ANTENNA RESEARCH ASSOCIATES

Quality Management System Manual

M-100-1 Revision H

Issued 1 July 2026

ISO 9001:2015

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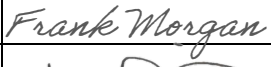
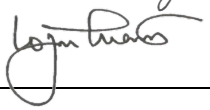
Contents

1 Approvals & Revision History

1.1 Approvals

The signatures below certify that this management system manual has been reviewed and accepted and demonstrate that the signatories are aware of all the requirements contained herein and are committed to ensuring their provision.

	Name	Signature	Position	Date
Prepared by	Kyle Edenzon		Director of Quality	07/02/2026
Reviewed by	Frank Morgan		Chief Operations Officer	07/02/2026
Approved by	Logen Thiran		Chief Executive Officer	07/10/2026

1.2 Revision History

This management system manual is reviewed to ensure its relevance to the systems and processes it describes. A record of contextual additions or omissions is given below:

Revision	Changes	Page No.	Date
A	Initial Release	Previously Archived Document	30 Apr 19
B	Updated Org Chart, Updated Quality Policy, Updated Main Processes	Previously Archived Document	17 Apr 20
C	Updated Context of the Organization file nomenclature in section 4.1 and 4.2	Previously Archived Document	7 July 20
D	Updated Document Reference numbers in sections 7.5, 6.0, 7.1.3, 8.5.1, 8.5.4, 8.5.2, & 9.3	Previously Archived Document	20 July 20
E	Updated sections 4.4.3 & 6.3 to accommodate the AQYR Processes variations Updated Appendix A – IOP Diagram	Previously Archived Document	05 Nov 20
F	Minor formatting changes and update to provide clarification in sections 2.0, 3.0, 4.3, & 7.5	Previously Archived Document	13 Nov 20
G	Integrated all ARA sites into One-ARA Organization. Updated Organization Chart, Overall process Sequence & Interaction, and minor formatting	Previously Archived Document	26 Apr 24
H	Re-write of Quality Manual, Utilizing a new format	All	30 Jun 26

1.3 Proprietary Information

2 Introduction

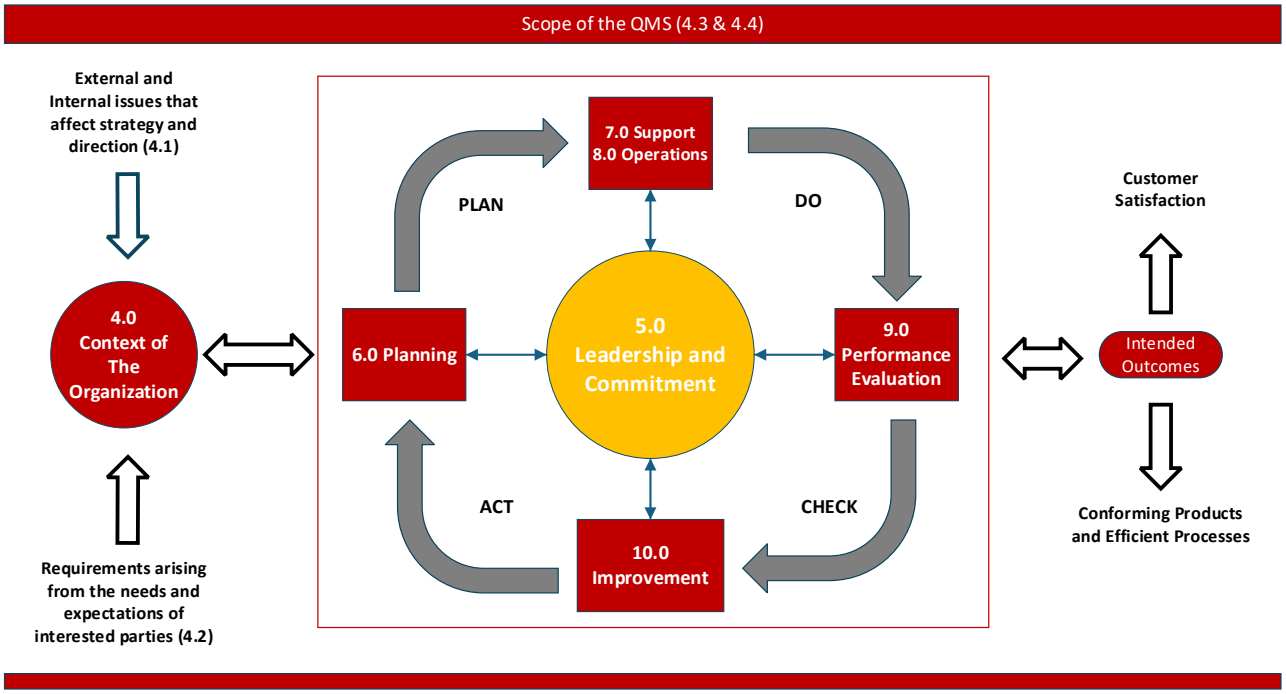
Antenna Research Associates (ARA) developed and implemented a Multi-Site Quality Management System utilizing ISO 9001:2015 as a framework that allows our organization to document and improve our practices to better satisfy the needs and expectations of our customers, stakeholders, and other interested parties.

2.1 Process Activity Map

The process overview (turtle diagram) provides stakeholders, process owners, and participants with an overview of the interactions of the management system.

The figure below illustrates our methodology for developing our quality management system, using the plan, do, check, and act process approach to implement and deliver management system objectives and stakeholder requirements to achieve compliance.

Figure 1: Overview of the Quality Management System



Certification to ISO 9001 will help achieve these intended outcomes and demonstrate that the quality management system effectively provides value for ARA and its interested parties.

2.2 Purpose

This document describes our quality management system and delineates authorities, interrelationships, and the responsibilities of personnel within the system. The quality manual also references the procedures and activities comprising our management system.

The document is used to familiarize customers and other external organizations or individuals with the quality controls that ARA has implemented. The controls defined herein demonstrate to all interested parties that our management system is focused on implementing processes that deliver customer satisfaction and process efficiency.

2.3 Applicability

Our quality management system meets the requirements of ISO 9001:2015 and uses the Plan, Do, Check, and Act approach to process planning. Our management system addresses and supports our strategies for the Design and Manufacturing of Antennas and Antennas Subsystems, Purchasing, Assembly, Testing, and Shipping of Final Delivery Products

ARA does not take exception to any ISO 9001:2015 requirements from Section 8.0

2.4 Process Approach

ARA fosters the use of a process approach during the development and implementation while improving the effectiveness of the quality management system. The application of the process approach enables:

1. Understanding and consistency in meeting requirements;
2. The consideration of the processes in terms of adding value;
3. The achievement of effective process performance;
4. Improvement activity based on the evaluation of data and information.

2.5 Plan-Do-Check-Act Cycle

The operation of the quality management system is achieved by using the Plan-Do-Check-Act (PDCA) cycle with a focus on risk-based thinking, leveraging opportunities, and preventing undesirable results. (PDCA) The closed Loop Cycle can be briefly described as follows:

1. Plan: Establish the objectives relevant to the management system and its processes; plan for the resources needed to deliver results in accordance with customers' requirements and organizational policies; identify and address business risks and opportunities;
2. Do: Implement what was planned;
3. Check: Monitor and (where applicable) measure the processes, the resulting products, and services against policies, objectives, requirements, and planned activities, and report the results; and
4. Act: Close the loop by taking actions to improve the quality management system's performance, as necessary.

2.6 Management System Principles

ARA utilizes the ISO 9000:2015 Quality Management Principles in the daily operation of the business. These quality management principles provide an underlying basis for ongoing improvement of the business and its management system. The quality management principles are:

1. Customer focus;
2. Leadership;
3. Engagement of people;
4. Process approach;
5. Improvement;
6. Evidence-based decision-making;
7. Relationship management.

Subsequent sections of this management system manual demonstrate our commitment to adopting the quality management principles.

3 Terms & Definitions

In addition to ISO 9001:2015, we reference other relevant international standards and customer specifications appropriate to our products and market.

Table 1: Terms & Definitions

Standard	Title	Description
ISO 9000:2015	Quality management system	Fundamentals and vocabulary
ISO 9001:2015_Amd1	QMS requirements	Amendment 1 Climate action changes 2024-02
ISO 9004:2018	Quality management systems	Guidelines for achieving sustained success
ISO 19011:2018	Auditing management systems	Guidelines for auditing

This document does not introduce any new definitions but instead relies on the following:

1. Definitions typically used by our customers, stakeholders, interested parties, or marketplace;
2. Terms typically used in standards and regulations as they relate to our processes and products;
3. Standard business terminology;

4 About Our Organization

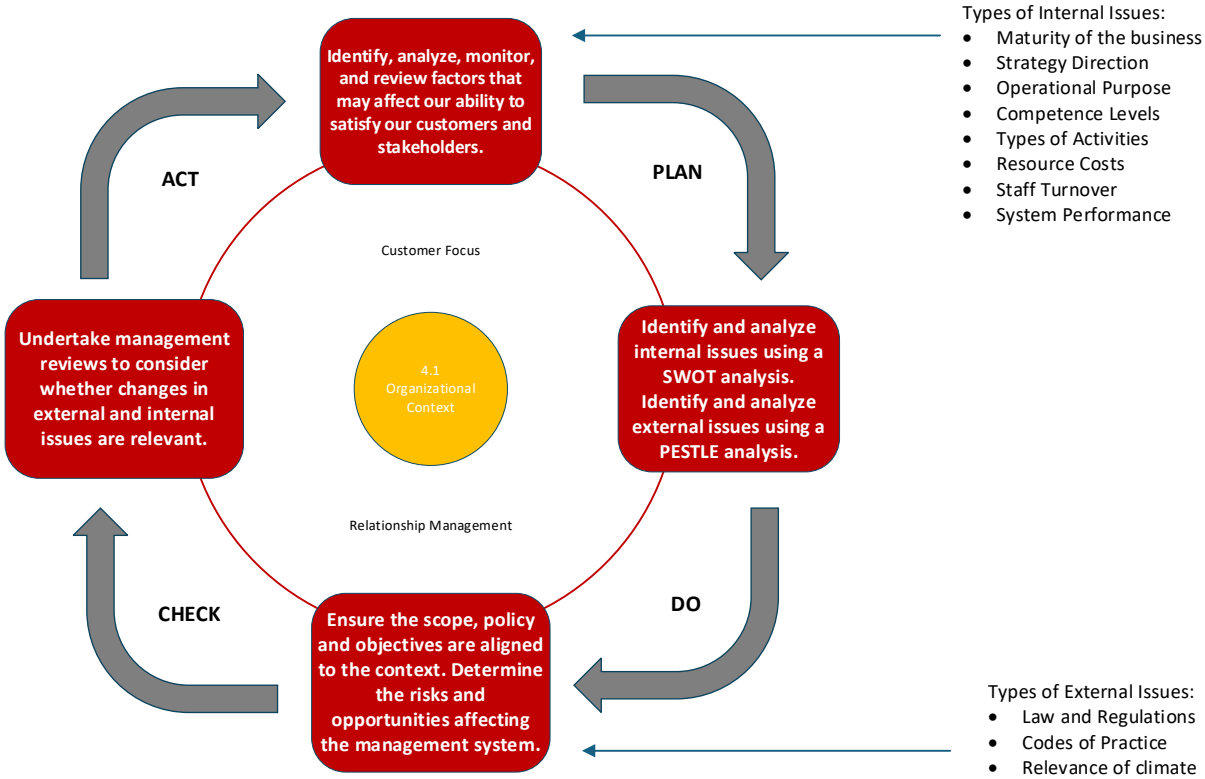
4.1 Organizational Context

Antenna Research Associates is committed to defining our position in the marketplace and understanding how relevant factors arising from legal, political, economic, social, and technological issues influence our strategic direction and our organizational context.

ARA identifies, analyzes, monitors, and reviews factors that may affect our ability to satisfy our customers and stakeholders, as well as factors that may adversely affect the stability and integrity of our processes and our quality management system.

To ensure that our organizational context is aligned with our strategy while taking account of relevant, influential, internal, and external factors, ARA collates and analyzes information pertinent to those influential factors to identify issues that have the potential to be affected by our activities, products, and services.

Figure 2: Context Discovery Process



Similarly, we identify internal and external issues that could affect our organization's ability to deliver products, services, or activities. Broadly, these issues are defined as:

Internal issues – conditions related to our organizational activities, products, services, strategic direction, culture, people, knowledge, processes, and systems. Using *SWOT analysis* provides our organization with a

framework for reviewing and evaluating our strategies, the position and direction of our organization, business propositions, and other ideas.

External issues – conditions related to cultural, social, political, legal, regulatory, financial, technological, economic, relevance of climate change, competition at local, national, or international levels. Using *PESTLE analysis* provides our organization with a framework for measuring our market and growth potential.

The output from this activity is evident as an input to consider risks and opportunities and the actions we take to address them. For more information about our risk and opportunity management framework, refer to Section 6.1.

Although we acknowledge that ISO 9001 does not require our organizational context to be maintained as documented information, we maintain and retain, in addition to this document, the following documented information that describes our organizational context:

1. Analysis of business plans, strategies, and statutory and regulatory commitments;
2. Analysis of technology and competitors;
3. Technical reports from experts and consultants;
4. SWOT analysis reports or schedules for internal issues;
5. PESTLE analysis reports or schedules for external issues;
6. Minutes of meetings (management and design review minutes), process maps and reports, etc.

