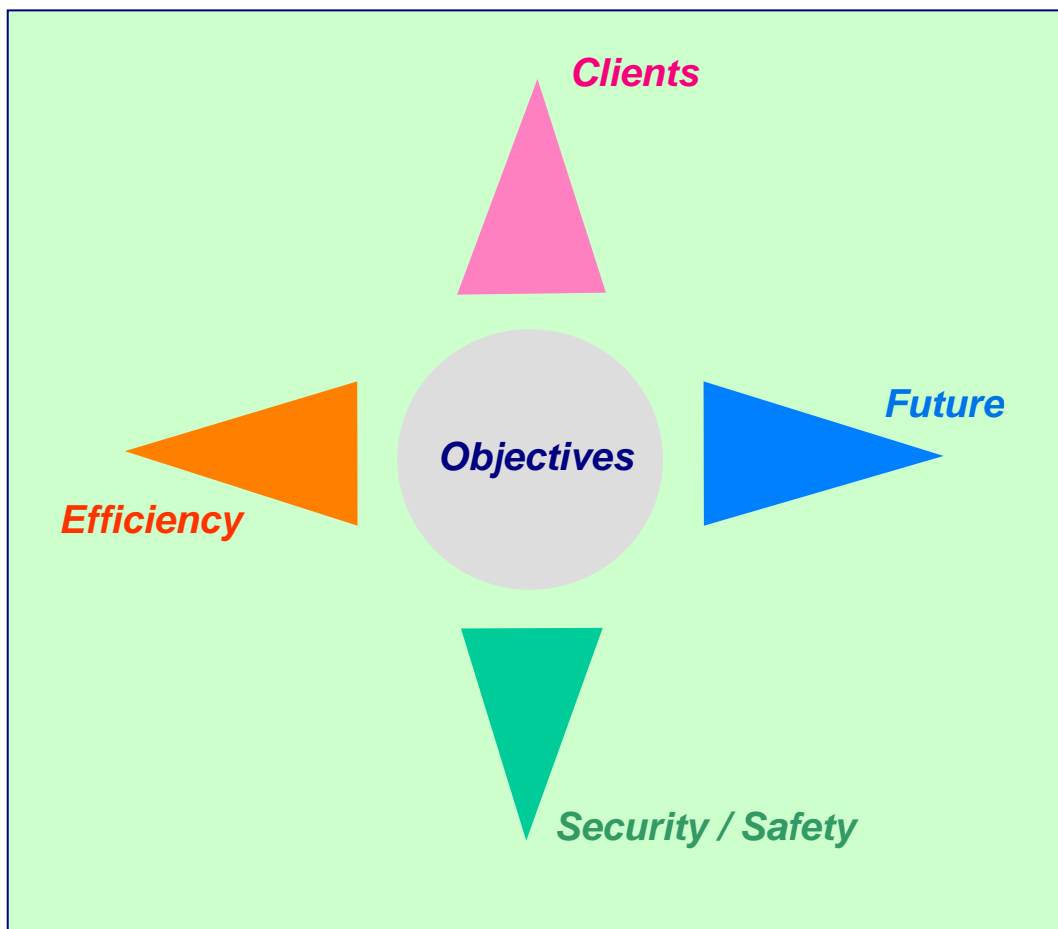




# QUALITY MANAGEMENT MANUAL

*(English version: in case of any differences due to the translation, the French version takes precedence)*



