q-ST-80C	5.5.5		
Q-ST-80C	6.2.7.11		
Q-ST-80C	6.3.6.4		
Q-ST-80C	6.3.6.6		
Q-ST-80C	6.3.6.7		
Q-ST-80C	6.3.6.9		
E-ST-40C	5.7.3.6	ACQ.5.BP3	Compliance with agreement
Q-ST-80C	6.3.6.7		
Q-ST-80C	5.5.5	ACQ.5.BP4	Accept product
Q-ST-80C	6.3.6.8		
Q-ST-80C	6.3.6.9		
M-ST-60C	6.2.3	ACQ.6.BP1	Propose contract modifications
M-ST-40C	4.3.3		
M-ST-60C	6.2.3	ACQ.6.BP2	Respond to contract modification request
M-ST-40C	5.3.2.3		
M-ST-60C	6.2.3	ACQ.6.BP3	Agree on contract modification
M-ST-40C	5.3.2.3	ENG.1.BP1	Obtain customer requirements and requests
M-ST-40C	5.3.2.4	ENG.1.BP2	Understand customer expectations
M-ST-40C	5.3.2.5	ENG.1.BP3	Agree on requirements
M-ST-40C	4.2.1	ENG.1.BP4	Establish customer requirements baseline
M-ST-40C	4.3.3	ENG.1.BP5	Manage customer requirement changes
M-ST-40C	4.3.3	ENG.1.BP6	Establish customer query mechanism
E-ST-10C	5.2.1.a, 5.2.1.b	ENG.2.BP1	Establish system requirements
M-ST-10C	4.4.3.3.2		
Q-ST-30C	6.4.3.a		
E-ST-10C	5.3.3	ENG.2.BP2	Optimize project solution
M-ST-10C	4.4.3.4.3	ENG.2.BP3	Analyse system requirements
Q-ST-30C	5.3.2 (Table 5-1)		
Q-ST-30C	5.3.3		
Q-ST-40C	6.4.1 (Table 6-1)		
Q-ST-80C	5.4.4		
Q-ST-80C	6.2.2.1		
E-ST-40C	5.8.3.1	ENG.2.BP4	evaluate and update system requirements
E-ST-10C	5.2.2.a	ENG.2.BP5	Ensure consistency
E-ST-40C	5.2.5.a		
E-ST-40C	5.8.3.1		
E-ST-40C	5.8.3.1.a		
M-ST-40C	4.1.3	ENG.2.BP6	Communicate system requirements
E-ST-10C	5.4.1.1.a	ENG.3.BP1	Describe system architecture
E-ST-10C	5.4.1.1.b		



ECSS	Subclause	PAM BP	BP title
E-ST-10C	5.4.1.1.d		
M-ST-10C	4.4.3.4.1		
Q-ST-80C	7.4.4		
E-ST-10C	5.4.1.1	ENG.3.BP2	Allocate requirements
E-ST-40C	5.2.4.9	ENG.3.BP3	Define interfaces
M-ST-10C	4.4.3.4.4	ENG.3.BP4	Verify system architecture
E-ST-10C	5.3.3	ENG.3.BP5	Evaluate alternative system architectures
E-ST-10C	5.2.2	ENG.3.BP6	Ensure consistency
E-ST-40C	5.4.2.1.a	ENG.4.BP1	Specify software requirements
E-ST-40C	5.4.2.2.a		
E-ST-40C	5.4.2.3		
Q-ST-30C	6.4.3.a		
Q-ST-80C	6.3.2.1		
Q-ST-80C	6.3.2.3		
Q-ST-80C	6.3.2.4		
Q-ST-80C	6.3.2.5		
Q-ST-80C	7.1.1		
Q-ST-80C	7.1.2		
Q-ST-80C	7.2.1		
Q-ST-80C	7.2.3.1		
Q-ST-80C	7.3.4		
E-ST-40C	5.4.2.1	ENG.4.BP2	Determine operating environment impact
Q-ST-80C	6.3.5.10	ENG.4.BP3	Develop criteria for software testing
Q-ST-80C	6.3.5.11		
Q-ST-80C	6.3.5.12		
Q-ST-80C	6.3.5.13		
E-ST-40C	5.8.3.11.a	ENG.4.BP4	Ensure consistency
E-ST-40C	5.8.3.12a		
E-ST-40C	5.8.3.13a		
E-ST-40C	5.8.3.2		
E-ST-40C	5.8.3.2	ENG.4.BP5	Evaluate and update software requirements
Q-ST-80C	6.3.2.5	ENG.4.BP6	Communicate software requirements
E-ST-40C	5.4.3.1.a	ENG.5.BP1	Describe software architecture
E-ST-40C	5.4.3.3.a		
E-ST-40C	5.4.3.4.a		
Q-ST-80C	7.2.2		
E-ST-40C	5.4.3.1.a	ENG.5.BP2	Define interfaces
E-ST-40C	5.4.3.5.a		
E-ST-40C	5.5.2.2		
E-ST-40C	5.5.2.1	ENG.5.BP3	Develop detailed design
E-ST-40C	5.5.2.3		
E-ST-40C	5.5.2.5		
E-ST-40C	5.5.2.6		
E-ST-40C	5.5.2.8		
Q-ST-80C	6.3.3.3		
Q-ST-80C	7.1.7		
Q-ST-80C	7.2.2		
E-ST-40C	4.2.5	ENG.5.BP4	Evaluate alternative software architectures
Q-ST-80C	7.2.2.3		
E-ST-40C	5.4.3.8	ENG.5.BP5	Analyze the design for testability
E-ST-40C	5.8.3.3	ENG.5.BP6	Ensure consistency
E-ST-40C	5.8.3.4		
E-ST-40C	5.5.2.7	ENG.5.BP7	Verify design
E-ST-40C	5.8.3.11a		
E-ST-40C	5.8.3.11b		
E-ST-40C	5.8.3.12a		
E-ST-40C	5.8.3.12b		
E-ST-40C	5.8.3.13b		
E-ST-40C	5.8.3.13c		
E-ST-40C	5.8.3.3		
E-ST-40C	5.8.3.4		
Q-ST-80C	6.3.3.5		
Q-ST-80C	7.2.2		
E-ST-40C	5.3.2.3.a	ENG.5.BP8	Identify and analyse reusable components