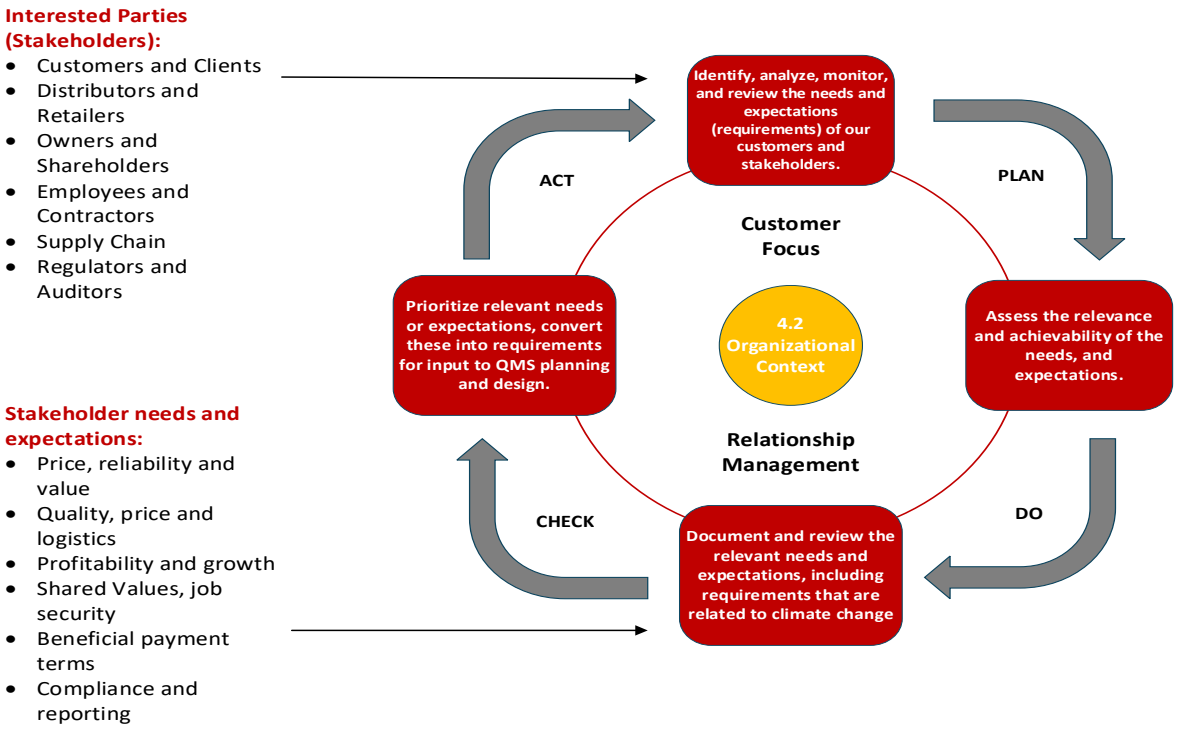
SWOT analysis provides our organization with a framework for reviewing and evaluating our strategies, the position and direction of our organization, business propositions, and other ideas.

Similarly, PESTLE analysis provides our organization with a framework for measuring our market and growth potential according to external political, economic, social, technological, legal, and environmental factors.

4.2 Relevant Interested Parties

ARA recognizes that we have a unique set of interested parties whose needs and expectations, some of which relate to climate change, will develop over time and that only a limited set of their respective needs and expectations apply to our operations, or the quality management system. Such needs and expectations broadly include those shown in the figure below.

Figure 3: Interested Parties and Their Needs and Expectations



To ensure that our products and processes meet all relevant requirements, we identify and assess the potential impact of any relevant needs and expectations that may be elicited from interested parties. Where appropriate, to ensure that our processes are aligned to deliver the requirements of our interested parties, we convert relevant needs and expectations into requirements that become inputs to our management system and our product and service designs.

Prioritized relevant needs or expectations are converted into requirements, which become inputs to quality management system planning and designs. The outputs from this process are typically used to inform the following sections and processes of this document:

1. Management system scope - 4.3;
2. Management system processes - 4.4;
3. Risk and opportunities - 6.1;
4. Communication - 7.4;
5. Operations - 8.0.

ARA recognizes that we have a unique set of interested parties whose needs and expectations change and develop over time and that only a limited set of their respective needs and expectations apply to our operational purpose.

4.3 Management System Scope

Based on the analysis of the issues and requirements identified in Sections 4.1 and 4.2, ARA has established the scope of our quality management system to implement our objectives and the policies relevant to our

context, legal requirements, the life cycle perspective of our products and activities, and our authority and ability to exercise control and exert influence operational aspects.

This document describes our quality management system and delineates authorities, inter-relationships, and responsibilities of process owners and personnel that operate within the system.

ARA can exert authority and differing levels of control and influence over our activities relating to our products and services performed at our facilities. The functional and organizational boundaries for the different physical locations (where applicable) and the level of control and influence are summarized below:

Table 2: Locations

Laurel (Headquarters)	Pembroke, Massachusetts	Billerica, Massachusetts	Nashua, New Hampshire
8880 Gorman Road Laurel, MD 20723 (301) 937-8888	28 Riverside Drive Pembroke, MA 02359 (781) 829-4740	267 Boston Road Suite 5 Billerica, MA 01862 (978) 495-5300	100 Innovative Way Suite 3410 Nashua, NH 03062 (603) 402-7100

Although we recognize that ISO 9001 does not require a quality manual, we have decided to retain and update this document as our employees, customers, suppliers, and other stakeholders perceive it to add value to our operations. The scope statement contained within this manual is available to interested parties via our website.

For our quality management system to be robust, all the activities, products, and services undertaken by Antenna Research Associates are included within the management system's scope. In this way, we can control and influence our activities, products, and services.

4.4 Management System Processes

ARA has implemented the quality management system in a broader management landscape. It has established, documented, and implemented our processes, policies, and objectives while satisfying the requirements of ISO 9001.

To achieve this, ARA has adopted the process approach advocated by ISO 9001:2015 and ISO 9000:2015. Using the PDCA cycle to manage processes and stimulate improvement, we have incorporated the 'process approach' into our daily operations.

Risk-based thinking is applied when developing, implementing, and improving the effectiveness of our quality management system.

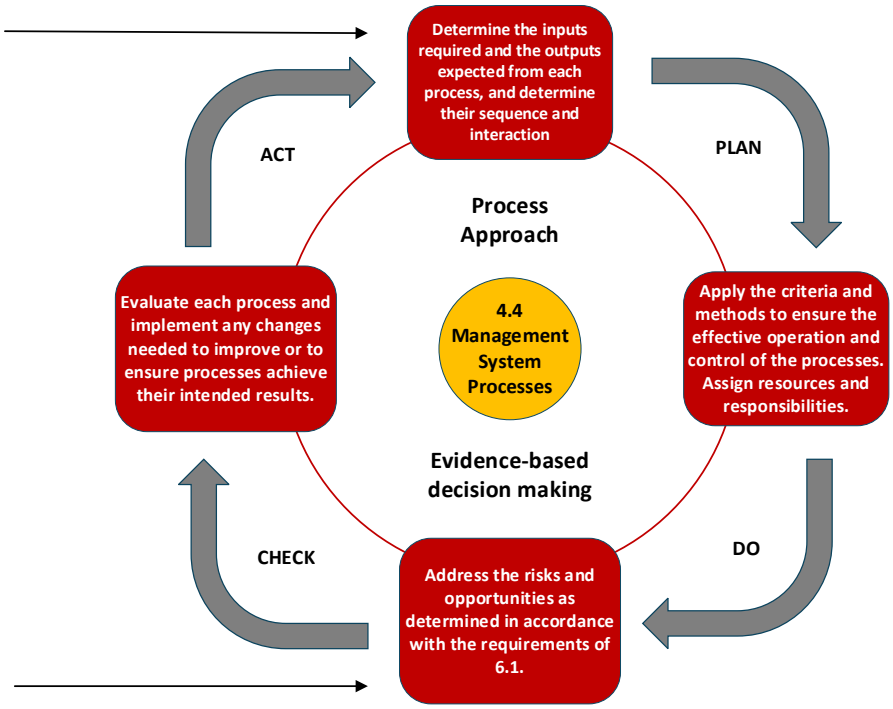
Figure 4: Process Approach

Contextual Issues:
- External and Internal Issues that affect strategy and direction (4.1)
- SWOT/PESTLE

Operational Issues:
Requirements arising from the needs and expectations of interested parties (4.2)

Scope:
- Quality Management System scope (4.3)
- Any exclusions from Section 8.0 of IOS 9001

Key Processes:
- Operational Processes
- Support Processes
- Management Processes



We establish and maintain system effectiveness by defining key process groups and managing their inputs, activities, controls, outputs, and interfaces. Refer to **Appendix A.1**, which shows the interaction of the process groups within our quality management system.

Monitoring key performance indicators (KPIs) linked to our objectives is used to measure, monitor, and communicate process performance. This approach allows top management to regularly review quality management system performance and ensure its ongoing integration with business processes.

As part of the decision-making process, we use trends and statistical data and trends related to nonconformities, customer feedback, targets, objectives, and corrective actions, as well as monitoring and measurement results, audit results, levels of customer satisfaction, process performance data and compliance data, to ensure that objective management decisions can be made.

By managing the inputs, activities, controls, outputs, and interfaces, our organization ensures that management system effectiveness is established, monitored, maintained, and improved. The process landscape is described and reported using documented procedures, process maps, turtle diagrams, matrices, schedules charts, etc. The process landscape is defined by seven key process groups, along with their associated quality objectives as shown in the table below.

Table 3: Core Processes and Quality Objectives

Key Process	Quality Objectives
Contracts	Achieve 95% completion of initial contract reviews within 72 hours for all new inquiries by end of CY26.
Design/Engineering	• Engineering Capacity – Overall engineering utilization will achieve a target of 80% measured on a monthly basis. • Engineering OTD will reach 90% by Q4 of FY26. • Engineering Recurring and Non-Recurring DTC - The average % against the BOE will be within 110% of the initial costs projects by the end of FY26
Procurement/Supplier Management	Achieve an average supplier OTD rate of ≥ 90% by the end of CY 2027.
Non-Conformance / Corrective Action	Achieve 98% First Pass Yield by January 2027
Production / Planning	Achieve best in class on-time delivery ≥ 95% by close of Fiscal Year 27
Receiving / Shipping	Receiving: Achieve an average of ≤ 2 days to inventory material/parts from the QC Completion to stockroom Shipping: Achieve an average of 95% shipping accuracy by the end of CY 2026

Where ARA identifies the requirement to outsource any process, or part thereof, which affects conformity with the stated requirements, ARA identifies control criteria such as the competence of employees and contractors, inspection regimes, the provision of product conformity certificates, adherence to specifications and specific job files, etc.

The controls identified do not absolve us of the responsibility to conform to client, statutory, and regulatory requirements, but instead, they enhance our capacity to manage our supply chain effectively. The controls adopted are influenced by the potential impact of outsourcing on meeting customer or stakeholder requirements and the degree to which process control is shared. Outsourced processes are controlled via the purchasing process and contractual agreements. Refer to Section 8.4.

5 Leadership

5.1 Leadership & Commitment

5.1.1 General

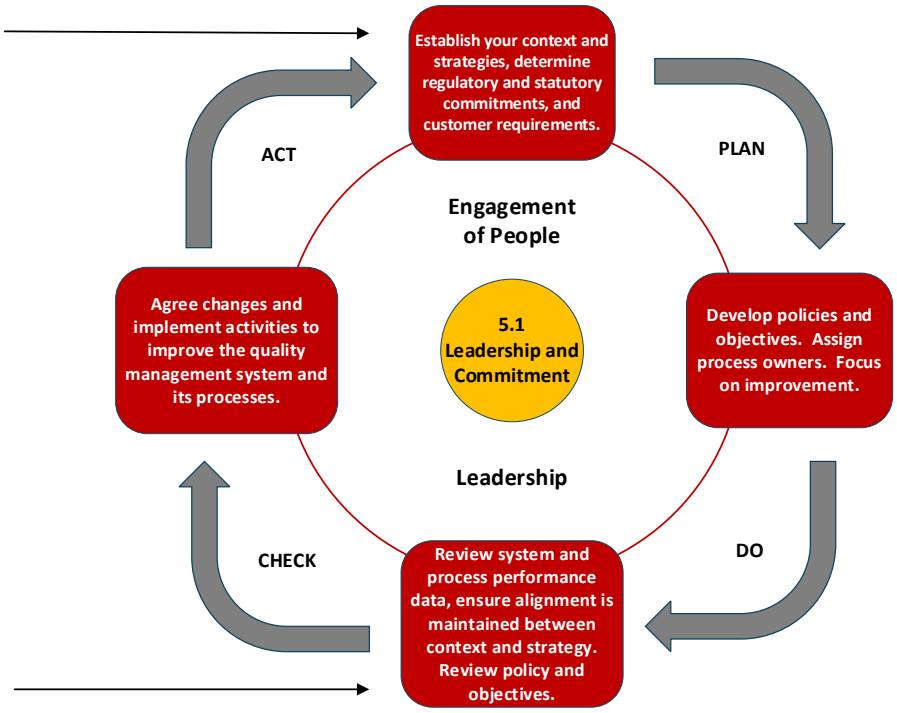
ARA's leadership is responsible for implementing our quality management system, including developing and deploying our quality policies, subsequent objectives and targets, and product or project-specific customer-focused plans.

Top management provides accountability and governance to all activities related to the lifecycle processes, including defining the strategic direction, responsibility, authority, and communication to assure safe and effective performance.

Figure 5: Leadership PDCA Cycle

Demonstrate leadership and commitment:

- Take accountability
- Establish the QMS Policy
- Establish QMS Objectives
- Engage, direct and support personnel
- Integrate requirements
- Support process owners
- Enable resources
- Communicate the importance of conformity
- Meeting statutory and regulatory requirements
- Promote continuous improvement
- Promote risk-based thinking
- Promote the process approach



Top management has appointed the Director of Quality to ensure that the necessary financial, technological, and organizational resources, including the services of specialists and competent Quality Professionals, are available to implement, monitor, maintain, and report on the status of the quality management system.

Top management has delegated the responsibility and authority for managing our quality management system, and the Director of Quality implements and maintains quality-related processes to deliver customer satisfaction.

Cross-functional committees that comprise various organizational levels, functions, and work areas have been established to support the active management of our integrated system. The Cross-functional committees oversee the implementation of improvement plans. The Cross-functional committees report to Top management and the Director of Quality.

