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The Civil Aviation Authority of Thailand

GUIDANCE MATERIAL FOR AIS QUALITY SYSTEM

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Table of Contents

0. Introduction 0-1
0.1 Background 0-1
0.2 Purpose 0-1
0.3 Applicability 0-2
0.4 Effective Date 0-2
0.5 Reference 0-2
1. A Quality System 1-1
1.1 The Need for a Quality System 1-1
1.2 What is a Quality System? 1-2
1.3 Permissible Exclusions 1-2
1.4 What is ISO 9000 About? 1-3
1.5 Products 1-3
1.6 The Process Model 1-4
2. GENERAL REQUIREMENTS 2-1
2.1 General Documentation Requirements 2-1
2.2 Documented Procedures 2-1
3. MANAGEMENT RESPONSIBILITY 3-1
3.1 Quality Policy 3-1
3.2 Commitment to Quality 3-2
3.3 Customer Focus 3-2
3.4 Planning 3-2
4. ADMINISTRATION 4-1
4.1 Responsibility and Authority 4-1
4.2 Management Representative 4-1
4.3 Internal Communications 4-1
4.4 Quality Manual 4-1
4.5 Control of Documents 4-2
4.6 Document Master Copy 4-3
4.7 Document Owner 4-3
4.8 Controlled and Uncontrolled Copies 4-3
4.9 Control of Quality Records 4-3
4.10 Management Review 4-6
5. RESOURCE MANAGEMENT 5-1
5.1 Provision of Resources 5-1
5.2 Human Resources 5-1

5.3 Training, Awareness and Competency 5-2
5.4 Checking Competence and Training 5-2
5.5 Facilities and the Work Environment 5-3
6. PRODUCT DEVELOPMENT AND REALISATION 6-1
6.1 Product Realisation 6-1
6.2 Identification of Customer Requirements 6-1
6.3 Who are the Customers? 6-2
6.4 Review of Product Requirements 6-2
6.5 Customer Communication 6-3
6.6 Understanding and Meeting Your Customer's Requirements 6-3
7. DESIGN AND/OR DEVELOPMENT PLANNING 7-1
7.1 A Disciplined Approach to Design and/or Development 7-1
7.2 Who is Going to Do What? 7-1
7.3 Design and/or Development Inputs 7-2
7.4 Have We Got it Right? 7-2
7.5 Does it Work? 7-2
7.6 Control of Design and/or Development Changes 7-3
7.7 Controlling Changes 7-3
7.8 Product Identification and Traceability 7-3
7.9 Keeping Track of What You're Doing 7-4
7.10 Customer Property 7-5
7.11 Looking After What the Customer Gives You 7-5
7.12 Looking After the Product and/or Service 7-6
7.13 Stock Control 7-7
7.14 Control of Measuring and Monitoring Devices 7-7
7.15 Having Confidence in the Equipment Used to Check Your Work 7-8
7.16 Measurement and Monitoring of Products 7-10
7.17 Checking Things are Right 7-11
7.18 Control of Non-conformity 7-12
7.19 Analysis of Data 7-13
7.20 Do the Measurements Reveal Any Trends? 7-13
7.21 Planning for Continual Improvement 7-14
7.22 What Improvements Do You Plan to Make? 7-14
7.23 Corrective Action 7-14
7.24 Preventive Action 7-14
7.25 Fixing the Causes of Problems 7-15
7.26 Fixing the Cause of Known Problems 7-15

7.27 Fixing the Cause of Potential Problems 7-16
8. PURCHASING 8-1
8.1 Purchasing Control 8-1
8.2 Stating Purchasing Requirements 8-1
8.3 Purchasing Documentation 8-3
8.4 Stating Purchasing Requirements 8-3
8.5 Verification of Purchased Products 8-3
8.6 Did You Get What You Ordered? 8-4
8.7 Production and Service Operations 8-4
8.8 Controlling What You Do 8-5
8.9 Contract Review 8-6
9. CUSTOMER SATISFACTION 9-1
9.1 How Satisfied are Your Customers? 9-1
9.2 More Than One Type of Customer 9-1
9.3 Satisfaction and Dissatisfaction 9-1
9.4 Monitoring Satisfaction 9-1
9.5 Satisfaction as a Measure of Your System Performance 9-2
9.6 Are You Doing What You Said You Would Do and Does It Work? 9-3
10. STEPS TOWARDS IMPLEMENTATION OF A QUALITY SYSTEM 10-1
11. CERTIFICATION AND REGISTRATION 11-1
11.1 Starting Out 11-1
11.2 Who Does the Certification/Registration? 11-1
11.3 Brief Outline 11-1

0. Introduction

0.1 Background

In accordance with ICAO Annex 15 (Aeronautical information Services), The Civil Aviation Authority of Thailand (CAAT) has been promulgated "*Regulation of CAAT on Aeronautical Information Services Standards"* and *"CAAT Rules on Manual of Standards of Aeronautical Information Services"* which require AIS provider to implement and maintain quality management systems encompassing all functions of an aeronautical information service.

Furthermore, the quality management system shall follow the ISO 9000 series of quality assurance standards and be certified by an accredited certification body.

Therefore, this guidance material has been developed to assist AIS provider about the implementation of a quality system for their aeronautical information service. Generally, it has been formulated around the relevant ISO Standards to provide this assistance, and to provide easy-to-read material as a starting point for the development and maintenance of a Quality System for AIS.

The Guidance Material are not intended to replace ISO documentation and should be read in conjunction with the appropriate Standards.

0.2 Purpose

This Guidance Material has been developed to provide information for AIS provider about the implementation of a quality system for their aeronautical information service, and should be read in conjunction with the appropriate ICAO and ISO references.

ICAO Annex 15 – Aeronautical Information Services shows the need for States to "…take all necessary measures to introduce a properly organised quality system containing procedures, processes and resources necessary to implement quality management at each function stage as outlined…." In this context, the function stages relate to the functions of AIS "to:

a) receive and/or originate;
b) collate or assemble;
c) edit;
d) format
e) publish/store; and
f) distribute.

aeronautical information/data concerning the entire territory of the State as well as areas in which the State is responsible for air traffic services (ATS) outside its territory."

ICAO notes that the ISO 9000 series of quality assurance standards provides a basic framework for the development of a quality assurance program.

These International Standards specify the requirements for a quality management system where an organisation needs to:

a) demonstrate its ability to consistently provide products that meet customer and applicable regulatory requirements; and
b) address customer satisfaction through the effective application of the system, including processes for continual improvement and the prevention of non-conformity.

The ICAO references and the International Standards provide clear directions towards the needs and requirements for a Quality System within a State's AIS to meet customer needs and expectations, and where continuous improvement is a pattern of organisational behaviour.

0.3 Applicability

This Guidance Material applies to AIS provider who holds the AIS Certificate under RCAAT No.25[1]

0.4 Effective Date

23 November 2020

0.5 Reference

a) Regulation of The Civil Aviation Authority of Thailand on Aeronautical Information Services Standards
b) The Civil Aviation Authority of Thailand Rules on Manual of Standards of Aeronautical Information Services

[1] The Requirement of CAAT No.25 on the Application for and Issuance of Air Navigation Services Certificate

1. A Quality System

1.1 The Need for a Quality System

The importance of aeronautical data and information to the world's aviation community cannot be overstated. Aeronautical data and information provide one of the essential elements and the backbone to enable aircraft operations to take place safely and efficiently throughout the world.

ICAO Annex 15 points to the need for a Quality System as being:

"The established quality system shall provide users with the necessary assurance and confidence that distributed aeronautical information/data satisfy stated requirements for data quality (accuracy, resolution and integrity) and for data traceability by the use of appropriate procedures in every stage of data production or data modification process. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met."

This means that the worldwide aviation community is looking to the AIS's so that they can have a confidence that they are being provided with accurate data and information that meets the required resolution and retains its integrity throughout its life cycle. While this is the principal reason for having a quality system, a Quality System also provides opportunities for:

a) Meeting regulatory requirements;
b) Performance, coordination and productivity improvements;
c) Increased focus on your business objectives and customer expectations;
d) Achievement and maintenance of the quality of your products and services to meet your customers stated or implied needs;
e) Increased customer awareness and satisfaction;
f) Confidence that your intended quality is being achieved and maintained;
g) Being able to demonstrate your organisation's capabilities to customers and potential customers; and
h) Expanded market opportunities.

By itself, introduction of a Quality System will not lead to automatic improvements in product or service quality, or an improvement in work practices and processes. What it will do however, is provide the tools and guidance for those working in the AIS field to use a defined and systematic approach to their work and business.

1.2 What is a Quality System?

A Quality System for AIS might best be described as the way the organisation carries out its business activities for the provision of AIS, relates to an organisational structure; together with the documentation, processes, and resources, necessary for the AIS to achieve its quality objectives and to meet customer's requirements.

A Quality System means that everything must fit together, to form one cohesive and effective system. This means that an organisation with a Quality System will have:

a) a Quality Manual that outlines the quality system;
b) procedures for all activities within that system; and
c) planning activities to ensure resources are available for the effective conduct of the quality system.

One of the most important things that must be in place for a Quality System to work is commitment from all of those affected to ensure that the documented procedures, processes and practices are not only in place, but are vigorously applied.

A Quality System will strive for excellence, always looking for ways to do the work better through a program of continuous improvement.

1.3 Permissible Exclusions

In some AIS, there may be processes that are not performed, for example Procedures Design Work. Part 7, and only in Part 7, of the ISO Standards makes allowances for some aspects to be excluded from a Quality Management System if they are not being carried out. These are known as Permissible Exclusions, and could arise due to the:

a) nature of the product range or services provided by a particular AIS;
b) customer requirements; and
c) regulatory requirements.

However, you cannot simply claim a Permissible Exclusion just because you do not want to do it. If you question a requirement in this Part of the ISO Standard, then you should ask yourself:

a) What is the idea or principle behind this requirement?
b) What kind of problem could be prevented by meeting this requirement?
c) Why would meeting the requirement give confidence to the customer?

Within Part 7 of the ISO Standard, the following processes are most likely to be considered for Permissible Exclusions:

a) Design and Development;
b) Identification and Traceability;
c) Customer Property; and
d) Control of Measuring and Monitoring Devices.

Importantly, if you decide to proceed with Permissible Exclusions you will need to justify this in the Quality Manual and, if you are seeking Certification or Registration, with these bodies as well.

1.4 What is ISO 9000 About?

In very simple terms, the requirements of the ISO Standards for a Quality System can be summarised as being three straightforward tasks:

a) Say what you do;
b) Do what you say; and
c) Show that you did it.

Say what you do:

This task requires AIS to document how it undertakes its activities.

Do what you say:

This task requires AIS to undertake its activities as recorded in the documented procedures.

Show how you did it:

This task requires AIS to maintain records that prove that it undertakes its activities as documented and has done so for a recognised period of time.

1.5 Products

One of the many terms used within the Quality System is “product”. In the context of the International Standards, and the diagrams that follow, a product is defined by the standards as:

Product: Result of activities or a process.

The Standards note that there are four generic product categories:

a) Hardware;
b) Software;
c) Services; and
d) Processed materials.

Products may be combinations of the four generic product categories.

1.6 The Process Model

Activities that receive inputs and convert them to outputs can be considered to be a process. In many cases, an output from one process will form the input to the next process, for example data is received from an aerodrome operator, entered into the AIS database, and when combined with other data, is provided as an output for charting or a document.