E-ST-40C	5.4.3.7.a		
Q-ST-80C	6.2.7.1		
Q-ST-80C	6.2.7.2		
Q-ST-80C	6.2.7.3		
Q-ST-80C	6.2.7.4		



ECSS	Subclause	PAM BP	BP title
Q-ST-80C	6.2.7.5		
Q-ST-80C	6.2.7.6		
Q-ST-80C	6.2.7.7		
Q-ST-80C	6.2.7.8		
E-ST-40C	5.3.2.3.a	ENG.5.BP9	Identify and analyse commercially available software components
E-ST-40C	5.4.3.7.a		
Q-ST-80C	5.5.2		
Q-ST-80C	5.5.3		
Q-ST-80C	6.2.7.1		
Q-ST-80C	6.2.7.2		
Q-ST-80C	6.2.7.3		
Q-ST-80C	6.2.7.5		
Q-ST-80C	6.2.7.6		
Q-ST-80C	6.2.7.7		
Q-ST-80C	6.2.7.8		
E-ST-40C	5.5.2.9	ENG.6.BP1	Develop unit verification procedures
E-ST-40C	5.5.3.1		
Q-ST-80C	6.2.8.2		
Q-ST-80C	6.3.5.1		
E-ST-40C	5.5.3.1	ENG.6.BP2	Develop software units
Q-ST-80C	6.3.3.3		
Q-ST-80C	6.3.4.1		
Q-ST-80C	6.3.5.22		
Q-ST-80C	6.3.5.23		
Q-ST-80C	6.3.5.24		
Q-ST-80C	6.3.5.25		
E-ST-40C	5.8.3.11c	ENG.6.BP3	Ensure consistency
E-ST-40C	5.8.3.12c		
E-ST-40C	5.5.3.2	ENG.6.BP4	Verify the software units
E-ST-40C	5.8.3.5		
Q-ST-80C	6.2.3.6		
Q-ST-80C	6.2.3.7		
Q-ST-80C	6.3.4.8		
Q-ST-80C	6.3.5.10		
Q-ST-80C	6.3.5.11		
Q-ST-80C	6.3.5.12		
Q-ST-80C	6.3.5.13		
Q-ST-80C	6.3.5.14		
Q-ST-80C	6.3.5.15		
Q-ST-80C	6.3.5.2		
Q-ST-80C	6.3.5.5.b		
Q-ST-80C	6.3.5.7		
Q-ST-80C	6.3.5.9		
Q-ST-80C	7.1.7		
E-ST-40C	5.8.3.6		
E-ST-40C	5.3.2.3.a	ENG.6.BP5	Reuse software units
Q-ST-80C	6.3.5.16	ENG.6.BP6	Update work products as necessary
Q-ST-80C	6.3.5.6		
Q-ST-80C	6.3.5.8		
E-ST-40C	5.4.3.8.a	ENG.7.BP1	Develop software integration strategy
E-ST-40C	5.5.4.1		
Q-ST-80C	6.3.5.1		
Q-ST-80C	6.3.5.22		
Q-ST-80C	6.3.5.23		
Q-ST-80C	6.3.5.24		
E-ST-40C	5.5.4.1	ENG.7.BP2	Develop tests for integrated software items
Q-ST-80C	6.2.8.2		
Q-ST-80C	6.3.5.22		
Q-ST-80C	6.3.5.23		
Q-ST-80C	6.3.5.24		
Q-ST-80C	6.3.5.25		
E-ST-40C	5.5.4.2	ENG.7.BP3	Integrate software items
E-ST-40C	5.5.4.2	ENG.7.BP4	Test integrated software items
Q-ST-80C	6.3.5.10		
Q-ST-80C	6.3.5.11		
Q-ST-80C	6.3.5.12		
Q-ST-80C	6.3.5.13		
Q-ST-80C	6.3.5.14		
Q-ST-80C	6.3.5.15		



ECSS	Subclause	PAM BP	BP title
Q-ST-80C	6.3.5.2		
Q-ST-80C	6.3.5.5.b		
Q-ST-80C	6.3.5.7		
Q-ST-80C	6.3.5.9		
E-ST-40C	5.8.3.11c	ENG.7.BP5	Ensure consistency
E-ST-40C	5.8.3.12c		
E-ST-40C	5.8.3.7		
Q-ST-80C	6.2.3.4	ENG.7.BP6	Regression test integrated software items
Q-ST-80C	6.2.3.7		
Q-ST-80C	6.3.5.15		
Q-ST-80C	6.3.5.16		
Q-ST-80C	6.3.5.17		
Q-ST-80C	6.3.5.18		
Q-ST-80C	6.3.5.6	ENG.7.BP7	Update work product as necessary
Q-ST-80C	6.3.5.8		
E-ST-40C	5.6.2.1	ENG.8.BP1	Develop tests for integrated software product
E-ST-40C	5.6.3.1		
E-ST-40C	5.8.3.11c		
E-ST-40C	5.8.3.12c		
Q-ST-80C	6.2.1.1		
Q-ST-80C	6.2.2.9		
Q-ST-80C	6.2.8.2		
Q-ST-80C	6.3.5.1		
Q-ST-80C	6.3.5.19		
Q-ST-80C	6.3.5.22		
Q-ST-80C	6.3.5.23		
Q-ST-80C	6.3.5.24		
Q-ST-80C	6.3.5.25		
Q-ST-80C	6.3.5.29		
Q-ST-80C	6.3.5.30		
Q-ST-80C	6.3.5.31		
Q-ST-80C	6.3.5.32		
Q-ST-80C	7.2.3.2		
Q-ST-80C	7.2.3.3		
Q-ST-80C	7.2.3.5		
Q-ST-80C	7.3.6		
E-ST-40C	5.6.3.2	ENG.8.BP2	Test integrated software product
E-ST-40C	5.6.3.3		
E-ST-40C	5.8.3.8		
Q-ST-80C	6.2.2.9		
Q-ST-80C	6.3.5.10		
Q-ST-80C	6.3.5.11		
Q-ST-80C	6.3.5.12		
Q-ST-80C	6.3.5.13		
Q-ST-80C	6.3.5.14		
Q-ST-80C	6.3.5.15		
Q-ST-80C	6.3.5.2		
Q-ST-80C	6.3.5.21		
Q-ST-80C	6.3.5.27		
Q-ST-80C	6.3.5.29		
Q-ST-80C	6.3.5.30		
Q-ST-80C	6.3.5.31		
Q-ST-80C	6.3.5.4		
Q-ST-80C	6.3.5.5.b		
Q-ST-80C	6.3.5.7		
Q-ST-80C	6.3.5.9		
Q-ST-80C	7.3.6		
Q-ST-80C	7.3.7		
Q-ST-80C	6.2.3.4	ENG.8.BP3	Regression test integrated software
Q-ST-80C	6.3.5.15		
Q-ST-80C	6.3.5.16		
Q-ST-80C	6.3.5.17		
Q-ST-80C	6.3.5.18		