Governance activities include systematically verifying quality management system effectiveness by undertaking internal audits, analyzing performance data, and reviewing trends and KPIs. Regular reviews and reporting ensure our quality management system is effective and can react to emerging issues. Top management is committed to implementing and developing the management system, and our corporate policies and objectives define this commitment. Top management's involvement and commitment is evident in:

1. Business strategy plans and meetings;
2. Management system goals, their communication, and incentivization;
3. Information provided on our website or social media channels;
4. Annual reports;
5. Management review meeting minutes.

ARA ensures that our QMS policies are understood, implemented, and maintained throughout at all levels of the organization through the printed distribution of our policy statements and periodic management review of the policy statements and corporate-level improvement objectives. ARA communicates our mission, vision, strategy, policies, and processes to all employees to:

1. Create and sustain shared values of fairness and ethical behavior;
2. Establish a culture of trust and integrity;
3. Encourage commitment to safety and quality;
4. Provide people with the required resources, training, and authority to act with accountability;
5. Inspire, encourage, and recognize people's contributions.

In addition, our policies, objectives, and targets are communicated and deployed throughout the business via individual, team, and department performance objectives, which are established and discussed during employee performance reviews.

5.1.2 Customer Focus

ARA strives to identify current and future customer needs, meet their requirements, and exceed their expectations. Top management ensures that the focus on improving customer satisfaction is maintained by setting objectives related to customer satisfaction at management review meetings.

Top management also ensures that customer requirements are understood and met. Customer requirements are understood, converted into internal requirements, and communicated to appropriate organizational personnel.

Customer complaints and other customer feedback are continually monitored and measured to identify opportunities for improvement. We continually look for ways to interact directly with our customers to ensure that we focus on their unique needs and expectations.

5.2 Management System Policy

5.2.1 Establishing the Policy

ARA quality policy acts as a compass by providing the direction and framework for establishing critical corporate-level performance measures and related objectives and targets. Top management ensures that our corporate policies are established and documented and that the policies are available to all interested parties via our website.

The Top management is responsible for defining, documenting, implementing, and reviewing our policies in consultation with the management teams and other personnel or their representatives.

The policies are reviewed at least annually, as part of the management review program or at a frequency determined by:

1. Changes in organizational context (Refer to Section 4.1);
2. The changing needs and expectations of relevant interested parties, Section 4.2;
3. The risks and opportunities presented through the risk management process, Section 6.1.

At Antenna Research Associates, we strive to be the preferred partner for antennas, antenna subsystems, and system integration solutions. We are committed to delivering the highest quality products and services by upholding our corporate values. Our goal is to enhance customer satisfaction through clear communication, reliable performance, and continual improvement. This commitment is achieved by maintaining a comprehensive Quality Management System, setting and achieving measurable quality objectives, and fostering a culture of excellence across the organization.

Although the activities contained within our quality policy are centrally coordinated from our facilities, the policy's success relies on everyone's participation, and as such, the policy's aims are embedded into our processes.

5.2.2 Communicating the Policy

Top management ensures that our corporate policies are established and documented and that the policies are available to all interested parties via our website.

Our quality policy is communicated to all employees at all levels throughout our organization via training, regular internal communications, and reinforcement during annual employee performance reviews. A general understanding of our policies and objectives is determined during internal audits and other appropriate methods.

5.3 Roles, Responsibilities & Authorities

All roles and designated person(s), team(s), or group(s) are clearly communicated across ARA to encourage or improve collaboration and cooperation for cross-functional process activities.

Job descriptions and the organizational structure are reviewed and approved by top management for adequacy as determined by the changing needs and expectations of the interested parties identified in Section 4.2, as well as any risks and opportunities presented through the risk management process, Section 6.1.

All roles with quality management system accountability and responsibilities (including compliance/legislative requirements) are:

1. Documented in job descriptions;
2. Training files and personnel files;
3. Documented in responsibility matrices;
4. Included in the organizational chart specific to the business;
5. Organizational charts are available to all employees;
6. Where contractors are involved, areas of accountability and responsibility are clarified.

The organization chart defined in **Appendix A.2** shows the interrelation of personnel within Antenna Research Associates, while job descriptions define the responsibilities and authorities of each role.

5.3.1 Top Management

Top management is responsible for business planning, development, and the communication of our quality policies, quality management system planning, the establishment and deployment of objectives, the provision of resources needed to implement and improve the QMS (Refer to Section 7.1), and for undertaking management reviews (Refer to Section 9.3). Top management is also responsible for:

1. Promote the quality policy when communicating with Management, Employees, and Subcontractors;
2. Provide support for the implementation of the QMS;
3. Ensure resources are provided for maintaining and improving the QMS;
4. Ensure that Management Teams meet regularly to monitor and review performance;
5. Effective implementation and ongoing operation of the QMS to maintain ISO 9001:2015 certification;
6. Ensuring that the responsibilities and authorities for relevant roles are assigned;
7. Allocating resources to ensure that continual improvements can be achieved;
8. Chairing the Management Reviews ensures that the QMS remains effective, suitable, and adequate.

5.3.2 Director of Quality

The Director of Quality is responsible, as delegated by Top management, for ensuring that any identified risks to quality are eliminated or reduced at source to As-Low-As-Reasonably-Practicable (ALARP) and that our organization's strategic development does not compromise the intended outcomes of our QMS by:

1. Providing advice, information, instruction, and training on quality management matters to employees and others as applicable;
2. Ensuring that the QMS is established, implemented, and maintained following the requirements of ISO 9001:2015;
3. Contributing to the annual (publicly available) reports;
4. Ensuring document control of QMS controlled documents;
5. Representation at QMS Improvement Groups;
6. Coordinating and completion of audits according to the internal audit program;
7. Reporting on the performance of the QMS, progress against objectives
8. Make recommendations for improvement to Top management via the agreed governance structure;
9. Increasing the competence and awareness of staff at all levels through the development of training and awareness initiatives and sharing of best practices;
10. Reporting on the operation of the QMS and identifying any opportunities;
11. Ensuring that improvement is taking place;
12. Ensuring that customer focus is promoted throughout the organization;

13. Ensuring that whenever changes to the QMS are planned and implemented;
14. Ensuring the integrity of the system is maintained during changes;
15. Ensuring that responsibilities and authorities within the QMS are communicated and delegated.

5.3.3 Quality Engineers & Technicians

Quality Engineers and Technicians support the Director of Quality to deliver the following:

1. Inspecting products on the manufacturing line for flaws or defects;
2. Testing items by analyzing size, weight, dimensions, etc.;
3. Ensuring the production process meets requirements;
4. Creating reports of quality control tests;
5. Performing statistical analysis and data analysis.
6. Assisting with internal audits;
7. Fulfilling documentation and reporting requirements.

5.3.4 Managers & Supervisors

All managers and supervisors demonstrate their commitment to the development and improvement of the management system through the provision of necessary resources, their involvement in the internal audit process, and their proactive involvement in continual improvement activities.

All Managers and Supervisors provide direction to employees in safe work practices and compliance with the safety standards and site/job-specific documentation, as well as:

1. Conducting daily pre-start shift briefings, which include a discussion of safety aspects of work;
2. Instructing employees in the requirements of quality standards and job/site-specific documentation applicable to their tasks;
3. Stopping works where activities do not comply with agreed standards or documentation;
4. Undertaking observations to provide feedback to employees;
5. Conducting documented workplace inspections to ensure activities conform to requirements;
6. Responding to observations raised by employees;
7. Responding to, reporting, and investigating incidents within the area of responsibility and applying skill and experience in identifying and implementing corrective and preventative action.

All Managers and Supervisors are responsible for planning and controlling the management system processes within their area of responsibility, including establishing and deploying operational-level objectives and providing resources needed to implement and improve these processes.

5.3.5 Employees & Contractors

All employees and contractors are responsible for the safety of their co-workers' work and for implementing our policies and procedures applicable to the processes they perform. Employees and contractors have the authority to stop production to correct safety problems.

Employees and contractors are motivated and empowered to identify and report any known or potential problems and to recommend solutions to aid subsequent risk management and corrective action activities.

At our facilities, ARA appoints nominated Safety Coordinators as required by local conditions and as determined by safety risk assessments. Employees who share workspace must cooperate and coordinate their actions to ensure safe undertakings.

6 Planning

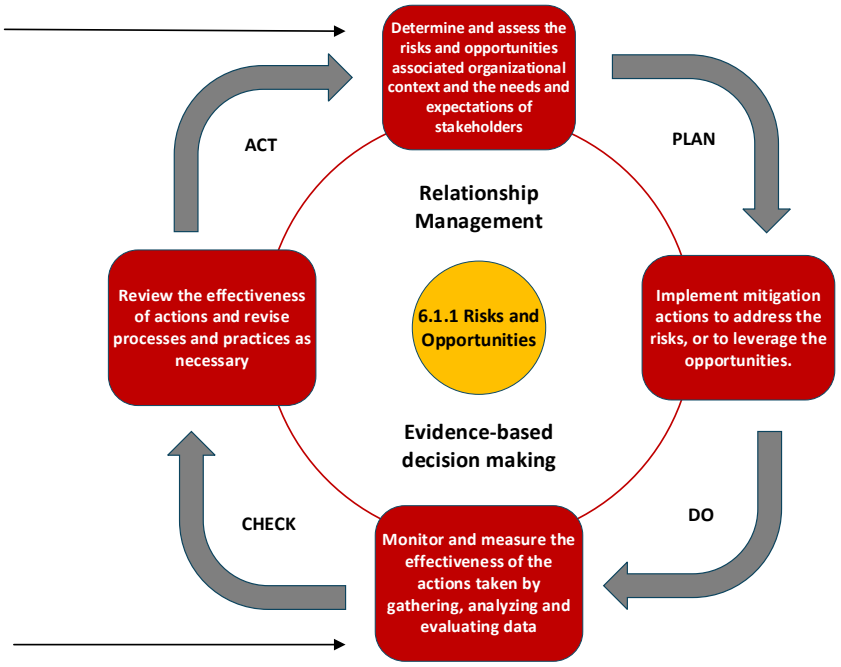
6.1 Actions to Address Risks & Opportunities

To have a successful quality management system, we consider and manage the risks and opportunities relating to our stakeholders and our organization's external and internal contexts. This process uses the information collected during our context and strategy evaluations (via SWOT & PESTLE analysis) and stakeholder and interested party analysis.

Figure 6 Risk & Opportunity Process

Manage Risks:

- Actions to avoid the risk
- Decide to take an identified acceptable risk in order to pursue an opportunity
- Eliminate the risk at source
- Change the probability
- Share the risk with stakeholders
- Retain and reduce the risk



Assess Opportunities:

- Adopt new practices
- Develop new technology
- Design new products
- Opening new markets
- Identifying new Customers
- Building relationships with strategic suppliers

Top management then considers the risks and opportunities we manage to ensure that our quality management system meets its intended outcomes, manages external environmental conditions, and achieves continual improvement.

Once the significant or material risks and opportunities are identified, ARA plans actions to mitigate perceived risks or take advantage of opportunities. Action is taken in various ways using our quality management system processes via setting objectives, targets, and policies, developing operational controls, and undertaking supplier evaluations.

6.1.1 Risks & Opportunities

Risk and opportunity management within ARA aims to ensure that organizational capabilities and resources are employed efficiently and effectively to take advantage of opportunities and mitigate risks.

Top management is responsible for incorporating risk-based thinking into ARA's culture. This includes the establishment of risk management policies and targets to ensure the effective implementation of risk and opportunity management principles throughout the lifecycle of our products, activities, or services by:

1. Providing sufficient resources to carry out risk and opportunity management activities;
2. Assigning responsibilities and authorities for risk and opportunity management activities;
3. Reviewing information and results from audits and risk and opportunity management activities.

ARA has classified its 'risk appetite' as the amount of risk that we are willing to accept in pursuit of an opportunity or the avoidance of risk where each pertains to the conformity of our products and processes and which reflect the following considerations:

1. Risk management philosophy per product, process, programs and tolerance for failures;
2. Capacity to take on or mitigate risk;
3. Our objectives, business plans, and respective stakeholder demands;
4. Evolving industry and market conditions.

ARA uses both a corporate level and program based *Risk & Opportunity Registers* to help record, assess, respond, review, report, monitor, and plan for the risks and opportunities we perceive as relevant.

The risk register allows our organization to assess each risk methodically and to study each opportunity associated with our organizational context, legal requirements, and the needs and expectations of our interested parties. The register also records the control and treatment of risk or opportunity to preserve this knowledge as documented information.

6.1.2 Planning Action

Our quality management system is planned and implemented to meet our corporate objectives and the requirements of ISO 9001. Planning involves establishing and communicating our corporate policies, objectives, and associated operational procedures.

This document constitutes our overall plan for establishing, maintaining, and improving our quality management system.

All identified risks and opportunities that need to be addressed are used to prioritize our action planning in order to manage and mitigate them. The Director of Quality analyses the risks associated with each change and presents the assessment to Top management for consideration.

The management review process, change control process, and internal audit process ensure that the integrity of our management system is maintained when significant changes affect vital processes. The management review makes recommendations to ensure that risks and opportunities that could affect the intended outcomes of the quality management system are considered and planned for with the most appropriate business processes.

6.2 Objectives & Planning to Achieve Them

6.2.1 Quality Objectives

ARA sets out its objectives and targets regularly within the management review minutes, during which details of program dates and responsibilities are defined. Improvements in management system performance are incremental and are in keeping with the size and complexity of our organization. Each measurable objective:

1. Is consistent with our established strategies, policies and context;
2. Provides a basis for continual improvement;
3. Enhances customer satisfaction.

Objectives are set in association with the Director of Quality which are based on reported compliance levels, audited deficiencies and legislative requirements, and agreed by the Top management. Each process owner monitors their metrics monthly and the Director of Quality monitors and reports progress at annual management review meetings. To enable objectives and targets to be met, annual improvement plans are developed, documented and integrated into our overall business planning process and which:

1. Specifies the required resources (both human and financial) needed to meet the objectives;
2. Specifies the roles and responsibilities for implementing improvement plans and actions;
3. Establishes the timeframes for completion of improvement plans and achievement of objectives.