To function effectively within a quality system, AIS must identify and manage numerous linked processes. Systematic identification and management of these many processes and the interactions between these processes that are used within an AIS are often referred to as a **"process approach"**.

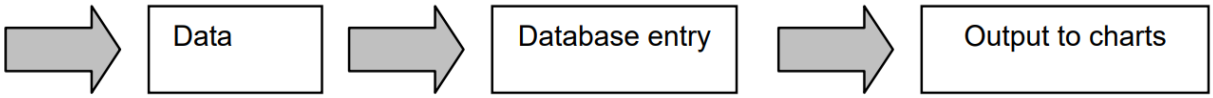


Figure 1: A simplistic process

A more sophisticated conceptual process model recognises the role that the customer plays in the definition of requirements as inputs. By monitoring customer satisfaction, or in some cases dissatisfaction, we are able to monitor and evaluate whether or not defined customer requirements have been met.

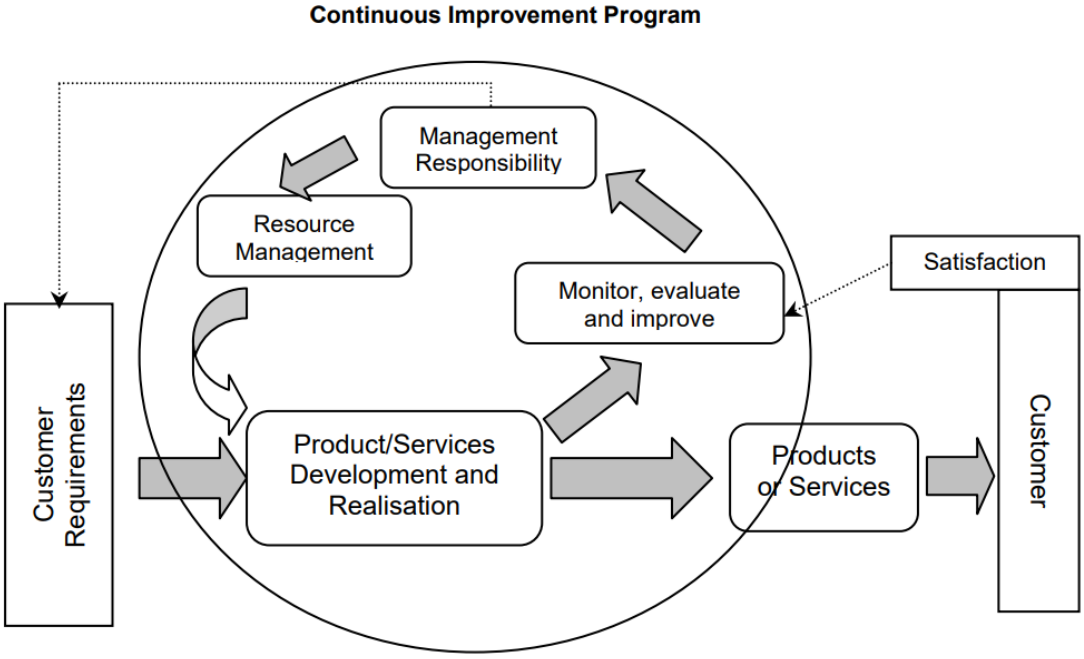


Figure 2: Conceptual model of the "Process Approach"

Figure 2 demonstrates that the process approach model and the Quality System starts and finishes with the customer. In the first instance there is the customer requirement on the left-hand side of the diagram, on the right-hand side there is the degree of customer satisfaction with the product or service that has been provided as a result of a number of inputs. Customer satisfaction is measurable against the initial requirements and specifications.

Perhaps the most important feature of the model is the need to obtain information about customer satisfaction, this feeds back into the monitoring and evaluation phase, which are in turn a measure of overall performance.

The loop into management responsibility is there to show that management has an important role to review customer feedback to ensure that the appropriate policies, objectives and strategies are in place, along with the necessary resources, to meet the quality challenges.

Resources are a key component of the Quality System. Resources are the equipment, materials and people that make the overall system work. Human resources need to be properly trained and competent to achieve the desired outcomes.

As noted earlier, a Quality System will strive for excellence, always looking for ways to do the work better through a program of continuous improvement. A Quality System will continue to challenge the outputs against the customer requirements and specifications to ensure that customer's expectations are met and exceeded. This is why all of the elements in the Continuous Improvement Program are so important. Outputs must be monitored and evaluated, management must consider the evaluations and apply the planning and resources to achieve the desired outcomes.

2. GENERAL REQUIREMENTS

The General Requirements for the implementation of a Quality Management System are to:

a) identify the processes needed for the Quality Management System;
b) determine the sequence and interaction of these processes;
c) determine criteria and methods required to ensure the effective operation and control of these processes;
d) ensure the availability of information necessary to support the operation and monitoring of these processes; and
e) measure, monitor and analyse these processes, and implement action necessary to achieve planned results and continual improvement.

2.1 General Documentation Requirements

Documentation for a Quality Management System must include:

a) documented procedures (see the section Documented Procedures2.2 that follows for a description of Documented Procedures); and
b) documents required by the organisation to ensure the effective operation and control of its processes.

The extent of the Quality Management System is, however, dependent on the following, and may be in any form or type of medium:

a) size and type of the organisation;
b) complexity and interaction of the processes; and
c) competence of personnel.

2.2 Documented Procedures

ISO requirements for a Quality System call for *6 Quality Management System procedures* to be in place. These are mandatory written procedures that describe how your organisation performs the activities described in each of the *6 Quality Management System procedures* described below:

1. Control of Documents;
2. Control of Quality Records;
3. Internal Audit;
4. Control of Non-conformity;
5. Corrective Action; and
6. Preventative Action.

Documented Procedures should indicate who does what, where and when they do it, why they do it, and how. It is up to the organisation itself to decide the level of detail that is included in the Documented Procedures. Largely, this will depend on:

a) methods used;
b) skills needed;
c) training; and
d) extent of supervision required.

Documented Procedures should not contain what you would like to happen in the organisation, but rather an accurate description of what really happens.

A robust Quality Management System will involve staff, to the extent that they can contribute, in the writing of Documented Procedures. The earlier and the more staff that are involved will lead to greater staff involvement, understanding and “buy-in” to the procedures and practices.

3. MANAGEMENT RESPONSIBILITY

AIS Management have a number of demonstrable responsibilities within the Quality System. These responsibilities relate to:

a) Quality Policy;
b) Commitment to Quality;
c) Customer Focus;
d) Planning;
e) Management Representation; and
f) Management Review.

Each of these responsibilities is addressed in further detail below.

A quality system is dependent on all those involved in its provision being quite clear about their responsibilities and authorities. The development and use of accurate position descriptions for all staff in AIS that address both the responsibilities and authorities of each position can accomplish this.

3.1 Quality Policy

The International Standards require management to have a Quality Policy in place that is in writing and is visible to staff. The quality policy forms an important element for the work of the AIS, and establishes:

a) a commitment to quality;
b) what the quality objectives or the organisation are; and
c) how the objectives relate to customers' expectations

The Quality Policy must address these issues and ensure that it:

a) is appropriate for the needs of the organisation;
b) includes commitment to meeting requirements and continual improvement;
c) provides a framework for establishing and reviewing quality objectives;
d) is communicated, understood and implemented throughout the organisation; and
e) is reviewed for continuing suitability.

A Quality Policy includes AIS's definition of quality and how management and staff will demonstrate their commitment to the policy, and provides an identifiable focus for all staff in their daily activities.

One of the best techniques to develop a Quality Policy is a facilitated meeting of all staff at which individual definitions of "quality" can be consolidated to provide a definition and statement that encapsulates all staff's beliefs and understandings.

3.2 Commitment to Quality

AIS Management must take an active responsibility in the establishment and maintenance of a Quality System. This role includes:

a) Definition and implementation of quality policy;
b) Communicating the quality policy within the organisation, including the importance of meeting customer, regulatory and legal requirements;
c) Setting objectives, strategies and targets derived from the policy;
d) Position descriptions that describe the role, responsibilities and authorities for all staff;
e) Ensuring that resources are adequate;
f) Appointment and support of a management representative; and
g) Regular reviews of the effectiveness of the system.

3.3 Customer Focus

Meeting customer and regulatory requirements is our primary business. To ensure that these requirements are met, and that customer confidence is maintained, AIS must have a clear understanding and defined specifications in the form of user requirements. Measurement and analysis of outcomes will be difficult, if not impossible without this specification.

3.4 Planning

The step that follows the publication of the Quality Policy is the setting of objectives, strategies and targets that will show how the organisation expects to implement the quality policy. Targets need to be realistic, relate to the customer's statement of requirements and measurable. The plan must include details of the continual improvement program.

Thorough planning sets the scene for other important aspects of the organisation's operations:

a) staff performance measurements;
b) budgets;
c) overall business performance measurements;
d) asset and facility purchases;
e) staff competencies and training requirements;
f) other resource requirements; and
g) the continuing improvement programs.

In some cases, planning may be conducted as a matter of routine, for example on an annual basis, whereas in others, specific project planning may be required for new or substantially altered products or services.

Planning enables an organisation to exercise control over routine business and changes to ensure that the Quality Management System is effective during the routine activities and after change.

4. ADMINISTRATION

4.1 Responsibility and Authority

A Quality System requires responsibilities and authorities for all staff members to be defined and communicated. This means that everyone in the organisation knows what they are responsible for, what the level of their authority is and what the reporting arrangements are. Responsibilities and authorities can be identified, recorded and communicated through published job descriptions. An organisational chart should supplement job descriptions.

4.2 Management Representative

Quality Systems are required to have a Management Representative who looks after the Quality System, and who has the responsibility and authority that includes:

a) ensuring that processes for the quality management system are established and maintained
b) reporting to senior management on the performance of the quality management system, including needs for improvements; and
c) promoting awareness of customer requirements throughout the organisation.

4.3 Internal Communications

Internal communications are all about keeping everybody in the team informed about what is going on and to keep abreast of the processes, changes and outcomes. This includes the good news and the bad news.

Effective internal communications will provide the ability to:

a) receive information quickly and act on it;
b) build trust among the staff;
c) identify business opportunities; and
d) identify opportunities for improvement.

4.4 Quality Manual

A Quality Manual is a controlled document that is perhaps the most important part of the Quality System. This is where it begins and includes the details of:

a) the scope of the quality management system;
b) the documented procedures or a suitable reference; and
c) a description of the sequence and interaction of the processes included in the Quality Management System.

The Quality Manual is the "map" for the organisation, and where the following items would be found:

a) the quality policy;
b) the activities of the business;
c) how the documentation works and where people might look to find information about how to do things;
d) a definition of any terms having a unique meaning to your business; and
e) statements of responsibility and authority.

If these items are not specifically included in the Quality Manual, the manual should contain a reference to where they can be found.

AS/NZS ISO 10013 "Guidelines for developing quality manuals" provides advice about writing a quality manual.

4.5 Control of Documents

All documents required in a quality management system must be controlled. Procedures must be documented to:

a) review documents for adequacy and then approve them before use;
b) review, update as necessary and re-approve documents;
c) identify the current revision status of documents;
d) ensure that relevant versions of applicable documents are available at points where they will be used;
e) ensure that documents remain legible, readily identifiable and retrievable;
f) ensure that documents of external origin are identified and their distribution is controlled;
g) identify changes in the document; and
h) prevent the unintended use of obsolete documents, and to apply suitable identification to them if they are retained for any purpose.