E-ST-10C Q-ST-20C E-10-03A		ENG.9.BP1	Develop system integration and regression test strategies
		ENG.9.BP2	Develop tests for system elements
		ENG.9.BP3	Integrate system elements
		ENG.9.BP4	Test system elements
		ENG.9.BP5	Regression test system elements
		ENG.9.BP6	Ensure consistency



ECSS	Subclause	PAM BP	BP title
		ENG.9.BP7	Build complete system of system elements
E-ST-10C	5.5.1.a	ENG.10.BP1	Develop tests for system
E-ST-10C	5.5.1	ENG.10.BP2	Test integrated system
E-ST-10C	5.5.2		
E-ST-10C	5.5.2.d		
E-ST-10C	5.5.2.e		
E-ST-10C	5.5.2.f		
Q-ST-30C	5.3.3		
E-10-03A	4.7.2	ENG.10.BP3	Regression test integrated system
E-10-03A	4.7.3		
M-ST-10C	4.4.3.6	ENG.10.BP4	Confirm system readiness
Q-ST-80C	6.3.6.1	ENG.11.BP1	Develop installation strategy
E-ST-40C	5.7.2.3	ENG.11.BP2	Establish installation criteria
E-ST-40C	5.4.2.1	ENG.11.BP3	Specify the requirements for adaptation
Not detailed in ECSS		ENG.11.BP4	Adapt the system
E-ST-40C	5.7.2.4	ENG.11.BP5	Install software product
Q-ST-80C	6.3.6.2		
Q-ST-80C	6.3.6.6		
Q-ST-80C	7.5.3		
Q-ST-80C	6.3.6.6	ENG.11.BP6	Confirm product readiness
E-ST-40C	5.10.2.1.a	ENG.12.BP1	Develop maintenance strategy
E-ST-40C	5.10.2.1.b		
E-ST-40C	5.10.2.1.c		
E-ST-40C	5.10.2.1.d		
E-ST-40C	5.10.2.2.a		
M-ST-10C	4.4.3.7.1		
Q-ST-80C	6.2.1.1		
Q-ST-80C	6.3.3.7		
Q-ST-80C	6.3.5.21		
Q-ST-80C	6.3.8.1		
Q-ST-80C	6.3.8.2		
Q-ST-80C	6.3.8.4		
Q-ST-80C	6.3.8.5		
Q-ST-80C	6.3.8.6		
Q-ST-80C	6.3.8.7		
Q-ST-80C	7.4.5		
E-ST-40C	5.10.2.1.e	ENG.12.BP2	Analyse user problems and changes
E-ST-40C	5.10.3.1.a		
E-ST-40C	5.10.3.1.b		
E-ST-40C	5.10.3.1.c		
E-ST-40C	5.10.3.1.d		
E-ST-40C	5.10.3.1.e		
E-ST-40C	5.10.6.6a		
Q-ST-80C	6.3.8.7		
E-ST-40C	5.10.4.1.a	ENG.12.BP3	Implement and test modifications
E-ST-40C	5.10.4.2.a		
E-ST-40C	5.10.4.3		
E-ST-40C	5.10.2.2.a	ENG.12.BP4	Upgrade user system
E-ST-40C	5.10.6.1		
E-ST-40C	5.10.6.2		
E-ST-40C	5.10.6.3		
E-ST-40C	5.10.6.4		
E-ST-40C	5.10.6.5		
E-ST-40C	5.10.6.6a		
E-ST-40C	5.10.6.7		
Q-ST-80C	6.3.8.7		
E-ST-40C	5.10.7	ENG.12.BP5	Retire software product
M-ST-10C	4.3.3.8		
E-ST-40C	5.10.3.1.e	ENG.12.BP6	Communicate modifications
E-ST-40C	5.10.5.1.a		
E-ST-40C	5.10.5.2.a		
E-ST-40C	5.10.6.6b		
ECSS are project oriented. This is an organisational related process.		MAN.1.BP1	Develop a strategic vision
		MAN.1.BP2	Define the process framework
		MAN.1.BP3	Define a strategy for process deployment
		MAN.1.BP4	Provide management commitment
		MAN.1.BP5	Communicate the vision and goals
		MAN.1.BP6	Ensure sharing of common vision



ECSS	Subclause	PAM BP	BP title
		MAN.1.BP7	Enable active participation
ECSS are project oriented. This is an organisational related process.		MAN.2.BP1	Identify management infrastructure
		MAN.2.BP2	Provide management infrastructure
		MAN.2.BP3	Identify and implement software management practices
		MAN.2.BP4	Perform identified management practices
		MAN.2.BP5	Evaluate effectiveness
		MAN.2.BP6	Provide support to adopt best practices
E-ST-40C	5.3.9.1	MAN.3.BP1	Define the scope of work
E-ST-40C	5.3.9.2		
M-ST-10C	4.4.3.2.2		
M-ST-10C	5.3		
M-ST-10C	5.3.a		
E-40 Part 1B	5.3.3.2	MAN.3.BP2	Define project lifecycle
E-ST-40C	5.3.2.1		
Q-ST-80C	6.1.1		
Q-ST-80C	6.1.2		
Q-ST-80C	6.1.5		
M-ST-10C	4.4.3.3.2	MAN.3.BP3	Evaluate feasibility of the project
M-ST-10C	4.4.3.3	MAN.3.BP4	Determine and maintain estimates for project attributes
M-ST-10C	4.4.3.3.2		
M-ST-10C	4.4.3.4		
M-ST-10C	5.3		
E-ST-40C	5.3.2.1.b	MAN.3.BP5	Define project activities and tasks.