When setting objectives and targets, Top management ensures that they are consistent with the needs and expectations of our interested parties, as defined in Section 4.2, and with our corporate targets and policies. In addition, technological options, financial, operational and business requirements are considered.

Progress is reviewed routinely by Top management as part of the management review and reporting activities, and incorporates any proposed developments for modified activities, products or services. Management programs are modified to account for any changes that affect the achievement of our objectives and targets. All proceedings and decisions are recorded in the management review meeting minutes.

In order to determine whether or not our objectives and targets are being met, their related metrics are reported as a set of key performance indicators (KPIs). This allows progress to be monitored as the metrics are gathered and data is analyzed. KPIs and objectives for our organization include the following aspects:

1. Process Efficiency
2. Engineering Capacity and OTD
3. Internal and Supplier OTD
4. First Pass Yield for Final Inspections
5. Shipping accuracy

Based on our quality policy, ARA sets objectives that are specified in the Quality Manual as shown in *Table 3: Core Processes and Quality Objectives* . All employees are aware of and responsible for fulfilling our policies and their subsequent objectives.

The KPIs and metrics listed below reflect specific and quantifiable indicators that ARA uses to evaluate the quality of the process and ensure ongoing optimization and process design improvements. KPIs are reported annually; however, Top management may require more frequent reporting of metrics and KPIs as necessary.

6.2.2 Planning to Achieve Objectives

Top Management is responsible for developing the program of objectives and targets for the whole organization. The Director of Quality is responsible for monitoring progress against our targets and objectives and reporting this data to top management. Our identified quality risks and opportunities are used to prioritize which objectives and plans to implement.

Top management is responsible for agreeing on objectives and targets relating to activities under their control and for approving and endorsing objectives and targets for the organization. Planning for action to mitigate adverse risk and the leveraging of opportunities is implemented via:

1. Quality objectives;
2. Monitoring, measuring, and analysis;
3. Operational controls;
4. Others, as appropriate.

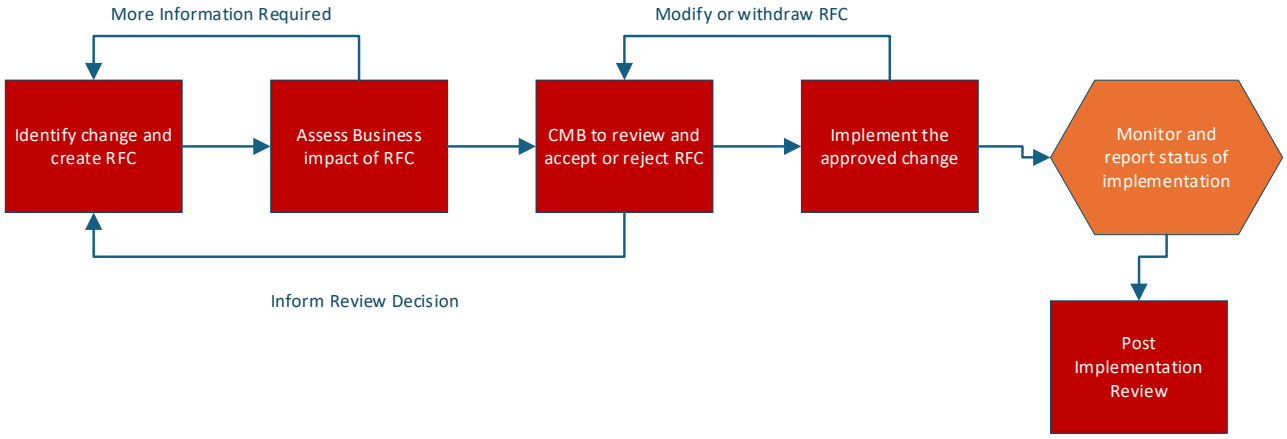
The program acts as our management action plan that identifies individual objectives, the means by which the objectives are to be achieved, and the timeframe in which the actions are to be achieved. Actions are assigned to suitably authorized and responsible members of the management team, who are responsible for ensuring that the actions are completed within the terms specified by the program.

Regular and documented management reviews make recommendations to ensure that those risks and opportunities that could affect the intended outcomes of the quality management system are considered and planned for via the most appropriate business processes.

6.3 Planning for Change

Our management system is planned and implemented to meet our corporate objectives and the requirements of ISO 9001. Planning involves establishing and communicating our corporate policies, objectives, and associated operational procedures.

Figure 2: Change Management Process



This document constitutes our overall plan for establishing, maintaining, and improving our management system. For each instance of management system planning, the output is documented and retained accordingly.

Any changes are controlled to ensure that no unintended threats affect the quality management system, and they are documented and assessed using the *Risk & Opportunity Register*.

Whenever management system changes are planned, Top management ensures that all personnel are made aware of any changes affecting their process and that subsequent monitoring is undertaken to ensure that quality management system changes are effectively implemented and do not adversely impact other processes.

All identified risks and opportunities that need to be addressed are used to prioritize action our action planning in order to manage and mitigate them. In order to manage the risks associated with any change, the Director of Quality identifies and assesses each change to any business processes that might impact the performance of the quality management system. These types of change may be:

1. Planned or unplanned;
2. Sudden or gradual;
3. Temporary or permanent.

The Director of Quality analyzes the risks associated with each change and presents the assessment to Top management for consideration. The change process applies to the following activities or items that may foreseeably change:

1. Facility, Safety and equipment;
2. Materials used, their composition, and properties;
3. Drawings and engineered processes;
4. Operating and maintenance procedures;
5. Emergency procedures or changes to business resilience;
6. Electronic system software;
7. Organizational structures and responsibilities;
8. Regulatory and statutory requirements;

The management review process, change control process, and internal audit process ensure that the integrity of our quality management system is maintained when significant changes affect vital processes.

The management review makes recommendations to ensure that risks and opportunities that could affect the intended outcomes of our quality management system are taken into account and planned for via the most appropriate business processes.

7 Support

7.1 Resources

7.1.1 General

Resources at Antenna Research Associates include human resources and specialized skills, infrastructure, technology, work environment, and financial resources. The resource requirements for the implementation, management, control, and continual improvement of our quality management system, and the activities necessary to enhance customer satisfaction, are defined in our operational procedures, work instructions, and the following sections of this manual:

1. Planning; Section 6.0
2. Management review; Section 9.3
3. Human resources; Section 7.1.2
4. Infrastructure; Section 7.1.3
5. Work environment; Section 7.1.4
6. Planning of product realization; Section 8.1
7. Determination of customer requirements; Section 8.2

7.1.2 People

To ensure the competence of our personnel, job descriptions have been prepared to identify the qualifications, experience, and responsibilities required for each position and affect product and quality management system conformity.

Qualifications include desired requirements for education, skills, and experience. Appropriate qualifications, along with the provision of any required training, provide the competence required for each position.

Qualifications are reviewed upon hire when an employee changes positions or the requirements for a position change. The Human Resources Department maintains records of employee qualifications. If any differences between the employee's qualifications and the requirements for the job are found, training or other action is taken to provide the employee with the necessary competence. The results of training are then evaluated to determine if it was effective.

Staff training records are maintained to demonstrate competency and experience. The Human Resources Department maintains and reviews the training records to ensure completeness and to identify possible future training needs. Training records are maintained and include, as a minimum, copies of certificates for any training undertaken to date, current job description, and curriculum vitae.

7.1.3 Infrastructure & Natural Resources

Antenna Research Associates is responsible for planning, providing, and maintaining the resources needed to achieve product and process conformance, including buildings, workspace, and associated utilities; process equipment (hardware and software); and supporting services (such as internal transportation and material handling systems and communications systems).

The Facilities Manager, in conjunction with the Vice President of Operations, has overall responsibility for managing our facilities and equipment maintenance programs, which include:

1. Transportation and material handling;
2. Equipment management, maintenance, and repair;
3. Process and production equipment management, maintenance, and repair;
4. Facilities management, maintenance, and repair.

The Facilities Manager, in conjunction with the Vice President of Operations, has overall responsibility for managing and mitigating our organization's use of natural resources to ensure that our operations remain compliant with relevant parts of:

1. QMS policies;
2. Control plans;
3. Legal and regulatory requirements.

7.1.4 Operational Environment

ARA ensures that our factories, offices, warehouses, and depots are maintained appropriately to comply with relevant health and safety regulations. The Environmental Health & Safety Manager carries out regular compliance audits to ensure that appropriate standards are maintained. Top management is committed to providing:

1. A place of work that is safe, including all equipment and methods of work;
2. Training, instruction, information, and supervision for employees;
3. A means of safe handling, storage, use, and transportation of equipment, materials, and chemicals;
4. Safe working environment with good lighting, ventilation, safe passageways, stairs, and corridors.

Where the work environment or the impact of personnel on the product realization process is determined to result in a risk to products, processes, or environment, then risk control measures are defined, documented, and implemented. The effectiveness of risk control measures is periodically assessed.

7.1.5 Monitoring & Measurement Tools

ARA has determined the monitoring and measurement activities to be undertaken and the devices needed to provide evidence of validation to specified tolerances and measurement ranges. The frequency of cleaning, maintenance, and calibration is considered with reference to the risks associated with the process.

Methods for controlling monitoring and measurement tools are communicated by the *Calibrated Equipment Procedure*. Where necessary, to ensure the validity of results, measuring and monitoring equipment is:

1. Calibrated or verified at specified intervals or before use;
2. Calibrated against measurement standards traceable to appropriate measurement standards;
3. Software used for monitoring and measurement is validated using defined parameters before use;
4. Protected from damage and deterioration during handling, maintenance, and storage;
5. Safeguarded from adjustments that would invalidate the measurement result;
6. Identified to enable the unit's calibration status to be determined;
7. Safeguarded from use when a unit is found to be out of calibration and the results revalidated;
8. Adjusted or re-adjusted as necessary.

In addition, the Director of Quality will assess and record the validity of previous measurement results when the equipment does not conform to requirements.

The appropriate manager will take appropriate action on any equipment, product, or process that may be affected. Where equipment is found to be out of calibration, the significance of the error is reviewed, and appropriate action is taken. Records of calibration and validation results are maintained using ARA's internal Quality Management Information System.

7.1.6 Organizational Knowledge

ARA recognizes that organizational knowledge is a valuable resource that supports our quality management activities and ensures product, process, and service conformity. There is a strong link between organizational knowledge and the competence of our people, the latter being people's ability to apply knowledge to their work.

To ensure that organizational knowledge is retained and transferred, organizational knowledge is recorded in documented information and is embedded in our processes, products, and services. Examples of organizational knowledge include:

1. Documented information regarding a process, product, or service;
2. Previous specifications and work instructions;
3. The experience of skilled people and their processes and operations;
4. Knowledge of technologies and infrastructure relevant to our organization, etc.

Sources of internal knowledge also include our intellectual property, knowledge gained from experience and coaching, lessons learned from failures and successes, capturing and sharing undocumented knowledge and experience, and the results of improvements in processes, products, and services.

External knowledge sources often include other ISO standards, research papers, webinars from conferences, or knowledge gathered from customers, stakeholders, or other external parties. ARA determines and reviews internal and external sources of knowledge, such as:

1. Lessons learned from nonconformities, corrective actions, and the results of improvement;
2. Gathering knowledge from customers, suppliers, and partners, benchmarking against competitors;
3. Capturing knowledge existing within the organization, e.g., through mentoring/succession planning;
4. Sharing knowledge with relevant interested parties to ensure the sustainability of the organization;
5. Knowledge from conferences, attending trade fairs, networking seminars, or other external events.

7.2 Competence

Top management identifies emerging competency needs during management reviews. Emergent competency needs are converted into job descriptions for the type and number of positions that need to be filled through internal or external recruitment.

To ensure the competence of our employees and contractors, job descriptions have been prepared to identify the qualifications, experience, and responsibilities required for each position that affect product and system conformity. Qualifications include desired requirements for education, skills, and experience. Appropriate qualifications, along with the provision of any required training, provide the competence required for each position.

Staff training records are maintained to demonstrate competency and experience. The Human Resources Department maintains and reviews the training records to ensure completeness and to identify possible future

training needs. Training records are maintained and include, as a minimum, copies of certificates for any training undertaken to date, current job description, and curriculum vitae.

Where required, competency training and monitoring are conducted in-house, although external seminars or courses are utilized for more specialist skills. The effectiveness of training is evaluated and recorded. The company induction includes an introduction to our policies and objectives.

Future competency training needs are identified as part of the management review process. As a minimum, the following competency-based training is provided:

1. Operational controls (including procedures and/or work instructions);
2. Workplace and safety and environmental monitoring;
3. Incident and defect management (including investigation methods as appropriate to the role);
4. Process interactions.

7.3 Awareness

ARA operates a formal system to ensure that all employees are adequately trained and aware to enable them to perform their assigned duties. Those staff members whose work is directly related to achieving our organization's objectives should understand their particular responsibilities and accountabilities within the context of the quality management system.

All employees are trained on the relevance and importance of their activities and how they contribute to achieving our quality policy and objectives. We aim to raise quality awareness and encourage involvement with relevant schemes.

Where required, awareness training is conducted in-house to transfer organizational knowledge, but external seminars, trainers, or courses are utilized for more specialist skills. The effectiveness of awareness training is evaluated and recorded using ARA's electronic training platform.

The company induction includes an introduction to our organization's policy statements and objectives. Future training needs are identified as part of the management review process. Employees are also encouraged to undertake personal and professional development with plans reviewed annually at individual annual performance appraisals undertaken by line management.

It is a requirement for line managers to refer to the training needs analysis during this appraisal to identify any gaps and/or any refresher training that may be due. These are added to the personal and professional development plans for the following year. As a minimum, the following awareness training is provided:

1. Understanding of our policies, the management system, and its processes
2. Significant risks;
3. Accountabilities of specific roles and responsibilities;
4. Consequences of departure from specified procedures or standards;
5. Emergency response procedures and business resilience.

7.4 Communication

7.4.1 General

ARA communicates information internally regarding our quality management system and its effectiveness through documented training, internal audit reports, and continual improvement processes.

All managers and supervisors are responsible for establishing regular formal and informal communications as needed to convey to their employees the relevance and importance of their activities; typically, this information is conveyed through team meetings and cross-functional improvement projects.