Documents defined as Quality Records must also be controlled.

Document control is about making sure that the document in use is the "right" document. A controlled document will be the latest approved and applicable version for the work to be done. This is particularly important if staff are to have the information they need to do the job correctly.

The simplest way to control documents is to make them available on the computing network, preferably without any paper copies. A number of computing software packages make document control relatively simple. For example, the "save date" can be saved in a footer or header of every page. A statement can be added to the effect that any paper copy is uncontrolled and that it is up to the reader to ensure that the copy being used is the latest version by checking on the network.

There is no limit to the number of documents that can be controlled in a Quality System, but the additional overhead in controlling the document must be balanced against any potential problems caused by using an inaccurate or obsolete version.

4.6 Document Master Copy

Each controlled document has one master copy. This is the copy to which all changes are initially made and from which further copies are made and issued as required. The location of the master copy is recorded on the Document Master List.

4.7 Document Owner

Each controlled document has an owner. This is the person or persons authorised to review and approve changes requested to the document. The document owner is also recorded on the Document Master List.

4.8 Controlled and Uncontrolled Copies

Documents may be issued as controlled or uncontrolled copies. Controlled copies are those issued to particular persons with a record of who has which copy. This record is kept with the document master copy. For controlled copies the document owner is responsible for ensuring that the registered holder of the copy is given an updated copy when the document is modified. Uncontrolled copies are issued with no record of who has a copy. For uncontrolled copies the document holder is responsible for ensuring that the copy they have is up-to-date.

4.9 Control of Quality Records

Records exist in all organisations. Quality Records are required to provide evidence of conformance with requirements and of effective operation of the quality management system. Procedures must be documented for the identification, storage, retrieval, protection, retention time and disposition of quality records.

A Quality Record is a record produced following a procedure in a Quality System document. This record provides a reference when reviewing progress and/or performance, and is often a form.

Each Quality System document must include definitions of the Quality Records to be produced and kept.

Quality records will provide AIS with information to help manage the business better. This is the part that enables you to “show how you did it”.

In some instances, retention periods will be dictated by legal or regulatory requirements, financial requirements or customer’s specifications. Details about specific retention periods should be recorded in the documented procedures.

Examples of Quality Records include:

a) customer orders, specifications and requirements;
b) meeting notes, e.g. Management review;
c) audit reports;
d) non-conformance records (service failure reports, customer complaints);
e) corrective action records;
f) files on suppliers, e.g. evaluation of suppliers and their performance history;
g) process control records;
h) inspection and testing reports;
i) training records; and
j) records of goods received and delivered.

Records, indexing and filing can be in any appropriate form; hard copy, or electronic. Storage needs to be appropriate to the circumstances and the medium and should be such that the risk of deterioration, damage or loss is minimised.

The International Standards also call for the organisation to identify and document who has access to the quality records.

To help in deciding what quality records need to be kept, it is useful to consider that all quality records can be considered under three different categories:

a) What is received before a procedure starts;
b) What is produced to show intermediary steps have been completed; and
c) What is produced to show a procedure has been completed.

Quality records are usually produced internally however, they may also be produced outside the AIS, for example a customer's order, or an external auditor's report.

For each quality record identified, the following aspects need to be defined:

a) What the record is;
b) Who is responsible for its filing;
c) How long the record is required to be kept;
d) Where the record will be kept; and
e) Who is responsible for the record's disposal.

A tabular layout may be useful to present the information required.

Record	Responsibility	Minimum Retention Period	Location
What the record is	Who is responsible for its filing.	The minimum time the record must be retained for.	Where the record is kept

	Who is responsible for its eventual disposition.		

In some ways, by default, the person deemed responsible for the record's filing is also responsible for and authorised to dispose of the record. In this case, one position can be listed as responsible for the record, and for the filing and disposition.

A minimum period is specified to supply an audit trail for accountability purposes. The audit trail may be required for official inquiries or litigation.

Specification of a minimum retention period allows us to keep records longer if required. Records are often kept on hand for as long as there is space to accommodate them.

In summary, the records management process ensures that all quality records are identified and controlled, in order to provide a ready reference to the effectiveness of our Quality System documents.

The records management process occurs over an extended period and interleaves with other processes, particularly with those for document development and control.

An example of how the records management process might be managed follows in the table below.

Stage	Description	Explanation
1	The need for a record is identified.	
2	The record definition is produced and documented.	
3	The record is produced.	
4	The record is indexed.	Uniquely identifying individual records assists in filing and retrieval. Records with no un1que identifier can be marked by allocating A specific location for storage. Whatever approach is taken should be recorded as part of the record definition.
5	The record is filed in the location specified in the record definition.	The location should be chosen to ensure that the record is not damaged for the period it is to be retained.

6	The record is stored for the period specified in the record definition.	Depending on the retention period, it may be necessary to regularly review the storage to ensure that the records are not being damaged.
7	The record is disposed of.	The person responsible for its storage (as provided for in the record definition) is authorised to dispose of the record.

4.10 Management Review

Quality management systems must be reviewed on a regular basis to ensure that they remain appropriate and relevant. Where changes are planned or being implemented, more frequent review periods may be warranted.

To ensure that the entire quality management system is covered, a consistent approach should be followed to ensure that the review addresses:

a) the relevance of quality policy and objectives to current needs;
b) how the quality management system is working and whether the objectives are being met;
c) any quality problems and actions taken;
d) any customer complaints;
e) quality audit reports (both internal and external);
f) areas for improvement/changes needed;
g) any outstanding actions from previous reviews;
h) training needs; and
i) equipment, working environment and maintenance

5. RESOURCE MANAGEMENT

5.1 Provision of Resources

Organisations are required under the International Standards to determine and provide in a timely manner, the resources needed to:

a) implement and improve the processes of the Quality Management System; and
b) address customer satisfaction.

In this context, the term resource applies to personnel, facilities and equipment.

5.2 Human Resources

Staff who are assigned responsibilities defined in the Quality Management System must be competent on the basis of applicable education, training, skills and experience.

People assigned to carry out quality activities are required to be competent to do them, otherwise a quality product or service is less likely to result. The standards require competence to be based on appropriate or applicable education and training and also on skill and experience that the people possess. There is however, no requirement to have all four, only those applicable to the particular task.

Appropriately qualified and experienced staff in sufficient numbers are prerequisites for an AIS organisation to provide safe and timely aeronautical information.

The most obvious users of aeronautical information are pilots. Other users of the information represent those engaged in airline operational control and those involved in the provision of ATS. The AIS must be technically oriented in the nature of the services being provided. Given the relevance of aeronautical information to global air traffic, it is important to promote the correct level of technical proficiency within the AIS and that the AIS has an appropriate status in the parent civil or military organisation.

This part of the Quality System requires AIS to have procedures in place for assessing the competence of personnel required by the organisation to check, edit and publish aeronautical information. These procedures should include the levels of training, qualification and experience necessary to achieve expeditious publication of information.

Equally, staff responsible for the collection, collation, checking, coordination and edition information published in the Integrated AIP Package must have a thorough understanding of the content, standards, format and other user requirements related to the material being published.

Ideally, staff responsible for checking, coordinating and editing aeronautical information should have an extensive background as a pilot or within air traffic services, or have received specialist training in AIS.

For example, staff responsible for the operation of the NOTAM office would be:

a) conversant with the standard format, codes and abbreviations for NOTAM;
b) conversant with the operational requirement for air traffic services, flight operations personnel, flight crews and the services responsible for pre-flight information to be kept informed of operationally significant information that may affect the safety of air navigation; and
c) competent in the operation of the AFTN.

5.3 Training, Awareness and Competency

This part of the standard requires an organisation to:

a) determine competency needs for personnel performing activities affecting quality;
b) provide training to satisfy those needs;
c) evaluate the effectiveness of the training provided;
d) ensure that its employees are aware of the relevance and importance of their activities and how they contribute to the achievement of quality objectives; and
e) maintain appropriate records of education, experience, training and qualifications.

5.4 Checking Competence and Training

AIS needs to regularly review the competence, experience, qualifications, capabilities and abilities of its staff to ensure that any skills and qualifications needed by the AIS are available for the tasks to be completed.

Training is required when deficiencies are noted, or when new employees start work. Any training that is required may be carried out in stages, and may be in the workplace, in-house or at an external location.

The scope of the training and checking is largely a matter for the organisation to determine, but generally, training for AIS would include the following topics:

a) Principles of the Aeronautical Information Service;
b) Organisation of AIS;
c) Responsibilities and Functions of AIS;
    - ICAO Documents
    - AIS Products
    - Responsibilities and Limitations

d) The Integrated AIP Package;
e) Relationships with External Agencies;
f) Change Management;
    - Applicable Policies and Procedures
    - Standard Operating Procedures
    - Quality Processes
    - Coordination Requirements
    - Collation and Processing
    - Data Entry and Verification
    - Data Structures
    - Formats to be used
    - Checking Procedures and Processes
    - File Management
    - Record Keeping
    - Publication and Production
    - Distribution
g) AIS Automation.

Records should be maintained to show what competences staff possess, and to show what training has been carried out, and the results of that training. Records that demonstrate successful completion, i.e. effectiveness, of a training program and the competence of staff can and should be kept simple.

At their simplest, records may consist of a "sign-off" to confirm that staff can carry out specific processes or follow certain procedures. These records should include a clear statement when a person is deemed to be competent to do the task for which they have been trained.

5.5 Facilities and the Work Environment

In addition to adequate numbers of suitably experienced and competent personnel, AIS also requires appropriate accommodation and adequate facilities to get the work done and so provide quality services. This part of the ISO Standards call for AIS to determine, provide and maintain the facilities it needs to achieve product conformity, including:

a) Workspace;
b) Equipment, hardware and software; and
c) Supporting services

In simple terms, this means that AIS needs to identify, provide and maintain adequate space, suitable equipment, tools and systems to enable staff to do their job.

ICAO Aeronautical Information Services Manual (Doc 8126) provides guidance on facilities and equipment for aeronautical information services.

At the most basic level, facilities for AIS should include:

a) Suitable furniture for staff to work comfortably, efficiently and ergonomically;
b) Sufficient space between work-stations to avoid disruption to other staff;
c) Noisy equipment isolated away from staff or sound-proofed;
d) Adequate overhead or specialist lighting to be able to easily read source document;
e) A quiet area for proof-reading; and
f) Suitable computing equipment for word-processing and data capture.

AIS organisations are moving more and more towards automated systems to improve the efficiency, accuracy and cost effectiveness of their businesses. AIS' need to ensure that any systems automation and services are designed with the intent of avoiding incompatibilities, divergences and unnecessary duplication of effort and importantly that there is an overall systems integration management plan in place. Standardisation of procedures, products and services is essential for the successful automation of aeronautical information services.

6. PRODUCT DEVELOPMENT AND REALISATION

6.1 Product Realisation

Product realisation is the sequence of processes and sub-processes required achieving the delivery of a product. Planning of the realisation processes must be consistent with the other requirements of the organisation's Quality Management System and documented in a form suitable for the organisation's method of operation.

