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ASSURANCE
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AQAP-2009
(Edition 3)

NATO GUIDANCE ON THE USE OF THE AQAP 2000 SERIES

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NORTH ATLANTIC TREATY ORGANIZATION

NATO STANDARDISATION AGENCY (NSA)

NATO LETTER OF PROMULGATION

29 March 2010

1. AQAP-2009 (Edition 3) – NATO GUIDANCE ON THE USE OF THE AQAP 2000 SERIES is a non-classified NATO publication. The agreement of interested nations to use this publication is recorded in STANAG 4107.

2. AQAP-2009 (Edition 3) replaces AQAP 2009 (Edition 2) and is effective on receipt.

3. It is permissible to distribute copies of this publication to Contractors and Suppliers and such distribution is encouraged.

Cesar Balduin

Juan A. MORENO
Vice Admiral, ESP(N)
Director, NATO Standardization Agency

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Record of Changes

Change Date	Date Entered	Effective Date	By Whom Entered

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1.0 General

1.1 Introduction

1.1.1 This publication introduces the AQAP 2000 series. It provides guidance on the interpretation and use of the requirements found in the AQAP 2000 series. The AQAP 2000 series is structured to be the NATO requirements for an Integrated Systems Approach to Quality through the Life Cycle, to be selected and applied for all nations and contractual relationships, and to match tailoring processes embodied in modern standards.

1.2 AQAP 2000 series structure

1.2.1 The AQAP 2000 series of contractual AQAPs is structured as a series of stand alone publications. Some of which subsume pre-selections of ISO 9001:2008 chapter 7. NATO has made these pre-selections after careful deliberation.

1.2.2 The structure allows the most appropriate publication to be selected and invoked in a contract, thus allowing the Acquirer and the Supplier to target resources efficiently thereby enhancing value for money. The relevant publication of the AQAP 2000 series can be invoked in contracts during any of the stages of a systems life cycle (See Annex A.). The publications of the AQAP 2000 series will allow for the continuous application of a quality management process to the products and all life cycle processes during the stages of life cycle covered by the contract.

1.2.3 Structure of the AQAP numbering:

First digit:	Indicates part of AQAP 2000 series	
Second digit:	Indicates purpose:	0 = guidance 1 = NATO Quality requirements for Hardware, Materiel and related processes 2 = NATO Quality requirements for software
Future possible placeholders:		3 = *NATO Quality requirements for Systems* *X* = *Evolution*
Third and fourth digits:	Indicates numbering of Publication	

AQAP 2000:	The NATO Policy on an Integrated Systems Approach to Quality through the Life Cycle
AQAP 2009:	NATO Guidance on the use of the AQAP 2000 series
AQAP 2050:	NATO Project Assessment Methodology
AQAP 2070:	NATO Mutual Government Quality Assurance (GQA) Process
AQAP 2131:	NATO Quality Assurance Requirements for Final Inspection
AQAP 2130:	NATO Quality Assurance Requirements for Inspection and Test
AQAP 2120:	NATO Quality Assurance Requirements for Production

AQAP 2110:	NATO Quality Assurance Requirements for Design, Development and Production
AQAP 2105:	NATO Requirements for Deliverable Quality Plans
AQAP 2210:	NATO Supplementary Software Quality Assurance Requirements to AQAP 2110

1.2.4 Figure 1 shows the present structure of AQAP 2000 series:

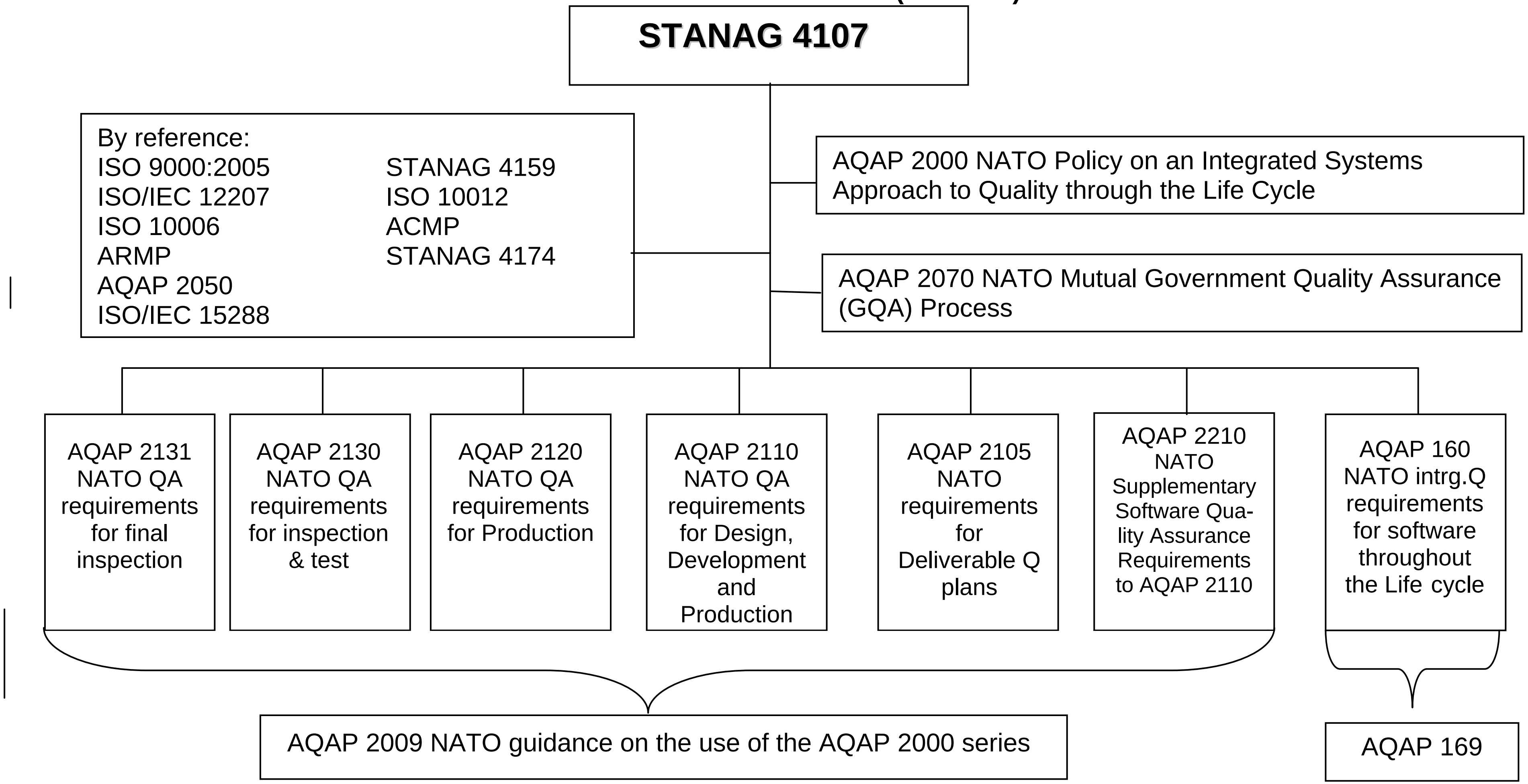
STANAG 4107
By reference:
ISO 9000:2005
ISO/IEC 12207
ISO 10006
ARMP
AQAP 2050
ISO/IEC 15288
STANAG 4159
ISO 10012
ACMP
STANAG 4174
AQAP 2000 NATO Policy on an Integrated Systems Approach to Quality through the Life Cycle
AQAP 2070 NATO Mutual Government Quality Assurance (GQA) Process
AQAP 2131 NATO QA requirements for final inspection
AQAP 2130 NATO QA requirements for inspection & test
AQAP 2120 NATO QA requirements for Production
AQAP 2110 NATO QA requirements for Design, Development and Production
AQAP 2105 NATO requirements for Deliverable Q plans
AQAP 2210 NATO Supplementary Software Qua-lity Assurance Requirements to AQAP 2110
AQAP 160 NATO intrg.Q requirements for software throughout the Life cycle
AQAP 2009 NATO guidance on the use of the AQAP 2000 series
AQAP 169

Figure 1

1.3 Scope of the AQAP 2000 series.

1.3.1 The AQAP 2000 series contains Policy, Guidance and Contractual publications. The NATO contractual Quality Assurance requirements, subsume ISO 9001:2008. ISO 9001:2008 itself uses the new concept in Quality Management standards of permissible exclusions. This approach has given rise to an escalating scale of NATO requirements published in a series of publications.

1.3.2 The principle of escalation means that in low risk products few quality assurance requirements will be imposed, while for higher risk products increased quality assurance will be imposed. This basis will be found in NATO's policy publication, AQAP 2000, on an Integrated Systems Approach to Quality through the Life Cycle.

1.3.2.1 *AQAP 2000 Policy on an Integrated Systems Approach to Quality through the Life Cycle* (guidance type):
This policy provides the framework for an integrated system approach to achieve quality in products and services throughout the life cycle. For further details, see Annex A.

1.3.2.2 *AQAP 2009 NATO Guidance on the use of AQAP 2000 series* (guidance type):
This publication provides guidance on the structure, interpretation of the NATO additional requirements and the use of the AQAP 2000 series.

1.3.2.3 *AQAP 2131 NATO Quality Assurance Requirements for Final Inspection* (contractual type):
The purpose of AQAP 2131 is to give the GQAR and/or Acquirer the right of access to the Supplier and that the Supplier's final inspection provides objective evidence that the product conforms with contract requirements.
This publication should be made a requirement of the contract when conformance with the requirements can be demonstrated satisfactorily on receipt of the final product.

1.3.2.4 *AQAP 2130 NATO Quality Assurance Requirements for Inspection and Test* (contractual type):
This publication defines the requirements for the Supplier's Quality Management System and associated requirements for minimum Configuration Management. A system needs to be established, documented, applied, maintained, assessed and improved, and/or evaluated, in accordance with requirements contained in the publication.
This publication is used when the design related to the product is established and conformance with requirements can be demonstrated solely on the basis of inspection, during the manufacturing and processing of materials, parts, components, sub-assemblies and the final product, as appropriate.

1.3.2.5 *AQAP 2120 NATO Quality Assurance Requirements for Production* (contractual type):
This publication defines the requirements for the Supplier's Quality Management System and associated requirements for Configuration Management capable of producing objective evidence that processes and product conforms to contract

requirements whether manufactured or processed by the Supplier or Sub-suppliers. This publication should be made a requirement of the contract when the design related to the product is established. Usually the complexity of the product requires comprehensive quality control and the need for servicing may arise. Life, reliability and other quality characteristics can only be ensured by the Supplier, throughout the manufacturing or processing phases, by use of materials and parts of proven quality and by means of detailed work instructions, process control and procedures whose purpose is to permit the earliest possible corrective action.

1.3.2.6 *AQAP 2110 NATO Quality Assurance Requirements for Design, Development and Production* (contractual type):
This publication defines the requirements for the Supplier's Quality Management System and associated requirements for Configuration Management when design activities are included in the contract.
This publication should be made a requirement of the contract when requirements are specified in terms of functional and technical requirements and the Supplier is, therefore, responsible for design, development and production.

1.3.2.7 *AQAP 2210 NATO Supplementary Software Quality Assurance Requirements to AQAP 2110* (contractual type):
This publication specifies the project oriented requirements to manage the quality of the software development process. Both managerial and technical processes must be addressed in order to:

a. establish visibility of the software development process;
b. detect software quality problems as early as possible in the software life cycle;
c. provide quality control data for the timely implementation of effective corrective action;
d. confirm that quality is engineered in during the software development process;
e. provide assurance that the software produced conforms to contractual requirements;
f. ensure that appropriate software support is provided to activities at system engineering level, if required by the contract; and
g. ensure that the safety and security conditions of the project are addressed.