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### History

Version Révision	Date	Reason and/or nature of change
1.0 à 4.0	1996 to 2002	Creation of first versions of the GMT (GME) Quality Manual in compliance with ISO 9001:1994 standard.
5.0	May 2003	Quality manual rewritten following 'ISO 9001:2000 Specifications.
6.0	September 2004	Simplification of flow chart. Addition of annexes and associated procedures.
7.0	January 2006	Integration of DRIS Department in the Quality Manual.
8.0	March 2008	Evolution of organisation. Modifications of P9 description. Abrogation of P12.1, 12.2, 12.3.
9.0	September 2009	New standard ISO9001:2008.
10.0	October 2010	DRIS out of GMT quality management system. New version of process description.
11.0	September 2012	Quality Manual review: global updating (organization and acronyms). SCSE replaced by DSSE. New version of process description (V5).
12.0	January 2016	Evolution of process flow chart: modification of process P1 (Proposal), process P2 (Contract) and process P5 (Develop new techniques for future) ; creation of process P14 (Carrying out HSE actions). New version of process description (V6).
13.0	March 2017	Acronym GMT replaced by DS (Direction des Souffleries = Wind Tunnel Division). Consistency with the ONERA general management system: adaptation of the process flow chart. Compliance with ISO 9001:2015 requirements. Creation of process M1 (define and orient strategy). New version of process description (V7).
14.0	March 2018	Fusion of both general ONERA and DS QMS (ONERA Directorate Decision n°3327). Description of DS realization processes (R2, R3). Highlighting of DS specificities.

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## QUALITY POLITICY

Over the years, ONERA/DS has built a solid reputation in wind tunnel aerodynamic testing for its ability to obtain reliable measurement results.

Continuous support and transparency add to customer satisfaction.

This reputation must be further strengthened to ensure the success of DS and its wind tunnels in the future

DS also offers its customers its expertise in engineering test means.

To carry on this activity DS's quality policy is guided by the following main principles:

- seeking maximum customer satisfaction, notably in relation to advice, technical results, and staying within budget and time limits;
- taking into account other stakeholders such as regulators and inspection, staff and residents (labor safety and environmental protection);
- focus on customers and keeping up with developments in the outside world enable us to choose the best direction for technical developments and investment;
- mastering the delegation of responsibilities of the personnel at all levels within the organisation in order to increase their implication in making improvements;
- clear internal communication so that each individual contributes to the same objectives;
- elaboration of a 10 years global outlook about: needs of infrastructure consolidation and upgrade; needs of methods and technique development in the purpose of keeping at the best level; building a middle term business plan.

The quality management system is built around the testing and engineering sites and support these main principles by:

- careful attention to customer satisfaction and other stakeholders;
- facility business control with a good balance between needs and resources;
- mastering the improvement process, including skills management, technical developments, investment...;
- a risk control and look for opportunities on all processes;
- creating a permanent awareness of personnel safety, installation and data protection.

DS management is committed to meeting these requirements through its policy and associated objectives, and to continuously improving the quality management system. DS's quality management system, now integrated into ONERA's general QMS, was designed with this in view and is applicable to all personnel for the design, development and carrying out of tests.



