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Quality requirements for the supply of Software Design and Development

SUMMARY:

This document defines the quality requirements applicable to the supply of Software Design and Development to the Defence Systems Business Unit of Leonardo S.p.a.

The general quality requirements for supplies to Leonardo-SDI are defined in the PQA004-L-IT-D procedure.

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AMENDMENT RECORD

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00	15/03/2018	-	First issue	C. Pagni
01	22/10/2018	058	Para. 1.1 and 2.1: – Updated ref. to UNI EN 9100:2018; Para. 6.1.10: - Added req.: joint SW reviews shall be approved by Leonardo-SDI; - Modified req.: software and documents subject to review shall be first formally issued by the supplier; - Changed title from “SW Design Review” to “SW Review”; Para. 6.3: - Added note in the title; - Better specified the requirements for reuse of existing software. Para. 6.9: - Req. for the supply completeness moved to para. 6.13. Para. 6.13: - Rephrased the specific requirements for the supply acceptance; - Detailed the activities and documents required from the supplier; - Clarified that the Acceptance Procedures shall be proposed by the supplier and approved by Leonardo-SDI. Appendix C: - Changed title from “SW Design Review” to “SW standard Review”;	C. Pagni

Rev.	Date	BMSCP	Description	Authors
02	01/04/2022	581	Modified code and template of the document according with the updated company standard (not traced); <u>Whole document</u>: replaced “Division” with “Business Unit”; replaced refs. to PQA004-L with PQA004-L-IT-D; minor changes have been made to some requirement wording for better specification (not traced); Para. 1.1: Replaced ref. to AER-Q-2110 with AQAP-2310; Para. 1.3: Modified title; added definition of “RQF Code” and relevant clauses; Para. 2.1: Removed ref. to AER-Q-2110; Added ref. to AQAP-2310, ACMP-2100, AQAP-2105, UNI-EN-9115; Para. 6.1.10: New req.: completion of actions from software review shall be verified and recorded; Para. 6.3: New req.: Off-the-shelf SW shall be subject to configuration management (<i>typo correction – the req. was included only in the Italian version rev. 01</i>); Para. 6.7: New req.: flow-down of PQA011-L-IT-D requirements to sub-tiers is required; Para. 6.10: Mod. req.: backup copy of software delivered “on-board” is not required unless specified in the PO; Para. 6.11: Modified title; Appendix A: Changed “Classification Index” to “RQF Code”; Appendix C: Better specified the req. for Software Quality Plan.	C. Pagni

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1 INTRODUCTION

1.1 Purpose

The purpose of this document is to define the specific quality requirements for the supply of Software Design and Development to the Defence Systems Business Unit of Leonardo S.p.a. (hereinafter Leonardo-SDI).

The document is complementary (not an alternative) to ISO 9001 and UNI EN 9100 where applicable and AQAP-2110, AQAP-2210 and AQAP-2310 as applicable.

Further general quality requirements applicable to all supplies are defined in the PQA004-L-IT-D document.

1.2 Applicability

This document applies to all software design and development supplies that are to be incorporated into products intended for Leonardo-SDI's customers or used in their production.

In particular, it applies to types of supplies as identified in document PQA004-L-IT-D:

- Type H: Software Design and Development Supplies;
- Type A: Design and Development Supplies (if including software development);
- Type E: Supplies of Ammunition, Exploding devices and Weapons (if including software development);

The document also applies to development of the software part of firmware.

1.3 RQF Code

As described in PQA004-L-IT-D, any supply to Leonardo-SDI is classified, for quality purpose, through the RQF Code, consisting of a letter (Type) and a number (Classification Index) which depend on the characteristics and the complexity of the requested product or service.

The **RQF Code** is associated to each item of the purchase orders and allows to identify the activities and documents that the supplier is required to provide:

RQF Code = <Type> + <Classification Index>

For example:

RQF = H2 indicates that design and development of a Mission Critical Software is requested (Type H, CI=2);

Values and meaning of the RQF Code for Software Design and Development supplies are indicated in Appendix A.1. The activities and the documents requested from the supplier are listed in Appendix A.2.