AQAP 2210 is intended for use with AQAP 2110 as a software specific and project oriented supplement.

The method for selecting the appropriate AQAP is shown (schematic) in figure 2.

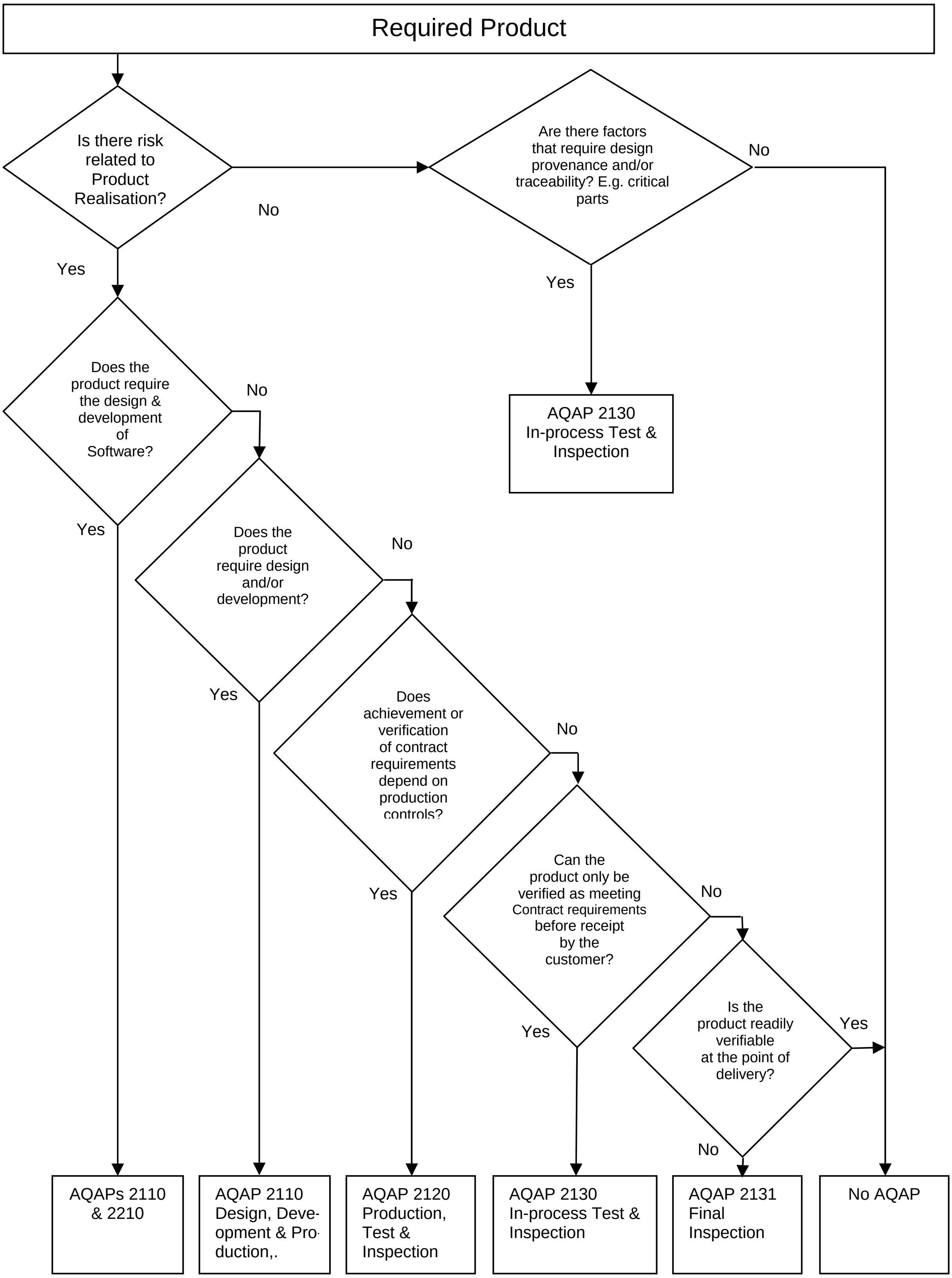

Figure 2
Possible process flow indicated

1.4 Purpose of this guidance

This guidance will be of use to personnel responsible for contract preparation, contract surveillance and/or evaluating a Supplier for compliance to the appropriate AQAPs. It will also contribute to common understanding of the requirements between Suppliers and the personnel responsible for Government Quality Assurance and between National Quality Assurance Authorities (NQAA) when Government Quality Assurance (GQA) is to be performed within the provisions of STANAG 4107 "Mutual Acceptance of Government Quality Assurance and usage of the Allied Quality Assurance Publications".

1.5 Applicability

This AQAP must not be used as a contractual document. Its content has no contractual status nor does it supersede, add to, cancel or redefine any of the requirements in a contract. Copies of this guide may be made available to Suppliers to facilitate their understanding of AQAPs and as a guide for use in the review of their own systems or those of their Sub-suppliers.

NOTE: Guidance on ISO 9001:2008 is not provided in this publication as this is considered a National matter. Guidance from ISO 9004:2000 may be used for improvement of the Quality Management System.

1.6 Supply chain

AQAP role	ISO equivalent	
Acquirer	Customer	
Supplier	Organisation	Customer
Sub-supplier	Supplier	Organisation
….		Supplier

Acquirer	Governmental and/or NATO Organisations, that enter into a contractual relationship with a Supplier, defining the product and quality requirements
Supplier	Organisation that acts in a contract as the provider of products to the Acquirer.
Sub-supplier	Provider of products to the Supplier.

ANNEX A - POLICY PAPER

1.0 General

This policy paper provides the framework for an integrated systems approach to achieve quality of products and services throughout the life cycle. This approach establishes a structured process that addresses both managerial and technical elements and is based on the following:

1.1 An organisation must establish, manage and conduct processes in order to effectively set and reach its goals.
1.2 Hardware, software, human interaction and other elements are integrated into a system and the corresponding disciplines are harmonised;
1.3 The interests of all the interested parties in the life cycle, including the natural environment, are taken into account. The related needs are translated into appropriate functional and technical requirements;
1.4 The life cycle participants use a common framework and terminology to create and manage the system; and
1.5 The quality management process and the associated activities are applied continuously to the products and all life cycle processes.

2. Concepts

This approach is based on the following concepts:

2.1 Life Cycle Phases

The life cycle (ranging from conception through disposal) of the system is divided into well-defined phases that provide a framework for the project(s).

2.2 Life Cycle Processes

In each phase of the life cycle there are processes which may be organisation wide or specific to a project. The organisations of the life cycle participants should establish, document, maintain and improve effective and economical processes for each life cycle phase. The quality management process includes the activities of planning, review, audit, measurement and monitoring, verification, validation, corrective and preventive action.

2.3 The Life Cycle Participants

The participants directly involved in processes and associated activities throughout the life cycle phases can be expressed in generic terms: e.-g., the user, the Acquirer, the owner, the Supplier, and the personnel with responsibility for Government Quality Assurance (GQA). Since quality is a shared responsibility, the responsibilities should not be allocated exclusively to any one of the participants.

2.4 The use of risk based tasking

To obtain a cost effective use of the resources, GQA should only be requested when areas of risk, associated with, for example, the product or the Supplier, have been identified.

2.5 Communication and information

It is important that information from all interested parties is exchanged continuously in order to take all interests into account as early as possible in the life cycle.

2.6 Project Management Teams

It is considered important that Project Management Teams (PMTs) are set up as early as possible and extended throughout the entire life cycle[1].

These teams are cross-functional and the team members should have complementary skills and be committed to common objectives. The PMTs should have the delegated authority to trade off performance, time, cost, and risk, as appropriate, while maintaining a focus on quality.

2.7 Quality management system

The organisations of the life cycle participants should establish, document, assess and improve an effective and economical quality management system. The quality management system is that part of the organisation's management system that establishes the quality policy and quality objectives and then focuses on the achievement of results according to the quality objectives.

The quality management policy and objectives should provide a way of effectively managing resources and life cycle processes based on the participation of all members of the organisation. This approach aims at long-term success by creating a focus on continuous improvement, customer satisfaction and benefits to all interested parties.

Assessment provides an insight into an organisation which indicates the areas where corrections are required and opportunities for improvements exist.

In order to survive in an environment where businesses are facing increasing competitive challenges every day, organisations are finding new ways to extend/augment their competitive edge and measure how far they are from "Performance Excellence" as it is expressed today. The use of internationally recognised "life cycle process models", "capability maturity levels" and the use of "assessment type(s)" depending on the need is seen as a trend.

2.8 The Use of International Standards

NATO AC/327 has decided to use international standards where they are appropriate. NATO Quality management requires that the AQAP document and related international standards must be used to form a complete standard for NATO use. The NATO community should seek to influence evolving international standards.

[1] If the project e. g. is only a "development project", the Project Management Team (PMT) can discontinue at the end of the "Development" phase.

2.9 The Use of NATO Publications

Since defence materiel may be purchased or developed as multinational projects, a set of NATO documents (including Allied Quality Assurance Publications) should be maintained and used for the mutual benefit of NATO and member nations.

ANNEX B - NATO GUIDANCE ON THE USE OF AQAP 2131

1. General

This section is considered self-explanatory.

2. Requirements

2.1 Access to Supplier and support for GQA activities

2.1.1 These requirements emphasise the Supplier's responsibility to provide unrestricted access for the Government Quality Assurance Representative (GQAR) where part of the contracted work is being performed.
The Supplier is solely responsible for the quality of all products he provides to the Acquirer.

2.2 Products presented by the Supplier for release

This section is considered self-explanatory.

2.3 Control of non-conforming products

The GQAR and/or Acquirer and the Supplier should agree upon the segregation processes suggested by the Supplier. The Supplier carries the responsibility for the proper identification, control and use of those processes.

2.4 Acquirer supplied products

This section is considered self-explanatory.

2.5 Final Inspection

If the format of the COC is not defined by the contract, a suitable example is available in AQAP 2070. This form contains the minimum set of information needed.

ANNEX C - NATO GUIDANCE ON THE USE OF AQAP-2110, AQAP-2120 AND AQAP-2130

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Section | Page number

ANNEX C - NATO GUIDANCE ON THE USE OF AQAP-2130, AQAP-2120 AND AQAP-2110

1.0 General

This section is considered self-explanatory.

2.0 Compliance with this publication

This section is considered self-explanatory.

3.0 Composition of requirements in AQAP 2110, 2120 and 2130

This section is considered self-explanatory.

4.0 Quality Management System

4.1 General requirements

NATO guidance:

Throughout the AQAP 2130, AQAP 2120 and AQAP 2110 the phrase "Quality Management System" or just "System" is used. This identifies the need to establish quality policy and quality objectives and to achieve those objectives.

AQAPs require that the System shall be established, documented, assessed and improved.

To "establish" means to set up on a permanent basis for the duration of the Contract.

To "document" means to describe the elements of the System in writing in sufficient detail that it is comprehensible to the personnel controlling and operating it. The document may be in hard copy or stored electronically.

To "assess" means that the System, necessary to satisfy the contract requirements, is audited on a regular basis, in a controlled way.

To "improve" means those experiences gained are reflected in updates of the System.