During the planning of the processes to bring a product to fruition, AIS would consider the following matters:

a) objectives for the product, project or contract;
b) the need to establish processes and documentation, and provide resources and facilities specific to the product;
c) verification and validation activities, and the criteria for acceptability; and
d) the records that are necessary to provide confidence of conformity of the processes and resulting product.

All this planning information should be documented. For regular product and/or service, this planning activity only needs to be carried out at the initial stage and revised when there is a change in process or resources that will affect the delivery of the service or manufacture of the product.

For project work and “one-off items”, you may have to carry out the planning process for each project and item.

Note: Documentation that describes how the processes of the Quality Management System are applied for a specific product, project or contract may be referred to as a quality plan.

6.2 Identification of Customer Requirements

As with any business, AIS needs to determine its customer requirements. These requirements include:

a) product requirements specified by the customer, including the requirements for availability, delivery and support;
b) product requirements not specified by the customer but necessary for intended or specified use; and
c) obligations related to product, including regulatory and legal requirements.

The following definitions are used in the Chapter:

Customer	The eventual (individual) user of the AIS products or services
Author Area	An identifiable group or organisation that has ownership of the information provided by AIS.
Note:	*For the purposes of these Guidance and the ISO requirements, the Author Areas can be considered to be a special type of customer since they have a vital role in determining if the information provided to and by AIS is correct and appropriate.*

6.3 Who are the Customers?

AIS provides a range of aeronautical information and data for pilots, aircraft operators, ATS personnel, flight planning companies and data vendors. Each of these can be considered to be customers of AIS.

6.4 Review of Product Requirements

AIS with an established Quality System, or in the process of establishing such a system would review the identified customer's requirements, together with any additional requirements that might be necessary.

This review must be conducted prior to the commitment to supply a product to the customer, e.g. submission of a tender, acceptance of a contract or order, and to ensure that:

a) product requirements are defined;
b) where the customer provides no documented statement of requirement, the customer requirements are confirmed before acceptance;
c) contract or order requirements differing from those previously expressed (e.g. in a tender or quotation) are resolved; and
d) the organisation has the ability to meet defined requirements.

The results of the review and subsequent follow up actions must be recorded and form part of the quality records.

When product requirements are changed, the AIS must ensure that any associated documentation; procedures, processes etc are also amended to reflect the changes, and that the staff are kept aware of the changed requirements.

An example of a customer requirement might relate to the supply of aeronautical data or information in a specific electronic format to meet customer needs and specifications.

6.5 Customer Communication

Effective communications with our customers are an important part of the work of AIS. This part of the standard requires the organisation to identify and put arrangements into place for this communication to take place. The communications plan must include information about:

a) product information;
b) enquiries, contracts or order handling, including amendments; and
c) customer feedback, including customer complaints.

6.6 Understanding and Meeting Your Customer's Requirements

All parts of the customer's order or contract need to be reviewed to ensure that you can meet your commitments.

The manner in which the customer provides the order may vary in form and may be a:

a) written order;
b) verbal agreement; or
c) telephone order.

Often problems can arise because of a misunderstanding about what was ordered. This makes good communications with your customer an essential part of good business and is essential to resolve any misunderstandings. This might mean that AIS will make someone specifically responsible for communications with your customers.

Written orders, such as those received by mail or facsimile, provide a permanent record of the order details.

When telephone and direct computer link orders are received, special provisions need to be made to record and confirm the order. Methods of handling these could be as follows:

One approach to telephone orders is to provide a pad (these could even be pre-printed forms) for the order receiver to record the details of the order and read it back to the, customer, asking for confirmation. Alternatively, the details may be faxed or mailed back to the customer.

Where electronic media are involved, two options exist: either save permanently on disk or print out the details.

At the time the order is received you need to determine if there are any design requirements in the order and to see if the commitment to the customer can be met.

The record of the review can be as simple as a notation on the order that it can be fulfilled with the signature of the reviewer and the date. Where a more complex review is called for, how the review is recorded is at your discretion.

7. DESIGN AND/OR DEVELOPMENT PLANNING

Many AIS' provide a Procedures Design function. This means that the AIS is required to plan and control design and/or development of the instrument procedures.

Design and/or development planning is required under this part of the Standard to determine:

a) stages of design and/or development processes;
b) review, verification and validation activities appropriate to each design and/or development stage; and
c) responsibilities and authorities for design and/or development activities.

Interfaces and internal communications between different groups involved in design and/or development must be managed to ensure effective communication and clarity of responsibilities.

7.1 A Disciplined Approach to Design and/or Development

It is important to understand that this part of the ISO Standard is intended to provide controls for the design and/or development process and in no way attempts to restrict the creativity of the designer.

The design controls should generally cover the following to establish:

a) the design aims, planning how the design is to proceed, and who is to carry out the design;
b) what is needed to be known for the design to proceed;
c) the form of the output from the design;

and to:

d) review, on completion of the design, whether it has achieved what was wanted (flight validation);
e) modify the design to include changes, which may occur at any stage of the process and for any reason.

7.2 Who is Going to Do What?

You need to plan what is to be done and who is going to do it in relation to the design. Responsibilities for design should be clearly assigned and the methods for the development and updating of the design plans should be established.

Design plans do not have to be complex. They can be as simple as a flowchart, showing the steps to be taken and who is to do them.

As part of the requirements, the AIS should also plan how the design review, verification and validation activities are to be carried out.

7.3 Design and/or Development Inputs

Inputs relating to product requirements must be defined and documented, and include:

a) functional and performance requirements;
b) applicable regulatory and legal requirements;
c) applicable information derived from previous similar designs, and
d) any other requirements essential for design and/or development.

These inputs must be reviewed for adequacy and any incomplete, ambiguous or conflicting requirements resolved.

7.4 Have We Got it Right?

Verification is checking that the results at the end of the design process meet the requirements identified as necessary at the beginning of the design process. For larger projects, the design process is often broken into stages and design verification may be carried out on a stage-by-stage basis.

The design plan should identify the verification method to be used, including who is to carry it out, how it is to be performed and what records are to be kept. There are many ways to verify the design, such as:

a) performing alternative calculations;
b) comparing the new design with a similar proven design (if available);
c) undertaking tests and demonstrations e.g. flight validations; and
d) reviewing the design stage documents before release.

You should determine which are appropriate and effective. Sometimes, regulatory agencies will describe the means required to verify the design.

Customers may need to be involved in the verification process.

7.5 Does it Work?

Validation is the process of checking that the final product and/or service will be capable of meeting or does meet the customer's needs in use.

This may include marketing trials or operational testing. It is the final stage in the design process and is an important opportunity to prevent serious financial loss by failure to supply acceptable product and/or service. The results of the verification and validation processes can be fed back into each stage of the design process, leading to modifications and improvements or even the next design revision or product and/or service generation.

For many products and/or services, validation is a relatively simple process. An example could be a new design of a visual chart, which could be validated by testing of the prototype, followed by test marketing.

For other types of product and/or service, the validation of the total performance range cannot be achieved until the actual conditions occur.

It is also acceptable for the customer to perform the validation and to provide feedback of the results to the designer. Many software projects are validated in this way.

7.6 Control of Design and/or Development Changes

Design and/or development changes must be identified, documented and controlled. This includes evaluation of the effect of the changes on constituent parts and delivered products. The changes shall be verified and validated, as appropriate, and approved before implementation.

The results of the review of changes and subsequent follow up actions must be documented.

Note: See ISO 10007 for guidance.

7.7 Controlling Changes

For AIS, change is a way of life. Changes occurring due to the customer, market, design review, verification or validation activities must be recorded, reviewed and approved. The extent to which the design needs to be to be modified as a result of the changes needs to be considered.

The Quality Management System has formal requirements for document and change control that must be followed.

Design changes may also require you to reconsider reviewing with your customer what is actually required.

The design change control process may need to be no more complicated than the system described earlier to control other documents. In other situations, the controls may need to be more complex, e.g. those involved in software design, may have to be involved in configuration management. Further advice on this aspect is available in ISO 10007, Quality Management – Guidelines for Configuration Management.

7.8 Product Identification and Traceability

AIS must identify;

a) the product by suitable means throughout production and service operations when appropriate;
b) the status of the product with respect to measurement and monitoring requirements; and

c) record the unique identification of the product, when traceability is a requirement.

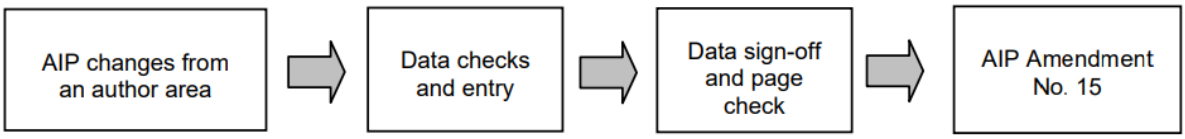
Examples of this might be the use of amendment numbering or specific page identification.

7.9 Keeping Track of What You're Doing

Identification is knowing what the product and/or service resulting from a particular process is, even an intermediate process. When you need to identify a product and/or service, the methods used and the records to be kept need to be defined. The recording of part numbers, job numbers, bar codes, the name of the person who carried out the service, colour codes or the revision status and version number of a software package being developed are just some examples of identification.

Traceability is knowing where the product and/or service came from, where it is now and in the case of services, what stage it is at. Most businesses, irrespective of size, will have a need in some stage of their operations to keep track of what goes where, what's been done and what still is to be completed. When traceability is a requirement, typical methods used include:

a) Job card entries;
b) Data checked and confirmed, data entry complete;
c) Service records, e.g. signing-off a particular work aspect;
d) Tagging;
e) Computer tracking.



When servicing a car, the status of each operation on the service checklist is changed from “to be done” to “done” by ticking off each operation on completion.

In a phone answering service, the status of messages taken is initially 'message received'. On passing the message on to the client, the status changes to 'message delivered'. The phone answering service would have some suitable means of identifying the status.

Some of the above techniques may be also used for identification. You need to be aware that the requirements for traceability may result in additional paperwork and costs, so you have to be aware of the balance between really needing to know and superfluous information.

An example of a checklist.

Action	Reg No.	Status	
		Completed	Yet to be done
Change details registered	WP16/00	✓ (DS)	
Data checked and verified		✓ (DS)	
Data Entry		✓ (CS)	
Entered on Charts		✓ (CH)	
Airspace Handbook			X
AIP Book			X
Document checks complete			X
Chart checks complete			X
Publications to printer			X
Publications to dispatch			X

You need to establish what your internal requirements are and document them. In AIS, identification and traceability are specified requirements. If the need for a product recall arises, an effective identification and traceability system will make the task a lot easier. An effective identification and traceability system will make it much easier to replace the poor-quality service and initiate steps to avoid recurrence such as retraining or a review of process operations.

Records that provide the traceability (including the change requirements) should be retained as part of the Quality Records.

The method(s) you adopt as being most suited to your business should be described, e.g. in your work instructions, so that everybody knows how it works.

7.10 Customer Property

AIS must exercise care with customer property while it is under the organisation's control or being used by the organization. The organization must identify, verify, protect and maintain customer property provided for use or incorporation into the product. Occurrence of any customer property that is lost, damaged or otherwise found to be unsuitable for use shall be recorded and reported to the customer.

Note: Customer property may include intellectual property.

7.11 Looking After What the Customer Gives You

Occasions may arise where the customer gives you material or equipment to be used in producing the items or delivering the service. Examples could include:

a) instruments provided by the customer for measurement purposes;
b) training room provided by the customer;
c) special hardware of software; and
d) special paper for specific products.