In cases where the PO does not report the RQF code, the Supplier is required to ask Leonardo-SDI for the RQF applicable to the supply

2 REFERENCES

2.1 Documents

Code	Title
AQAP-2310 ed. B	NATO Quality Management System Requirements for Aviation, Space and Defence suppliers
ACMP 2100 Ed. A	Configuration Management Contractual Requirements.
AQAP 2105 Ed. C	NATO Requirements for deliverable Quality Plans
AQAP 2070 Ed B	NATO Mutual Government Quality Assurance (GQA) Process
AQAP 2110 Ed D	NATO Quality Assurance Requirements for Design, Development and Production
AQAP 2210 Ed A	NATO supplementary Software Quality Assurance Requirements to AQAP-2110
UNI EN 9100:2018	Quality Management Systems - Requirements for Aviation, Space and Defense Organizations.
UNI EN 9115:2018	Quality Management Systems - Requirements for Aviation, Space and Defense Organizations – Deliverable Software (Supplement to EN 9100)
ISO 9001:2015	Quality Management System – Requirements.
MIL-STD-498	Software Development and Documentation
MIL-STD-882E	System Safety Program Requirements
STANAG 4427	Introduction of allied configuration management publications (ACMP's).
PQA004-L-IT-D	Quality Requirements for Supplies to the Defence Systems Business Unit of Leonardo S.p.a.
PQA010-L-IT-D	Quality requirements for the supply of Design and Development
PQA009-L	Quality Requirements for the supply of Ammunition, Exploding devices and Weapons

3 DEFINITIONS AND ACRONYMS

3.1 Definitions

See document PQA004-L-IT-D.

3.2 Acronyms

Acronym	Description
CDR	Critical Design Review
CI	Classification Index (of the supply)
CSCI	Computer Software Configuration Item
CSU	Computer Software Unit
DTSW	SW Technical Development File
FCA	Functional Configuration Audit
GQA	Government Quality Assurance
GQA	Government Quality Assurance
GQAR	Government Quality Assurance Representative
HWCI	HardWare Configuration Item
IDD	Interface Design Description
IRS	Interface Requirements Specification
P/N	Part Number
PCA	Physical Configuration Audit
PDR	Preliminary Design Review
PO	Purchase Order
PQSW	Software Quality Plan
SAR	Software Assessment Report
SDD	Software Design Description
SDP	Software Development Plan
SQR	Software Qualification Review
SRS	Software Requirements Specification
SSA	Software Safety Analysis
SSR	Software Specification Review
STD	Software Test Description
STP	Software Test Plan
STR	Software Test Report
SUM	Software User Manual
SVD	Software Version Description
TRR	Test Readiness Review

4 RELATIONS BETWEEN LEONARDO-SDI AND THE SUPPLIER

4.1 Requirements for the Supplier

The requirements of PQA004-L-IT-D apply.

4.2 Requirements for supplies

General requirements

The requirements of PQA004-L-IT-D apply.

Specific requirements

Each software representing a separate delivery item is managed by Leonardo-SDI as a formal configuration item (CSCI) and is therefore subject to the requirements defined in this document.

The scope of supply may include the following:

- a) Software requirements analysis, design and development, based on higher level requirements established by the supplier itself in a System/Subsystem Technical Specification;
- b) Software requirements analysis, design and development, based on higher level requirements established by Leonardo-SDI in a Technical Specification attached to the PO;
- c) Software Design and development, based on a Software Requirements Specification (SRS) written by Leonardo-SDI and attached to the PO.

4.3 Leonardo-SDI interface with the Supplier

The requirements of PQA004-L-IT-D apply.

5 REQUIREMENTS FOR THE SUPPLIER'S QUALITY SYSTEM

The requirements of PQA004-L-IT-D apply.

6 REQUIREMENTS FOR SOFTWARE DESIGN AND DEVELOPMENT

6.1 Software Development Process

6.1.1 Review of contractual requirements

The supplier shall review the technical and quality requirements communicated by Leonardo-SDI via the PO and the documents referred to therein to ensure that they are clear, complete, consistent and suitable for the development of the project. If the supplier considers the information received to be non-exhaustive, it shall agree with Leonardo-SDI on the necessary actions to fully share the supply requirements.

The supplier shall also identify the statutory and regulatory requirements applicable to the project and any requirements not defined by Leonardo-SDI but considered necessary for carrying out the required activities; moreover, it shall take into account the requirements implicit in the intended use of the product, including safety requirements and those relating to risk management.

The supplier shall retain a record of the outcome of the review, and ensure traceability of the requirements through all phases of development, verification and validation of the software project, as applicable.

If changes are introduced by Leonardo-SDI to the technical and/or quality requirements associated with the PO, the supplier shall ensure that these changes are incorporated into the project and the related documentation.