An "effective" System provides confidence in the Supplier's capability that only an acceptable product is delivered to the Acquirer in a timely manner. It includes the planning, establishment and implementation of the activities and controls required to achieve this end at all stages of the work from preliminary design through manufacture and acceptance to the provision of any required after-delivery services. Recognising that most functions of management affect quality in some manner and to some degree, each function is analysed to identify the factors that affect quality and to ensure that these factors are controlled. An appreciation of the effectiveness of the implementation of the System can be obtained in many ways, such as:

- Demonstration of top management commitment
- Self assessment
- Continual improvement
- User/Acquirer feedback
- Evaluation of the severity of non-conformities detected at the Supplier's facility
- Trend analysis

An "economical" System has as its goal, not only the effective use of resources but also, the minimising of repair, rework, scrap and failure costs. To achieve this, a prime objective of the System is the prevention of non-conformities, especially during the design and development stages. The cost of preventing non-conformities is normally much less than the cost of failures, rework and corrective action. Excessive amounts of non-conforming products are symptomatic of an out-of-control situation. Non-conforming products may also be a hidden factor in the cost of the product to the Acquirer.
AQAPs stipulate, in objective terms, the requirements a Supplier shall meet to control quality. They do not stipulate the exact procedures or methods to be used by the Supplier for this purpose. The procedures employed, however, are subject to evaluation by the GQAR and/or Acquirer.

4.2 Documentation requirements

4.2.1 General

No NATO guidance.

4.2.2 Quality manual

NATO guidance
All departments of a Supplier's organisation concerned with the contract contribute to satisfying the requirements of the AQAPs and therefore, their activities, which affect quality, are to be integrated in and co-ordinated through the System. The documentation of the System describes the structure of the organisation, the functions and interrelationships (hierarchical and functional) of those who are involved in operating it; assigns specific responsibilities for operations and decisions and confers the necessary authority on those concerned.

4.2.3 Control of Documents

No NATO guidance.

4.2.4 Control of Records

No NATO guidance.

5.0 Management responsibility

5.1 Management commitment

No NATO guidance.

5.2 Customer focus

No NATO guidance.

5.3 Quality Policy

No NATO guidance

5.4 Planning

NATO guidance

The Quality Plan should be developed in conjunction with other project-related planning, e.g. as a sub-set of the Project Management Plan. Where functions and processes are clearly defined in the Supplier's Quality Manual, a cross-reference is recommended. The QP should include the contract specific description of the organisational structure.

Details of the Quality Plan may be, but are not limited to:

- Organisational structure including the assignment of responsibilities and authorities of, for instance, the project manager, the project quality manager and the organisational units of the Supplier and Sub-suppliers.
- The specific operational functions of the Supplier's Quality Manual including the identification and control of all operational interfaces including those with the Sub-suppliers.
- The application of contract related procedures, processes and instructions for activities such as:
  - Award of Design & Development sub-contracts.
  - Procurement and qualification processes for new components.
  - Configuration management.
- Introduction and qualification of new methods, processes and procedures for the Design & Development process, production, verification etc.
- Analysis, evaluation and correction of problems/non-conformities.
- Fulfilment of specific requirements such as:
  - Reliability/maintainability/interoperability/serviceability.
  - Technical, weapon and human safety.
  - Ergonomics.
  - Environmental protection.
- Preparation of inspection and test specifications for acceptance tests and for their approval as necessary.
- The design, development and production verification programme for the complete product including:
- Theoretical/analytical demonstration.
  - Design review.
  - Functional test.
  - Environmental test.
  - Acceptance test.
- These verification activities should be coordinated and indicated in a flowchart, which includes the full verification test programme for the product.
- Methods for notification and submittal of documents required by the contract to the GQAR and/or Acquirer.

In order to maintain customer focus when planning for the product realisation, the Supplier should consider conducting the following as appropriate:

- An analysis of ISO 9001:2008 7.2.1 Determination of requirements related to the product
- Identification of risks including Supplier's management risks.

- Functional analysis of needs, classification, weighting.
- Restrictions in use, ergonomics, maintenance, interoperability, and training.
- Research of needs (customer expectations, perceived customer needs and expressed customer needs).
- Detecting unnecessary and expensive constraints.
- Detecting pitfalls, process and technological dead-ends.
- Allocation of resources.
- Minimising any harmful and detrimental effects on the environment.

Any special or unusual requirements should be identified. When there are such requirements are found, there is a need to study, plan for and schedule the provision of appropriate operations, processes and techniques and identify means for testing and proving conformance with the requirement.
All the above mentioned information may be organised in a set of management plans (Project Management Plan, Development Plan, Quality Plan etc.) which enables the Acquirer to remain informed about difficulties, pitfalls, uncertainties and risks, and the implementation of specific measures or means which could result in an update of the contract.

5.4.1 Quality objectives

No NATO guidance

5.4.2 Quality Management System Planning

No NATO guidance

5.5 Responsibility, authority and communication

5.5.1 Responsibility and authority

No NATO guidance

5.5.2 Management representative

NATO guidance
It is important that the management representative is a member of the Supplier's senior management with executive responsibilities and acts as the Supplier’s focal point for the resolution of quality matters raised by the GQAR and/or Acquirer.

5.5.3 Internal communication

NATO guidance
In order to ensure proper communication, the Supplier should establish communications processes, which ensure the adequate level of information is supplied to the GQAR and/or Acquirer. This is considered to be the level necessary for the GQAR and/or Acquirer to fulfil the assigned Government Quality Assurance activities.

5.6 Management review

5.6.1 General

No NATO guidance

5.6.2 Review input

No NATO guidance

5.6.3 Review output

No NATO guidance

6.0 Resource management

6.1 Provision of resources

No NATO guidance

6.2 Human resources

6.2.1 General

No NATO guidance

6.2.2 Competence, training and awareness

No NATO guidance

6.3 Infrastructure

No NATO guidance

6.4 Work environment

No NATO guidance

7.0 Product realisation

NATO guidance

When AQAP 2130, 2120 or 2110 are required, the elements of ISO 9001:2008 chapter 7 apply in accordance with the table below:

ISO 9001:2008 element	AQAP 2130	AQAP 2120	AQAP 2110
7.1 Planning of product realisation	Partially	YES	YES
7.2 Customer-related processes	YES	YES	YES
7.3 Design and development	NO	NO	YES
7.4.1 Purchasing process	YES	YES	YES
7.4.2 Purchasing information	YES	YES	YES
7.4.3 Verification of purchased product	YES	YES	YES
7.5.1 Control of production and service provision	YES	YES	YES
7.5.2 Validation of processes for production and service provision	NO	YES	YES
7.5.3 Identification and traceability	YES	YES	YES
7.5.4 Customer property	YES	YES	YES
7.5.5 Preservation of product	YES	YES	YES
7.6 Control of monitoring and measuring equipment	YES	YES	YES
7.7 Configuration management (CM)[2]	YES[3]	YES[4]	YES
7.8 Reliability and Maintainability[5]	NO	NO	YES

7.1 Planning of product realisation

For details, see this publication §5.4.

NATO guidance:

In order to maintain customer focus, planning for the product realisation, the Supplier should consider conducting the following as appropriate:
- An analysis of ISO 9001:2008 7.2.1 Determination of requirements related to the product.
- Identification of risks including Supplier's management risks.
- Functional analysis of needs, classification, weighting.
- Restrictions in use, ergonomics, maintenance, interoperability, and training.
- Research of needs (customer expectations, perceived customer needs and expressed customer needs.
- Detecting unnecessary and expensive constraints.
- Detecting pitfalls, process and technological dead-ends.
- Allocation of resources.
- Minimise any harmful and detrimental effect on the environment.

Any special or unusual requirements should be identified. When such requirements are found, there is a need for study, planning and scheduling to provide appropriate

[2] NATO addition not in ISO 9001:2008
[3] AQAP 2009 elements apply only as required by AQAP 2130 §7.7.1
[4] AQAP 2009 elements apply only as required by AQAP 2120 §7.7.1 and §7.7.2
[5] NATO addition not in ISO 9001:2008

operations, processes and techniques and the means for testing and proving conformance with the requirement.
All the above mentioned information may be organised in a set of management plans (project management plan, development plan, quality plan etc.) which enable the Acquirer to remain informed about difficulties, pitfalls, uncertainties and risks, and implementation of specific measures or means, and which could result in an update of the contract.

7.2 Customer-related processes

No NATO guidance

7.2.1 Determination of requirements related to the product

No NATO guidance

7.2.2 Review of requirements related to the product

No NATO guidance

7.2.3 Customer communication

NATO guidance
Level of information should be determined between GQAR and/or Acquirer and Supplier. As AQAPs give the framework for contractual quality assurance requirements, it is essential that the GQAR and/or Acquirer and the Supplier establish a relationship, based on the contract and the Supplier's normal "way of doing business", in order to ensure that the necessary information is received by the GQAR and/or Acquirer in a timely manner.

7.3 Design and development

No NATO guidance

7.3.1 Design and development planning

No NATO guidance

7.3.2 Design and development input

No NATO guidance

7.3.3 Design and development outputs

No NATO guidance

7.3.4 Design and development review

No NATO guidance

7.3.5 Design and development verification

No NATO guidance

7.3.6 Design and development validation

No NATO guidance

7.3.7 Control of design and development changes

No NATO guidance

7.4 Purchasing

7.4.1 Purchasing process

NATO guidance
The GQAR/ and or the Acquirer should be aware of what processes the Supplier might outsource and how such outsourcing is managed. Outsourcing agreements may not always be contract specific, and might be used at short notice by the Supplier.

7.4.2 Purchasing information

NATO guidance
When the Supplier determines that work has to be sub-contracted to a Sub-supplier, the Supplier should make such information available to the GQAR and/or Acquirer as early as possible. This enables the GQAR and/or Acquirer to consider the need for GQA at the Sub-supplier's facility at an early stage.

7.4.3 Verification of purchased product

No NATO guidance

7.5 Production and service provision

7.5.1 Control of production and service provision

No NATO guidance

7.5.2 Validation of processes for production and service provision

No NATO guidance

7.5.3 Identification and traceability

No NATO guidance

7.5.4 Customer property

No NATO guidance

7.5.5 Preservation of product

No NATO guidance

7.6 Control of monitoring and measuring equipment

No NATO guidance

7.7 Configuration management (CM)

More information can be found in STANAG 4427 & STANAG 4159.

7.7.1 Configuration Management (CM) requirements

No NATO guidance

7.7.2 Configuration Management Plan (CMP)

No NATO guidance

7.8 Reliability and Maintainability

No NATO guidance

8.0 Measurement, analysis and improvement

8.1 General

No NATO guidance

8.2 Monitoring and measurement

8.2.1 Customer satisfaction

No NATO guidance

8.2.2 Internal audit

No NATO guidance

8.2.3 Monitoring and measurement of processes

No NATO guidance

8.2.4 Monitoring and measurement of product

NATO guidance
If the format of the Certificate of Conformity (COC) is not defined by the contract, a suitable example is available in AQAP 2070. This form contains the minimum information requirements for a COC.

8.3 Control of non-conforming product

NATO guidance
Acquirers must ensure that the contractual requirements for dealing with concessions are clearly stated in the contract. Acquirers should be aware that national practice of the country placing the contract and the nation where the contract will be performed may be different with respect to handling concessions and should therefore clearly set out the required actions.