Whilst a documented procedure is not required for this aspect, the organisation is responsible for ensuring that the control of customer property is sufficiently documented to describe how it is identified and cared for. The document could simply reference in-house processes that are in use.

7.12 Looking After the Product and/or Service

AIS must preserve conformity of product with customer requirements during internal processing and final delivery to the intended destination. This includes identification, handling, packaging, storage and protection, and also applies to the constituent parts of a product.

This part of the Standard means that none of these activities are allowed to affect the quality of the product and/or service being provided. It is up to you to determine how you will ensure that this is the case.

Depending on the nature of your business, some or all of the requirements of this part of the Standard may apply. When they do apply the arrangements for handling, storage, packaging, preservation and delivery should be recorded in your process documentation.

There are a number of areas where handling, storage and preservation, packaging and delivery problems can affect the quality of the product and/or service. Some examples are found in the following areas:

Handling: This might be the use of computers and/or a filing system, job cards, or work-packages to control work in progress.

Storage/Preservation: Use of computer systems to store work in progress, and off-site or other back-up arrangements.

Packaging/Delivery: Use of mailing tubes or electronic transfer of data to deliver charting products to a printer for reproduction.

You will need to examine your own procedures to determine the extent special handling procedures are needed and to document them.

Packaging should be appropriate for the materials. In many cases, little or no packaging will be required. Bulk materials, such as sand, coal, wheat etc are examples where packing consists simply of filling the carrying container. Even for such bulk transport, there needs to be a check that the container is suitable and does not contaminate the product. Large fabricated components may be simply loaded onto a truck and strapped down.

Packaging should be appropriate for the product, the intended transport and end use. You should make sure that where packaging and marking materials are used, that they are compatible with the products being packaged or marked. Marking materials can cause corrosion or otherwise damage products and should be selected with care.

Additionally, you should be aware if any regulations exist regarding packaging. These could require “use-by-dates”, handling instructions or specific information regarding the contents to be displayed on the package.

Examples of this might be the packaging required for chart negatives to be dispatched to the printer. Packaging needs to be robust to ensure that the film is not damaged in transit, and may require some marking to ensure that the contents are not bent or folded.

7.13 Stock Control

Most businesses will probably already have a stock control system. During stocktaking it is usually possible to check the condition of products. You need to identify the storage requirements for your products and assign appropriate storage areas. Each product does not necessarily require a separate storage area.

A periodic check of the condition of the product in stock is necessary if it is likely to deteriorate or become contaminated. The frequency is dependent on the nature of the product, with robust types requiring a less frequent check than perishable or fragile products. There may be regulatory and legislative requirements or the preservation system may be specified in the customer's order.

The protection of the quality of the product after final inspection and test now extends to include delivery to destination. If this is to be subcontracted out then you will have to ensure that appropriate procedures or instructions are given in order that final delivery does not prevent or affect the product and/or service from meeting customer requirements. You may need to carry out a supplier evaluation.

This may involve you in taking responsibility for the transport. In such cases, you would need to be aware of any legislation or regulations that might apply.

7.14 Control of Measuring and Monitoring Devices

When necessary, AIS must identify the measurements to be made and the measuring and monitoring devices required to assure conformity of product to specified requirements.

This part of the standard is only applicable to those AIS’ where measuring or testing equipment, including test software, is used to check that what you are providing meets your customer's requirements for example the supply of data electronically to a data vendor, for example the use of cyclic redundancy checks (CRC). If however, for example, your inspection method is visual inspection such as that use for some maps and charts, you may not need to have any measuring equipment or instruments and this part of the Standard does not apply.

Measuring and monitoring devices must be used and controlled to ensure that measurement capability is consistent with the measurement requirements.

When applicable, measuring and monitoring devices must:

a) be calibrated and adjusted periodically or prior to use, against devices traceable to international or national standards; where no such standards exist, the basis used for calibration must be recorded;
b) be safeguarded from adjustments that would invalidate the calibration;
c) be protected from damage and deterioration during handling, maintenance and storage;
d) have the results of their calibration recorded; and
e) have the validity of previous results re-assessed if they are subsequently found to be out of calibration, and corrective action taken.

Note: See ISO 10012 for additional guidance

Software used for measuring and monitoring of specified requirements must be validated prior to use.

7.15 Having Confidence in the Equipment Used to Check Your Work

If use is made of measuring and testing equipment for checking compliance with your customer's requirements, you will need to consider how it is controlled, stored, used and its accuracy maintained at the level needed.

It should be emphasised that the requirement applies only to equipment that can affect quality. If you are using measuring and testing equipment for indication purposes only, it does not necessarily have to be calibrated. The key message here is do not automatically calibrate everything.

Calibration is the process of periodically comparing your equipment against a reference standard to determine how accurate it is and whether or not it is still capable of meeting the accuracy required for the measurements made with it.

“Periodically” can mean on a time basis (monthly, annually) or a usage basis (before each use or after a number of times used).

The reference standard may have been provided with the equipment. For example, a paint thickness meter is normally supplied with a set of thickness standards. In other instances, you may have to have access to a suitable reference standard by buying one or using a supplier.

For a reference standard to have validity, it needs to be traceable back to an appropriate recognised accurate source. This will normally be a national or international standard. There are cases where a national standard does not exist. In these cases, the sources or frame of reference needs to be described.

You also need to take into account just how accurate the measurements need to be. How accurate your equipment needs to be will depend upon how much tolerance is permissible in what you are

measuring. A measuring device usually has to be capable of measuring to a much closer tolerance than the tolerance specified for the item being measured. However, there is no point in having measuring devices calibrated to unnecessarily high precision if you do not need that precision for your operations. Allied with these factors is how skilled the personnel need to be to use the equipment.

To make sure the measuring equipment operates effectively and gives reliable results, you need to:

a) make sure it is looked after, regularly calibrated and adjusted as needed;
b) describe how this will be done so that records are available which show calibration is traceable to national standards; and
c) make sure it is possible to identify which equipment has been calibrated and that it is suitable for use, e.g. label the equipment.

If equipment is found to be faulty, you need to find out at what stage it went wrong. You need to decide whether you need to do anything about product you have passed using that equipment. The results of any review may indicate that no action is required or that a product recall is required.

Test software needs to be subject to some form of validation to make sure that it can perform the required measurements. One way is to ensure that this software can accurately and reliably identify product with a known set of faults and deficiencies. The details of how the test software is validated should be documented.

Unlike hardware test equipment, test software does not experience 'drift' or ageing, so periodic revalidation may not appear to be necessary. However, software can be subject to unintended errors. Therefore, the purpose of revalidating test software is to ensure its continuing ability to perform the required measurements.

Some type of secure write protection should be used, in the same manner as seals are used on hardware calibration adjustments, to minimize inadvertent adjustments.

If you decide to carry out your own calibrations, you will need to have procedures for calibrating each type of equipment you use.

If you decide to use a supplier, some additional points you will need to consider are:

a) ideally, the organisation should be endorsed as a calibrating service by a suitable certifying body;
b) the organisation should issue a certificate of calibration, which states the uncertainty of measurement. (This is another way of stating how accurately the instrument can measure);
c) the certificate should indicate that the organisation can trace your calibration back to a national or international standard.

You are free to use an organisation that has not been endorsed as described above to carry out your own calibration if this is practical, e.g. original equipment manufacturer or neighbouring company. However, the resulting records must confirm that the reference standards used for calibration are of known accuracy, normally traceable to a national or international standard.

It may be possible, if you have several measuring instruments of a similar type, for the most accurate of these to be calibrated by a supplier then used as the basis for calibration of the others. For example, an accurately calibrated digital thermometer may be suitable as a reference standard for other less accurate temperature measuring equipment.

Calibration is an expensive operation. For AIS, the costs of calibration can be considerable. You should ensure, therefore, that you know the difference between checking that process control equipment is fit for purpose and calibrating equipment that is required to give confidence in your inspection and test measurements.

You need to make sure that the calibration frequency, and standards of accuracy specified are appropriate to the actual equipment usage and not excessive. Once having determined the initial calibration procedure it does not have to remain fixed forever; it can be adjusted in light of experience.

In addition to calibrating equipment, records need to be kept to show:

a) when the equipment was last calibrated, who did it, the calibration procedure, the acceptance criteria, what the result was, its acceptability and how this affects the equipment suitability (calibration status); and
b) when the next calibration is due-the period is dependent on the type of equipment, its usage and how critical the measurements are to the process.
c) measuring equipment needs to be suitably stored when not in use, to protect it from damage or deterioration. It should also be suitable for use in the proposed operating environment. These precautions apply even more so to any 'master' measuring equipment or reference standards used for calibration purposes.

7.16 Measurement and Monitoring of Products

AIS must measure and monitor the characteristics of the product to verify that requirements for the product are met, and must be carried out at appropriate stages of the product realisation process.

Evidence of conformity with the acceptance criteria must be documented, and records must indicate the authority responsible for release of product.

Product release and service delivery must not proceed until all the specified activities have been satisfactorily completed, unless otherwise approved by the customer.

7.17 Checking Things are Right

This part of the Standards requires that you establish how you intend to check and monitor both your processes and your product and/or service. Frequently there will be considerable overlap between the two and in many cases the same monitoring processes will be adequate for both purposes.

a) Some examples of measurement and monitoring include:
b) measuring dimensions;
c) proof-reading publications;
d) matching colours; and
e) looking at things and deciding if they are what were asked for.

You need to decide what your measurement and monitoring requirements are and how they are to be carried out. People who carry out measurement and monitoring may need to be trained for what they are doing.

You also need to decide and record who has the authority to say a job is finished and the product and/or service can be delivered.

Individuals may check their own work, without secondary checking by another person. Such flexibility is sometimes necessary in AIS where excessive duplication of effort should be avoided.

Verification, i.e. examining something to see if it meets requirements, is also a measurement and monitoring operation. In some industries, such as publishing industry, visual verification may be the main form of measurement and monitoring carried out.

Somebody has to be responsible for the actual measurement and monitoring. The person does not have to have a staff or managerial status. For example, in a small AIS with only a few employees, it may be necessary for cartographers to inspect their own work before passing it on to the printing and dispatch area. A job card may follow the work, and the operator signs off the work performed on the job card. This works well because the work of the next operator down the line is affected if the incoming work is not correct.

The final approval phase includes not only checking the finished product and/or service, but that all the inspections and tests that ought to have been done, have in fact been done and that if any paperwork is to go with the product and/or service, that it has been prepared and is satisfactory. In other words, if you were the customer, these are all the things you would want to know have happened before you took delivery of the product and/or service.

The measurement and monitoring to be carried out may be listed in a number of ways, such as:

a) quality plan;
b) sampling plan;

c) an inspection and test plan;
d) a procedure;
e) an instruction; and
f) the customer's order.

There needs to be a consistent method of recording that the measurement and monitoring has been carried out. In AIS, the supervisor could sign off a checklist to show all the inspections have taken place.

Your Quality Management System should be capable of identifying the job and include a procedure to recall the job if the item subsequently proves defective.

You need to have a system for keeping the necessary testing and inspection records or have other means of showing that the inspections have taken place.

Your records should indicate whether any failures occurred and the proposed action.

Inspection and test failures are handled by the activities described for nonconforming products.

Inspection and test failures should not be confused with normal processing activities to bring the product and/or service within specification before it is released to the next stage of operations.