7.4.2 Internal Communication

Communication regarding how employees contribute to achieving objectives is also conveyed and reinforced during employee briefings and performance reviews. Issues pertaining to our quality management system that may be communicated internally include:

1. Day-to-day operations and general awareness;
2. QMS policies;
3. Information on achieving objectives and targets;
4. Risk and opportunities.

Top management and their direct reports are responsible for communicating corporate policies and the importance of meeting customer, statutory, and regulatory requirements for employees within their respective departments.

They ensure that our policies are understood and applied to the organization's daily work by establishing measurable goals and objectives. Internal communication occurs on an ongoing basis and is achieved through various mechanisms as appropriate:

1. Regular meetings and briefings;
2. Training sessions and training material;
3. Display boards, memorandums, letters;
4. Website, intranet, internal e-mails;
5. Product and process performance data analysis and audit results;
6. Targets, objectives, scorecards, KPIs, management system manual, and procedures;
7. Corrective action and nonconformance reports;
8. Minutes of ad-hoc and scheduled meetings.

7.4.3 External Communication

ARA determines the need to communicate information externally to our interested parties, as defined in Section 4.2, regarding the effectiveness of our quality management system.

In most instances, external interested parties (such as consumers, stockholders, neighboring communities, etc.) are the main driving force behind our organization’s desire to implement the quality management system.

ARA ensures that all external communications are authorized before release. Where required, advice appropriate to the context of the communication may be sought concerning the content and dissemination of certain external communications.

1. **Website** - Information about our quality management system is communicated externally to interested parties via our website.
2. **Enquiries** - ARA is subject to the Freedom of Information Act, which requires responding to external requests for information within specific timescales.
3. **Social media** - ARA manages social media accounts to share information, encourage behavioral change, and promote events. Our Marketing Dept. coordinates all social media.

Responses to external communications are recorded if they are transmitted by email or letter. In each case, the response is retained and controlled in accordance with the requirements for documented information.

7.5 Documented Information

7.5.1 Management System Documents

ARA ensures that our management system includes the documented information required to be maintained and retained by ISO 9001 and any documented information identified by our organization that demonstrates effective operation.

ARA applies the following criteria to all types of documented information to assess whether the information is necessary for demonstrating the effectiveness of our quality management system and whether it should be formally controlled.

Should any criteria apply, Antenna Research Associates ensures that this information is retained and/or maintained as a form of documented information:

1. Communicates a message internally or externally;
2. Provides evidence of process and product conformity;
3. Provides evidence that planned outputs were achieved;
4. Provides knowledge sharing.

7.5.2 Creating, Updating & Issuing

ARA ensures that when we create documented information, it is appropriately identified and described (e.g., title, date, author, reference number) and is available in an appropriate format (e.g., language, software version, graphics, etc.) and on appropriate media (e.g., paper, electronic).

All documented information is reviewed and approved for suitability and adequacy. Where permanent changes to a document are required, a *Document Change Request* is completed and submitted to the document owner for consideration and implementation.

7.5.3 Controlling Documented Information

Documented information is retained to provide evidence of conformity to the requirements specified by ISO standards, customer requirements, and the effective operation of our management system.

ARA uses standard forms and templates that are accessed via a local area network computer system. An electronic document management system backed up and updated as required, is used to retain documented information, ensuring only the current versions are available to users.

All management system documents are controlled and communicated according to the *Control of Documents* procedure, which defines the process for:

1. Approving documents for adequacy before issue;
2. Reviewing and revising as necessary and re-approving documents;
3. Ensuring that changes and current revision status of documents are identified;
4. Ensuring that relevant versions of applicable documents are available at points of use;
5. Ensuring that documents remain legible and readily identifiable;
6. Ensuring that documents of external origin are identified and their distribution controlled;
7. Preventing the unintended use of obsolete documents;
8. Ensuring that documents of external origin are identified and their distribution controlled.

8 Operations

8.1 Operational Planning & Control

Antenna Research Associates establishes and implements documented plans and procedures that describe the processes identified in Section 4.3.2 and the controls required to provide products and services in cognizance of our objectives, the potential for planned or unintended change, and the risks and opportunities identified in Section 6.1.

During the planning phase, Top management, the Director of Quality, and other responsible personnel identify the following parameters:

1. Objectives, work instructions, and requirements for the product or service;
2. Verification, validation, monitoring, inspection, and test requirements;
3. Documented information to demonstrate conformity;
4. Related life cycle aspects, impacts, and mitigations;
5. Documented information to demonstrate conformity, including;
    - Control Plans;
    - Engineering Drawings;
    - Part Lists;
    - Work Instructions.
6. Necessary resources or outsourced processes and their controls;
7. Criteria for process performance and product/service acceptance;
8. Potential consequences and mitigation to change affecting input requirements;
9. Resources necessary to support the ongoing operation and maintenance of the product.

The output of this planning activity includes documented plans, resource schedules, processes, equipment requirements, procedures, and design outputs. Design and development activities targeted at controlling risks are supported by documented information.

This documentation relates the design activities to identified risks in a way that provides objective evidence that the nature and extent of the design control is reasonable and appropriate to the degree of risk.

8.2 Determining Requirements for Products

8.2.1 Customer Communication

Following our commitment to exceeding our customers' expectations, ARA highlights effective customer communication as an essential element of customer satisfaction. Appropriate handling of customer communication helps to reduce customer dissatisfaction and, in many cases, turn a dissatisfying scenario into a satisfying experience. Customer communication occurs through the following formats, events, and processes:

1. Brochures, specifications, or technical data sheets relating to our products and services;
2. Inquiries, quotations and order forms, invoices, and credit notes;
3. Confirmation of authorized orders and amended orders;
4. Delivery notes and certificates of conformity;
5. E-mails, letters, and general correspondence;
6. When customer property is handled or controlled;
7. Customer feedback and complaints management process;

The Customer Service Team and Sales & Marketing are responsible for establishing methods of communication with our customers to ensure inquiries, contracts, or order handling, including amendments, customer feedback, and complaints, are handled expeditiously and professionally.

8.2.2 Determining Requirements

ARA develops appropriate requirements to ensure we satisfy the needs and expectations across the socio-technical environment, including those of our customers, stakeholders, or relevant interested parties. ARA ensures that customer requirements are clearly articulated and their requirements are captured and understood before the acceptance of an order.

Customer requirements include the following:

1. Previous customer requirements that pertain to current parts being ordered;
2. Statutory and regulatory obligations related to the product's lifecycle;
3. Other non-customer-specified performance requirements;
4. Any additional requirements determined by ARA;
5. Requirements not stated by the customer but are necessary for specified or intended use.

ARA controls the stages of the product lifecycle by establishing requirements for each product during its design and development phase. This is customer-driven process requires clear, and often repeated, customer interaction to understand the customer's needs.

8.2.3 Review of Requirements

Before committing to the customer, ARA ensures and confirms our capacity to supply the required product or service. Pre-acceptance reviews are conducted to ensure that:

1. Product requirements are defined and are appropriate;
2. Requirements are defined for delivery and post-delivery activities such as product or service support;
3. Requirements not stated by the customer but which are necessary for intended use are appropriate;
4. Any additional lifecycle requirements determined by ARA are appropriate;
5. Contract or order requirements differing from those previously expressed are resolved;

6. ARA can meet the defined requirements;
7. Documented information is retained and maintained, showing the results of the review.

Customer requirements are confirmed before acceptance by exchanging contracts or purchase orders via appropriate electronic or hard copy formats. Evidence of requirements review is documented using ARA's ERP System.

8.2.4 Changes in Requirements

Antenna Research Associates ensures that all relevant documented information relating to changes in product or service requirements is authorized and amended where necessary and that all relevant personnel are made aware of the documented changes to customer requirements via a *Design Change Request*.

To manage the risks associated with any change to business processes, the Director of Quality identifies and assesses each change that may impact performance.

8.3 Design & Development

8.3.1 General

Design and development planning ensures that risk management activities are conducted during the design and development process by identifying the inter-relationship(s) between appropriate risk management activities and design and development activities, as well as the resources needed, including the appropriate expertise required to ensure sufficient coverage of potential concerns.

The design and development processes are carried out under controlled conditions; all activities are planned, and all outputs are documented. Design and development activities are targeted at controlling risk and are supported by documented information.

All designs are reviewed at appropriate stages and validated where applicable. The design and development outputs are verified before they are released to production.

Our design and development practice incorporates appropriate review activities where required, including reviews of relevant standards and codes of practice, peer review, creator self-review, or independent review as appropriate.

8.3.2 Planning

At the start of the design process, ARA reviews the available requirements and specifications and identifies the critical stages of the design process. Design and development stages are established, including organization, task sequence, mandatory steps, significant stages, and configuration control methods. Where appropriate, our organization considers and implements the following activities:

1. Assigning responsibilities and authorities for the design and development process;
2. Determining and scheduling required design review meetings;
3. Verification and validation activities appropriate to each stage;
4. Determining the nature, duration, and complexity of the design and development activities;
5. Identification of internal and external resources;
6. Determining the need to control interfaces between personnel involved;
7. Identification of multi-disciplinary interfaces whose input is required;
8. Determining the need for involvement of customers and users in the process;

9. Determining the requirements for subsequent provision of products and services;
10. Determining the level of control expected by customers and other relevant interested parties;
11. Determining the documented information needed to demonstrate that requirements have been met.

By structuring the design effort into significant elements and by analyzing the elements and the necessary resources for design and development, ARA identifies responsible personnel, design content, input data, planning constraints, and performance conditions.

The input data specific to each element is reviewed to ensure consistency with customer requirements.

8.3.3 Inputs

Design inputs, such as customer data, drawings, specifications, standards, regulations, obligations, safety requirements, etc., are checked to confirm they are adequate and unambiguous. Any conflicting or ambiguous requirements are discussed and resolved with the originator, and the outcome is retained as documented information. ARA also considers the following:

1. Functional and performance requirements;
2. Information derived from previous, similar designs;
3. Statutory and regulatory requirements;
4. Commitments to implement any standards or codes practice;
5. Consequences of failure due to the nature of the products or services.

If the project involves modifying an existing company design, then the impact of the changes on components parts, stocks, and delivered products is also evaluated. When establishing design and development inputs, the need for risk control measures is considered. When risk control measures are determined to be necessary, they are initially defined and become an output as part of the iterative lifecycle of the products.

8.3.4 Controls

ARA controls the design and development process to ensure that the results to be achieved are defined and that corrective action is taken where problems or changes are identified during design reviews and verification or validation activities.

Our designs are verified by referencing similar, proven designs or by carrying out alternative calculations to meet input requirements. Verification is usually carried out during the design review process; the results are retained as documented information.

Design and development verification generate objective evidence that the identified risks were addressed, risk control measures were implemented as necessary, and risk control measures were verified to be effective so that the result meets the defined acceptability criteria.

Design and development validation is performed to ensure that the resultant products or services can meet the requirements for the specified application or intended use, where known, before release for delivery or implementation. Validation confirms that the products and services meet user needs and intended uses and that any residual risk meets the overall acceptability criteria.

Where it is impossible to perform full validation before delivery or implementation, partial validation is performed to the extent applicable. Where tests are necessary for verification and validation, tests are planned, controlled, reviewed, and documented to ensure and prove the following:

1. The correct configuration of the product is submitted for testing;
2. The requirements of the test plan and the test procedures are observed;
3. The acceptance criteria are met.

The design is reviewed at appropriate stages to ensure it meets the specified input requirements and identifies and resolves any problems. These actions are recorded. The review includes all relevant stakeholders. Records of critical decisions are retained. The design review includes the following:

1. Evaluation of results to determine whether they fulfill requirements;
2. Identification of problems and proposals for corrective actions;
3. Authorization to progress to the next design and development stage.

Design and development reviews determine if any individual residual risks, as well as any overall residual risks, are adequately communicated to appropriate individuals, including users.

8.3.5 Outputs

The design and development process outputs are retained as documented information and expressed in terms of requirements, calculations, analysis, or other means that can be verified against input requirements.

The resulting outputs satisfy the design requirements, provide adequate information on production and service operations, refer to acceptance criteria, and specify characteristics essential for the safe and proper use of the product.

During the design and development process, when inherent safety and/or design for protective measures are not possible or practical, additional risk control measures such as labeling, training, and residual risk communication may be necessary design outputs.

8.3.6 Changes

ARA ensures that changes made during or after the design and development requirements are identified and retained as documented information. Any changes are reviewed, verified, validated, and approved.

The review of design development changes includes evaluating the adverse effects of those changes on constituent products already delivered. Where a design change results from changes in a risk control measure, any current risk assessments are reviewed and updated as necessary.

8.4 Suppliers & Purchasing

8.4.1 General

The purchasing process is essential to our organization's ability to provide customers with products and services that meet their requirements. ARA ensures that all purchased products or services incorporated into our final outputs conform to specified requirements.

ARA accomplishes control by closely working with a network of external suppliers. Performance and capability are continually assessed through periodic audits, performance data analysis, and inspection or verification of the supplied products or services.

The type and extent of control applied to our suppliers and the purchased product depend on the effect the outsourced product or service may have on our final product or service. The following considerations are taken into account:

1. Ensuring that we understand the capabilities and competencies of potential outsourcing suppliers;
2. Ensuring that we communicate the roles and responsibilities of the outsourcing supplier;
3. Defining the quality requirements for the outsourced process, activity, or product;
4. Establishing upfront the criteria for and review of deliverables, frequency of inspections and audits;
5. Selecting and qualifying appropriate outsourcing suppliers;
6. Ensuring usage requirements, precautions, and protective measures are communicated and available.

After successful review and evaluation, suppliers are evaluated and added to the *Approved Vendor List*. It is the responsibility of the Purchasing/Supply Chain Manager and Director of Quality to evaluate and select suppliers based on their ability to supply products or services in accordance with specified QMS requirements to ensure that our operations remain compliant with our:

1. Corporate QMS policies and objectives;
2. Sustainable development procurement policy;
3. Legal and other requirements.