E-ST-40C	5.3.2.1.c		
E-ST-40C	5.3.2.1.d		
M-ST-10C	4.3.1		
M-ST-10C	4.4.3.3		
M-ST-10C	4.4.3.4		
M-ST-10C	5.1.2.g		
M-ST-10C	5.3		
M-ST-60C	8		
Q-ST-80C	6.1.5		
M-ST-10C	5.2.1.2	MAN.3.BP6	Define needs for experience, knowledge and skills
Q-ST-80C	5.1.5.1		
Q-ST-80C	6.3.2.5		
E-ST-40C	5.3.6.1	MAN.3.BP7	Define project schedule
E-ST-40C	5.3.6.2		
M-ST-60C	8		
Q-ST-80C	6.1.5		
Q-ST-80C	6.2.7.9		
E-ST-40C	5.3.2.2	MAN.3.BP8	Identify and monitor project interfaces
E-ST-40C	5.3.7.1		
M-ST-10C	4.4.3.3.2		
M-ST-10C	5.2.1.1		
M-ST-10C	5.2.1.1.b		
M-ST-10C	5.2.1.1.c		
M-ST-40C	5.2.2.a		
M-ST-40C	5.2.2.b		
M-ST-40C	5.2.2.c		
M-ST-40C	5.2.2.d		
M-ST-40C	5.2.2.e		
E-ST-40C	5.3.5.2	MAN.3.BP9	Allocate responsibilities
M-ST-10C	5.2.1.2		
M-ST-10C	5.3		
Q-ST-80C	5.1.1		
Q-ST-80C	5.1.2		
Q-ST-80C	5.1.3.1		
Q-ST-80C	5.1.4		
Q-ST-80C	5.1.5.3		
Q-ST-80C	5.2.6.1.b		
E-40 Part 1B	5.3.3.2	MAN.3.BP10	Establish project plan
E-ST-40C	5.2.5.a		
E-ST-40C	5.3.4.2		
E-ST-40C	5.3.4.3		
E-ST-40C	5.3.4.3.b		
E-ST-40C	5.3.4.4.a		
E-ST-40C	5.3.4.5.a		
E-ST-40C	5.4.3.2		
E-ST-40C	5.5.2.4		



ECSS	Subclause	PAM BP	BP title
M-ST-10C	4.4.3.4.1		
M-ST-10C	5.1.3		
Q-ST-80C	5.6.1.1		
Q-ST-80C	5.6.1.2		
Q-ST-80C	5.6.2.1		
Q-ST-80C	5.6.2.2		
Q-ST-80C	6.2.1.1		
Q-ST-80C	6.2.1.2		
Q-ST-80C	6.2.1.3		
Q-ST-80C	6.2.1.6		
Q-ST-80C	6.2.1.7		
Q-ST-80C	6.2.8.1		
Q-ST-80C	6.3.3.2		
Q-ST-80C	6.3.4.5		
E-ST-40C	5.2.5.a	MAN.3.BP11	Implement the project plan
E-ST-40C	5.3.4.2		
Q-ST-80C	6.2.1.2		
Q-ST-80C	6.2.1.3		
Q-ST-80C	6.2.1.7		
M-ST-60C	8	MAN.3.BP12	Monitor project attributes
Q-ST-80C	6.2.5.3		
Q-ST-80C	6.2.5.4		
Q-ST-80C	6.2.5.5		
E-ST-40C	5.3.8.2	MAN.3.BP13	Review progress of the project
M-ST-10C	5.2.2.1.b		
M-ST-10C	5.2.2.1.c		
M-ST-10C	5.2.2.1.d		
M-ST-10C	5.2.2.1.e		
M-ST-10C	5.2.2.1.f		
M-ST-10C	5.2.2.1.g		
M-ST-10C	5.2.2.1.j		
M-ST-10C	5.2.2.2.a		
M-ST-10C	5.2.2.2.b		
Q-ST-80C	6.2.5.3		
Q-ST-80C	6.2.5.4		
Q-ST-80C	6.2.5.5		
M-ST-10C	5.2.2.1.h	MAN.3.BP14	Act to correct deviations
M-ST-10C	5.2.2.1.k		
M-ST-60C	4.4.3	MAN.3.BP15	Identify and report lessons learned
M-ST-60C	5	MAN.3.BP16	Develop a cost breakdown structure
M-ST-60C	7.1.1		
ECSS are project oriented. This is an organisational related process.		MAN.4.BP1	Establish quality goals
		MAN.4.BP2	Define overall strategy
		MAN.4.BP3	Define quality criteria
		MAN.4.BP4	Establish a quality management system
		MAN.4.BP5	Assess achievement of quality goals
		MAN.4.BP6	Take preventive or corrective action
		MAN.4.BP7	Collect feedback
		MAN.4.BP8	Monitor actual performance of quality
M-ST-80C	5.2.1.2	MAN.5.BP1	Established risk management scope
M-ST-80C	5.2.1.3		
Q-ST-80C	5.3.1		
M-ST-80C	7.2.10	MAN.5.BP10	Accept residual risks
M-ST-80C	5.2.1.2	MAN.5.BP2	Define risk management strategies
M-ST-80C	5.2.1.3		
Q-ST-80C	5.3.1		
M-ST-80C	5.2.2.2	MAN.5.BP3	Identify risks
Q-ST-80C	5.3.1		
M-ST-80C	5.2.2.3	MAN.5.BP4	Analyse risks
Q-ST-80C	5.3.1		
Q-ST-80C	5.3.2		
M-ST-80C	5.2.3	MAN.5.BP5	Define and perform risk treatment actions
M-ST-80C	7.2.6		
Q-ST-80C	5.3.1		
M-ST-80C	5.2.4	MAN.5.BP6	Monitor risks
M-ST-80C	7.2.11		
Q-ST-80C	5.3.1		
M-ST-80C	5.2.3.3	MAN.5.BP7	Take preventive and corrective actions
M-ST-80C	5.2.3.4	MAN.5.BP8	Recommended acceptance



ECSS	Subclause	PAM BP	BP title
M-ST-80C	5.2.4.2	MAN.5.BP9	Communicate risks
M-ST-80C	7.2.11		
Organisation related		MAN.6.BP1	Establish organisational commitment for measurement
Q-ST-80C	6.2.5.2	MAN.6.BP2	Develop measurement strategy
Q-ST-80C	6.2.5.3		
Q-ST-80C	6.2.5.4		
Q-ST-80C	7.1.8		
Organisation related		MAN.6.BP3	Identify measurement information needs
Q-ST-80C	5.2.7.1	MAN.6.BP4	Specify measures
Q-ST-80C	5.2.7.2		
Q-ST-80C	6.2.5.2		
Q-ST-80C	6.2.5.3		
Q-ST-80C	6.2.5.4		
Q-ST-80C	6.3.5.2		
Q-ST-80C	7.1.2		
Q-ST-80C	7.1.4		
Q-ST-80C	7.1.5		
Q-ST-80C	6.2.5.3	MAN.6.BP5	Retrieve measurement data
Q-ST-80C	6.2.5.4		
Q-ST-80C	6.3.4.6		
Q-ST-80C	6.3.5.2		
Q-ST-80C	6.3.5.5.b		
Q-ST-80C	7.1.4		
Q-ST-80C	6.2.5.2	MAN.6.BP6	Analyse measurement data
Q-ST-80C	6.3.5.5.a		
Q-ST-80C	6.3.8.7		
Q-ST-80C	7.1.4		
Q-ST-80C	7.1.4	MAN.6.BP7	Use information-products for decision making
Q-ST-80C	7.1.6		
Q-ST-80C	7.1.6	MAN.6.BP8	Communicate measurement results
Q-ST-80C	6.2.5.1	MAN.6.BP9	Evaluate information products and measurement activities
Q-ST-80C	7.1.4		
Q-ST-80C	7.1.8		
M-ST-40C	5.3.7.1.a	MAN.7.BP1	Identify necessary information
M-ST-40C	5.3.7.6		
M-ST-40C	5.3.7.1.b	MAN.7.BP2	Establish information system
M-ST-40C	5.3.7.1.e		
M-ST-40C	5.3.7.1.c	MAN.7.BP3	Make information system accessible
M-ST-40C	5.3.7.1.f	MAN.7.BP4	Maintain and verify information
M-ST-40C	5.3.7.2.2		
M-ST-40C	5.3.7.2.3		
M-ST-40C	5.3.7.5		
Q-ST-80C	5.7.3.3		
Q-ST-80C	6.3.8.6		
M-ST-40C	5.2.1.2	MAN.7.BP5	Control access to information
M-ST-40C	5.2.1.3		
M-ST-40C	5.3.7.4	MAN.7.BP6	Distribute information
Not detailed in ECSS		MAN.7.BP7	Notify users when modifications occur
M-ST-40C	5.3.7.1.d	MAN.7.BP8	Monitor system performance
M-ST-80C	-	OPE.1.BP1	Identify operational risks
E-ST-40C	5.9.3.1	OPE.1.BP2	Perform operational testing
M-ST-10C	4.4.3.7.1		
Q-ST-80C	6.3.7.2		
M-ST-10C	4.4.3.7.1	OPE.1.BP3	Operate the product
M-ST-40C	5.3.6	OPE.1.BP4	Develop criteria for operational use
Q-ST-80C	6.3.7.1		
Q-ST-80C	6.3.7.3		
Q-ST-80C	7.4.2		
E-ST-40C	5.9.2.3	OPE.1.BP5	Monitor operational use
M-ST-10C	4.4.3.7.1		
Q-ST-80C	6.3.7.1		
Q-ST-80C	7.4.2		
E-ST-40C	5.9.2.1	OPE.1.BP6	Develop and maintain an operational plan
E-ST-40C	5.9.2.2		
E-ST-40C	5.9.2.3		
Q-ST-80C	7.5.3	OPE.1.BP7	Prepare system for operational use.