6.1.2 Planning

6.1.2.1 SW Development Plan (SDP)

Following the review of the contractual requirements, the supplier shall plan and describe the software development activities in a Software Development Plan drawn up in accordance with the SDP form of MIL-STD-498.

A time schedule of the activities (GANTT) shall be included in (or attached to) the Software Development Plan..

The SDP shall be signed by the supplier's quality manager and be presented to Leonardo-SDI for approval within 30 calendar days of acceptance of the PO and in any case before the start of the activities.

The supplier shall manage the SDP in configuration and keep it up-to-date in relation to:

- time deviations in the progress of the planned activities;
- changes in its organization or in the way the project is developed;
- changes made to the PO by Leonardo-SDI;

6.1.2.2 SW Quality Plan (PQSW)

The supplier shall define the plans and activities for management of software quality, including identification, control and mitigation of risks associated to the project, The PQSW may be produced as a separate document or as part of the SDP and shall contain the information required in Appendix B.

If the PQSW is produced as a separate document, it shall be managed according to the information given in paragraph 6.1.2.1.

6.1.3 SW requirements definition

Unless otherwise specified in the order¹, the supplier shall prepare, for each CSCI, the Software Requirements Specification (SRS) and the Interface Requirements Specification (IRS) to define the software functional, non-functional and interface requirements, and their traceability to higher level requirements.

The SRS shall also define the SW states and modes of operation with relevant transition conditions, and specify any possible diagnostic messages. The document shall take into account and trace the results of the risk analysis and safety analysis as applicable to SW.

If agreed with Leonardo-SDI, the interface requirements can be defined in the SRS.

The documents shall be submitted to Leonardo-SDI approval.

6.1.4 SW design

For each CSCI the supplier shall describe the SW design, according to the indications of Appendix A.2, in order to implement a software which can satisfy the requirements specified in the SRS and IRS:

- The architectural design shall identify the CSCI SW components, their interfaces and their dynamic behaviour to transform the requirements into functionality.
- The detailed design shall identify the individual code units (CSUs), define the implementation logics and algorithms for their functionalities and shall describe the characteristics and data of all interfaces;
- The supplier shall document the design of each CSCI through the Software Design Description (SDD) and Interface Design Description (IDD) documents.

If agreed between Leonardo-SDI and the Supplier, the software interface can be described in the SDD.

¹ This activity is not requested if software design and development is required to the supplier, basing on software requirements specified by Leonardo-SDI in an SRS attached to the PO (see par. 4.2).

6.1.5 Coding, Unit Testing and SW Integration

For each CSCI, the supplier shall carry out the following activities:

- Implements software code corresponding to the SW design and capable to meet the SW requirements;
- Submit the CSUs to unit testing (for Safety Critical SW or if required in the order);
- Integrate the CSUs and produce the executable code (that shall be submitted to the Qualification tests).

If required by order, the SW code shall be developed in the language and according to the programming rules indicated by Leonardo-SDI.

Throughout the development cycle, the supplier shall ensure identification, storage and retrieval for the deliverable source and executable software, and for all SW elements of the development and SW Engineering environments.

6.1.6 SW qualification

Software qualification

To demonstrate compliance with the functional and interface requirements specified in the SRS, the supplier shall submit each CSCI to Qualification tests that shall be planned in a Software Test Plan (STP) and submitted to Leonardo-SDI for approval:

Tests shall be performed according to operating procedures defined in a Software Test Description (STD), and the results shall be recorded in a Software Test Report (STR).

Qualification results shall be traceable against software requirements.

In case of HW+SW supplies, the qualification of a CSCI shall include also integration tests of the CSCI with the HWCI on which it will operate.

In the case of a SW-only supply, the integration of the CSCI with the target HWCI is conducted by Leonardo-SDI and the supplier is required to provide technical assistance and support in accordance with the provisions of the PO.

6.1.7 Equipment/System Integration

In case of HW+SW supplies (SW produced as part of the development of equipment/systems), the CSCI verification shall also include, in addition to the integration tests with its target HWCI, appropriate integration tests with the other CSCI/HWCI of the system.

In this case, the supplier shall plan the activities in a specific *HW/SW Integration Plan*, to be submitted for Leonardo-SDI approval and define in one or more *HW/SW Integration Procedures* the operating methods for conducting the tests.