Additionally, other internal resources may be called on to assist as required. The selection, evaluation, and re-evaluation criteria are defined and communicated in the *Suppliers & Purchasing Procedure*. Records of the results of evaluations and any necessary actions arising from the evaluation are maintained.

8.4.2 Purchasing Controls

Antenna Research Associates ensures that externally provided processes, products, and services do not adversely affect our ability to consistently deliver conforming products and services to our customers. Quality control measures are applied to outsourced processes and purchased products where appropriate. These controls are documented within the purchasing information and communicated to the supplier.

A SCAR Form is issued to Suppliers and vendors for repetitive, ongoing problems and issues that significantly impact end-product delivery. A SCAR may be requested due to the supplier's poor performance for more than three consecutive months or any three months in 12 months based on data analysis.

Supplier performance and capability are monitored and assessed through periodic audits, performance data analysis, and inspection and/or verification of the purchased product or outsourced process. Suppliers who demonstrate inadequate audit and delivery performance must implement corrective actions.

Personnel with authority to take action on the remediation are identified in the report. The Supplier's approval status will be determined based on the table below:

Score	New Supplier	Currently Approved Supplier
>95%	Systems are effective; start doing business with this supplier	No change in status, systems are effective, continue business with this supplier
85-95%	Conditionally approve the supplier and encourage them to improve their processes	Request improvement, encourage them to improve their processes, and monitor and continue using the supplier
60-84%	Supplier may implement corrective actions and request re-audit	Request immediate corrective action and request re-audit, temporarily stop using issues are fixed
<60%	There are severe problems and or defects that could impact our business, reject the supplier	There are severe problems and or defects impacting our business, change supplier

Poor-performing suppliers are replaced, and the *Approved Vendor List* is updated. The frequency of supplier contract reviews varies depending on their performance and the criticality of the products supplied, but the interval between each review is no more than 24 months. The type and extent of control required for purchased products depends on the product's effect on the subsequent realization of the end product.

To ensure that all purchase order requirements are met before the material is released for use, purchased items and delivery notes are checked against the purchase order to confirm that the identity and quantity are correct. Activities to verify conformance to requirements may include:

1. Obtaining evidence of quality conformance from the supplier in the form of inspection documentation, certificates of conformity, test reports, and/or records of statistical process control;
2. Inspection and audit at supplier's facilities;
3. Review and acceptance of required documentation;
4. Inspection of product upon receipt;
5. Verifying test report data against applicable specifications;
6. Periodic third-party testing may be performed on materials to verify the accuracy of supplied test reports.

Satisfactory purchased items are placed in stock. If items are rejected on receipt, a nonconformance report is raised, and the supplier is contacted to arrange replacement or credit.

8.4.3 Purchasing Information

ARA uses purchase orders to describe the product or service to be purchased. Designated individuals within the company create purchase orders using the company system. They also ensure the adequacy of the requirements specified by the purchase order before release. Each purchase order includes, where appropriate:

1. Identification of product or service to be delivered, quantity, delivery date, and cost;
2. Requirements for approval or qualification of product, procedures, processes, or equipment;
3. Requirements of the supplier's management system
4. Competence of contractors;
5. Contractual and Customer requirements and operating criteria.

Where appropriate, the roles and responsibilities of the manufacturer or supplier for risk management are defined as part of the purchasing requirements. In addition, prescribed risk control measures are included in the purchasing requirements as part of the purchasing information, which is clearly communicated to the supplier or manufacturer.

8.5 Production & Service Provision

8.5.1 Control of Production & Service Provision

To control the planning, administrative support, and implementation of work, our organization's policy describes the work methods, the controls applied, and the records required.

The process control activities are related to quality control. The following controlled conditions are applied where applicable:

1. Quality control checks are performed using appropriate measuring equipment;
2. Handling, storage, and transportation;
3. Evidence of completed inspections;

4. Detailed process work instructions and specifications for all products;
5. Criteria for workmanship, competence, and plant maintenance.

In cases where special processes are employed, the results cannot be easily checked, including any processes where deficiencies become apparent only after the product is used. Validation demonstrates the ability of these processes to achieve planned results by:

1. Defining qualification criteria and approval of special processes before use;
2. Defining criteria for review and approval of the processes;
3. Approval of equipment and qualification of personnel;
4. Use of specific methods and procedures;
5. Requirements for records;
6. Revalidation.

Production information such as the rate of nonconformities, the rate of rework, scrap, yield, and other quality data sources are evaluated and or compared against the current risk management output to confirm the adequacy and completeness of risk controls.

8.5.2 Identification & Traceability

To preserve the conformance of products to customer requirements during internal processing and delivery, ARA identifies the product throughout the product realization process:

1. Stored equipment and materials are identified according to type, description, and inspection status;
2. Unacceptable items are identified as such and are removed from the typical workflow;
3. All inquiries are identified with a unique estimate number allocated on receipt;
4. Subsequent orders are identified by contract number and/or Sales Order number.

Where appropriate, the Director of Quality has implemented an identification system allowing for traceability from the finished product to incoming material records and customer specifications. All parts, products, and materials, either purchased or manufactured, are identified with part numbers and/or job numbers and, where applicable, serial numbers that link the parts, products, and materials to their respective documentation.

When the customer requires, traceability is maintained from receipt of parts to delivery of the final products. The Materials Manager maintains records that trace part numbers to their corresponding drawings, specifications, and any other relevant documentation, such as product configuration records that trace serial numbers of products to their parts lists. Final product serial numbers are recorded on shipping documentation to provide traceability to the end user (customer) and the originating work order.

8.5.3 Customer Property

We identify, verify, protect, and maintain customer property provided for use. The Director of Quality ensures that lost, damaged, or unsuitable customer property is recorded and immediately reported to the customer, and in cases where the customer provides drawings, specifications, etc., they are managed as documented information. Customer property can also include customer-owned materials, tools (including packaging), tooling (including test/inspection tooling and equipment), and intellectual property.

1. Unless otherwise defined by the contract, upon receipt of customer property, our organization will examine items for completeness, proper identification, and possible transit damage and identify these items as the property of the relevant customer;

2. Items found to be nonconforming are quarantined, tagged, and recorded as defined in the Nonconforming Outputs Procedure and brought to the immediate attention of the customer;
3. No customer property is released for further processing or storage until such time as all required verification and testing activities are completed and the results are found to be acceptable;
4. After receipt, care is exercised to ensure the protection of customer property against loss or damage until it is incorporated into the product or returned to the customer;
5. The identification, segregation, handling, and protection of customer property from the time of receipt, subsequent storage, and maintenance during the entire realization cycle are performed in accordance with internal policies any applicable contract requirements;

If customer property is lost, damaged, or otherwise identified as unsuitable for use while under our control, these conditions will be recorded and reported to the customer.

8.5.4 Preservation

Antenna Research Associates ensures that all products and materials are handled and stored appropriately at all stages of the development cycle to prevent damage or deterioration. Products and materials are stored in designated storage areas with appropriate control of inbound receipts and outbound releases.

Products in storage are periodically assessed to detect deterioration. All packaging is sufficient to ensure product quality while in storage and during delivery to the customer:

1. Components and products are handled and stored in a manner that prevents damage or deterioration, pending use or delivery;
2. Each department ensures controls are implemented to prevent mixing conforming and nonconforming materials;
3. Packing ensures specified or original manufacturing packaging is utilized;
4. All products are suitably packed to prevent deterioration or damage during storage and delivery.

Only products with the proper identification and inspection status are accepted into and released from storage by authorized stockroom staff. Limited shelf-life items are issued on a 'first in, first out' basis and the condition of long shelf-life material in stock is assessed every three months to prevent product deterioration.

Completed products awaiting packaging and shipping are protected to prevent damage from vibration, shock, abrasion, corrosion, humidity, temperature, or any other conditions that may occur during handling or storage.

8.5.5 Post-delivery Activities

Antenna Research Associates determines customer requirements before acceptance of an order. Customer requirements include the following:

1. Previous customer requirements that pertain to current part numbers being ordered;
2. Requirements not stated by the customer but necessary for specified use or intended use;
3. Statutory and regulatory requirements related to the product;
4. Requirements required for delivery and post-delivery activities such as product support.
5. Any additional requirements determined by our organization.

Post-delivery activities also include, as appropriate actions under warranty provisions, contractual obligations such as maintenance services, and supplementary services such as recycling or final disposal.

8.5.6 Control of Changes

Changes to the production and service provision requirements are identified, communicated, and recorded as appropriate. Any unplanned changes are reviewed, verified, validated, and approved to ensure that products and services continue to meet their specified requirements in such a way that conformity with requirements is maintained. Changes are documented, and information is retained about changes, including who authorized the change and the actions arising from the change.

8.6 Release of Products & Services

The Director of Quality is responsible for planning and implementing the inspection and test activities to verify that product requirements are met at appropriate stages of the product realization process. Products are not used until inspected or verified as conforming to requirements, except when the product is released under positive-recall procedures pending completion of all required measurement and monitoring activities.

The amount and nature of inspection and test are based on the importance of the product characteristic, the process control exercised, and the specified requirements. All inspection and test activities are carried out by competent, authorized employees.

ARA uses the following methods to ensure product acceptance.

1. **Incoming inspection** - Incoming material is withheld pending completion of required inspection or receipt of objective evidence of conformance from the supplier;
2. **First-article inspection and testing** – Typically, the first produced unit that both the customer or supplier agrees to use as the required base-line standard for all following units;
3. **In-process inspection and testing** - Products are withheld from further processing until there is objective evidence that the required inspection and test have been performed;
4. **Final inspection and testing** - Evidence that all inspections and tests that were required during previous stages of manufacturing were performed and documented as meeting the requirements.

Measurement and acceptance criteria that are necessary for product acceptance are retained as documented information; subsequent acceptance records form the production documentation evidence, which includes the following information:

1. Criteria for acceptance and rejection;
2. Locations in the process sequence where measurement and testing operations were performed;
3. Types of measurement instruments used, including any instructions associated with their use;
4. Test records showing actual test results where required by the specification or acceptance test plan.

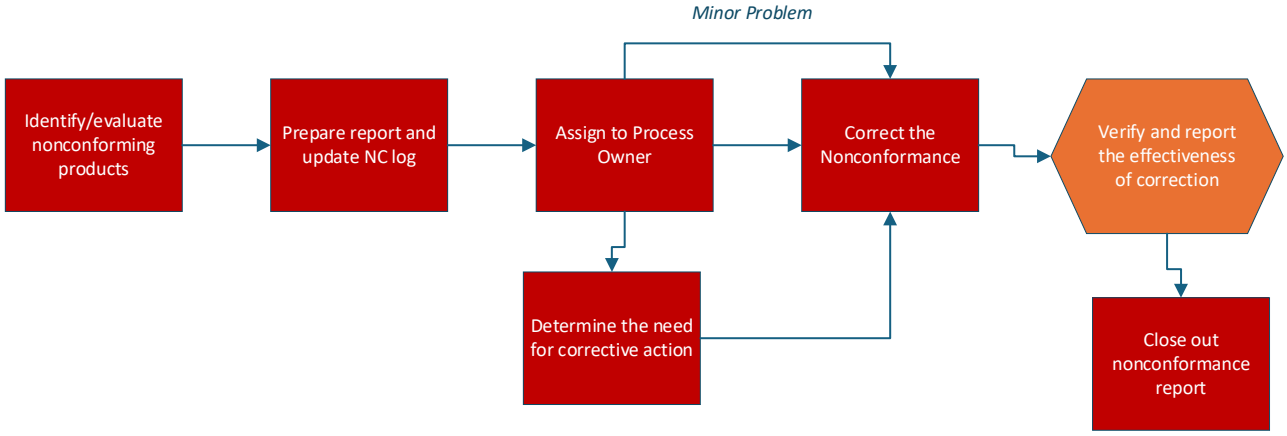
Documented information is retained to indicate the person authorizing the release of the product. Product release and service delivery do not proceed until all the planned arrangements have been satisfactorily completed unless otherwise approved by a relevant authority and, where applicable, by the customer.

8.7 Nonconforming Outputs

ARA ensures that provisions are made for identifying and controlling all nonconforming outputs and materials, including nonconforming product returns by a customer, to prevent the inadvertent use or shipment of nonconforming products and the unnecessary costs associated with the processing of nonconforming products.

Records clearly identifying the product, the nature and extent of nonconformance, the approved disposition, and corrective action taken are maintained as documented information in accordance with Section 7.5. Disposition of 'use-as-is' or 'repair' is only used after approval by an authorized representative of the organization responsible for the design.

Figure 3: Nonconforming Outputs Process



Documented information concerning the nature of any nonconformances, the resolving authority, and the resulting corrective actions is retained. Where necessary, details concerning authorized concessions are documented as evidence of acceptance.

9 Performance Evaluation

9.1 Monitoring, Measurement, Analysis & Evaluation

9.1.1 General

Antenna Research Associates applies suitable methods for determining which aspects of the quality management system and its processes are to be monitored, measured, and evaluated. The frequency and methods by which our processes are monitored, measured, and evaluated are determined and informed by:

1. Statutory and regulatory requirements;
2. Customer feedback and specification requirements;
3. Process and QMS requirements and the criticality for product conformity;
4. Process performance and audit results;
5. Level of risk and types of control measure;
6. Trends in nonconformities or corrective actions;
7. Criticality for product conformity.

Appropriate tools and techniques are often determined in the quality planning process. It is usually documented in control plans, sampling plans, or manufacturing work instructions. It is often based on customer requirements or acceptance criteria.

All monitoring, measuring, and evaluation outputs are documented and analyzed to determine process effectiveness, ensure their effectiveness in achieving in-tolerance results, and identify improvement opportunities.

1. In-process checks relate to both quality control and productivity checks;
2. Provision is made for the identification and resolution of nonconformances;
3. The emphasis is to prevent any problems which might affect customer satisfaction;
4. In-process checks are performed and documented;
5. Where specific inspection points are required, these are identified at the contract planning phase.

Where applicable, test and inspection records are retained as documented information for at least three years. This documented information includes details of the final inspection authority to confirm that all critical parameters were in accordance with established requirements and specifications. Additionally, product samples are stored for a minimum of five years.