8.4 Analysis of data

No NATO guidance

8.5 Improvement

8.5.1 Continual improvement

No NATO guidance

8.5.2 Corrective action

No NATO guidance

8.5.3 Preventive action

No NATO guidance

9.0 NATO additional requirements

9.1 Access to Supplier and Sub-suppliers and support for GQA activities

9.1.1 These requirements emphasise the Supplier's responsibility to provide unrestricted access and assistance for the Government Quality Assurance Representative (GQAR) where part of the contracted work is being performed.
The Supplier is solely responsible for the conformance to requirements, of products provided to the Acquirer.
The Supplier should ensure that the GQAR and/or Acquirer is provided with suitable office space for administrative purposes and with adequate workspace, when required for verification purposes. Accommodation excludes travel expenses, lodging, subsistence or entertainment. Facilities and assistance include, but are not limited to:

- Access by the GQAR and/or Acquirer to those areas where, and at the time when, the contract work is in progress.
- Assistance in the documentation, audit and release of materiel and services where appropriate.
- Information necessary for the proper conduct of Government Quality Assurance.

9.2 Products for release to the Acquirer

This section is considered self-explanatory.

ANNEX D - NATO GUIDANCE ON THE USE OF AQAP 2105 FOR DELIVERABLE QUALITY PLANS

1.0 General

1.1 Introduction

AQAP 2009 Annex D is NATO guidance for the use of AQAP 2105 NATO Requirements for Deliverable Quality Plans to be used in contracts.

1.2 Purpose

This paragraph is considered self-explanatory.

1.3 Applicability

This paragraph is considered self-explanatory.

1.4 References

The documents referenced in this Annex are defined below.

AQAP 2105	NATO Requirements for Deliverable Quality Plans
AQAP 2110	NATO Quality Assurance Requirements for Design, Development and Production
AQAP 2120	NATO Quality Assurance Requirements for Production
AQAP 2130	NATO Quality Assurance Requirements Inspection and Test
AQAP 2070	NATO Mutual Government Quality Assurance (GQA) Process

1.5 Definitions

The definitions given in AQAP 2105 should apply.

1.6 Acronyms

The acronyms given in AQAP 2105 should apply.

2.0 Structure of AQAP 2105

This paragraph is considered self-explanatory.

3.0 Establishment of the Deliverable Quality Plan

3.1 Preparation

The Deliverable Quality Plan should be developed in conjunction with other project-related planning, e.g. as a sub-set of the Project Management Plan and should be prepared in a narrative form, supported by diagrams, activity and process flow-charts etc. as appropriate. The Deliverable Quality Plan is expected to be prepared in a user-friendly format. The sequence of processes and individual activities may be included in an overview and presented as a table or flow chart.
The activities specified within Deliverable Quality Plans should be stated unambiguously and concisely so that their intent is clear, objective and are possible to implement. The Deliverable Quality Plan should reflect the supplier’s continual

improvement process. The supplier is expected to identify measurable indicators, analyze data and initiate corrective and/or preventive action.
The extent of the Deliverable Quality Plan is expected to adapt to the scope of the contract, product complexity, technology/processes, experience with corresponding products, duration of the project, work share between supplier and sub-suppliers, and the applicability of suppliers quality management system to the contractual requirements.
The supplier should ensure that the Deliverable Quality Plan (hardcopy, computerized i.e.) and referred documents have got a format that allows satisfactory accessibility for evaluation by the Acquirer and/or GQAR.

3.2 Approval/Submission

Supplier authorized personnel, e.g. the Project Manager, the Management Representative or the Quality Manager, should be appointed to approve the Deliverable Quality Plan.

3.3 Implementation

The approved Deliverable Quality Plan should be implemented in advance of the applicable activities by the supplier's organization through the Life Cycle Phases, until closure of the contract.

3.4 Reviews, Revisions and Change Control

The supplier is expected to revise the Deliverable Quality Plan when necessary.
The Deliverable Quality Plan is to be amended/reissued when contractual or supplier related changes occur, especially prior to the start of activities not already included in the current version.
Also the Deliverable Quality Plan is to be amended/reissued when new risks are identified or if identified risks substantially change, that requires the supplier to take mitigating action.
The supplier is expected to ensure that revisions are properly implemented.

4.0 Content of the Deliverable Quality Plan

4.1 General

The Deliverable Quality Plan is expected to specify how the supplier ensures necessary resources (manpower, facilities, training, equipment etc.) needed for carrying out the required activities, including confirmation that these resources are available for use on the contract. The Deliverable Quality Plan should include a reference to risk analysis and risk mitigation activities and describe the methods of risk management. The Deliverable Quality Plan should refer to a Risk Plan/Risk Management Plan, if such a plan is required by the contract or self-imposed by the supplier.
If elements of requirements for quality to be applied to the contract are considered not applicable, the Deliverable Quality Plan should include a rationale for their non-applicability. Similarly, where contracts require separate Deliverable Quality Plans for a specific phase of a contract, the Deliverable Quality Plan should include the rationale for the non-applicability of quality related contract requirements applicable for those phases.

The Supplier should determine the format/layout of the Deliverable Quality Plan. The overall structure may in principle be as shown in figure 1 below.

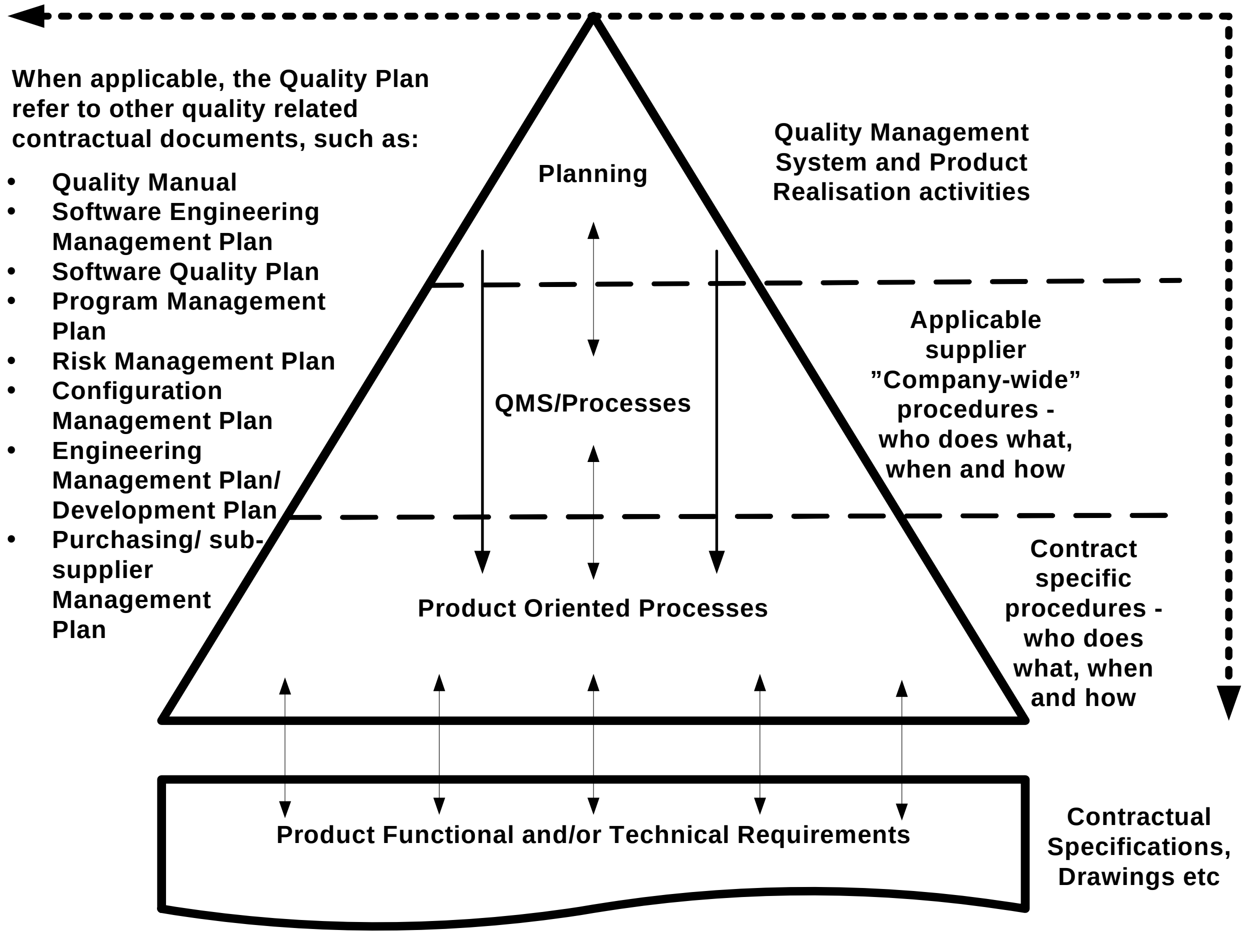

Figure 1 illustrates the overall structure of a Quality Plan according to this AQAP

4.2 Project Description

An abstract of special contractual conditions, requirements, risks, challenges and pitfalls should be provided. Contract related sub-suppliers and the facilities where contractual activities are performed and their related products should be listed.

4.3 Acronyms, Abbreviations and Definitions

This paragraph is considered self-explanatory.

4.4 Organization and Responsibilities

The supplier is expected to describe how requirements for management review should be fulfilled. It should be clearly stated how requirements related to management commitment, customer focus and quality policy are met.

4.5 Resource Management

If applicable, confirmation of the availability of resources may be given as a general statement for all activities.

4.6 Quality Management System Activities

The Deliverable Quality Plan should describe how the requirements are flowed down to the places where work is being performed e.g. through work instructions, computerized production management system, work orders etc. Performance of work is expected to be continuously measured and reported to the supplier's management.

4.6.1 Processes (General requirements)

Quality metrics should be used for monitoring the effectiveness of the Quality Management System performance under the Deliverable Quality Plan.
An audit plan that covers contract specific processes and activities, including those at sub-supplier's, is required (see also 4.8.2).

4.6.2 Documentation requirements

The Quality Manual being used as part of the fulfilment of this AQAP 2105, ref below paragraph 4.10.2 is expected to be maintained and controlled during the contract period. The Deliverable Quality Plan should include how the required and/or involved plans, documents, procedures etc should be controlled. The Deliverable Quality Plan should include how records should be established and maintained, and their storage time.

4.7 Product Realization Activities

This paragraph is considered self-explanatory.

4.7.1 Planning of product realization

The output of these planning activities should demonstrate product conformance to contract requirements e.g. processes needed, requirements for the product, criteria for product acceptance and the method of inspection, verification, validation etc. The relevant quality activities for delivery, installation and putting into operational order (commissioning) form part of the requirement.

4.7.2 Customer related processes

This paragraph is considered self-explanatory.

4.7.3 Design and development

Design and development only applies when AQAP 2110 is in the contract. How design and development inputs to product requirements are determined and recorded should be included, as well as how the design and development outputs are provided, verified, and approved. Moreover, the processes and plans for performing systematic design and development review, verification and validation in order to ensure that the product meets the requirements should be included. The determination of how the required test methods and how tests should be carried out to demonstrate product conformity forms part of the requirement. How design and development changes should be controlled forms part of the requirement.

Specific risks associated with design and development should be listed and addressed.

4.7.4 Purchasing including control of sub-suppliers

The requirement includes how the supplier controls that relevant purchasing information and requirements are flowed down to sub-suppliers, and how verification that the purchased product meets the requirements should be carried out. Sub-suppliers requirements are to be documented. Contract specific measures for the control of the sub-supplier are to be planned. This includes a review/audit plan. Contract specific requirements for incoming inspection of products and/or services should be documented.

4.7.5 Production and service provisioning

The requirements include how validation of processes for production and service provision should be carried out to demonstrate their ability to achieve planned results. Procedures for identification of the product should be included. If product traceability is required, procedures for control and record of the unique identity of the product should be defined. The procedures of exercising care with customer property should be documented. The methods used to preserve the conformity of the product should be described. Contract specific requirements for storage, preservation and handling should be documented.