The results and outcomes of the tests shall be recorded in the *HW/SW Integration Report*.

If required in the order, or following agreements with Leonardo-SDI, the above activities can be carried out and documented as part of the activities relating to the Equipment/System.

In the case of a SW-only supply, the integration of the equipment/system is conducted by Leonardo-SDI and the supplier is required to provide technical assistance and support in accordance with the provisions of the PO.

6.1.8 SW Validation

In the case of HW+SW supplies (SW produced as part of the development of equipment/systems), the supplier shall validate the SW product to ensure that it meets the implicit or explicit requirements for the intended application and for use in the intended operational context.

In particular, unless otherwise required by the order:

- The strategy shall be defined in a Validation Plan (possibly the one for the system), to be submitted for Leonardo-SDI approval;
- Validation of the design and documentation requirements shall be conducted as part of the Design Reviews or similar activities;
- The software code shall be validated through tests, to be carried out according to suitably documented procedures.
- The validation results (Test Reports and evidence of other activities) shall be documented.

Test results previously conducted in other activities (Qualification, HW/SW Integration, etc.) can be used to support the validation;

If software validation is carried out, even partially, by Leonardo-SDI, the supplier is required to provide technical assistance and support, in accordance with the provisions of the PO or the Supply Specification.

6.1.9 Support Documents

If the software includes a human-machine interface, the supplier shall provide the necessary information for software use in the Software User Manual (SUM).

For each CSCI supplied, the information for software installation and maintenance shall be included in the relevant Software Version Description (SVD) document.

6.1.10 SW Review

To achieve control of the project, the supplier shall organize the software development process in subsequent stages, including appropriate software reviews aiming to:

- Evaluate outputs of the activities carried out, against the applicable contractual, technical and quality requirements;
- identify any problems and risks, and propose the necessary corrective and/or preventive actions

Depending on contractual agreements, SW Reviews may be internal (carried out independently by the supplier) or joint (carried out by the supplier in the presence of Leonardo-SDI and potentially its customer).

Joint software reviews shall be approved by Leonardo-SDI.

SW Reviews shall be planned in the PQSW document. Joint reviews shall be notified to Leonardo-SDI at least fifteen calendar days prior to the scheduled date, along with submittal of software and documents to be reviewed.

Documents and software submitted to review shall be prior formally issued by the supplier and subject to configuration management.

The outcome of SW Reviews shall be recorded by the supplier, including any actions necessary for completion of the review and progression to the next phase..

The supplier shall verify and record the effective implementation of actions planned as an outcome of software reviews

Unless otherwise agreed with Leonardo-SDI, the supplier shall carry out at least the SW Reviews indicated in Appendix C. If deemed necessary, Leonardo-SDI reserves the right to request further SW Reviews in addition to those planned.

For HW+SW supplies, software reviews can be carried out as part of equipment/system reviews.

6.1.11 Physical and functional configuration audits (FCA, PCA)

For the Software Qualification Review, the supplier shall conduct:

- a Functional Configuration Audit (FCA), to verify that the development of all CSCIs has been completed, that the software complies with its requirements and that the documentation is complete and satisfactory;
- a Physical Configuration Audit (PCA), to verify that the baseline of each CSCI (set of software and its documents) matches the one documented in the SVD in terms of development completeness and correctness of identification (P/N and related revision indexes).

6.2 Safety Critical Software

For supply of Safety Critical software (RQF = H1) the special requirements defined in the following subsections apply.

6.2.1 Application of MIL-STD-882

For the production of safety-critical software, unless otherwise requested on the order, the supplier shall plan and carry out development activities in accordance with the indications of the MIL-STD-882 standard.

6.2.2 Unit testing

In particular, Safety Critical SW shall undergo unit testing including as a minimum:

- static code analysis,
- white box testing,
- black box testing

6.2.3 Safety Analysis

If Safety Critical SW is produced as part of a HW+SW supply (development of larger equipment/system), the supplier shall carry out and document a Safety Analysis relating to development and use of the SW, including the following activities:

- a) Identification of *hazards* that could result in mission failure or affect the safety of the system, environment and/or people;
- b) Assessment of the risk associated with each hazard according to its severity and the probability of occurrence;
- c) Risk mitigation through the identification of appropriate techniques and/or SW development solutions which can eliminate or reduce the risks identified to acceptable levels;
- d) Monitoring and evaluation of the risk management measures implemented, to be performed throughout the SW life cycle.