Products are not normally released or delivered until all planned inspections and tests have been completed and that documented information exists to provide evidence of conformity with acceptance criteria and identifying the person(s) authorizing release.

In rare cases (due to customer requirements and/or production emergencies), unverified products may be released or delivered under controlled conditions of positive recall, as documented and authorized by the Director of Quality and, where applicable, approved by the customer.

9.1.2 Customer Satisfaction

The success in meeting our customer's requirements and achieving a high level of customer satisfaction with ARA's products and services is evaluated regularly, at least quarterly. This is done using, but is not limited to, on-time delivery performance, warranty analysis, in-service performance monitoring, customer complaint analysis, annual customer satisfaction surveys, and other appropriate means. The customer satisfaction results are summarized for discussion at management reviews.

ARA has developed and implemented plans for customer satisfaction improvement that address any deficiencies identified by these evaluations and assess the effectiveness of the results. ARA has implemented a method of handling customer inquiries. It is established to provide a rapid response to customers who have an urgent need for assistance or a complaint, which would adversely affect customer satisfaction.

Customer complaints, whether received in writing, verbally, or electronically which are immediately forwarded to the appropriate Customer Service Team/Department for action. If the problem cannot be resolved, the complaint is escalated to the Director of Quality or another manager for resolution.

Customer survey data and other customer feedback, including written or verbal complaints and information, are collected and reviewed by the Quality Manager, who initiates appropriate corrective actions. The level of customer satisfaction is monitored using various customer data points:

1. Product returns and warranty claims;
2. Repeat customers and trends in market share;

3. Analysis of customer complaints/complaint statistics;
4. Results from customer audits;
5. Evaluation reports provided by the customer;
6. Customer satisfaction surveys;
7. Feedback from customer visits;
8. Recognition and consumer awards.

The Director of Quality monitors information and trends relating to customer perception as to whether the organization has fulfilled the customers' requirements in accordance with the *Customer Satisfaction Procedure*.

9.1.3 Analysis & Evaluation

Data collection systems exist to provide data to the function/department responsible for analyzing and reporting issues related to the management system's effectiveness and overall quality management system improvement.

The systems include methods for analyzing the information collected and extracting specific details. ERP/SAP is the primary source of enterprise data, though other data systems exist. Where appropriate, statistical techniques may be employed.

Data is presented objectively so that well-informed decisions can be made. Full disclosure of assumptions, gaps, and exceptions is documented wherever possible to facilitate transparency.

To identify opportunities for improvement, Top management and senior managers, as appropriate, collect and analyze data using appropriate statistical and non-statistical techniques to determine the suitability and effectiveness of crucial quality management system processes using data points that apply to their area(s) of responsibility.

At a minimum, data is analyzed to assess the achievement of the corporate-level objectives and customer requirements. Analysis and evaluation of quality data can be undertaken using statistical tools and concepts to help break down the variables within the information and present it in a summary format that determines whether actions are needed.

A process is effective if the desired results are measurably achieved. Effectiveness is measured in terms of product quality, process performance, process accuracy, delivery schedule performance, cost and budgetary performance, employee performance against established objectives, and levels of customer satisfaction.

To identify strengths, weaknesses, threats, and opportunities within our management system, ARA monitors and analyzes trends using the following data points:

1. Characteristics of processes, products, and their trends;
2. Conformity to product, customer, and legal requirements;
3. Customer satisfaction and perception data;
4. Supplier and external provider performance data;
5. Results of actions taken to address risks and opportunities;
6. Effective implementation of management system planning;
7. Improvement opportunities are identified during internal audits and management reviews.

Control limits for process and product performance are expressed as objectives and targets and are disseminated via documented information as appropriate. ARA undertakes corrective action when the data shows a trend toward the pre-defined control limit.

Employees who utilize statistical tools to analyze, measure, and verify outputs are sufficiently competent to ensure the proper deployment of these techniques.

9.2 Internal Audit

9.2.1 General

Internal audit results are critical inputs that help assess our quality management system's effectiveness. ARA's internal auditing process uses risk-based thinking and the notion of continual improvement as the main drivers.

Internal audits are conducted at planned intervals to determine whether the quality management system conforms to our organization's planned arrangements and to the requirements of ISO 9001. The auditors and their conduct ensures objectivity throughout the audit process to ensure:

1. The results of each are reported to the Director of Quality;
2. That timely, appropriate corrective action is undertaken where required;
3. They retain documented information such as audit checklists and audit reports as evidence of the effective implementation of the audit program with respect to each audit.

Internal auditors are selected to ensure objectivity and impartiality of the audit process. This is achieved by outsourcing our internal audits to an external firm. The following qualitative scoring criteria are used to identify the level of compliance and effectiveness during internal audits:

Finding	Criteria Description
Conforms	Audit findings indicate conformity (3.6.11). See ISO 9000:2015. Conforms [+100]. Criteria: All performance indicators, metrics, objectives, audit results, etc., show stability and consistently achieve targets. The process is fully documented and implemented and demonstrates compliance and effectiveness. Continue to monitor trends and indicators to determine ongoing stability.
Minor NC	Audit findings indicate a nonconformity (3.6.9). See ISO 9000:2015. Minor [-25]. Criteria: Poor performance, adverse trends, expected results not achieved. Current practices conform but are not documented. Deviation from practice is unlikely to result in the failure of the QMS or process or will not result in the delivery of nonconforming products. Investigate root cause (s) and implement corrective action by the next reporting period or next audit.
Major NC	Audit findings indicate a nonconformity (3.6.9). See ISO 9000:2015. Major [-75]. Criteria: Practices are nonconforming and likely to cause compliance issues. Likely to have a significant adverse effect on customer satisfaction, product quality, delivery, or profitability. Process not implemented or documented. Implement immediate containment action, investigate root cause (s), and apply corrective action. Re-audit in 4 weeks.
OFI	Opportunities for improvement (3.3.1) See ISO 9000:2015 or recording good practices. (3.10) Note 2 ISO 19011:2018. Minor problems exist, with weaknesses, bottlenecks, or potential deficiencies, which, if not improved, may lead to nonconformity in the future. The auditor noted negative or positive situations but did not relate to a requirement in the standard.

The Director of Quality coordinates all external audits; the relevant findings will be input for the improvement phase. External audits such as statutory fire inspections, reviews, evaluations, and compliance audits may be carried out by external bodies, such as the Health and Safety Executive (HSE) or Notified Body. When such

external audits occur, whether planned or unannounced, the Director of Quality will accompany external auditors.

9.2.2 Internal Audit Program

The internal audit program, coordinated by the Director of Quality, details the frequency and general focus of each internal audit and is recorded and communicated within the *Internal Audit Program*. ARA's internal audit program is based upon a strategy that considers the status and importance of each process comprising the quality management system.

The audit frequency is also based on process performance trends, results from previous audits, levels of customer satisfaction, rates of nonconformity and corrective action, etc., to ensure that our organization focuses on the aspects that affect product and process conformity the most.

The internal audit reports define each audit's criteria, scope, frequency, and methods. The selection of trained auditors and their subsequent impartial conduct ensures objectivity throughout the audit process and that:

1. The results of each are reported to the Director of Quality;
2. That timely, appropriate corrective action is undertaken where required;
3. They retain documented information such as audit checklists and audit reports as evidence of the effective implementation of the audit program with respect to each audit.

The audit is conducted according to the *Internal Audit Procedure* to ensure that timely corrective actions are implemented to correct any deficiencies found. The results of the audits are recorded and submitted to the personnel responsible for the audited area. The results of the internal quality audits are summarized for discussion at management reviews.

9.3 Management Review

9.3.1 General

To ensure our quality management system's continued suitability, adequacy, and effectiveness in meeting our organization's strategies, the Top management conducts formal management review meetings at planned intervals. The management review requirements are defined and communicated using the *Management Reviews Procedure*.

Each management review meeting may require multiple subjects and departmental input and rely upon multiple metrics and data analysis. When more frequent meetings are conducted, the meeting agenda is reduced to focus on customer-critical issues, with the entire review cycle of the QMS occurring annually.

Agenda Item (9.3.2)	Impact on Customer or Business	Frequency	Type of Meeting
Previous actions	Medium	Quarterly	Status Review
Changes in External and Internal Issues that are relevant to the QMS	Low	Annually	Management Review
Customer Satisfaction	High	Quarterly	Individual Review (Meeting only as required)
Core Processes	Low	Annually	Management Review
QMS objectives	Medium	Annually	Management Review

Agenda Item (9.3.2)	Impact on Customer or Business	Frequency	Type of Meeting
Product and process conformity	Very High	Monthly	Data Review (Meeting only as required)
Non-Conformities and Corrective Actions	Very High	Weekly	MRB Status Meetings (By program)
Monitoring and measurement results	Low	Annually	Management Review
External Audits	Low	Annually	Management Review
Internal Audits	Medium	Monthly	Corrective Action Board
Performance of External Providers	High	Monthly	Data Review (Meeting only as required)
Adequacy of Resources	Low	Annually	Management Review
Risks and Opportunities	Low	Annually	Management Review
Continual Improvement	Medium	Monthly	Corrective Action Board
Action Items	Medium	Quarterly	Status Review

The frequency of management review activities will increase in response to changing or special conditions and events.

In summary, the Director of Quality chairs the management review meeting. The review group is coordinated and recorded by the Director of Quality. To ensure that the review group includes each of the requirements of ISO 9001, a *Management Review Agenda & Minutes* is prepared, issued, and distributed by the Director of Quality as appropriate.

9.3.2 Inputs

The primary inputs that are reviewed comprise data from conformance and performance measurements gathered at crucial quality management system data points from various processes. Subsequent recommendations for improvement are based on the evaluation of such measurements.

Conformance is primarily assured through internal audits and demonstrated through a review of audit results and our ability to detect, correct, and prevent problems. Performance is primarily assured through deploying corporate and operational level objectives and reviewing our demonstrated ability to achieve desired results.

9.3.3 Outputs

The primary outputs of management review meetings are management actions that are taken to make changes or improvements to our quality management system. During management review meetings, Top management identifies appropriate actions to be taken regarding the following issues:

1. Improvement of the effectiveness of the quality management system and its processes;
2. Improvement of product related to customer requirements;
3. Opportunities and risks;
4. Resource needs.

The primary outputs of management review meetings are the actions necessary to make changes or improvements to our management system and the provision of resources needed to implement these actions. Responsibilities for required actions are assigned to members of the management review team. The

management review minutes record the decisions made during the meeting, including assigned actions and due dates.

10 Improvement

10.1 General

The Director of Quality uses a range of the performance evaluation tools highlighted in Section 9 to make recommendations for improvement and to achieve the intended outcomes of our quality management system. For example, recommendations may emerge from the review groups and findings raised in internal audits.

In order to determine and select opportunities for improvement or implement any necessary actions to meet the requirements of customers and relevant interested parties or to enhance customer satisfaction, ARA drives improvement via the analysis of relevant data. The data inputs for the improvement process include:

1. Risk and opportunity evaluations;
2. Assessment of the changing needs and expectations of interested parties;
3. The conformity of existing products and services;
4. The effectiveness of our quality management system;
5. Supplier performance;
6. Mitigating and reducing risks;
7. Increasing beneficial impact and opportunities;
8. Levels of customer satisfaction, including complaints and feedback;
9. Internal and external audit results;
10. Corrective action and nonconformance rates;
11. Data from processes and product characteristics and their trends.

ARA also ensures that opportunities for improvement from daily feedback on operational performance are evaluated by the Director of Quality as appropriate. Changes are typically implemented through the corrective action system.

Opportunities for improvement from the analysis of longer-term data and trends are evaluated and implemented through the management review process. They are prioritized with respect to their relevance for achieving our quality management system objectives.

Our management review process assesses the overall effectiveness of the continual improvement program (including corrective actions taken and the overall progress toward achieving corporate-level improvement objectives).

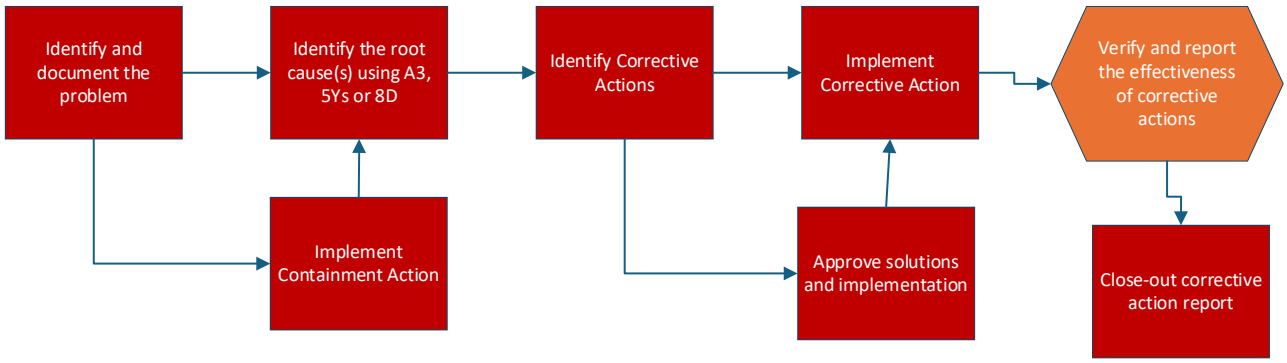
10.2 Nonconformity & Corrective Action

10.2.1 Corrective Action

Any corrective action taken to eliminate the cause of nonconformity is appropriate to the magnitude of the problem while also being in proportion to the risks presented by the nonconformity. The root causes of process nonconformities, including those arising from complaints, are investigated, and actions are implemented to prevent their recurrence.