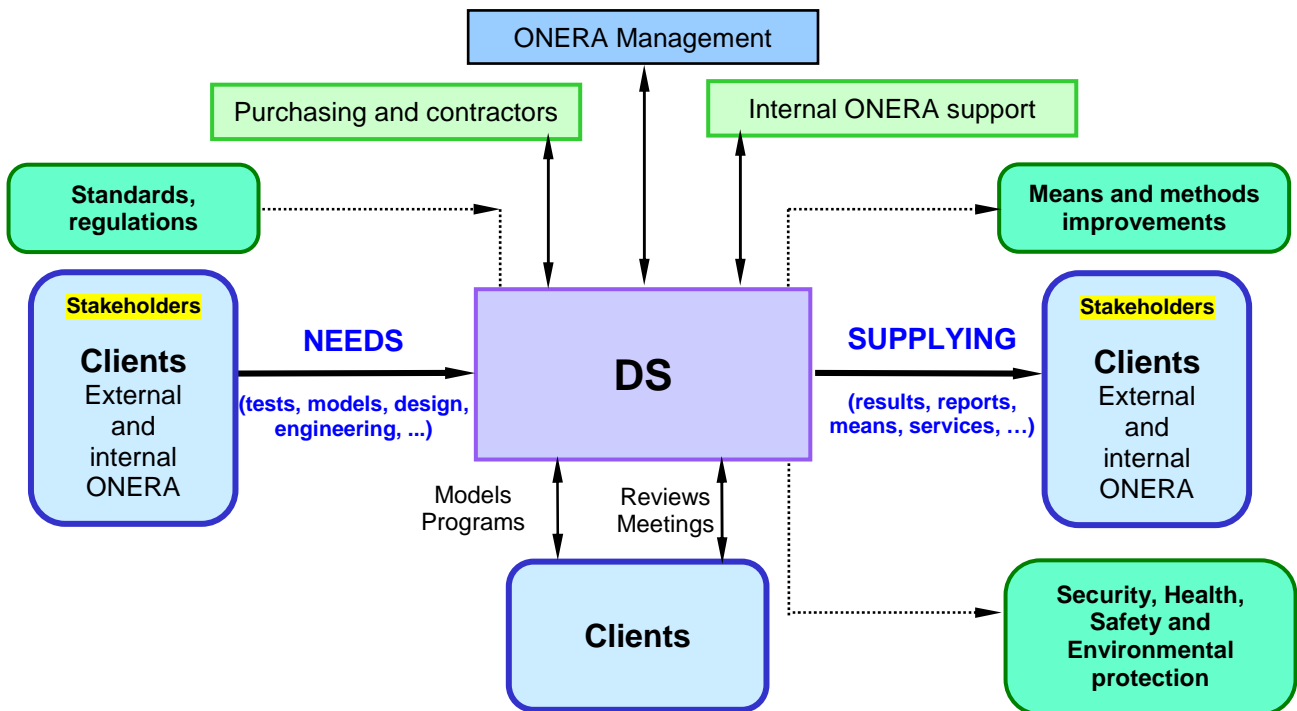
## Scope:

This manual describes DS's internal organisation and its role within ONERA. It presents the main elements which make up its quality management system, integrated in the ONERA's general QMS.

Its goal is to inform stakeholders, mainly both present and future clients, as well as the personnel, of the principles which guide quality management at DS.

**This manual and processes apply to all different DS sites in the following areas:**

- test design and performance on site,
- test method research, model design and building, test set-ups, related metrology, engineering works and test means.



## ONERA/DS Test Facilities:

### Modane-Avrieux Centre:

- S1MA Continuous sonic wind tunnel
- S2MA Continuous transonic and supersonic pressurised wind tunnel
- S3MA Transonic and supersonic blowdown wind tunnel
- S4A Hypersonic blowdown wind tunnel
- S4B Calibration bench
- BD2 Dynalpy test bench
- R4 Specialised test bench (test bench, cascade, ...)
- TURMA (\*) Turbine test bench