4.7.6 Control of monitoring and measuring devices

This paragraph is considered self-explanatory.

4.7.7 Configuration management

This paragraph is considered self-explanatory.

4.7.8 Reliability and Maintainability

Only applies if specifically required by contract. This paragraph is considered self-explanatory.

4.8 Measurement, Analysis and Improvement Activities

This paragraph is considered self-explanatory.

4.8.1 Customer satisfaction

The requirement includes demonstration of product conformity to customer requirements, processes and products, handling of non-conformities, customer claims etc.

4.8.2 Internal audit

This paragraph is considered self-explanatory.

4.8.3 Certificate of Conformity

The requirement is applicable when the supplier is required to provide Certificate of Conformity at product release. An example of a suitable form is found in AQAP 2070 Annex B5. A specific format of a Certificate of Conformity should be defined in the contract.

4.8.4 Control of non-conforming product

This paragraph is considered self-explanatory.

4.8.5 Analysis of data

This paragraph is considered self-explanatory.

4.8.6 Improvement

This paragraph is considered self-explanatory.

4.9 NATO Additional Requirements

The requirement includes how information required by the GQAR and/or Acquirer should be provided.
The requirement includes how the supplier should perform review, inspection, verification, validation and test activities to demonstrate product conformity.

4.10 Referenced Documents

4.10.1 Contractual documents

Examples of other plans and quality related contractual documents that need to be referred are:

- Program Management Plan
- Risk Management Plan
- Configuration Management Plan
- Engineering Management Plan
- Development Plan
- Software Engineering Management Plan
- Software Deliverable Quality Plan
- Purchasing/sub-supplier Management Plan
- Test Plans

4.10.2 Supplier internal quality related documents

The references to the supplier's Quality Management System could be either partially or fully, e.g. the Deliverable Quality Plan should cross-reference the Quality Manual where functions and processes are clearly described. Other internal contract specific documents should be listed, e.g. contract specific procedures – who does what, when and how.

4.10.3 Other documents

Other relevant documents such as, related plans, interface documents, procedures and documents, including those of sub-suppliers that contribute to the delivered product as specified in the contract, is to be listed.

4.10.4 Order of precedence

This paragraph is considered self-explanatory.

ANNEX E - NATO GUIDANCE ON THE USE OF AQAP 2210 NATO SUPPLEMENTARY SOFTWARE QUALITY ASSURANCE REQUIREMENTS TO AQAP 2110

FOREWORD

This document has been prepared and issued to provide information and guidance on the application of:

AQAP 2210 Edition 1	"NATO Supplementary Software Quality Assurance Requirements to AQAP 2110".

It aims to contribute to commonality of interpretation of these requirements between Supplier and Acquirer. It is not intended as a procurement document. Its content has no legal or contractual status nor does it supersede, add to or cancel any of the AQAP 2210 requirements. Copies of this document may be made available to industry to facilitate the use and understanding of AQAP 2210.

Each paragraph (and subparagraph) of AQAP 2210 is listed in this document only with his title in bold italic, followed by the related guidance (or by the sentence "No guidance required"). The guidance offers some suggestions as to subjects and factors to be considered".

Because of the multiplicity of conditions that can exist (dependent on such factors as the type of work or process, the devices used and the skill of personnel involved), this guidance should not be considered as all-encompassing nor should it be considered as imposing specific means or methods for meeting contract requirements. Managers must be aware that other means or methods could be used to meet these requirements.

The fundamental requirements of AQAP 2210 are mandatory for all software projects but the sub-level application of tools, methods and procedures can be implicitly tailored to the needs of individual projects.

This publication supersedes AQAP 159 Edition 2.

1.0 INTRODUCTION

1.1 Purpose

In addition to the requirements (a. through e.) strictly related to the software development process, this Publication also addresses the system-software relationship. The additional requirements (f. and g.) provide for the meaningful participation of software engineering in system engineering, and for addressing the system/software critical issues, like safety and security.

1.2 Applicability

No guidance required

1.3 Referenced Documents

No guidance required

1.4 Definitions and Acronyms

No guidance required

2.0 REQUIREMENTS

2.1 Software Quality System (SQS)

AQAP 2210 normally presumes the existence of a documented Software Quality System (SQS); the SQS includes not only the technical processes of software development but also the managerial processes.

The company wide SQS should address the range of software that the Supplier produces. Different methods, procedures and tools may be called for dependent on the type of application, size of project, number of people involved etc..

Review of the SQS is defined as a periodic, systematic and documented evaluation of the status and adequacy of the system elements. Such a review is conducted by or on behalf of top management to ensure that their objectives are reached, and to reveal non-conformances or irregularities in the system elements that require improvement.

For the SQS to be effective it should support the requirements of AQAP 2210 and any additional requirements imposed by the contract.

2.2 Project Software Quality Management Activities.

2.2.1 General

The Project Software Quality Management Activities should comprise the planning and implementation activities necessary for the successful execution of the project. The project activities mentioned in paragraphs 2.2.1 a, b, c and d are elaborated in paragraphs 2.2.3 through 2.2.7. Guidance on these activities is given on each sub-paragraph.

The depth of Project Software Quality Management Activities will be influenced by the contractual requirements and constraints like complexity, criticality, size, Acquirer involvement etc.. Therefore, as a prerequisite to the planning of the activities, the Supplier should undertake a formal contract review, to ensure all requirements and constraints are clearly defined and understood.

Evaluation of the activities by the Acquirer, should initially make use of objective evidence of the Supplier's own reviews. Where no objective evidence exists that such reviews have been conducted, it should be regarded as a serious quality system shortcoming and consequential risk.

2.2.2 Software Project Quality Plan (SPQP)

The SPQP and its contents should be recognized by Acquirer and Supplier as an indication of the understanding, commitment and compliance with the quality requirements of the contract.

Suppliers should begin to plan their quality related activities at the earliest possible phase of the contract.

The SPQP should address "contract specific" quality activities and risk areas, and should not be a reiteration of the SQS requirements as detailed in the Supplier's Quality Manual/Documentation. However, reference to these requirements in the SPQP may be necessary.

An SPQP may be required in response to an Invitation-to-tender/Request-for-proposal or under the contract, and should be prepared as a precursor to the software development process. See Annex E Part 2.

2.2.3 Identification and Review of Software Requirements

The software requirements may be derived from an expressed need (but not necessarily specified) by the Acquirer. Often the Supplier does not fully understand the Acquirer's problem and field of application; both contractual parties may work together to come to a formal contractual agreement on what the completed software must do.

The key to achieving effective software development is for both the Supplier and Acquirer to achieve a common understanding of the requirements. Therefore, the Supplier should ensure that the software requirements are described in such a way that their interpretation is not in doubt. Any omissions, misunderstandings or inconsistencies in the requirements should be addressed as early as possible in the software development process when they are easier to correct. The Supplier should also be satisfied that each requirement is defined in such a manner, that its achievement can be ultimately subjected to validation by a prescribed method. If this is in doubt, the matter should be brought to the attention of the Acquirer.

Often the software requirements are derived from higher level (i.e. system or sub-system requirements), in that case the task at hand consists in ensuring that all applicable higher level requirements have been correctly translated into software requirements and no new requirements have been introduced.

"Development constraints" are restrictions on the development process, which shift greater design responsibility to the Organisation setting the restrictions and need to be separated from the software product characteristics. Examples are : Design standards and conventions, languages, computer hardware and Acquirer supplied software.

Consideration should be given to the provision of training of personnel (both Acquirer and Supplier)

Definitions of software quality characteristics can be found in ISO/IEC 9126-1. These include functionality, reliability, usability, efficiency, maintainability and portability.

2.2.4 Management

2.2.4.1 Software Development Process

The software development has a strong impact on the quality of the software product. Software development models are simplified, abstract representations of a systematic approach to the software development process and, together with methods and tools, are the most important quality management elements.

Development models are a basis for detailed planning of project software quality management activities, including time and budget aspects, and support continuing improvement of the software development process.

The models structure the processes in logical and co-ordinated activities and tasks, and clearly relate development activities to the associated evaluation activities.

There are various types of development model e.g. Waterfall Model, Spiral Model etc.. AQAP 2210 gives the Supplier freedom in the choice of development model. The selection, definition and application of a specific model depends on the complexity, criticality and type of software to be developed. Whatever model is selected, it may be tailored to meet the specific contract requirements. However, the model should achieve the issues mentioned in paragraph 2.2.4.1 (a. through m.) of AQAP 2210. Where possible account should be taken of International or National standards defining these models.

It should be noted that whilst paragraph 2.2.4.1 is under the parent paragraph 2.2.4 (Management), the software development process also includes the technical processes described in paragraph 2.2.5 (Software Engineering) and paragraph 2.2.6 (Evaluation, Verification and Validation).

The model should clearly describe all the primary processes e.g. design, coding, testing etc., together with all the supporting and organizational processes e.g. project management, quality management, configuration management etc. undertaken throughout the software life-cycle. The description of the processes should not only include the identification of the tasks, but also the results, the start and end criteria and all the technical and managerial aspects. This is in order to reduce the complexity of the software development process, thus giving improved visibility, integrity and control of the software product itself.

A developed software integration strategy should include verification criteria for software units consistent with the software design and the prioritised software requirements

i. items are developed that ensure compliance with the software requirements allocated to the items;
ii software items are verified using the defined criteria;
iii software items defined by the integration strategy are produced;
iv results of integration testing are recorded;
v consistency and traceability are established between software design and software items
vi a regression strategy is developed and applied for re-verifying software items when a change in software units (including associated requirements, design and code) occur.

2.2.4.2 Organization

It is important to define the inter-relationship of organizational elements and groups, since activities of the development process may overlap and be executed iteratively. It is also important that the organizational structure indicates the co-operation and consultation between elements or groups, and also indicates the point(s) of contact with the Acquirer.

The degree of independence required for personnel performing evaluations/verifications/validations may depend upon the circumstances of the particular contract and/or Supplier concerned. In most instances suitably independent personnel may be found amongst the peers of those who developed the software product or performed the activity being subjected to evaluation, verification or validation. Sometimes it may be necessary to seek such personnel within other areas or organizations, internal or external to that of the Supplier. Where special independence requirements pertain, such as for safety critical software, these should be defined in the contract.

A determination of the necessary independence of the verification effort should be required based on the potential of an undetected error in a system or software for causing:

i death or personal injury
ii mission failure
iii catastrophic equipment loss or damage
iv the maturity of and risks associated with the software technology to be used
v financial loss

2.2.4.3 Non-conforming Software

Non-conforming software should be clearly identified as such and segregated from conforming software. Once "conforming" software is released and made available for use, e.g. to test areas or placed in the software library, its status should be clearly indicated and made known. Upon becoming non-conforming software e.g. after failing a test or a confirmed customer fault report, it should be segregated by clearly indicating its non-conforming status and taking appropriate action to control access to the software.

2.2.4.4 Corrective Action

The primary aim of the corrective action process should be to prevent the recurrence of a problem. It will also be a source of data for the review of the SQS. The analysis of problems should consider the effectiveness of any processes involved, be they technical or managerial.

2.2.4.5 Sub-supplier Management

The main Supplier is responsible for ensuring that sub-contracted products and services comply with the requirements and conditions of the main contract, even if the entire software package is sub-contracted.

The Supplier should select Sub-suppliers, using an appropriate procedure, on the basis of their ability to meet sub-contract requirements, including quality. The Sub-suppliers previously demonstrated performance should also be taken into account.

The Sub-supplier's SPQP should be related to the main Supplier's SPQP. This relationship of plans is necessary for configuration management and specifically to coordinate changes to configuration items.