A typical example might be a publishing company that measures, adjusts and readjusts colour densities on a chart until the required levels are achieved. Such an iterative approach does not constitute an inspection failure.

However, if the printer signs the system off as meeting specification, and it is subsequently found to be outside specification, this is a non-conformance.

7.18 Control of Non-conformity

AIS must ensure that products that do not conform to requirements are identified and controlled to prevent unintended use or delivery. These activities shall be defined in a documented procedure.

Non-conforming products must be corrected and subject to re-verification after correction to demonstrate conformity.

When non-conforming products are detected after delivery or use has started, the organisation shall take appropriate action regarding the consequences of the non-conformity.

Some customers may require notification of any non-conforming product and/or service and approve what steps should be taken. If this is the case, it will be necessary to notify the customer following detection of the nonconforming product and/or service. You may wish to include the steps you propose taking along with the notification.

Records will need to be kept of any decision made, approval given by the customer, any rework or repair procedure, and the results on the inspection and testing on any rework or repair.

If, for example, a publishing company discovers that it has inadvertently used inks that are beyond their "use by-date" (or shelf life) in the printing of maps and charts. A number of actions might be required to fix the problem:

a) investigation to find out the extent of the problem;
b) segregation and quarantine of the remaining ink supply from that consignment;
c) segregation and quarantine of affected maps and charts awaiting delivery; and
d) recall of those maps and charts likely to be similarly affected, and that could affect safety.

Depending on the potential risks, there may be a need to involve the applicable regulatory authorities and to make the public aware of the problem.

7.19 Analysis of Data

This part of the Standard requires AIS to collect and analyse appropriate data to determine the suitability and effectiveness of the Quality Management System and to identify improvements that can be made. This includes data generated by measuring and monitoring activities and other relevant sources.

In this regard, the AIS must analyse data to provide information on:

a) customer satisfaction and/or dissatisfaction;
b) conformance to customer requirements;
c) characteristics of processes, product and their trends; and
d) suppliers.

7.20 Do the Measurements Reveal Any Trends?

As a result of your measuring and monitoring activities, you probably will have collected significant amounts of data, which can be analysed to indicate any trends. Any trends that you may find could suggest where there are problems in your quality management system, which indicates areas where improvement is needed.

You may also find activities that, although effective as they are now performed, could be improved further.

You may find that statistical techniques are useful tools for the analysis process.

The Standard identifies four areas where analysis is to be applied but you can extend data analysis to whatever areas provide you with useful information.

7.21 Planning for Continual Improvement

Understandably, AIS must plan and manage the processes necessary for the continual improvement of the Quality Management System to facilitate the continual improvement of the Quality Management System through the use of the quality policy, objectives, audit results, analysis of data, corrective and preventive action and management review.

7.22 What Improvements Do You Plan to Make?

Continual improvement of the Quality Management System is now a mandatory requirement. It is important to understand that continual improvement doesn't mean that it occurs without a break or without ceasing. Instead, improvement should be interpreted as a repeated activity to be implemented as each opportunity is identified and there is justification for proceeding.

The standard lists a number of tools and inputs that you can use to both plan and actually implement improvement.

7.23 Corrective Action

AIS must take corrective action to eliminate the cause of non-conformities in order to prevent recurrence. Corrective action must be appropriate to the impact of the problems encountered.

The documented procedure for corrective action must define requirements for:

a) identifying non-conformities (including customer complaints);
b) determining the causes of nonconformity;
c) evaluating the need for actions to ensure that non-conformities do not recur;
d) determining and implementing the corrective action needed; and
e) recording results of action taken reviewing of corrective action taken.

7.24 Preventive Action

AIS must identify preventive action to eliminate the causes of potential nonconformities to prevent occurrence. Preventive actions taken shall be appropriate to the impact of the potential problems.

The documented procedure for preventive action must define requirements for

a) identifying potential non-conformities and their causes;
b) determining and ensuring the implementation of preventive action needed;
c) recording results of action taken; and
d) reviewing of preventive action taken.

7.25 Fixing the Causes of Problems

Both corrective and preventive action can be seen as steps in a quality improvement cycle. The need for corrective action can arise when an internal nonconformity (product and/or service or quality management system) occurs, or from external sources such as a customer complaint or warranty claim, or problems encountered with a supplier.

Corrective action involves finding the cause of the particular problem and then putting in place the necessary actions to prevent the problem recurring.

Preventive action starts with considering and analysing the data from all the incidences of non-conformities, all the customer complaints, all the warranty claims, all the problems with suppliers as well as any other sources of problems to find out if any trend is occurring.

Where this analysis shows that the potential for problems exists, preventive action then involves putting in place the necessary steps to eliminate these potential causes.

The documented procedures for both corrective and preventive actions should define the responsibilities and authorities for these activities.

7.26 Fixing the Cause of Known Problems

There is a difference between carrying out corrective action and fixing a non-conformity. Fixing a non-conformity is about making good the problem either by reworking, replacing or any of the other activities described in the guidance material. A corrective action is concerned with finding out why the nonconformity occurred and making sure that the problem does not occur again.

The need for corrective action could be indicated by a number of factors, some of which could be:

a) customer complaints;
b) non-conformances;
c) rework or repairs; and
d) audit reports.

Analysis of the causes may suggest some solutions such as retraining employees or amending a process control practice.

The size of the problem and the associated risks to your business will determine the actions that you need to take.

When corrective action is taken, it should be recorded and followed up within a reasonable period to find out whether it has worked. It may be necessary to change the quality manual, documented procedures, instructions and any other relevant documentation. Changes should be made in accordance with the provisions shown for the Control of documents.

7.27 Fixing the Cause of Potential Problems

You should use your records to see if any trends exist which show a potential problem could arise. Typical examples of where information might be found and used for such analysis are from such sources as:

a) difficulties with suppliers;
b) in-process problems, rework rates, wastage levels;
c) final inspection failures; and
d) customer complaints and customer surveys.

Other sources might include market surveys, audit reports and quality records. Where a potential problem is identified, a course of action may need to be developed and put in place to reduce or eliminate the risk of the problem.

If preventive action is found to be necessary, it should be recorded and followed up within a reasonable period to find out whether it has worked. As a result of preventive action, the quality manual, documented procedures, instructions and any other relevant documentation may need to be changed.

Examples of where preventive action may be applied include:

a) identifying possible situations where product damage may occur and implementing practices to prevent it from happening;
b) feedback from personnel may indicate a more efficient process; and
c) re-assessment of suppliers to overcome potential supply problems.

In AIS, there is little justification in separating management review arrangements from long-term corrective and preventive action. Where there are few personnel and the same people are involved in both activities, an artificial separation may result in duplication of effort. If this approach is taken, it should be included in the quality manual.

8. PURCHASING

8.1 Purchasing Control

Controlling provision/production is of little consequence if the raw materials brought into AIS are unsatisfactory. Complying with the part of the Standard therefore requires:

a) Documented procedures for ensuring purchased products meet requirements;
b) The evaluation, selection and reviewing of contractors;
c) Clear definitions of requirements of contractors; and
d) Procedures for verifying and allowing customer verification of contractor operation at the contractor's premises.

As with any other business, AIS needs to, and the ISO Standards require that its purchasing processes are controlled to ensure that the purchased product conforms to requirements. The type and extent of control shall be dependent upon the effect on subsequent realisation processes and their output.

Examples of products or services that AIS might purchase are:

a) Hardware;
b) Software;
c) Aeronautical data;
d) Cartographic services.

The organisation must evaluate and select suppliers based on their ability to supply products in accordance with AIS' requirements. Criteria for selection and periodic evaluation need to be defined and recorded.

8.2 Stating Purchasing Requirements

Who do we get it from?

You will need to identify those materials and services that you buy which can affect the quality of your product and/or service. You will then need to select from suppliers who can supply these materials and services, those you intend to use. Remember that sub-contracted services such as design, transport and delivery, calibration services etc. may affect quality and may need to be considered.

Most AIS' usually have a number of reasons why they deal with a particular supplier. You can continue to use existing suppliers when developing your quality management system. The standard simply requires that selection be carried out in a controlled manner.

When you decide why a particular supplier is to be used, you should write down the criteria and basis for the selection. Questions you may wish to ask in selecting suppliers may include one or more of the following:

a) How reliable are they?
b) Can they supply what you want?
c) Do they have the necessary resources, e.g. equipment and personnel?
d) Is the quoted delivery time and price acceptable?
e) Do they have a quality management system?
f) Have you used them before successfully?
g) Have they a good business reputation?

Where a proprietary or brand name product is to be purchased, an obvious source may be a wholesale or retail outlet offering an off-the-shelf or self-selection service. A wide range of products are available from such sources, such as cartographic and stationery resources, hardware and some software supplies.

In these circumstances, the criteria for supplier selection and the associated records may be minimal.

You may wish to consider buying for a trial period, with a review at the end of the period to establish the acceptability of the supplied product and/or service or the supplier.

As well as maintaining records of approved suppliers and basis of approval, you should also regularly monitor the performance of those suppliers to ensure that they still meet the selection criteria. However, as a somewhat small business, you need to be aware that your purchasing power is limited, and threats to remove suppliers from your supplier approval system may be ineffectual. This is particularly true where you are obtaining product and/or service from very large national or international organisations. Your quality manual needs to reflect the real-life situation.

The extent to which you monitor supplier's performance depends on how critical the product and/or service being supplied is to the quality of your product and/or service.

For example, the paper quality could be critical in an external business that provides printing services to AIS. Other businesses might use normal, commercial stationery, which would not need any quality related purchasing controls, but in the case of some AIS products, paper thickness and longevity, colour matching or ink bleeding through can create a number of problems for the delivery of quality products.

The printing business may monitor the performance of its paper suppliers very closely to ensure the quality of its printed product and/or service remains at the expected level.

8.3 Purchasing Documentation

Purchasing documents must contain information describing the product to be purchased, including where appropriate:

a) Requirements for approval or qualification of
   - Product;
   - Procedures;
   - Processes;
   - Equipment; and
   - personnel.

b) Quality Management System requirements.

When making a purchase, AIS must ensure the adequacy of specified requirements contained in the purchasing documents prior to their release.

8.4 Stating Purchasing Requirements

What do we need?

In order to get what you need, the purchase instructions should leave no doubt of what it is you want. Instructions are preferably given as a written order. As discussed before, remember that phone instructions are open to misunderstanding by your supplier and you may need to take additional precautions to ensure that your instructions are understood. Irrespective of whether the order is written or verbal, you will need to keep a record of what was ordered so you can confirm you got what you asked for.

This part of the purchasing requirement deals with the details that you should include, as appropriate, in advising your purchase requirements. The extent to which the details listed in Items (a) and (b) apply depends on the extent that the goods and services being ordered affect the main business and the quality of your product and/or service.

It is essential that all relevant details of the items or services wanted are clearly stated at the time of ordering. These may include drawing, catalogue or model numbers and required delivery date and place. In some cases, a catalogue number, or a part number may cover the complete description. While it is essential to fully describe what you want, unnecessary detail can lead to misunderstanding and incorrect delivery.

8.5 Verification of Purchased Products

The organisation must identify and implement the activities necessary for verification of purchased product.

Where the organisation or its customer proposes to perform verification activities at the supplier's premises, for example factory acceptance testing of hardware of software on a Test and Evaluation Platform before introduction onto an operational platform, the organisation must specify the intended verification arrangements, e.g. a test plan and method of product release in the purchasing information.