ARA's nonconformity and corrective action process combines organizational management techniques with individual tools to create a robust closed-loop process to:

Figure 4: Corrective Action Process



Corrective Action Reports are issued for repetitive, ongoing problems during our production processes and issues that significantly impact the customer, end product delivery, or the management system. Other nonconformities outside these criteria are controlled through the nonconformance system. All corrective action reports raised are categorized as follows:

High - A problem that results in major/significant impact or is a repetitive problem. Requires a root-cause analysis of corrective action(s). The eight disciplines (8D) are commonly used to discover and eliminate multiple and complex root-causes.
Medium - A problem that results in moderate impact. Requires containment and root-cause analysis, as well as corrective actions when appropriate. Use 5-Whys for troubleshooting, quality improvement, and problem-solving.
Low - A low-level problem typically closed to 5-whys or 8D requires cause analysis, containment, and trending. Use the A3 method when the issue is minor, and the solution is obvious; a formal analysis is not required.
OFI - Improvement opportunity that does not need correction but can be enhanced, improved, or made more efficient. Does not require problem-solving.

Based upon the information captured from the *Corrective Action System* prompts the user to use 1 of 3 increasingly detailed problem-solving methods (e.g., A3, 5-whys, or 8D), depending on the severity or complexity of the nonconformity. This ensures that the appropriate tools and techniques are applied for problem-solving and formulating corrective action.

Where applicable, any corrective action taken and controls implemented to eliminate the cause of nonconformity are applied to other similar processes. They are controlled by the Director of Quality in liaison with the affected process owners. Significant actions are entered into the *Corrective Action System*.

Appropriate statistical and non-statistical techniques can be applied to analyze nonconformity. The organization will select the appropriate methodology based on the problem's complexity. Examples of statistical techniques are:

1. Statistical Process Control (SPC) charts;
2. Pareto analysis and data trending;
3. Linear and non-linear regression analysis;
4. Experimental design (DOE – Design of Experiments) and analysis of variance;

5. Graphical methods (histograms, scatter plots, etc.).

Non-statistical techniques include:

1. Management reviews and the results from quality meetings;
2. 5W2H: Who, what, where, when, why, how, and how many for both occurrence and non-detection;
3. Product review committees (internal/external);
4. Failure Mode and Effect Analysis (FMEA);
5. Fault Tree Analysis (FTA).

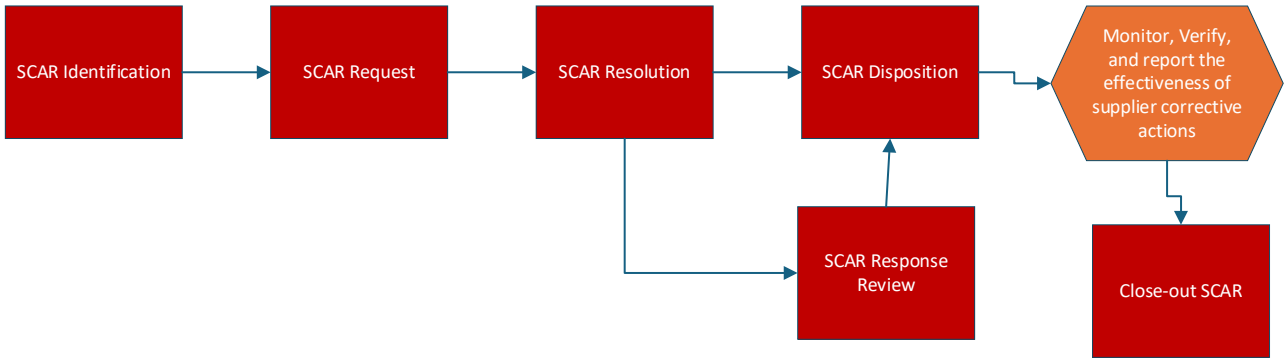
The Director of Quality will detect and determine the extent of the problem (place, time, quantity, number of affected components, versions, projects, vehicles, Customer sites, etc.) to check whether the problem is relevant to safety and if relevant stakeholders need to be informed.

10.2.2 Supplier Corrective Action

ARA uses a Supplier Corrective Action Request (SCAR) Form, which follows the 8D methodology, to formally notify our Suppliers of quality issues found with their supplied products or services and to request that Suppliers take appropriate actions to prevent recurrences.

A SCAR Form is issued to Suppliers and vendors for repetitive, ongoing problems and issues that significantly impact end-product delivery. Based on data analysis, a SCAR may be requested due to the supplier's poor performance for more than three consecutive months or any three months in a 12-month period.

Figure 5: Supplier Corrective Action Process



Documentation concerning the nature of supplier corrective actions taken, including any concessions obtained, is maintained and uploaded into the appropriate databases. This will ensure accuracy, communication, consistency, and agreement upon understanding the root causes and support organizational knowledge and future supplier selection.

10.3 Improvement

ARA continually improves the effectiveness of its quality management system through the practical application of corporate policies, objectives, auditing and data analysis, corrective and preventive actions, and management reviews.

The continual improvement process begins with establishing our corporate policies and objectives for improvement based on objectives contained in our business plan and customer targets and goals. Customer satisfaction, internal audit data, process and product performance data, and the cost of poor quality or risk control are then compared against objectives or KPIs to identify additional opportunities for improvement.

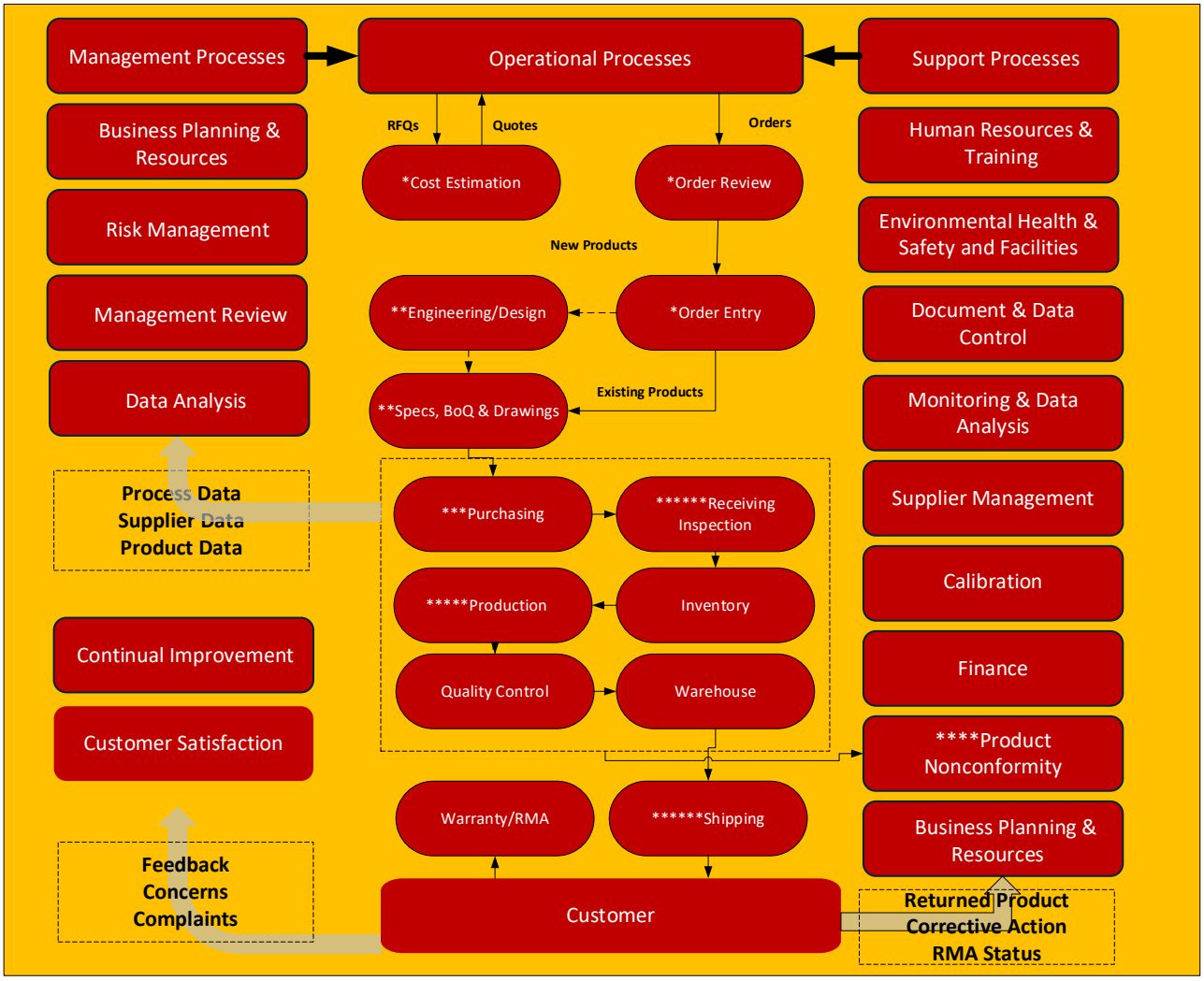
Opportunities for improvement from the analysis of longer-term data and trends are evaluated and implemented through the management review process. They are prioritized with respect to their relevance for achieving our objectives.

The Director of Quality analyzes and summarizes corrective action data to identify trends, assess the overall effectiveness of the corrective action system, and develop related recommendations for improvement.

The overall effectiveness of the continual improvement program, including corrective actions taken and the overall progress towards achieving corporate-level improvement objectives, are assessed through our management review process.

Appendices

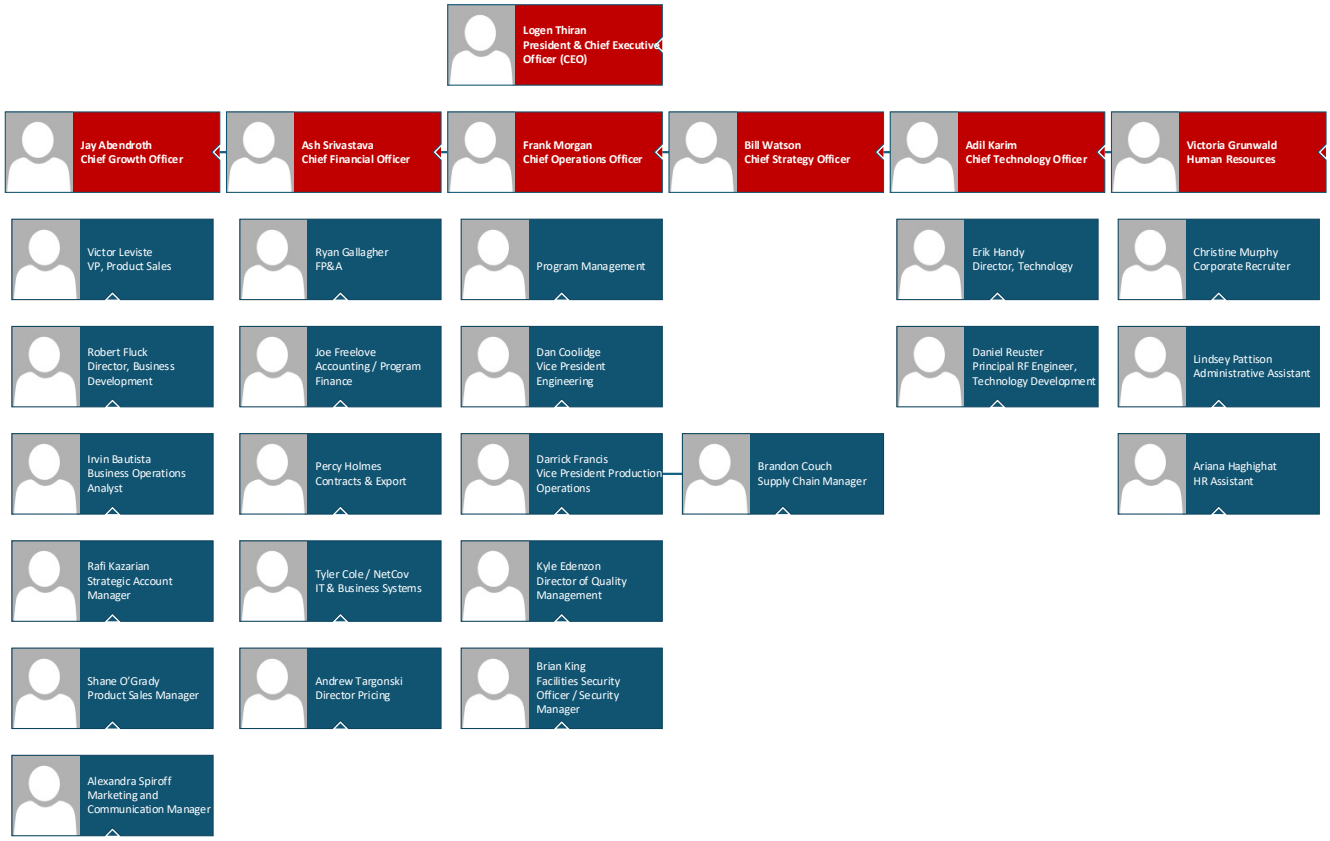
A.1 Interaction of Processes



Core Processes are identified via "*".

**Contract Review*
***Engineering/Design*
****Purchasing/Supply Chain*
*****Nonconformance and Corrective Action*
******Production*
*******Shipping/Receiving*

A.2 Organization Chart



A.3 Correlation Matrix

This section provides a matrix that correlates the headings of ISO 9001 against the relevant sections in this document.

ISO 9001:2015		
Clause	**Title**	**QMS Manual**
4.1	Organizational Context	4.1
4.2	Relevant Interested Parties	4.2
4.3	Management System Scope	4.3
4.4	Management System Processes	4.4 & A.1
5.1.1	Leadership & Commitment - General	5.1.1
5.1.2	Customer Focus	5.1.2
5.2.1	Establishing the Policy	5.2.1
5.2.2	Communicating the Policy	5.2.2
5.3	Roles, Responsibilities & Authorities	5.3 & A.2
6.1.1	Risks & Opportunities	6.1.1
6.1.2	Planning Action	6.1.2
6.2.1	QMS Objectives	6.2.1
6.2.2	QMS Objectives & Plans to Achieve Them	6.2.2
6.3	Planning for Change	6.3
7.1.1	Resources - General	7.1.1
7.1.2	People	7.1.2
7.1.3	Infrastructure	7.1.3
7.1.4	Environment for the Operation of Processes	7.1.4
7.1.5	Monitoring & Measuring Resources	7.1.5
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