2.2.4.6 Software Configuration Management (SCM)

In software development and/or maintenance, a strong relationship exists between SCM and software quality assurance. Without a disciplined SCM process, one of the means for quality assurance is missing.

Configuration management is a discipline for identifying, controlling tracking and auditing the versions of each software configuration item. SCM should be applied in a cost effective manner, in terms of organization, methods, tools and procedures, whilst ensuring the necessary integrity and traceability of the software product. Configuration management can be automated or undertaken by manual methods.

Temporary changes to delivered software, sometimes known as patches, should be strictly controlled. Where such changes are introduced into software they should be carried out in accordance with defined procedures. In any event, follow-up action should confirm the validity of the change and where appropriate formally introduce it under normal configuration management procedures.

2.2.4.7 Off-the-shelf Software

The reason why off-the-shelf software should be placed under Configuration Management is because it affects the integrity of the developed software. This is true, whether it is a component of the software under development or a tool to assist the development of such software.

Off-the-shelf software by definition includes "government furnished software" (see paragraph 1.4.1.6 of AQAP 2210). Government furnished software places constraints on the Supplier in terms of development freedom and responsibility.

The evaluation and validation of the ability of off-the-shelf software to perform the required functions may include such considerations as Intellectual Property Rights, licensing arrangement and configuration management controls.

The Supplier should be able to provide objective evidence (e.g. validation reports, configuration reports, etc) that the use of off-the-shelf software has been evaluated and is under control.

Documentation requirements for off-the-shelf software may include functional and interface specifications.

2.2.4.8 Non-deliverable Software

Examples of non-deliverable software which may be employed in the development of deliverable software are: emulators, test harnesses and driver programs, stub routines etc..

It is essential that all such software is placed under configuration management, since it directly affects the integrity of the developed software.

2.2.4.9 Quality Records

Quality records may be in the form of EVV reports, test results, corrective action reports etc.. They can be the formal results of both main Supplier and Sub-supplier activities.

2.2.4.10 Documentation

There are a number of reasons for documentation retention, e.g. to:

- i facilitate the correction of faults;
- ii allow traceability of product;
- iii provide evidence in liability disputes; and
- iv allow for the re-creation of the software development environment.

The Supplier should therefore identify all necessary documentation to allow the successful completion of such tasks.

Documentation should include but not be limited to:

- i requirement specifications
- ii architectural and design documents
- iii user documentation
- iv testing documentation
- v quality Records;
- vi and software licences e.g. seats, number of platforms, number of users, reuse, interfaces, replication etc.

Documentation can be in electronic or hard copy.

2.2.4.11 Handling and Storage of Software Media

Any media on which software is stored should be handled in such a way that the integrity and confidentiality of the stored information is assured. It is therefore necessary that activities likely to influence the quality are recognized and steps taken to avoid degradation of the material or the information. The Supplier should describe the storage, storage security, environment, access to and release from storage in a procedure that also indicates how these activities are controlled.

Software may be considered as "critical" because of its safety, security or other implications. However, it may also be considered as critical if for example, its loss would seriously delay the successful completion of the software development programme.

Adequate antivirus and firewall protection should be provisioned.

2.2.4.12 Replication and Delivery

No guidance required.

2.2.5 Software Engineering

Software engineering is the defined, documented and controlled engineering discipline which develops the software products, with the use of methods, tools and procedures that are established and documented. The methods and procedures applied in software engineering should be consistent with the development model and criteria defined in paragraph 2.2.4.1.

Software tools may be related to the specific methods or techniques identified or provide support to other aspects of the software life-cycle. Some tools may be phase independent, for example those associated with configuration management or quality assurance activities.

Software tool validation may entail one or more of the following:

- i certification provided by a recognized body that the tool has been subject to specified tests or validation processes;
- ii establishment with the tool supplier that the tool meets required criteria through the Supplier quality system and evidence of appropriate tests;
- iii the identification of appropriate tests to be applied to the tool and any upgrades;
- iv monitored usage of the tool during support to the development of the software product;
- v feedback from a user group.

To facilitate software product maintenance, the availability of longer-term support for software tools is an important aspect that should not be ignored in their evaluation.

2.2.6 Evaluation, Verification and Validation (EVV)

Although EVV is an integral part of the management and technical process (paragraph 2.2.3, 2.2.4 and 2.2.5), due to its importance in Quality Management, the EVV process is addressed in this discrete paragraph.

Due to the inter-relationship of Evaluation, Verification and Validation, these activities should be planned as a whole. The allocation of resources and time, and the selection of methods and techniques should be done in such a way that the entire EVV process is optimized.

The correct execution of EVV tasks has a considerable impact on the quality of the end product. This process requires, in general, the use of a considerable amount of resources, so that it should be carefully planned in terms of availability of qualified personnel, schedule, cost and test environment.

The level of EVV should be tailored to the level of complexity and/or criticality of the software and to the requirements of the contract and should involve optimum use of existing techniques and standards available.

This paragraph is also related, as a by-product, to the evaluation and improvement of the Software Quality System, e.g. it monitors the application of the established procedures and measures the correctness and efficiency of those procedures. This evaluation process is based on data provided by project groups and is a contract independent activity (see paragraph 2.1).

2.2.6.1 Testing

In general tests are much more effective the earlier they are addressed/conducted in the software development process. Planning for testing and the specification of tests should therefore take place as early as possible.

During test planning, if required by the contract, consideration should be given to the involvement of Acquirer personnel in test activities.

2.2.6.2 Reviews

Software related review activities may be known under various headings including design reviews, peer reviews, walk-throughs, inspections, document reviews, desk-checks etc..

Experience has shown that significant software errors are introduced during the early phases of the software development process. Emphasis should therefore be placed on design reviews at these stages to promote the early detection and resolution of errors.

2.2.7 Maintenance

Software Maintenance is the process of maintaining software after initial delivery and installation e.g. to correct defects, modify/adapt functions, or improve/augment performance.

2.3 Personnel Skill Levels and Training

Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training and/or experience as required:

i design methods;
ii specific programming languages;
iii tools, techniques;
iv computer platforms and target environment

2.4 Acquirer Access and Involvement

No guidance required.

ANNEX E Part 2

Guidance for a Software Project Quality Plan

In AQAP 2210 (paragraph 2.2.2) a Software Project Quality Plan (SPQP) is required and requirements for the SPQP may be found throughout AQAP 2210.

As written in the same paragraph, the SPQP may be a discrete document or part of another plan that is prepared under the contract.

A possible layout of the SPQP may be found below. It should be noted however, that it is a guide and that the SPQP documenting the software management activities related to a specific project, is the sole responsibility of the Supplier.

The requirements, for evaluation of the software quality management activities by the Acquirer, are laid down in AQAP 2210, 2.2.1. If stipulated in the contract, the SPQP shall be offered to the Acquirer for agreement as called for in AQAP 2210, 2.2.2.

0. COVER SHEET

The cover sheet should carry the signature of approval of those organisational elements having responsibilities identified in the SPQP. It may also indicate the name(s) of the organisation(s) for whom the SPQP is prepared.

1. INTRODUCTION

1.1 Purpose

A graphic presentation of the project may be included - or reference to where else it may be found. This could e.g. summarise the milestones and the numbers and positions of sites (or subsystems).

1.2 Scope

If the entire project is covered by plans, such as:

- project management plan
- time schedule/milestone
- work breakdown structure
- list of deliveries
- risk assessment
- test plan and specifications
- installation handbook

reference to the plans can be made in paragraph 1.2 and the only reference needed in paragraph 1.4 may be AQAP 2210.

1.3 Maintenance of the SPQP.
e.g. change control procedures.

1.4 Referenced Documents.
1.5 Relationship to other plans.
1.6 Definitions and Acronyms.

2. PROJECT DESCRIPTION
2.1 Project Overview (or reference to where else it may be found).
2.2 Assumptions
2.3 Deliverable Products.

3. MANAGEMENT
3.1 Software Development Process
3.2 Organisation.
3.3 Non-conforming Software.
3.4 Corrective Action.
3.5 Sub-supplier Management.
3.6 Configuration Management.
3.7 Off-the-Shelf Software.
3.8 Non-deliverable Software.
3.9 Quality Records.
3.10 Documentation
3.11 Handling and Storage of Software Media.
3.12 Replication and Delivery.

4. SOFTWARE ENGINEERING
4.1 Software Engineering Environment.
4.2 Methods, Procedures, Standards.
4.3 Development Documentation.

5. EVALUATION, VERIFICATION AND VALIDATION (EVV)
5.1 Testing.
5.2 Reviews.

6. MAINTENANCE

7. HUMAN RESOURCES

8. ACQUIRER ACCESS AND INVOLVEMENT

ANNEX E Part 3

Cross reference from AQAP 2210 to AQAP 2110

§ of AQAP 2210		Main references to § of AQAP 2110	
INTRODUCTION	1.		
Purpose	1.1	1.2	Purpose
Applicability	1.2	1.3	Applicability
Referenced Documents	1.3	3.2	References
Definitions and Acronyms	1.4		
Definitions	1.4.1	3.3	Definitions
Acronyms	1.4.2		
REQUIREMENTS	2.		
Software Quality System (SQS)	2.1	4.0	Quality Management System
		5.4	Planning
		5.6	Management review
Project Software Quality Management Activities	2.2		
General	2.2.1	7.1	Planning of product realization
		7.2.2	Review of requirements related to the product
		7.3.6	Design and development validation
		7.7	Configuration Management
Software Project Quality Plan (SPQP)	2.2.2	5.4	Planning
		7.1	Planning of product realisation
Identification and Review of Software Requirements	2.2.3	7.2.1	Determination of requirements related to the product
		7.2.2	Review of requirements related to the product
		7.3.4	Design and development review
		7.7	Configuration Management
Management	2.2.4		
Software Development Process	2.2.4.1	7.3.1	Design and development planning
		7.3.2	Design and development inputs
		7.3.3	Design and development outputs

		8.2.3	Monitoring and measurement of processes
		8.2.4	Monitoring and measurement of product
Organization	2.2.4.2	5.5.1	Responsibility and authority
		5.5.2	Management representative
		6.1	Provision of resources
		6.2.1	General (Human resources)
		6.2.2	Competence, training and awareness
Non-conforming Software	2.2.4.3	8.3	Control of nonconforming product
Corrective Action	2.2.4.4	8.5.2	Corrective action
Sub-supplier Management	2.2.4.5	4.0	Quality Management System
		7.2.1	Determination of requirements related to the product
		7.2.2	Review of requirements related to the product
		7.3.4	Design and development review
		7.3.6	Design and development validation
		7.4	Purchasing
		7.7	Configuration Management
		9.1	Access to Supplier and Sub-suppliers and support for GQA activities
Software Configuration Management (SCM)	2.2.4.6	5.5.1	Responsibility and authority
		7.5.3	Identification and traceability
		7.7	Configuration Management
Off-the-shelf Software	2.2.4.7	7.2.1	Determination of requirements related to the product
		7.4	Purchasing
		7.5.4	Customer property
		7.7	Configuration Management
Non-deliverable Software	2.2.4.8	6.3	Infrastructure
		6.4	Work environment
		7.2.1	Determination of requirements related to the product
		7.3.6	Design and development validation
		7.4	Purchasing
		7.7	Configuration Management
Quality Records	2.2.4.9	4.2.3	Control of documents
		4.2.4	Control of records
		8.4	Analysis of data
Documentation	2.2.4.10	4.2.3	Control of documents
		6.3	Infrastructure
Handling and Storage of Software Media	2.2.4.11	6.3	Infrastructure
		7.5.5	Preservation of product