8.6 Did You Get What You Ordered?

Most businesses have some form of incoming measurement and monitoring, even if it is simply an employee checking the delivery docket and signing it to confirm that goods were delivered. A further check is that goods are what was ordered and have been received in good order. However, you need to decide whether the goods and services you receive should be inspected, by whom and how.

When a supplier has a Quality Management System in place, it may be possible to reduce the extent of measurement and monitoring.

The extent of measurement and monitoring also depends on the nature of the goods being received; e.g. the inspection of office supplies may be simply a verification that the quantity ordered was delivered. The delivery docket, signed by the employee, may be all the documentation required.

If you order goods or services, or both, from a supplier, and wish to inspect the goods or services, or both, at the supplier's premises, the arrangements for such an inspection need to be agreed and included in your order. Some examples of this requirement are:

a) factory acceptance testing of software of hardware before taking delivery;
b) monitoring employees being trained at a training organisation.

If your customer wants to visit your supplier's premises to check the product and/or service, this needs to be stated in both the customer's order to you and in your order to the supplier.

Whether or not the customer actually does this, you are still responsible for ensuring that all the products and/or services obtained from suppliers meet the requirement of the customer's order.

8.7 Production and Service Operations

Operations Control

The organisation must control production and service operations through the:

a) availability of information that specifies the characteristics of the products;
b) availability of work instructions when necessary;
c) use and maintenance of suitable equipment for production and service operations.
d) availability and use of measuring and monitoring devices;
e) implementation of monitoring activities;

f) implementation of defined processes for release, delivery and applicable post-delivery activities.

8.8 Controlling What You Do

Perhaps a more easily understood title for this part of the standard might be Process Management. Remember that this applies equally to services as well as "hardware" type products.

How your processes, which are necessary to produce the required product and/or service, interact with each other and the order in which they occur has to planned and then put into practice.

Note that a documented procedure is not required, but may prove beneficial to AIS for staff to understand all of the processes and relationships.

You need to understand how each of these processes impacts on the final product and/or service and to ensure that appropriate controls are in place to be able to meet whatever customer requirements have been specified. In many companies, the control is exercised through internal orders, drawings, production schedules, service specifications, operator instructions, etc.

You need clearly understandable work specifications or work instructions when they are necessary to ensure the product and/or service conforms to the specified or customer requirements. One of the key issues here is that it is not necessary to write a document with all the details that a competent operator would be expected to know.

For example, there should be no need to describe to a trained cartographer how to operate CAD equipment. If the cartographer cannot operate the equipment, the answer is not written instructions but training. However, the procedure might refer to ICAO SARPS and procedures for depictions or routine file maintenance and record keeping.

When product quality is dependent on avoiding any deterioration of the condition of process equipment, you need to establish arrangements for maintenance of that equipment, e.g. plotters or printers may only continue to produce quality output if there is periodic maintenance of ink cartridges or toner.

Control of operations will require you to ensure your equipment is fit for purpose and that there are no problems due to the work area.

Many of the requirements for equipment control and working environment may be specified by your customer or by regulation such as Occupational Health and Safety and will need to be reflected in your own process controls.

Process controls should also include how the process condition or the product itself is to be monitored, e.g. the printer may monitor the colour values of the charts or the operation of the printing equipment. To assist there may be proof charts or photographs available to indicate the

required colours for the charting output and the folding required. Another example might be the use of data integrity checks to ensure that the output is that required.

Many goods and services are sold with a commitment to provide post-delivery maintenance and support, e.g. hardware and software as part of the overall contract. Remember that commitments made as part of a warranty also form part of the contract and this part is relevant.

In dealing with post-delivery activities, your process will need to address the following aspects:

a) general provisions of a servicing programme;
b) planning the servicing activities;
c) personnel needed and any training requirements;
d) spare parts management;
e) preparation of servicing instructions; and
f) records of servicing activities.

When providing servicing, it is important to remember that any product and/or service non-conformances should be fed into the corrective action system so that the reason for the failure can be identified. Remember, if warranty repairs were required, the product did not perform as intended and this is a form of non-conformance.

As always, records that show what you did to measure how your process was under control should be kept.

8.9 Contract Review

All agreements with the customer base must first be defined as requirements and then controlled to ensure that:

a) all requirements are adequately defined;
b) any differences between the end product and the requirements are resolved; and
c) the terms of the agreement can be met.

To ensure this occurs, the following steps are necessary:

a) a documented procedure for reviewing and approving agreements
b) a documented process for managing changes to agreements; and
c) the keeping of records of the agreements and their review and/or approval.

9. CUSTOMER SATISFACTION

The Standards require AIS to monitor information on customer satisfaction and/or dissatisfaction as one of the measurements of the performance of the quality management system. The methodologies for obtaining and using this information must be determined.

9.1 How Satisfied are Your Customers?

You are required to monitor your performance as a supplier to your customers. More specifically, you are required to monitor information on satisfaction or dissatisfaction. To do this you will need to find out how satisfied your customers are.

9.2 More Than One Type of Customer

Firstly, it is important to remember that you may have more than one type of customer. For example, if you are a map or chart manufacturer, you may sell to wholesalers who then sell to retailers who then sell to the general public. In this case you have three types of customer and they all have different requirements. You may be satisfying one group and upsetting another. For your product and/or service to sell successfully you will need to satisfy them all.

9.3 Satisfaction and Dissatisfaction

Another important point is to understand that satisfaction is not the opposite of dissatisfaction. Your customers are entitled to be satisfied and may take good quality of products and/or services for granted. On the other hand, if they are dissatisfied, they may react quite badly or strongly. So satisfaction may produce a neutral response whereas dissatisfaction may produce a strong negative response. There is a third possibility, which is a strong positive response. This is sometimes referred to as 'delight', something beyond the normal level of satisfaction.

9.4 Monitoring Satisfaction

There are many ways of finding out what your customers think of you. Amongst the most widely used are:

a) telephone calls made periodically or after delivery of product and/or service;
b) questionnaires and surveys;
c) using a market research company; and
d) focus groups.

All of these have merits and disadvantages. For a small AIS organization, it recommended that you start with simple methods such as calling your customers. You may gain a useful insight by calling

someone who is senior to the one that you normally deal with. Such a person is likely to know how you perform and is likely to tell you, good or bad.

Surveys and questionnaires are being extensively used. For example, how many do you receive in a year? You may get some good ideas from the ones sent to you. You can give your customers the option of giving their name or staying anonymous. You may get more negative responses from anonymous people, because some people do not like being the bearer of bad news. If they can hide their identity, they may tell you something they would not otherwise do. Remember criticism is vital information, which will help grow your business.

Questionnaires and surveys have their disadvantages because they are time consuming. If you use a questionnaire, keep it simple. Choose your questions very carefully. Ensure that they are clear. Why not test it out on a trusted friend before you send it out?

If you really want to know what your customers think, it is probably best left to the professional market research companies. Their independence enables them to gather an objective perspective of your performance and your customers' satisfaction.

Customer focus groups are a powerful tool for finding out the reasons behind the measure of satisfaction. A group of customers is brought together in a small meeting where they discuss the merits of your product and/or service. This needs facilitation, which is best left to a professional.

9.5 Satisfaction as a Measure of Your System Performance

The new version of the Standard makes it clear, that you are to use customer satisfaction as a measure of the performance of your Quality Management System.

At its simplest, this could be the percentage of dissatisfied, satisfied and delighted customers. In reality, it tends to be more complicated than that.

One customer may be both satisfied and dissatisfied. He or she may be satisfied with the product and/or service but dissatisfied with your delivery performance, for example. Therefore, you need to think it through and come up with a practical measure. Perhaps you could ask your customers to rate your performance on a scale from 1 to 10. Alternatively, perhaps it would be worthwhile measuring several aspects of your business, for example, appearance, delivery performance, packaging, functionality, and value for money.

The periodic internal audits shall be conducted to determine whether the quality management system:

a) conforms to the requirements of the International Standard; and
b) has been effectively implemented and maintained.

The audit program must take into consideration the status and importance of the activities and areas to be audited as well as the results of previous audits. The audit scope, frequency and methodologies must be defined. Audits must be conducted by personnel other than those who performed the activity being audited.

A documented procedure must include the responsibilities and requirements for conducting audits, ensuring their independence, recording results and reporting to management.

AIS Management must take timely corrective action on deficiencies found during the audit.

Follow-up actions shall include the verification of implementation of corrective action and the reporting of verification results.

Note: See ISO 10011 for guidance.

9.6 Are You Doing What You Said You Would Do and Does It Work?

Audits are about getting information, in a planned way, from a variety of sources and comparing it all to confirm that things are being done properly. The steps of gathering this information should include:

a) reading the documented procedures;
b) reading relevant process control documents;
c) observing processes being carried out;
d) talking to the people carrying out the processes; and
e) looking at the records.

All these need to tell the same story; i.e. that you are doing things right, the way you said you would.

For a well-organized and run AIS, where familiarity with the day-to-day activities is the norm, a properly conducted audit can be beneficial. You should use audits to stand back and look at your business objectively to confirm that the Quality Management System is helping you do what you want to do and what you need to do.

You need to find some form of evidence, documented or otherwise, which can confirm that the Quality Management System is performing in the way it was intended. It is not sufficient to simply do an overview and conclude without any proper basis or supporting evidence that the quality management system is operating satisfactorily. This requirement is reinforced to require you to develop some means for measuring how the Quality Management System is performing.

Seeking out areas for improvement is now particularly important as it is this information that is required to be added to the data to be analysed.

The information from internal audits should also be used as part of your management review. The better your audit, the more useful your management review will be.

When an internal quality audit shows up non-conformances and inconsistencies, you need to develop the necessary corrective actions and then put them in place.

These may be as simple as:

a) writing or revising a documented procedure or a process control document;
b) redesigning a form to incorporate more information; and
c) arranging for employee retraining.

Audits should be scheduled to cover all the quality-related activities you undertake and all the requirements of the standard. In deciding how to manage the audit schedule and how often any particular aspect should be audited, the following factors may be considered:

a) Are there any complex procedures or processes that would justify individual audits?
b) Are there any aspects or areas that have a history of problems?
c) Does your 'hands-on' approach indicate a need for less frequent audits?

A report or summary of each audit should be made out, listing the findings and what action if any is to be taken. The record need not necessarily be complex. For example, a simple entry in a daybook may be sufficient. If the previous audit recommended or required action to be taken, the current audit should check how effective the change was and this should be recorded.

There is a requirement in the Standards that “audits shall be conducted by personnel other than those who performed the activity being audited”. For example, it is acceptable for the office personnel to audit the production/service activities and vice-versa. This can provide benefits in developing an understanding of each other's problems.

In a small AIS where there may be only one or two people in the entire management structure, this requirement may not be achievable. It is suggested that in such cases, the manager, carrying out the duties of an auditor tries to step back from direct involvement in the business operations and be very objective about the audit.

Another approach would be to seek the cooperation of another work area and each provides the internal quality audit facility for the other. This may prove attractive if there are good relations between the two businesses.

Effective use of internal quality audits is an area that you may use to minimize the ongoing costs of certification/ registration. If the auditor from the certification/registration body can see that internal quality audits are being used to effectively monitor and control the quality management system, the auditor does not need to spend as much time verifying the quality management system operation. Again, it must be emphasized that what the auditor will be seeking is objective evidence with respect to internal quality audits.