E-ST-40C	5.7.2.2	OPE.2.BP1	Establish product support
E-ST-40C	5.9.4		
E-ST-40C	5.9.5.1a		



ECSS	Subclause	PAM BP	BP title
E-ST-40C	5.7.2.2	OPE.2.BP2	Provide user training
E-ST-40C	5.9.5.1a		
E-ST-40C	5.9.5.1b	OPE.2.BP3	Monitor performance
E-ST-40C	5.9.5.2		
Q-ST-80C	6.3.7.1		
Q-ST-80C	6.3.7.1	OPE.2.BP4	Determine customer satisfaction level
Not detailed in ECSS		OPE.2.BP5	Benchmark customer satisfaction
Not detailed in ECSS		OPE.2.BP6	Communicate customer satisfaction
ECSS are project oriented. This is an organisational related process.		PIM.1.BP1	Define process architecture
		PIM.1.BP2	Support deployment process
		PIM.1.BP3	Maintain process data
		PIM.1.BP4	Identify performance expectations
		PIM.1.BP5	Establish process tailoring guidelines
		PIM.1.BP6	Maintain process data
Q-ST-80C	5.7.2.2	PIM.2.BP1	Define assessment goals
Q-ST-80C	5.7.2.1	PIM.2.BP2	Plan the assessment
Q-ST-80C	5.7.2.2		
Q-ST-80C	5.7.2.2	PIM.2.BP3	Obtain commitment
Q-ST-80C	5.7.1	PIM.2.BP4	Perform the assessment to collect data
Q-ST-80C	5.7.2.2		
Q-ST-80C	5.7.2.2	PIM.2.BP5	Validate the assessment data
Q-ST-80C	5.7.2.2	PIM.2.BP6	Analyze the assessment data
Q-ST-80C	5.7.2.3		
Q-ST-80C	5.7.2.2	PIM.2.BP7	Report the assessment data
Q-ST-80C	5.7.3.1		
Q-ST-80C	5.7.2.4	PIM.2.BP8	Maintain assessment record
ECSS are project oriented. This is an organisational related process.		PIM.3.BP1	Establish commitment
		PIM.3.BP2	Identify issues
		PIM.3.BP3	Establish process improvement objectives
		PIM.3.BP4	Prioritise improvements
		PIM.3.BP5	Plan process changes
		PIM.3.BP6	Implement process changes
		PIM.3.BP7	Confirm process improvement
		PIM.3.BP8	Communicate results of improvement
		PIM.3.BP9	Evaluate the results of the improvement project
ECSS are project oriented. This is an organisational related process.		REU.1.BP1	Define and document an asset management strategy
		REU.1.BP2	Establish classification scheme for assets
		REU.1.BP3	Define criteria for assets
		REU.1.BP4	Establish the asset storage and retrieval mechanisms
		REU.1.BP5	Identify reusable assets
		REU.1.BP6	Accept reusable assets
		REU.1.BP7	Operate asset storage
		REU.1.BP8	Record use of assets
		REU.1.BP9	Notify re-users of asset status
		REU.1.BP10	Retire assets
Organisation related		REU.2.BP1	Define organisational reuse strategy
Organisation related		REU.2.BP2	Identify domains for potential reuse
Organisation related		REU.2.BP3	Assess reuse capability
Organisation related		REU.2.BP4	Assess domains for potential reuse
E-ST-40C	5.4.3.7.a	REU.2.BP5	Evaluate reuse proposals
Q-ST-80C	6.2.7.2		
Q-ST-80C	6.2.7.6		
Q-ST-80C	6.2.7.7		
Organisation related		REU.2.BP6	Implement the reuse program
Organisation related		REU.2.BP7	Collect and manage learning
Organisation related		REU.2.BP8	Get feedback from reuse
Organisation related		REU.2.BP9	Monitor reuse
ECSS are project oriented. This is an organisational related process.		REU.3.BP1	Define criteria for domain definition
		REU.3.BP2	Define domain models
		REU.3.BP3	Define domain architecture
		REU.3.BP4	Develop asset specification
		REU.3.BP5	Provide domain assets
		REU.3.BP6	Maintain domain assets
ECSS are project oriented. This is an organisational related process.		RIN.1.BP1	Identify needed skills and competencies
		RIN.1.BP2	Define evaluation criteria
		RIN.1.BP3	Recruit qualified staff
		RIN.1.BP4	Develop staff skills and competencies



ECSS	Subclause	PAM BP	BP title
		RIN.1.BP5	Define project team organisation
		RIN.1.BP6	Empower project teams
		RIN.1.BP7	Maintain project team interactions
		RIN.1.BP8	Evaluate staff performance
		RIN.1.BP9	Provide feedback on performance
		RIN.1.BP10	Maintain staff records
ECSS are project oriented. This is an organisational related process. Training subclause in Q-ST-80C 5.1.5		RIN.2.BP1	Develop a strategy for training
		RIN.2.BP2	Train Personnel
		RIN.2.BP3	Develop or acquire training
		RIN.2.BP4	Develop or acquire training
		RIN.2.BP5	Train personnel
		RIN.2.BP6	Maintain staff training records
		RIN.2.BP7	Evaluate training effectiveness
ECSS are project oriented. This is an organisational related process.		RIN.3.BP1	Establish a knowledge management system
		RIN.3.BP2	Create the network of knowledge contributors
		RIN.3.BP3	Develop knowledge management strategy
		RIN.3.BP4	Capture knowledge
		RIN.3.BP5	Disseminate knowledge assets
		RIN.3.BP6	Improve knowledge assets
E-ST-40C	5.4.3.2	RIN.4.BP1	Identify infrastructure process scope
Q-ST-80C	5.6.1.2	RIN.4.BP2	Define the infrastructure process requirements
Q-ST-80C	5.6.2.1		
Q-ST-80C	5.6.2.2		