Replication and Delivery	2.2.4.12	6.3	Infrastructure
		7.5.1	Control of production and service provision
		7.5.2	Validation of processes for production and service provision
		7.5.3	Identification and traceability
		7.5.5	Preservation of product
Software Engineering	2.2.5	7.0	Product realisation
		8.0	Measurement, analysis and improvement
Evaluation, Verification and Validation (EVV)	2.2.6	7.3.4	Design and development review
		7.3.5	Design and development verification
		7.3.6	Design and development validation
		8.0	Measurement, analysis and improvement
Testing	2.2.6.1	7.3.5	Design and development verification
		7.3.6	Design and development validation
		7.7	Configuration Management
Reviews	2.2.6.2	7.3.4	Design and development review
Maintenance	2.2.7	7.3	Design and Development
		7.5	Production and service provision
		7.7	Configuration Management
		8.0	Measurement, analysis and improvement
Human Resources	2.3	6.2.2	Competence, awareness and training
Acquirer Access and Involvement	2.4	9.1	Access to Supplier and Sub-suppliers and support for GQA activities

ANNEX E Part 4

Cross reference from AQAP 2110 to AQAP 2210

§ of AQAP 2110		Main references to § of AQAP 2210	
General	1.0		
Introduction	1.1		
Purpose	1.2	1.1	Purpose
Applicability	1.3	1.2	Applicability
Compliance with this Publication	2.0		
Organisational compliance	2.1		
Contractual compliance	2.2		
Composition of requirements in AQAP 2110	3.0		
Composition	3.1		
References	3.2	1.3	Referenced Documents
Definitions	3.3	1.4.1	Definitions
Quality Management System	4.0	2.1	Software Quality System (SQS)
		2.2.4.5	Sub-supplier Management
General requirements	4.1		
Documentation requirements	4.2		
General	4.2.1		
Quality manual	4.2.2		
Control of documents	4.2.3	2.2.4.9	Quality Records
		2.2.4.10	Documentation
Control of records	4.2.4	2.2.4.9	Quality Records
Management responsibility	5.0		
Management commitment	5.1		
Customer focus	5.2		
Quality Policy	5.3		
Planning	5.4	2.1	Software Quality System (SQS)
		2.2.2	Software Project Quality Plan (SPQP)
Quality objectives	5.4.1		
Quality Management System planning	5.4.2		
Responsibility, authority and communication	5.5		
Responsibility and authority	5.5.1	2.2.4.2	Organization
		2.2.4.6	Software Configuration Management (SCM)
Management representative	5.5.2	2.2.4.2	Organization
Internal communication	5.5.3		
Management review	5.6	2.1	Software Quality System (SQS)
General	5.6.1		
Review input	5.6.2		
Review output	5.6.3		
Resource management	6.0		
Provision of resources	6.1	2.2.4.2	Organization

Human resources	6.2		
General	6.2.1	2.2.4.2	Organization
Competence, training and awareness	6.2.2	2.2.4.2	Organization
		2.3	Human resources
Infrastructure	6.3	2.2.4.8	Non-deliverable Software
		2.2.4.10	Documentation
		2.2.4.11	Handling and Storage of Software Media
		2.2.4.12	Replication and Delivery
Work environment	6.4	2.2.4.8	Non-deliverable Software
Product realisation	7.0	2.2.5	Software Engineering
Planning of product realisation	7.1	2.2.1	General (Project Software Quality Management Activities)
		2.2.2	Software Project Quality Plan (SPQP)
Customer-related processes	7.2		
Determination of requirements related to the product	7.2.1	2.2.3	Identification and Review of Software Requirements
		2.2.4.5	Sub-supplier Management
		2.2.4.7	Off-the-shelf Software
		2.2.4.8	Non-deliverable Software
Review of requirements related to the product	7.2.2	2.2.1	General (Project Software Quality Management
		2.2.3	Identification and Review of Software Requirements
		2.2.4.5	Sub-supplier Management
Customer communication	7.2.3		
Design and development	7.3	2.2.7	Maintenance
Design and development planning	7.3.1	2.2.4.1	Software Development Process
Design and development inputs	7.3.2	2.2.4.1	Software Development Process
Design and development outputs	7.3.3	2.2.4.1	Software Development Process
Design and development review	7.3.4	2.2.3	Identification and Review of Software Requirements
		2.2.4.5	Sub-supplier Management
		2.2.6	Evaluation, Verification and Validation (EVV)
		2.2.6.2	Reviews
Design and development verification	7.3.5	2.2.6	Evaluation, Verification and Validation (EVV)
		2.2.6.1	Testing
Design and development validation	7.3.6	2.2.1	General (Project Software Quality Management
		2.2.4.5	Sub-supplier Management
		2.2.4.8	Non-deliverable Software
		2.2.6	Evaluation, Verification and Validation (EVV)
		2.2.6.1	Testing

Control of design and development changes	7.3.7		
Purchasing	7.4	2.2.4.5	Sub-supplier Management
		2.2.4.7	Off-the-shelf Software
		2.2.4.8	Non-deliverable Software
Purchasing process	7.4.1		
Purchasing information	7.4.2		
Verification of purchased product	7.4.3		
Production and service provision	7.5	2.2.7	Maintenance
Control of production and service provision	7.5.1	2.2.4.12	Replication and Delivery
Validation of processes for production and service provision	7.5.2	2.2.4.12	Replication and Delivery
Identification and traceability	7.5.3	2.2.4.6	Software Configuration Management (SCM)
		2.2.4.12	Replication and Delivery
Customer property	7.5.4	2.2.4.7	Off-the-shelf Software
Preservation of product	7.5.5	2.2.4.11	Handling and Storage of Software Media
		2.2.4.12	Replication and Delivery
Control of monitoring and measuring equipment	7.6		
Configuration Management	7.7	2.2.1	General (Project Software Quality Management
		2.2.3	Identification and Review of Software Requirements
		2.2.4.5	Sub-supplier Management
		2.2.4.6	Software Configuration Management (SCM)
		2.2.4.7	Off-the-shelf Software
		2.2.4.8	Non-deliverable Software
		2.2.6.1	Testing
		2.2.7	Maintenance
Configuration Management (CM) requirements	7.7.1		
Configuration Management Plan (CMP)	7.7.2		
Reliability and Maintainability (R&M).	7.8		
Measurement, analysis and improvement	8.0	2.2.5	Software Engineering
		2.2.6	Evaluation, Verification and Validation (EVV)
		2.2.7	Maintenance
General	8.1		
Monitoring and measurement	8.2		
Customer satisfaction	8.2.1		
Internal audit	8.2.2		

Monitoring and measurement of processes	8.2.3	2.2.4.1	Software Development Process
Monitoring and measurement of product	8.2.4	2.2.4.1	Software Development Process
Control of non-conforming product	8.3	2.2.4.3	Non-conforming Software
Analysis of data	8.4	2.2.4.9	Quality Records
Improvement	8.5		
Continual improvement	8.5.1		
Corrective action	8.5.2	2.2.4.4	Corrective Action
Preventive action	8.5.3		
NATO additional requirements	9.0		
Access to Supplier and Sub -suppliers and support for GQA activities	9.1	2.2.4.5	Sub-supplier Management
		2.4	Acquirer Access and Involvement
Products for release to the Acquirer	9.2		

ANNEX F - GUIDANCE ON THE APPLICATION OF AQAP 2110 WITHIN A 9100 QUALITY MANAGEMENT SYSTEM

1 INTRODUCTION

1.1 This document has been prepared and issued to provide information and guidance on the application of AQAP 2110 when the Supplier adheres to the provisions of 9100. This document is published as AQAP 2009 Annex F and 9137[6]. It was jointly developed by NATO and industry representatives for use by NATO and industry to facilitate the use and understanding of the relationship between the AQAP 2110 and 9100.

1.2 It aims to contribute to commonality of interpretation of the AQAP 2110 requirements by the Acquirer and their 9100 Supplier.

1.3 Its content has no legal or contractual status nor does it supersede, add to, or cancel any of the AQAP 2110 or 9100 requirements.

1.4 Because of the multiplicity of conditions that can exist (dependent on such factors as the type of work or process, the devices used, and the skill of personnel involved), this guidance should not be considered as all-encompassing nor should it be considered as imposing specific means or methods for meeting contract requirements. Stakeholders should be aware that other means or methods could be used to meet these requirements.

1.5 Users of this guidance should keep in mind that the requirements of AQAP 2110 are mandatory, as cited in the contract, on Suppliers and Sub-suppliers.

2. REFERENCES

The following documents are important references for the application guidance provided in this document. Only the edition cited applies for dated references. The latest edition of the referenced document (including any amendments) applies for undated references.

AS/EN/JISQ 9100:2009	Quality Management Systems – Requirements for Aviation, Space and Defense
AQAP 2009 Edition 3	NATO Guidance on the Use of the AQAP 2000 Series
AQAP 2070 Edition 2	NATO Mutual Government Quality Assurance (GQA) Process

[6] 9137 "Quality Management Systems - Guidance for the Application of AQAP 2110 within a 9100 Quality Management System" is the document prepared by IAQG – International Aerospace Quality Group – for publication by the regional standardizing organizations.

AQAP 2110 Edition 3	NATO Quality Assurance Requirements for Design, Development and Production
AQAP 2120 Edition 3	NATO Quality Assurance Requirements for Production
AQAP 2130 Edition 3	NATO Quality Assurance Requirements for Inspection and Test
ISO 9001:2008	Quality management systems – Requirements
ISO 10012:2003	Measurement management systems – Requirements for measurement processes and measuring equipment

3 GENERAL GUIDANCE

3.1 In a 9100 certificated organization, the entire content of both standards is within the purview of Government Quality Assurance (GQA).

3.2 When reviewing the two documents (i.e. AQAP 2110, 9100) it is helpful to note the differences in wording used to describe the stakeholders. The following equivalence (see Table 1) is offered as a workable translation. The contract will normally define the points of contact, outlining their role and authority.

TABLE 1 – AQAP 2110 AND 9100 STAKEHOLDER TERMS

AQAP 2110	9100
Acquirer	Customer, only if it is the Acquiring government.
Government Quality Assurance Representative (GQAR)	A Customer's Quality Representative.
Supplier	Organization with a direct contract with the government.
Sub-supplier	Supplier or Organization without a direct contract with the government.

3.3 9100 is complementary (not alternative) to contractual and applicable law and regulatory requirements. It includes ISO 9001:2008 Quality Management System (QMS) requirements and specifies additional requirements for a quality management system for the aviation, space and defence industries.

3.4 The common ISO 9001:2008 baseline inherently makes 9100 and AQAP 2110 appear almost identical. However, four features differentiate the two documents:

a) AQAP 2110 defines contractual requirements; while 9100 defines organizational provisions to be addressed within the scope of certification;

b) AQAP 2110 reflects the agreement between NATO members to contract using the mandatory QMS clauses that enables reciprocal GQA; while industry conformance to 9100 is voluntary;

c) The additions to ISO 9001:2008 of both documents add higher level quality management functions. AQAP 2110 also includes additional requirements related to communication and GQAR access to contract pertinent facilities, information and processes;

d) 9100 can be tailored by exclusions, according to the scope of the QMS; whereas AQAP 2110 is pre-tailored into AQAP 2120 and AQAP 2130.

3.5 It is acceptable for a Supplier to offer a QMS that complies with the provisions of 9100 as a satisfactory response to the QMS requirements of AQAP 2110, under two conditions:

a) The Supplier formally states that, “All 9100 requirements applicable to the organization are applicable to this contract”;

b) The Supplier formally states that, “No exclusions to 9100 taken by the organization shall in any way diminish, alter, or relieve the AQAP 2110 requirements of this contract”.