### Fauga-Mauzac Centre:

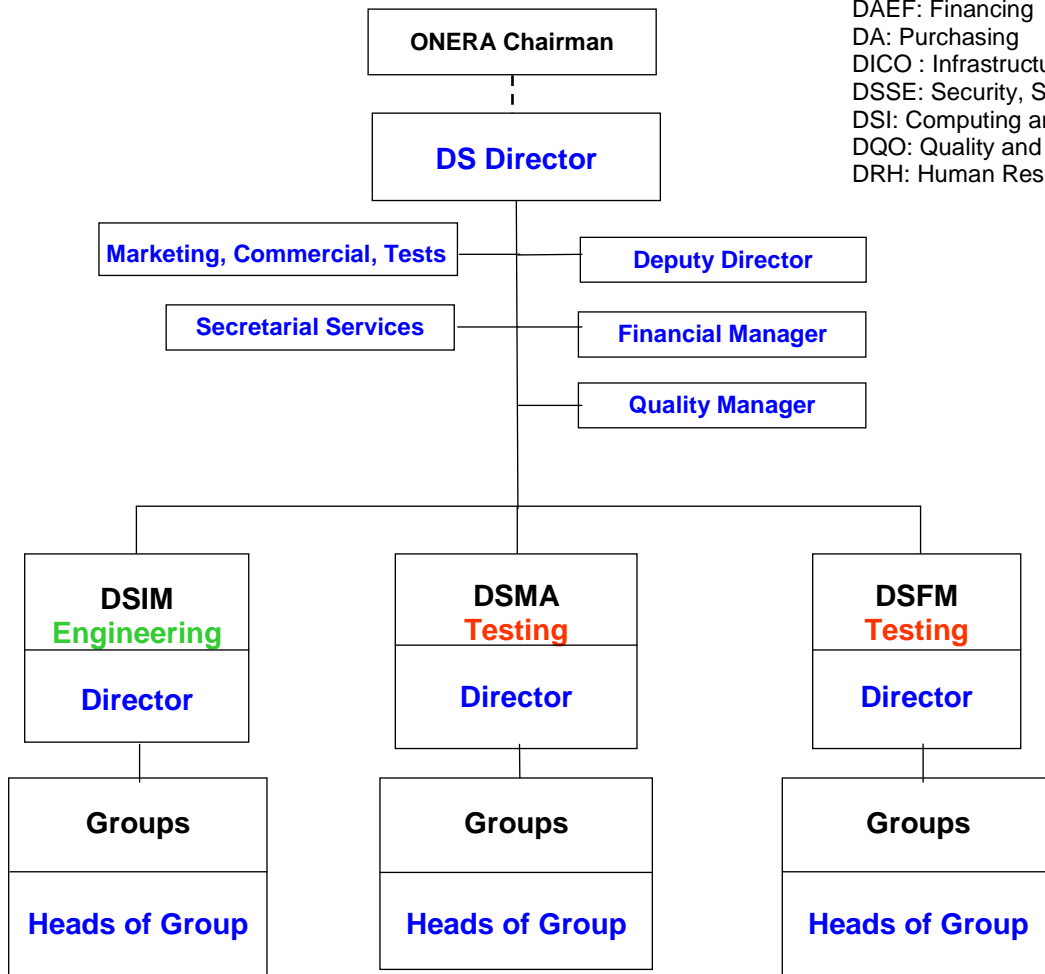
- F1 Continuous low speed pressurised wind tunnel
- F2 Continuous low speed atmospheric wind tunnel
- F4 (\*) High enthalpy hypersonic wind tunnel
- CEPRA19 Continuous aero-acoustic wind tunnel (Saclay)

(\*): test facilities today out of operation

**DS General Organisation Chart:**

**ONERA Support Services :**

AC: Invoicing  
DAEF: Financing  
DA: Purchasing  
DICO : Infrastructure and centre services  
DSSE: Security, Safety and Environment  
DSI: Computing and network  
DQO: Quality and Organization  
DRH: Human Resources



The DS director is in charge of DS organization. He defines organizational structure and proposes the nomination of departmental heads who are formally approved by the ONERA President. The Director DS approves the job definitions of the managers who report directly to him.