The supplier shall plan the above activities in the Software Safety Analysis (SSA) document to be submitted for approval to Leonardo-SDI and demonstrate, through a Safety Assessment Report (SAR), the successful implementation and effectiveness of all the measures provided for risk mitigation.

Unless otherwise required by the order, the Safety Analysis shall be conducted in accordance with MIL-STD-882.

6.3 Use of Off-The-Shelf software²

If the supplier includes one or more off-the-shelf software (COTS or Custom) in the supply, the following requirements apply.

- a) The software shall be subject to configuration management by the supplier;
- b) In case of Reuse as-is, the supplier shall provide evidence that the software meets the functional and quality requirements specified by Leonardo-SDI;
- c) In case of Reuse with modifications, the supplier shall document and test all software changes, and provide evidence that the modified software meets the functional and quality requirements specified by Leonardo-SDI. Software verification activities shall include regression testing.
- d) If delivery of the source code is stated by contract, software maintainability shall be ensured by the supplier.
- e) Off-the-shelf SW covered by user licence shall be delivered to Leonardo-SDI together with the associated licence in accordance with the original manufacturer software license terms.

² Off-The-Shelf means an existing software, ready for use, which can be a commercial item (COTS) or an item developed for a specific goal (Custom).

6.4 Support Software (non-deliverable)

The supplier shall ensure that support software (non-deliverable) used for the development and maintenance of the CSCIs supplied is identified and traceable and suitable for the intended use.

The above requirements apply both to off-the-shelf support software (COTS or custom) and to support software developed by the supplier or its sub-tiers.

6.5 Non-conforming Software

The supplier shall plan and implement management of nonconformities in order to avoid improper use of non-conforming software and unintended delivery to Leonardo-SDI.

Non-conforming software shall be appropriately identified and segregated; nonconformities shall be recorded, notified to Leonardo-SDI and processed to determine the necessary corrective actions.

Nonconformities on software products may be found:

- During software and/or system tests (at any stage of the life cycle);
- Following the Design Review;
- Following Audits;
- During the operational use of the software and/or system

Software that has not yet completed the development process is considered by Leonardo-SDI to be formally "nonconforming with the applicable requirements" until it has successfully passed all of the verification phases provided for in the contract and the SDP. This software can however be released to Leonardo-SDI according to the information contained in paragraph 6.10.

6.6 Corrective Actions

The supplier shall define and implement management of corrective actions to resolve nonconformities found on software products both during the development phase and after delivery of the finished product to Leonardo-SDI.

To do this, the Supplier shall:

- Control the nonconformity and correct it in accordance with the Configuration Management Rules
- Analyse and correct the cause of the non-conformity to prevent it from reoccurring;
- Review the effectiveness of corrective actions;
- Record and retain information on nonconformities, actions taken and results of corrective actions; the information shall remain available to Leonardo-SDI and its Customer.

6.7 Software Sub-tier Suppliers

General requirements

The requirements defined in PQA004-L-IT-D ("Management of Sub-tiers") shall apply.

Specific requirements

The supplier shall flow down to sub-tiers the quality requirements specified by Leonardo-SDI in this document PQA011-L-IT-D and ensure a correct and complete application by the sub-tiers.

Leonardo-SDI reserves the right to carry out audits of sub-contractors and to involve sub-tiers in software design reviews.

6.8 Software Configuration Management

The supplier shall ensure the integrity and traceability of the software products, recording and monitoring all changes made to the software and the documents formally issued and approved by Leonardo-SDI.

To this end, the supplier shall define and implement a SW configuration management process in accordance with NATO AQAP-2210 requirements. The process shall be described in the SDP.

If not explicitly defined in the PO, the supplier shall agree with Leonardo-SDI, and document in the SDP, specific procedures for:

- a) Identification of Part Number and revision index for each CSCI;
- b) Labelling SW on the HW components (where applicable);
- c) Classification of changes to software products (SW code and documents);
- d) Assessing impact of changes on the SW P/N;
- e) Submitting a Change Request for SW products already approved by Leonardo-SDI during development and obtain the relevant approval;
- f) Sending the checksum of delivered CSCIs to Leonardo-SDI;
- g) Identification and approval of SW intermediate versions released to Leonardo-SDI, and management of subsequent updates.

During the various possible verification moments (design review, audits, tests, etc.) and during the final delivery of the software, the supplier shall describe in the SVD the configuration status of each CSCI, including information on the checksum.