These formal statements could be made in tender documentation, the contract, or the Quality Plan (QP) and should always be brought to the attention of the GQAR.

4. DETAILED GUIDANCE

Detailed guidance is provided only where there is either the need for clarification or the potential for conflict or misunderstanding exists. Each paragraph and sub-paragraph of the standards (i.e., 9100, AQAP 2110) are listed below in Table 2 – 9100 AND AQAP 2110 DETAILED HARMONIZATION GUIDANCE. Where either standard contains additional requirements or notes to the base standard (i.e. ISO 9001:2008), the clause heading text is bolded.

TABLE 2 – 9100 AND AQAP 2110 DETAILED HARMONIZATION GUIDANCE

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
4. QUALITY MANAGEMENT SYSTEM	4.0 Quality management system	
4.1 General Requirements	**4.1 General requirements**	The Acquirer has chosen the Supplier based in part, on their 9100 QMS. With respect to the NATO specific requirements: 9100 highlights the need to include customer and applicable statutory and regulatory requirements in the scope of the QMS in addition to the 9001 provisions relating to the product (see clause 7.2.1). The Acquirer and/or GQAR have the right to review and verify that the QMS meets the certification and contractual requirements. Where objective evidence of non-compliance is presented, the Supplier is obliged to take corrective action. If corrective action is not taken or is shown to be persistently ineffective then ultimately the QMS might be rejected, but this is neither a desired or common outcome. Sharing details of 9100 certification results from the Online Aerospace Supplier Information System (OASIS) and audit reports provides ongoing evidence of how the system is meeting the certification requirements and may reduce the need for the Acquirer/GQAR to conduct additional audits.
4.2 Documentation Requirements	4.2 Documentation requirements	
4.2.1 General	4.2.1 General	
4.2.2 Quality Manual	**4.2.2 Quality manual**	In 9100 exclusions can be made based on the processes within the organization. Such exclusions are permissible as long as they match the tailoring criteria of the AQAP series as shown in AQAP 2009 Figure 2. With reference to AQAP 2110 clause 5.4 it is permissible to detail any interpretational clarifications or specific application of AQAP requirements in the QP.
4.2.3 Control of Documents	4.2.3 Control of documents	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
4.2.4 Control of Records	**4.2.4 Control of records**	
5. MANAGEMENT RESPONSIBILITY	5.0 Management responsibility	
5.1 Management Commitment	5.1 Management commitment	
5.2 Customer Focus	5.2 Customer focus	
5.3 Quality Policy	5.3 Quality policy	
5.4 Planning	**5.4 Planning**	Both 9100 and AQAP 2110 require planning for quality to be undertaken and recorded, describing how the product will be realized (reference clause 7.1). AQAP 2110 requires a contract specific QP be documented and provided to the Acquirer so that it may be reviewed against the contractual requirements. The QP describes the application of the QMS to fulfil the contract requirements; describing what the Supplier will actually do (e.g. what requirements apply or how they are interpreted). To be compliant, QPs should address clause 5.4 of AQAP 2110 and clause 7.1 of both standards. QPs should be developed in conjunction with other project related planning (reference to 9100 clause 7.1.1).
5.4.1 Quality Objectives	5.4.1 Quality objectives	
5.4.2 Quality Management System Planning	5.4.2 Quality Management system planning	
5.5 Responsibility, Authority and Communication	5.5 Responsibility, authority and communication	
5.5.1 Responsibility and Authority	5.5.1 Responsibility and authority	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
5.5.2 Management Representative	**5.5.2 Management representative**	AQAP 2110 requires that the management representative reports directly to top management. 9100 requires that the management representative has unrestricted access to top management. The key aspect is that AQAP 2110 requires the management representative to have the necessary organizational authority and freedom to resolve matters pertaining to the QMS and product quality. In that respect, the standards are considered to be in harmony.
5.5.3 Internal Communication	**5.5.3 – Internal communication**	The NATO Specific requirement for communication with the GQAR should be considered as part of 9100 clause 7.2.3 customer communication.
5.6 Management Review	5.6 Management review	
5.6.1 General	5.6.1 General	
5.6.2 Review Input	**5.6.2 Review input**	
5.6.3 Review Output	**5.6.3 Review output**	
6. RESOURCE MANAGEMENT	6.0 Resource management	
6.1 Provision of Resources	6.1 Provision of resources	
6.2 Human Resources	6.2 Human resources	
6.2.1 General	6.2.1 General	
6.2.2 Competence, Awareness and Training	6.2.2 Competence, awareness and training	
6.3 Infrastructure	6.3 Infrastructure	
6.4 Work Environment	6.4 Work environment	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
7. PRODUCT REALIZATION	7.0 Product realisation	
7.1 Planning of Product Realization	**7.1 Planning of product realisation**	
7.1.1 Project Management		
7.1.2 Risk Management		
7.1.3 Configuration Management		The 9100 additional requirement should be viewed in conjunction with AQAP 2110 clause 7.7.
7.1.4 Control of Work Transfers		With respect to the 9100 additional requirement, work transfers include transfers within and outside of the organization.
7.2 Customer-Related Processes	7.2 Customer-related processes	
7.2.1 Determination of Requirements Related to the Product	7.2.1 Determination of requirements related to the product	
7.2.2 Review of Requirements Related to the Product	7.2.2 Review of requirements related to the product	
7.2.3 Customer Communication	**7.2.3 Customer communication**	The NATO Specific requirement for communication with the GQAR includes the NATO specific requirement in AQAP 2110 clause 5.5.3 Internal communication.
7.3 Design and Development	7.3 Design and development	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
7.3.1 Design and Development Planning	7.3.1 Design and development planning	
7.3.2 Design and Development Inputs	7.3.2 Design and development inputs	
7.3.3 Design and Development Outputs	7.3.3 Design and development outputs	
7.3.4 Design and Development Review	7.3.4 Design and development review	The authorization referred to in 9100 for progressing to the next stage in design and development is the Supplier's process and should not be confused with Acquirer intermediate or final acceptance of product.
7.3.5 Design and Development Verification	**7.3.5 Design and development verification**	
7.3.6 Design and Development Validation	7.3.6 – Design and development validation	
7.3.6.1 Design and/or development verification and validation testing		Within 9100 'prove' means to demonstrate or to provide evidence. The intent is that the act of planning, controlling, reviewing and documenting verification and validation testing will collectively ensure that the requirements contained in a) and b) are fulfilled and that c), d) and e) are proved.
7.3.6.2 Design and/or development verification and validation documentation		
7.3.7 Control of Design and Development Changes	7.3.7 Control of design and development changes	
7.4 Purchasing	7.4 Purchasing	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
7.4.1 Purchasing Process	**7.4.1 Purchasing process**	With respect to the NATO specific requirement to provide copies of subcontracts or orders for products, those documents may obscure or exclude pricing information. With respect to the NATO Specific requirement for notification of risks in subcontracts or orders; the Acquirer and/or GQAR, need to be aware of risks in the supply chain so that appropriate GQA activities can be planned. The Supplier (AQAP definition) will be informed of any GQA activities to be planned and performed in the Supplier chain (see AQAP 2070 para. 11.4).
7.4.2 Purchasing Information	**7.4.2 Purchasing information**	Flowing down the relevant contractual requirements, not necessarily the full AQAP 2110 or 9100 is the key aspect of the NATO specific requirement. This means that flowing down standard Supplier requirements for the supply chain, which cover the relevant contractual requirements, is compliant with this clause of AQAP 2110 but should be detailed in the QP. The NATO specific requirement states the text to be included on purchasing information to ensure that rights of access to perform GQA are provided. The text may be amended, if agreed through the QP provided that rights to conduct GQA, through the supply chain are preserved.
7.4.3 Verification of Purchased Product	**7.4.3 Verification of purchased product**	
7.5 Production and Service Provision	7.5 Production and service provision	
7.5.1 Control of Production and Service Provision	7.5.1 Control of production and service provision	
7.5.1.1 Production Process Verification		

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
7.5.1.2 Control of Production Process Changes		
7.5.1.3 Control of Production Equipment, Tools and Software Programs		
7.5.1.4 Post-Delivery Support		
7.5.2 Validation of Processes for Production and Service Provision	7.5.2 Validation of processes for production and service provision	
7.5.3 Identification and Traceability	7.5.3 Identification and traceability	
7.5.4 Customer Property	**7.5.4 Customer property**	
7.5.5 Preservation of Product	7.5.5 Preservation of product	
7.6 Control of Monitoring and Measuring Equipment	**7.6 Control of monitoring and measurement equipment**	With respect to the NATO specific requirement to implement ISO 10012, the QP should establish what requirements of ISO 10012 are appropriate to the contract.
	7.7 Configuration Management	For specific Configuration Management (CM) requirements refer to the contractual conditions. Either NATO, International or National standards may be acceptable. This requirement directly relates to 9100 clause 7.1.3.
	7.7.1 Configuration Management (CM) requirements	
	7.7.2 Configuration Management Plan (CMP)	
	7.8 Reliability and Maintainability (R&M)	
	7.8.1 (No Title)	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
8. MEASUREMENT, ANALYSIS AND IMPROVEMENT	8.0 Measurement, analysis and improvement	
8.1 General	8.1 General	
8.2 Monitoring and Measurement	8.2 Monitoring and measurement	
8.2.1 Customer Satisfaction	**8.2.1 Customer satisfaction**	
8.2.2 Internal Audit	**8.2.2 Internal audit**	Traceability is the key aspect of the NATO specific requirement and is related to 'planned arrangements' defined in the 9100 note. Internal audits themselves do not need to reference the AQAP. They need only demonstrate traceability to AQAP 2110 requirements.
8.2.3 Monitoring and Measurement of Processes	8.2.3 Monitoring and measurement of processes	
8.2.4 Monitoring and Measurement of Product	**8.2.4 Monitoring and measurement of product**	
8.3 Control of Nonconforming Product	**8.3 Control of nonconforming product**	AQAP 2110 does not allow the delivery of nonconforming product, unless by Concessions/waiver or Deviation Permit (C/DP). There is no AQAP 2110 clause defining how to apply for C/DP, therefore, the process to be applied to C/DP should be covered by separate contractual arrangements and/or addressed in the QP.
8.4 Analysis of Data	8.4 Analysis of data	
8.5 Improvement	8.5 Improvement	
8.5.1 Continual Improvement	**8.5.1 Continual improvement**	

9100 CLAUSE	AQAP 2110 CLAUSE	DETAILED HARMONIZATION GUIDANCE
8.5.2 Corrective Action	8.5.2 Corrective Action	
8.5.3 Preventive Action	8.5.3 Preventive Action	
	9.0 NATO additional requirements	
	9.1 Access to Supplier and Sub-suppliers and support for GQA activities	Unrestricted access is within the limitations of the national laws within the acquisition process. Any limitations must be fully justified and documented (in the tender, contract documentation and/or QP) and brought to the attention of the GQAR.
	9.1.1 (No Title)	
	9.2 Products for release to the Acquirer	
	9.2.1 (No Title)	

Notes

Note 1: Throughout this document 9100 is used to refer to AS/EN/JIS Q 9100.

Note 2: Non Nonconforming Product (8.3)– the method of handling rework should be defined in the quality plan.

Note 3: This guidance applies equally to AQAP 2120 and AQAP 2130, (see AQAP 2009 Figure 2).

Note 4: For the purposes of this guidance, the terms within AQAP 2110 have been used. (see General Guidance 3.2 Table 1)

Note 5: AQAP 2009 Annex C provides general guidance for the application of AQAP 2110.