10. STEPS TOWARDS IMPLEMENTATION OF A QUALITY SYSTEM

There are many ways an organisation can go about implementing a Quality Management System. This chapter of the Guidance Material is intended to provide an example of implementation into AIS.

Note: This example is intended as guidance only and should not be regarded as the only method of implementation, nor necessarily the best or only method of implementation.

The approach in this example consists of three stages:

a) Considering what happens in AIS;
b) Implementing a Quality Management System; and
c) Improving the Quality Management System.

(a) Considering what happens in AIS	Step 1	Consider the business of AIS, *i.e.* the different flows of work through the organisation and list them.
	Step 2	With this list in mind, decide if there are any "permissible exclusions" (refer to Standards Guidelines for details) that apply to the AIS. Remember that any exclusions will need to be justified in the Quality Manual.
(b) Implementing a Quality Management System	Step 3	Get people involved in writing down what their jobs cover.
	Step 4	Collate this in sequences relevant to the list of main business activities collected in Step 1.
	Step 5	Identify where the standards and this list of your main business activities link together.
	Step 6	Apply the standard and the Quality Management System.
	Step 7	Keep the Quality Management System simple and functional, *i.e.* relevant to the business operations.
(c) Improving the Quality Management System	Step 8	Consider the feedback of information from the Quality Management System to lead to improvements in ideas and activities
	Step 9	Monitor and measure the changes so that everybody is aware of the gains made by the system.

Now that you have determined that you would like to analyse the business and would like to work in a more efficient manner, where do you start?

The stages and their associated steps have been outlined above, the following section provides an amplification of the details.

Step 1	**CONSIDER WHAT YOUR MAIN BUSINESS ACTIVITIES ARE AND LIST THEM** Those elements described in Annex 15 form the main business activities of AIS. • receive and/or originate • collate or assemble • edit • format • publish/store • distribute Aeronautical information/data
Step 2	**WITH THIS LIST OF MAIN BUSINESS ACTIVITIES, DETERMINE IF ANY OF THE ACTIVITIES REQUIRE YOU TO DO DESIGN WORK** Design means taking raw ideas or concepts and either though design drawing, computer design or academic thought process developing a product and/or service design or project plan to suit the needs of your customer. Generally for AIS, design work will manifest itself through the design of instrument procedures. If you determine that you do not design, and the products and/or services are done against tried and previously developed standards or specifications, you may be able to claim a "permissible exclusion". To achieve the next step, you need to keep the list of main business activities firmly in mind. It may help at this stage to produce these activities in the form of a flow chart to assist in the development of a Quality Management System. The purpose of setting activities out in this way is to identify: • the different components of the AIS and decide if they all fit together, or if changes are required to make the whole process work better; and • where and if the elements of the standard are covered.

Step 3	**GET PEOPLE INVOLVED BY WRITING DOWN WHAT THEIR JOBS COVER** Now is the time to get everyone concerned involved in writing down how they carry out the parts of the AIS activities they are responsible for, stating: • who is responsible for performing and checking? • activities; • where the activity takes place; • when it will happen; and • what happens, that is, how the activity is performed. Some important points you will need to think about are: a) As the job is being carried out by a specialist, you will only need to reference the type of person and the qualifications. b) If, the work is done by non-specialist staff, or there are specific in-house requirements, more detail may be required. c) The sequence of the activities may still need to be defined, for example: • How a job is initiated. • How does the work get started? • Who monitors the progress? • How is the work processed and inspected? • Who decides when the work is finished? • How is delivery made? • What follow up action is needed and who does it? • What records are kept and who keeps them? If your organisation already has its details written down as operating or work instructions, your job is already half done. Do not rewrite what is already documented, make a note of the name and title of the document so it can be controlled and if necessary referenced in other quality management system documentation at a later date. d) Most important … Keep written documentation simple.

Step 4	**COLLATE THIS IN SEQUENCES RELEVANT TO THE LIST OF BUSINESS ACTIVITIES (STEP 1)** Once everyone has written down (or collected previously written) work instructions relevant to their part of the activity or particular job responsibilities, you as manager should take time out with someone else from the business to look at: • What has been written; • Satisfy yourself that it all fits together; and • Deal with any gaps or inconsistencies. By appointing someone to assist you, you have basically appointed a management representative or if you are doing most of this yourself as manager, you have assumed the role of management representative. You have now addressed one of the first requirements of the standard. By collating all these documents, you now have a procedures manual (which is another requirement of the standard). You should adopt a consistent style for these documents which you and your people are comfortable with. This may provide an opportunity to review and improve the procedures themselves.
Step 5	**IDENTIFY WHERE THE STANDARDS AND THIS LIST OF YOUR BUSINESS ACTIVITIES LINK TOGETHER** You or your management representative need to go through the documents you have written with a copy of the standard beside you and determine if you have met: • the requirements of the standard; and • your process control requirements. If you identify an area of the standard you have not addressed you will need to consider how you will cover that particular requirement. You may need to add some detail to one of the existing procedures to ensure the requirement is met. It may require some additional documentation, but be careful, make sure it is relevant to the work of the AIS. You may have to use external documents in your business activities. Some examples are dealers' manuals, maintenance manuals and installation manuals. It is not necessary to rewrite these to include them in your quality management system. All

	that is needed is to make an appropriate reference to the process control document in your manual.
Step 6	**APPLY THE STANDARD AND THE QUALITY MANAGEMENT SYSTEM** If you continue to involve others in your organisation, they are more likely to grow with the quality management system and have input. The quality management system will then reflect reality rather than become irrelevant paperwork. The following points should be noted: • Do not create unnecessary paperwork, forms, and the like. Look at what is currently done and write your procedures to show how the job is done, not how you wish it was done or should be done. • Only create a form if it is going to capture a critical activity or is going to help someone. A signature on or an extension to an existing form may suffice. • Remember, keep a record when: o a problem arises; o a good suggestion is raised; or o a customer or employee expresses a need for action. • To implement the quality management system, everybody needs to be have access to the documentation that relates to their activities. They need to be given some insight into how the quality management system works and why, for example, document control ensures that they have the latest copies of information relevant to their jobs and can rely on making decisions based on up-to-date information. • Everybody needs to be trained to understand how to keep the quality management system up-to-date themselves, if changes take place in areas they are responsible for. Everybody needs to know how to make changes to the quality management system as well as noting problems and putting forward ideas for improvement. Remember that you need to approve any changes before they are put in place.

Step 7	**KEEP THE QUALITY MANAGEMENT SYSTEM SIMPLE, FUNCTIONAL AND RELEVANT TO THE BUSINESS OPERATIONS** The following points are worth noting: • The purpose of implementing a Quality Management System is to ensure that the business activities of the AIS are operating in a controlled manner and the people responsible for the various activities know and understand their roles and responsibilities. • Quality Management System documentation should be a ready reference point to identify how, when, where and sometimes why a job should be done, or an activity managed. For that reason, the wording should be simple and, in the language, used in the workplace on a daily basis. • Documentation should be in a format that is easily used in the organisation. For example: o if computers are available, it may be easier to have a computerised system, rather than a paper system; o where there may be language or other differences in the workforce, it may be necessary to use pictures or several translations of the documents. • Documentation should reflect what is currently happening in the business. During the audit process, questions will be asked and objective evidence sought, to show that personnel are using and understanding the quality management system. The objective evidence is provided by the documentation.

IMPROVING THE QUALITY MANAGEMENT SYSTEM

An effective Quality Management System uses feedback loops to improve how you go about doing things, which in turn should lead to an improvement in product and/or service quality.

Step 8	**CONSIDER THE FEEDBACK OF INFORMATION FROM THE QUALITY MANAGEMENT SYSTEM TO LEAD TO IMPROVEMENT IN IDEAS AND ACTIVITIES** By noting areas of concern from corrective action activities (Step 6), you will gather data, or note trends that you can look at and consider for improvement. Improvements may be simple and easily achieved in the initial stages but may become more challenging once the obvious opportunities for improvement have been taken. It is worthwhile persevering with a systematic approach to quality improvement, since the benefits can be considerable. Normally, improvements are adopted over a period of time as money and resources become available. A realistic approach and steady progress will build confidence and maintain enthusiasm.
Step 9	**MONITOR AND MEASURE THE CHANGES SO YOU KNOW WHAT YOU HAVE GAINED** It is important to remember to measure your progress. One way of doing this is to monitor mistakes and their cost. This gives you the opportunity to identify areas where cost savings may be made. Noting how long or how many resources are spent on an activity or service delivery may also obtain measurements. This should always be recorded on any activity that has been chosen for improvement, prior to commencement and compared again at the end, even though the activity may be small and simple.

CONCLUSION Remember: Small steady changes leading to improvements, well thought through and effective, are going to have long term advantages.

These nine steps can help you take advantage of the quality management system approach and allow it to contribute to the growth of your business.

11. CERTIFICATION AND REGISTRATION

11.1 Starting Out

With respect to CAAT Rules on Manual of Standards of Aeronautical Information Services, Certification or Registration is a mandatory requirement to implement the ISO 9000 series of Standards. The following describes a brief outline for AIS provider to follow this path.

Before the actual certification/registration can take place, it is essential to have all aspects of the Quality Management System in place and running for several months. You can then see the Quality Management System in operation and have the opportunity to improve it. Any improvements you can achieve at this stage can simplify the certification/ registration process. This can save you time and money.

Certification/registration bodies do not operate on the principle of “what is going to happen”. They want to see what has happened. You will need sufficient records to demonstrate that your Quality Management System has become established and effective.

11.2 Who Does the Certification/Registration?

There are two types of certification/registration; one is carried out by your customer(s) and the other by an independent party. The outline below is based on that typically adopted by independent third-party certification/registration bodies.

11.3 Brief Outline

The process generally takes the form of the following steps: You make a formal application to the certification/registration body. The application normally includes a description of your business activities, the product and/or service range, and any other information requested. The certification/ registration body may ask for a questionnaire to be filled out.

Next, the certification/registration body will review your quality manual. What it will be looking for is how well the quality manual describes what you say happens against what the standard says should happen.

When there are deficiencies, the certification/registration body will indicate where the problems are. Amendments to the quality manual will usually overcome most problems, but you may also have to develop additional procedures.

A further review of any changes is carried out and is often combined with one of the subsequent stages. The certification/registration body may then hold a pre-assessment check or go straight to the certification/registration audit.

In the certification/registration audit, the auditor (and there may be more than one) will use the quality manual and any procedures as a guide to how your business operates. The auditor's operative words will be 'Show me'. The auditor will be looking for records, documents, or other objective evidence to see that you are doing what your quality manual/procedures say you do.

Where inconsistencies (non-conformities) are found, the auditor's actions depend on how serious these are. For major non-conformities, the certification/registration could be withheld pending rectification. For minor non-conformities, a qualified certification/registration might be issued, pending rectification by the next compliance audit.

Once certification/registration is granted, the certification/ registration body will carry out compliance audits of the Quality Management System over the period for which the certification/ registration is valid. These audits are not as comprehensive, in that the full quality management system is not necessarily assessed at each compliance audit.

If non-conformities are found during a compliance audit and not rectified within specified times, certification/registration may be withdrawn. Minor nonconformances will be required to be rectified by the next compliance audit, which under these circumstances may seem to come round very quickly.