To implement modifications on software and/or documents already delivered or formally approved by Leonardo-SDI, the supplier shall request the prior approval of Leonardo-SDI.

Changes to SW already delivered to Leonardo-SDI shall be traced and submitted to verification test, including appropriate non-regression tests. Test results shall be documented.

6.9 Software Documentation

General requirements

The requirements set out in the document PQA004-L-IT-D ("Documentation" paragraph) shall apply.

Specific requirements

The list of documents required from the supplier according to the level of the supply is given in Appendix A.

The SW documentation shall be produced according to DIDs of MIL-STD-498 standard.

Any deviations from these instructions will be defined in the Supply Specification, which in this case will contain the list of documents requested, the forms to be used, the procedures and timescales for submitting them to Leonardo-SDI.

If not explicitly defined in the PO, the supplier shall agree with Leonardo-SDI the rules for formal identification of documents (code and revision index).

The Supplier shall verify SW documents to ensure that they meet the quality and contractual requirements and the purpose for which they have been produced.

All documents submitted for review and/or final delivery shall carry the supplier's signature of approval.

SW documentation submitted for final acceptance shall be delivered to Leonardo-SDI with a Cover Letter including the following information: List of documents delivered, delivery date, reference to the PO number.

6.10 Software Release, Duplication and Delivery

Each CSCI shall be delivered to Leonardo-SDI on a separate magnetic/optical support (CD-ROM), in compliance with the applicable confidentiality and protection constraints. The physical medium shall contain the CSCI identification data (P/N, revision index and issue date) and shall be approved by the supplier's configuration manager.

When "on-board delivery"³ is foreseen for the supplied software, then delivery of backup copy on magnetic/optical support is not required, unless specified in the PO.

Following contractual agreements, software not yet completed can be released to Leonardo-SDI as an Intermediate Version (VI). In this case, the supplier shall appropriately identify the SW according to the procedures agreed with Leonardo-SDI and shall document its configuration status at the time of release.

In accordance with PO statements, the supply may also include delivery to Leonardo-SDI of the software elements of the development and testing environments.

The supplier shall ensure the capability to generate duplicates of the software (modified where necessary to the requirements of Leonardo-SDI) for the entire duration of the contract, including any warranty and/or technical assistance periods.

6.11 Software development and software engineering environments

The SW elements of the software development and testing environment shall be validated, i.e. the supplier shall provide evidence that they meet the requirements for the intended use.

The supplier shall maintain the SW development and testing environment for the entire duration of the contract in accordance with the timescales indicated in the Supply Specification, including the warranty period and any periods relating to maintenance and technical assistance provided for the system on which the software is to operate.

For software development and maintenance, the supplier shall use appropriate engineering methods and tools, and personnel with an appropriate level of expertise, along with internationally recognised procedures/good practices.

6.12 Metrics

The supplier shall identify in the Software Development Plan the quality attributes applicable to the delivered software and the relevant metrics implemented in the SW development process to measure the achieved quality level.

6.13 Acceptance of the Supply

General requirements

The requirements of PQA004-L-IT-D ("Acceptance of the Supply") apply.

Specific requirements

If not otherwise specified in the PO, the final acceptance testing shall include:

- A joint Software Qualification Review (SQR), conducted according to the indications in para.6.1.10;
- Functional testing of the software product, to be performed according to an Acceptance Test Procedure (ATP) issued by the supplier and submitted to Leonardo-SDI for approval.

The supplier shall send the invitation to the tests to Leonardo-SDI according to the provisions of PQA004-L-IT-D (see paragraph "Acceptance of the Supply"), attaching a copy of the following documentation:

- Acceptance Test Procedure and documents subject to the Software Qualification Review;
- Data Records to provide evidence of the successful final internal testing (if applicable);
- Certificate of Conformity according to Annex B of AQAP-2070;
- Any requests for acceptance waivers, approved by Leonardo-SDI

³ the software is not delivered as a separate item but already installed on the hardware of the equipment/system on which it must operate.

A supply of Software Design and Development is completed only after all the expected documents have been delivered and accepted by Leonardo-SDI.

6.14 Warranty

The legal terms apply, unless otherwise specified in the contract/order.

6.15 Right of access and support for the Customer and GQAR

The requirements of PQA004-L-IT-D apply (see "Right of access and support for the Customer and GQAR").