Q-ST-80C	6.2.1.6		
Q-ST-80C	6.2.8.1		
Q-ST-80C	6.2.8.3		
Q-ST-80C	6.3.3.2		
Q-ST-80C	6.3.4.1		
Q-ST-80C	5.6.1.1	RIN.4.BP3	Acquire and provide infrastructure process
Q-ST-80C	6.2.8.1		
Not detailed in ECSS		RIN.4.BP4	Establish the infrastructure process
Q-ST-80C	5.6.1.1	RIN.4.BP5	Provide support for the infrastructure process
Not detailed in ECSS		RIN.4.BP6	Maintain the infrastructure knowledge
Q-ST-80C	5.6.1.2	RIN.4.BP7	Verify infrastructure
Q-ST-80C	5.6.2.2		
Q-ST-80C	5.6.2.3		
Q-ST-80C	6.2.1.8		
Q-ST-80C	6.2.1.9		
Not detailed in ECSS		SPL.1.BP1	Establish communication interface
Not detailed in ECSS		SPL.1.BP2	Perform customer enquiry screening
Not detailed in ECSS		SPL.1.BP3	Establish customer proposal evaluation criteria
M-ST-10C	-	SPL.1.BP4	Evaluate customer request for proposal
Not detailed in ECSS		SPL.1.BP5	Determine need for preliminary evaluations or feasibility studies
Not detailed in ECSS		SPL.1.BP6	Identify and nominate staff
M-ST-10C	4.4.3.3.2	SPL.1.BP7	Perform preliminary overall estimation
M-ST-10C	4.3.7	SPL.1.BP8	Prepare supplier proposal response
M-ST-10C	4.4.3.4.1		
M-ST-10C	5.3.a		
M-ST-10C	5.3.g		
M-ST-60C	7.1.2		
M-ST-10C	-	SPL.1.BP9	Negotiate contract/agreement with acquirer
Not detailed in ECSS		SPL.1.BP10	Establish confirmation of contract/agreement
Q-ST-80C	6.2.4.3	SPL.2.BP1	Define release products
E-ST-40C	5.7.2.1	SPL.2.BP2	Prepare software product for delivery
Q-ST-80C	6.2.4.11	SPL.2.BP3	Establish a product release classification and numbering schema
E-ST-40C	5.5.3.1	SPL.2.BP4	Define the build activities and build environment
E-ST-40C	5.7.3.3	SPL.2.BP5	Build the release from configuration item
E-ST-40C	5.10.2	SPL.2.BP6	The type, level and duration of support for the release are communicated
M-ST-40C	5.3.7.4	SPL.2.BP7	Determine the delivery media type for the release.
Q-ST-80C	6.2.4.10		
Q-ST-80C	6.2.4.8		
Q-ST-80C	6.2.4.9		
Q-ST-80C	6.2.4.11	SPL.2.BP8	Identify the packaging for the release media
M-ST-40C	5.3.3	SPL.2.BP9	Define and produce the software product release documentation
Q-ST-80C	6.2.4.3		
Q-ST-80C	6.3.6.5	SPL.2.BP10	Ensure product release approval before delivery
E-ST-40C	5.9.3.3	SPL.2.BP11	Deliver the release to the intended customer



ECSS	Subclause	PAM BP	BP title
E-ST-40C	5.7.2.1	SPL.3.BP1	Deliver product
E-ST-40C	5.7.2.2	SPL.3.BP2	Support customer product evaluation
E-ST-40C	5.7.2.2	SPL.3.BP3	Provide training to customer
E-ST-40C	5.7.3.4.a		
E-ST-40C	5.7.2.2	SPL.3.BP4	Provide training to customer
Q-ST-10C	5.2.5	SUP.1.BP1	Develop a strategy for product and process quality assurance
Q-ST-20C	5.1.1		
Q-ST-80C	7.1		
Q-ST-80C	5.2.1		
Q-ST-80C	5.2.7		
Q-ST-80C	6.2.3.1		
Q-ST-20C	5.2	SUP.1.BP2	Define quality records
Q-ST-80C	5.2.2		
Q-ST-80C	7.1.6		
Q-ST-10C	All	SUP.1.BP3	Assure the quality of project process activities and project work products
Q-ST-20C	All		
Q-ST-80C	All		
Q-ST-20C	5.2.2	SUP.1.BP4	Identify and record problems and non-conformances
Q-ST-80C	5.2.4		
Q-ST-80C	5.2.5		
Q-ST-80C	5.2.6		
Q-ST-20C	5.2.2	SUP.1.BP5	Act on non-conformance
Q-ST-80C	5.2.5.4		
E-ST-40C	5.8.2.1	SUP.2.BP1	Develop verification strategy
M-ST-10C	4.4.3.5.1		
Q-ST-80C	6.2.1.1		
Q-ST-80C	6.2.2.9		
Q-ST-80C	6.2.6		
E-ST-40C	5.8.2.1	SUP.2.BP2	Develop criteria for verification
E-ST-40C	5.8.2.1.d		
E-ST-40C	5.8.3	SUP.2.BP3	Conduct verification
Q-ST-80C	5.2.1.5		
Q-ST-80C	6.2.2.5		
Q-ST-80C	6.2.6		
Q-ST-80C	7.1.7		
Q-ST-80C	7.2.3.6		
E-ST-40C	5.8.3	SUP.2.BP4	Determine actions for verification results
Q-ST-80C	6.2.6.4		
Q-ST-80C	6.3.5.8		
E-ST-40C	5.6.2.1	SUP.3.BP1	Develop validation strategy
E-ST-40C	5.6.4.1		
Q-ST-80C	6.2.1.1		
Q-ST-80C	6.2.2.9		
Q-ST-80C	6.3.5.19		
Q-ST-80C	6.3.5.20		
Q-ST-80C	6.3.5.29		
Q-ST-80C	6.3.5.30		
Q-ST-80C	6.3.5.31		
Q-ST-80C	6.3.5.32		
E-ST-40C	5.6.4.1	SUP.3.BP2	Develop validation criteria
M-ST-10C	4.4.3.5.1		
Q-ST-80C	6.3.5.20		
Q-ST-80C	6.3.5.29		
Q-ST-80C	6.3.5.30		
Q-ST-80C	6.3.5.31		
E-ST-40C	5.6.4.2	SUP.3.BP3	Perform validation activities
E-ST-40C	5.8.3.9		
Q-ST-80C	6.2.2.9		
Q-ST-80C	6.3.5.20		
Q-ST-80C	6.3.5.26		
Q-ST-80C	6.3.5.27		
Q-ST-80C	6.3.5.29		
Q-ST-80C	6.3.5.30		
Q-ST-80C	6.3.5.31		
E-ST-40C	5.6.4.3	SUP.3.BP4	Identify problems
Q-ST-80C	6.3.5.26		
E-ST-40C	5.6.3.2	SUP.3.BP5	Provide validation data
Not detailed in ECSS		SUP.3.BP6	Make validation results available to the customer and other involved parties



ECSS	Subclause	PAM BP	BP title
E-ST-40C	5.3.3.1	SUP.4.BP1	Identify reviews
E-ST-40C	5.4.2.4		
M-ST-10C	all		
Q-ST-80C	5.2.1.3		
Q-ST-80C	6.2.6.10		
E-ST-40C	5.3.3.3	SUP.4.BP2	Prepare joint review