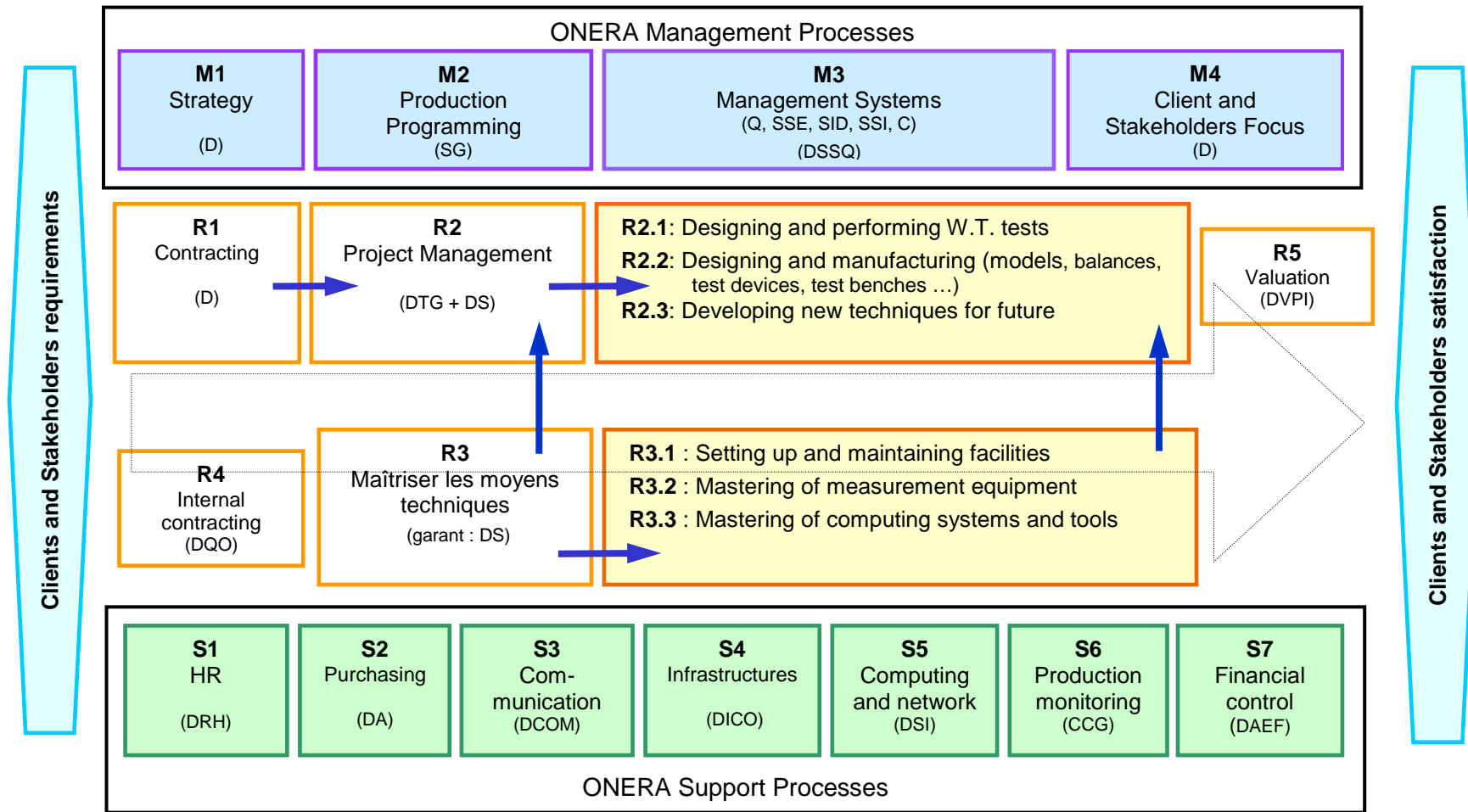
The departments (DSMA, DSFM, DSIM) are organised in groups. The Directors supervise the heads of department and groups, who are responsible for day to day management in relation to delegated responsibilities.

Regular DS management reviews ensure that the organization corresponds to an effective quality management system. The management review extends to the departmental level to ensure harmonisation between local and top management objectives.

The heads of departments and groups organize the structures for which they are responsible, define needed responsibilities and contribute to the management of personnel skills. The DS management approves the organisation and nominations in the different departments and groups. The heads of departments organize personnel training with assistance of local HR services.

Annual progress reviews between staff and line managers are held once a year during which the year’s work is reviewed and training needs defined. This process develops coherence between the organization, personnel skills and the needs of the quality management process. This process, based on skills tables, identifies critical skills and ensures the adequacy between the organization, skills and needs of the quality management system processes.