APPENDIX A – RQF Code and Documents requested from the Supplier**A.1. – RQF Code for software supplies**

The following table defines the possible values for the RQF Code of software supplies, and the associated characteristics.

RQF Code	Characteristics of the supplied software
H1	Software Safety Critical: SW installed on weapon systems, test equipment or support equipment, the malfunction of which may compromise their safety characteristics.
H2	Software Mission Critical: Non level 1 SW, installed on weapon systems , test equipment or support equipment, the malfunction of which may cause mission failure or compromise the system/equipment functionality or performance.
H3	Software Non-Critical: Non level 1 or level 2 SW.
H4	Service & Support Software: Non level 1 or level 2 SW, with a short or tailored SW development cycle, developed for a low-complexity project. The category can also include software/firmware products dedicated to providing HW/SW interface.

Table 1 – RQF Code for the supplied software

A.2. - Documents requested from the supplier

The following table summarises the activities and documents required from the supplier according to the classification index of the supply.

The table defines a standard that may be overwritten by any information contained in the PO and by other special conditions described in this document.

Activity	Documents	RQF Code			
		H1	H2	H3	H4
Planning	Software Development Plan (SDP) SW Quality Plan (PQSW)	(1)	(1)	(1)	
SW Security Analysis	SW Safety Analysis (SSA)	X			
	Software Assessment Report (SAR)	X			
Definition of SW requirements	Software Requirements Specification (SRS)	X	X	X	
	Interface Requirements Specification (IRS)	X	X	X	
SW architectural design	Software Design Description (SDD) Interface Design Description (IDD)	X	(2)	(3)	
SW detailed design	Software Design Description (SDD) Interface Design Description (IDD)	X	(2)		
Software coding	Source code	X	X	X	X
	Executable code	X	X	X	X
Software unit testing	Data Records of Input/Output (in electronic format, if applicable)	X			
Software Verification (Qualification)	Software Test Plan (STP)	X	X	X	
	Software Test Description (STD)	X	X	X	
	Software Test Report (STR)	X	X	X	
Equipment/System Integration	HW/SW Integration Plan, Procedure, Report	X	X		
SW validation	Validation Plan, Procedures and Reports	X	X		
SW user support	Software User Manual (SUM)	(4)	(4)	(4)	
Configuration Status Accounting/ Installation and maintenance support	Software Version Description (SVD)	X	X	X	X
All design and development activities	SW Technical Development File (DTSW)				(5)
Acceptance of the SW supply	Acceptance Testing Procedure	X	X	X	X
SW Design Review	Review Minutes	X	X	X	

Table 2 – Documents vs. RQF Code of the supplied software

- (1) The plans may be produced as a single document.
- (2) The architecture shall be documented at a design level which ensures an adequate and effective level of testing.
- (3) If agreed with Leonardo-SDI, the design can be described in an Appendix of the SRS/IRS documents instead of as a separate document.
- (4) For software with human-machine interface
- (5) Single document containing all information and data related to the SW design and development activities.

APPENDIX B - Requirements for the SW Quality Plan

The SW Quality Plan (PQSW) may be produced as a separate document or as part of the Software Development Plan (SDP).

At least the following information shall be provided in both cases:

- Scope and Applicability
- Reference Documents
- Definitions and Acronyms
- Organization (Roles, Responsibilities, Human Resources, Time Planning)
- Software Development Process (Life Cycle, Activities, Applicable Standards)
- SW documentation
- SW Configuration Management
- Review and Audit
- Software Safety
- SW Testing, Verification and Validation
- SW Engineering (Tools, Techniques, Methodologies)
- Nonconformities, SW Problem Report, Corrective Actions
- Media management and control (SW media)
- Management of supplies from sub-tiers
- Management of quality records
- Risk management
- Support for Customer and GQAR

APPENDIX C - Software standard Review

Unless otherwise agreed with Leonardo-SDI, the supplier shall conduct at least the following Software Reviews:

- **Software Specification Review (SSR)** - to validate and approve the software requirements and verify that the qualification methods have been identified and documented in a preliminary plan;
- **Critical Design Review (CDR)** - to validate the project in terms of completeness with respect to the software requirements, software code feasibility and completion of qualification plans;
- **Test Readiness Review (TRR)** - to validate the completion of the software code development and the availability of the necessary resources and documented procedures for performing the qualification tests;
- **Software Qualification Review (SQR)** - to validate the results of the software qualification activities and consequently all of the code developed and the associated documentation