Q-ST-80C	6.2.6.10		
Q-ST-80C	6.2.6.9		
E-ST-40C	5.3.3.2	SUP.4.BP3	Conduct joint review
E-ST-40C	5.10.6.6a		
E-ST-40C	5.2.5.a		
E-ST-40C	5.3.4.2		
E-ST-40C	5.3.4.3		
E-ST-40C	5.3.4.4.a		
E-ST-40C	5.3.4.5.a		
E-ST-40C	5.3.5.1		
E-ST-40C	5.4.4.a		
E-ST-40C	5.5.2.10		
E-ST-40C	5.6.3.4		
E-ST-40C	5.6.4.4		
Q-ST-80C	6.2.6.8		
Q-ST-80C	6.3.3.7		
Q-ST-80C	6.3.5.14		
Q-ST-80C	6.3.5.4		
Not detailed in ECSS		SUP.4.BP4	Distribute the results
Q-ST-80C	6.2.6.11	SUP.4.BP5	Determine actions for review results
Q-ST-80C	6.2.6.11	SUP.4.BP6	Track actions for review results
M-ST-10C	5.2.3.2	SUP.5.BP1	Develop and implement an audit strategy
M-ST-10C	5.2.3.3		
Q-ST-10C	5.2.3		
M-ST-10C	5.2.3.2	SUP.5.BP2	Select auditors
M-ST-10C	5.2.3.3		
Q-ST-80C	5.2.3		
M-ST-40C	5.3.5	SUP.5.BP3	Audit for conformance against the requirements
Q-ST-10C	5.2.3		
Not detailed in ECSS		SUP.5.BP4	Take corrective action
M-ST-10C	5.2.3.1	SUP.5.BP5	Prepare and distribute an audit report
Q-ST-80C	5.2.3	SUP.5.BP6	Track resolution
Q-ST-80C	6.3.3.5	SUP.6.BP1	Establish general requirements for product evaluation
Q-ST-80C	6.3.3.6		
Q-ST-80C	6.3.4.6		
Q-ST-80C	6.3.5.5		
E-ST-40C	3.2.15	SUP.6.BP2	Specify measures
Q-ST-80C	5.2.7		
Q-ST-80C	6.2.5		
Q-ST-80C	7.1.4		
Q-ST-80C	7.1.5		
Q-HB-80-04	-	SUP.6.BP3	Specify the criteria
Not detailed in ECSS		SUP.6.BP4	Identify method for the evaluation
Q-ST-80C	6.2.5.2	SUP.6.BP5	Identify the activities
Q-ST-80C	7.1.4		
Q-ST-80C	7.1.4	SUP.6.BP6	Perform the evaluation
Q-ST-80C	7.1.4	SUP.6.BP7	Analyse results against defined criteria
Q-ST-80C	6.2.5.5	SUP.6.BP8	Communicate results
Q-ST-80C	7.1.6		
M-ST-40C	5.3.7.2.1	SUP.7.BP1	Develop documentation management strategy
Q-ST-80C	6.2.1.1		
Q-ST-80C	7.3.2		
Q-ST-80C	7.3.3		
M-ST-40C	5.3.7.2.2	SUP.7.BP2	Establish standards for documents
M-ST-40C	5.3.7.2.3		
Q-ST-80C	6.2.1.6		
Q-ST-80C	6.2.1.7		
Q-ST-80C	6.2.1.4	SUP.7.BP3	Specify document requirements
Q-ST-80C	6.2.4.7		
Q-ST-80C	7.2.3.5		
Q-ST-80C	7.3.4		
M-ST-40C	5.3.7.2.4	SUP.7.BP4	Identify the documents to be produced
E-ST-40C	Annex A	SUP.7.BP5	Develop documents



ECSS	Subclause	PAM BP	BP title
E-ST-40C	Annex Q		
Q-ST-80C	6.2.1.3		
Q-ST-80C	6.3.1.2		
Q-ST-80C	6.3.2.2		
Q-ST-80C	6.3.3.1		
E-ST-40C	5.8.3.10	SUP.7.BP6	Check documents
E-ST-40C	Annex A		
E-ST-40C	Annex Q		
M-ST-40C	5.3.7.3		
Q-ST-80C	6.2.6.11		
Q-ST-80C	6.2.6.12		
Q-ST-80C	6.2.6.8		
M-ST-40C	5.3.7.4	SUP.7.BP7	Distribute documents
M-ST-10C	5.3.l	SUP.7.BP8	Maintain documents
M-ST-40C	5.3.7.2.5		
Q-ST-80C	6.2.1.3		
M-ST-40C	5.3.7.5	SUP.7.BP9	Store and protect documents
E-ST-40C	5.3.7.1	SUP.8.BP1	Develop configuration management strategy
M-ST-40C	5.2.1.1.a		
M-ST-40C	5.2.1.1.b		
M-ST-40C	5.3.7.2.1		
Q-ST-80C	6.2.1.1		
Q-ST-80C	6.2.4.1		
Q-ST-80C	6.2.4.3		
Q-ST-80C	6.2.4.4		
Q-ST-80C	6.2.7.10		
Q-ST-80C	6.3.1.2		
Q-ST-80C	6.3.2.2		
Q-ST-80C	6.3.3.1		
Q-ST-80C	7.3.5		
M-ST-10C	5.3	SUP.8.BP2	Identify configuration items
M-ST-40C	5.3.1.1.a		
M-ST-40C	5.3.1.2		
M-ST-40C	5.3.1.5		
M-ST-40C	5.3.1.6		
Q-ST-80C	5.5.4		
Q-ST-80C	6.2.4.2		
Q-ST-80C	6.2.4.5		
Q-ST-80C	6.2.4.7		
Q-ST-80C	7.5.2		
Q-ST-80C	6.2.4.2	SUP.8.BP3	Establish branch management strategy
Q-ST-80C	6.2.4.5		
M-ST-40C	5.3.1.3	SUP.8.BP4	Establish baselines
M-ST-40C	5.3.1.4		
Q-ST-80C	6.2.4.2		
Q-ST-80C	6.2.4.4		
Q-ST-80C	6.2.4.5		
Q-ST-80C	6.2.4.7		
M-ST-10C	5.3.g	SUP.8.BP5	Maintain configuration item description
M-ST-10C	5.3.l		
M-ST-40C	5.3.1.1.a		
M-ST-40C	5.3.1.3		
M-ST-40C	5.3.1.4		
M-ST-40C	5.3.2	SUP.8.BP6	Control modifications and releases
M-ST-40C	5.3.2.7		
M-ST-40C	5.3.2.8		
M-ST-40C	5.3.7.2.5		
Q-ST-80C	6.2.4.2		
Q-ST-80C	6.2.4.4		
Q-ST-80C	6.2.4.6		
Q-ST-80C	6.3.4.8		
E-ST-40C	5.3.2.5	SUP.8.BP7	Maintain configuration item history
M-ST-40C	5.3.3	SUP.8.BP8	Report configuration status
Q-ST-80C	6.2.4.3		
M-ST-40C	5.3.4	SUP.8.BP9	Verify the information about configured items
Q-ST-80C	6.2.4.3		
Q-ST-80C	6.2.4.10	SUP.8.BP10	Manage the backup, storage, archiving, handling and delivery of configured items
Q-ST-80C	6.2.4.11		



ECSS	Subclause	PAM BP	BP title
Q-ST-80C	6.2.4.8		
Q-ST-80C	6.2.4.9		
Q-ST-80C	5.2.4	SUP.9.BP1	Develop problem resolution strategy
Q-ST-80C	5.2.5		
Q-ST-80C	5.2.6.1.a		
Q-ST-80C	5.2.6.1.b		
Q-ST-80C	5.2.6.2		
Q-ST-80C	6.3.5.6		
Q-ST-80C	5.2.4	SUP.9.BP2	Identify and record the problem
Q-ST-80C	5.2.5		
Q-ST-80C	5.2.6.1.a		
Q-ST-80C	6.3.5.6		
Q-ST-80C	6.3.6.7		
Q-ST-10-09	5.2.2.2	SUP.9.BP3	Provide initial support and classification
Q-ST-10-09	5.2.2.3	SUP.9.BP4	Investigate and diagnose the cause of the problem.
Q-ST-10-09	5.2.3.4	SUP.9.BP5	Assess the impact of the problem to determine solution
Q-ST-10-09	6.3.3	SUP.9.BP6	Execute urgent resolution action, where necessary
Q-ST-80C	5.2.4	SUP.9.BP7	Raise alert notification where necessary
Q-ST-10-09	5.4.1	SUP.9.BP8	Implement problem resolution
M-ST-40C	4.3.3.2	SUP.9.BP9	Initiate change request
Q-ST-80C	6.3.5.8	SUP.9.BP10	Track problem status
Q-ST-80C	5.2.4	SUP.9.BP11	Prepare preliminary alert information
Q-ST-10C	5.2.9	SUP.9.BP12	Support processing of incoming alerts
Q-ST-80C	5.2.4		
M-ST-40C	5.3.2.1.a	SUP.10.BP1	Develop a change management strategy
M-ST-40C	5.3.2.1b		
M-ST-40C	5.3.2.1c		
M-ST-40C	5.3.2.1d		
M-ST-40C	5.3.2.1e		
Q-ST-80C	6.2.4.6		
M-ST-40C	5.3.2.2.e	SUP.10.BP2	Record the request for change
M-ST-40C	5.3.2.2.f		
M-ST-40C	5.3.2.2.g		
M-ST-40C	5.3.2.2a		
M-ST-40C	5.3.2.2b		
M-ST-40C	5.3.2.2c		
M-ST-40C	5.3.2.2d		
M-ST-40C	5.3.2.3		
M-ST-40C	4.3.4.1	SUP.10.BP3	Record the status of change requests
M-ST-40C	4.3.3.5	SUP.10.BP4	Establish the dependencies and relationships to other change requests
M-ST-40C	5.3.2.4	SUP.10.BP5	Asses the impact of the change
Q-ST-10-09	5.2.3.4	SUP.10.BP6	Identify the verification and validation activities to be performed for the implemented change
M-ST-40C	5.3.2.2.h	SUP.10.BP7	Approve changes
M-ST-40C	5.3.2.2.i		
M-ST-40C	5.3.2.5		
M-ST-40C	5.3.2.6		
M-ST-40C	5.3.2.7	SUP.10.BP8	Implement the change
Q-ST-80C	6.2.4.6	SUP.10.BP9	Review the implemented change
Q-HB-80-03	all	SUP.11.BP1	Define dependability and safety strategy
Q-ST-10-04	all		
Q-ST-40C	5.2		
Q-ST-40C	5.3		
Q-ST-40C	6.5.1		
Q-ST-40C	6.5.5		
Q-ST-40C	6.5.6.1		
Q-ST-80C	6.2.3.1		
Q-ST-80C	6.2.3.5		
M-ST-10C	4.4.3.5.1	SUP.11.BP2	Perform dependability and safety analysis
Q-ST-30C	all		
Q-ST-40C	all		
Q-ST-80C	5.4.4		
Q-ST-80C	6.2.2		
Q-ST-80C	6.2.3.1		
Q-ST-80C	6.3.1.3		
Q-ST-80C	6.3.2.3		
Q-ST-80C	6.3.2.4		
Q-ST-30-02C	all	SUP.11.BP3	Identify measures for handling critical modules
Q-ST-40C	6.5.3		



ECSS	Subclause	PAM BP	BP title
Q-ST-40C	6.5.6.4		
Q-ST-80C	6.2.2.4		
Q-ST-80C	6.2.3.1		
Q-ST-80C	6.2.3.2		
Q-ST-80C	6.2.3.6		
Q-ST-30C	4.6	SUP.11.BP4	Verify dependability and safety of the product
Q-ST-30C	5.3.3		
Q-ST-80C	6.2.2.5		
Q-ST-80C	6.2.3.3		
Q-ST-80C	6.2.3.5		
Q-ST-80C	6.2.3.6		
ISVV Guide	all	SUP.12.BP1	Define scope of ISVV
Q-ST-80C	6.2.6.13		
E-ST-40C	5.6.2.2.a		
E-ST-40C	5.6.2.2.b		
E-ST-40C	5.8.2.1		
E-ST-40C	5.8.2.2		
ISVV Guide	all	SUP.12.BP2	Plan ISVV
E-ST-40C	5.6.2.2		
E-ST-40C	5.8.2.2		
Q-ST-80C	6.2.6.13		
Q-ST-80C	6.3.5.28		
ISVV Guide	all	SUP.12.BP3	Perform ISVV
E-ST-40C	5.6.2.2		
E-ST-40C	5.8.3		
Q-ST-80C	6.2.6.13		
Q-ST-80C	6.3.5.28		
E-ST-40C	4.2.6	SUP.12.BP4	Report ISVV activities and results
E-ST-40C	4.2.8		
Q-ST-80C	6.2.6.13		
Q-ST-80C	6.3.5.28		