**DS Process Flow Chart:**



Rx.1 :  
Rx.2 :  
Rx.3 :

Subprocesses DS of production processes R2 and R3

### Quality Management System:

A quality management system (QMS) has been set up to apply the policy and goals of the ONERA's President. **This system is based on the ISO 9001:2015 standard.**

The ONERA's QMS is declined in DS by a local quality management system. This DS QMS consists of a set of dynamic and interacting processes and resources to provide services to its clients (and to satisfy other stakeholders)

Some DS specificities are kept in order to keep the maximum efficiency:

Processes	DS Specificities	Comments
M1	Quality Policy and objectives ONERA's President declined at DS and Department Director levels. Director DS member of the ONERA Executive Committee DS Policy of technical development.	
M2	No specificity for DS	
M3-Q	A specific Quality manual for DS. Subprocesses for R2 and R3. An Indicators / Thresholds dashboard and a process summary for DS and department. An assessment and monitoring of the costs related to quality. A DS strategy in risk / opportunity management. Improved process control and improvement loop.	Evolutionary Table, with annual report. See definition page 18 See page 10 See page 9
M3-SSE	A Safety-Environment Referent manager for DS	See page 12
M3-SID	No specificity for DS	See page 13
M3-SSI	No specificity for DS	See page 13
M3-C	A DS Strategy for Knowledge management	See page 10
M4	A DS Strategy for Clients/Stakeholders focus	See page 9
R1	A privileged and strengthened client relationship. No formal RIO (offer interest review). A record of offer reviews and contract reviews on specific DS forms.	
R2	Declined in 3 DS subprocesses.	See process sheets
R3	Declined in 3 DS subprocesses.	See process sheets
R4	An allocation and management of the DT financing independent.	
R5	A strategy of valuation of innovations in DT specific to DS.	
S1	Skill charts in each unit or DS service. A notion of critical competence developed.	
S2	Enhanced supplier assessment (small purchases or large projects). Special monitoring of strategic purchases (DS - DA periodic meetings).	
S3	No specificity for DS	See tables pages 14, 15 and 16
S4	No specificity for DS	
S5	No specificity for DS	
S6	No specificity for DS	
S7	No specificity for DS	

All activities are carried out, according to the requirements of the quality documents, to meet the needs of the customers and other stakeholders with the aim to respect the budget and the foreseen deadlines.



### Listening to clients and stakeholders needs:

DS pay particular attention to customer requirements, and this is organized at several levels:

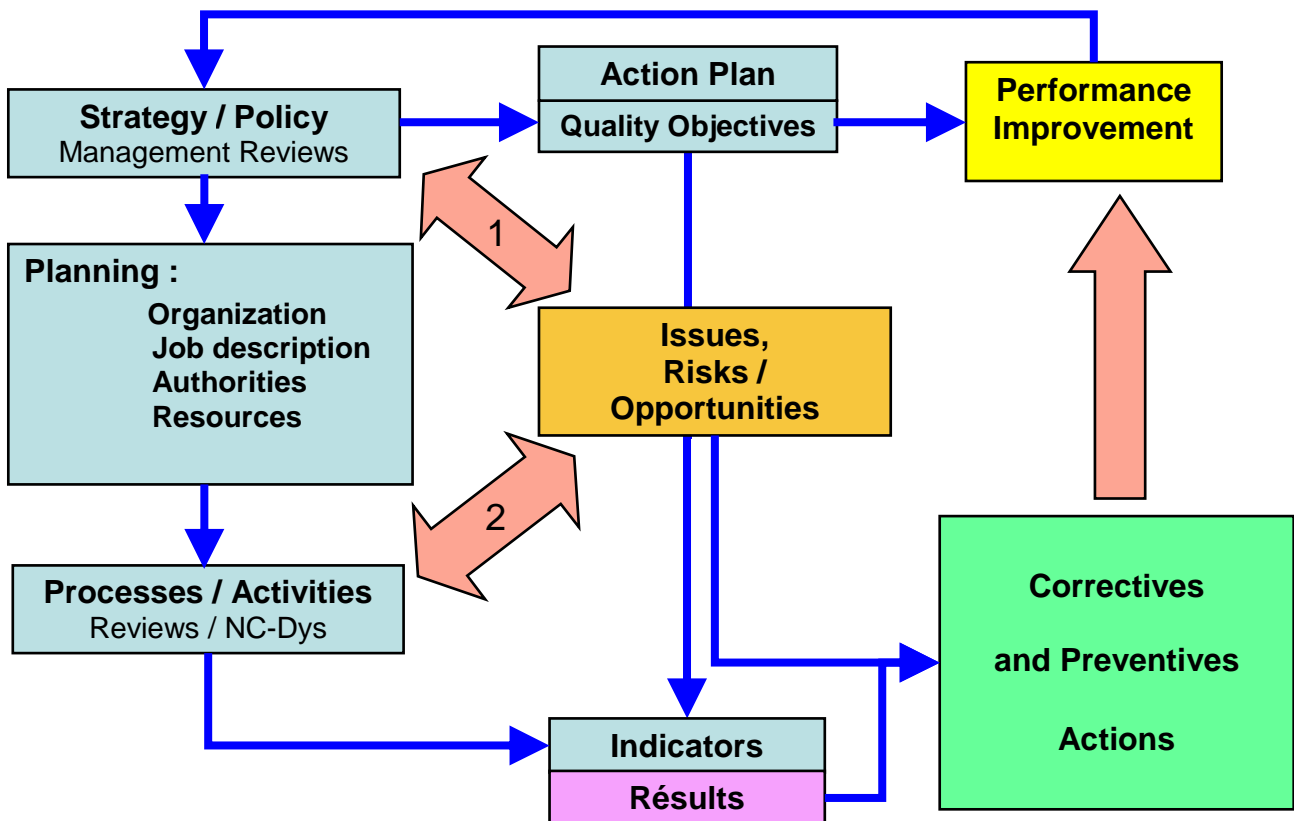
- bi-annual meeting with constructors which brings together DS's main national clients; these meetings enable DS to present the main technical innovations developed by DS (improvement of means and methods to meet clients' medium and long term expectations);
- regular top management meetings with main clients as part of partnership contracts;
- post-test reviews with the client's participation enabling clients to express ways of improving;
- end of contract reviews during which customer satisfaction can be assessed;
- during the whole implementation process, customer complaints and demands are recorded and dealt with.

Needs and expectations of other DS important stakeholders (internal/external) are identified, taken into account and regularly reviewed due to adapted arrangements of the QMS.

### Process control and improvement loop:

The manual describes the major processes involved in providing customer services, support services and management. The guiding principle is that these form part of a process of continuous improvement (PDCA). For DS this means:

- identifying the processes needed for the quality management system and their application throughout the organisation (these processes have their own identification sheet)
- determining process sequence and interaction;
- determining the criteria and methods to ensure control of the processes: effectiveness is assessed by measuring the extent to which quality goals have been achieved;
- ensuring that resources are made available and that information flows in order to set up and check the processes;
- overseeing, assessing and analysing the processes (indicators, risks);
- setting up whatever actions are needed to continuously improve the processes.



### **Management of Risks/Opportunities:**

DS identify and implement a risk/opportunity management at different levels:

- overall processes (with periodic review);
- at each client performance by means of a preliminary risk analysis during the proposal review, followed by a risk review done later during the preparation of the production process;
- in the design stage for all facility renovation projects, in accordance with adapted analysis methods (such as Hazop method);
- at a regulation level, included in the professional risk management.

### **Management of Knowledge:**

DS identify the key knowledge necessary to the process implementation, and to reach the conformance of products and services: regulation, feedback, knowledge sharing, etc.

Knowledge management includes skills but also technical, scientific, organizational sides, etc.

This knowledge is stored as information (documented or not), or simply detained by human resources: experience/skills, organisation, applicable and reference documents (technical procedures / operating modes), storage (PV/RT, folders, technological files).

Documentation doesn't replace experience and everything is not necessarily capitalizable by written records. However, every technical manager is responsible for identifying and documenting information to record, especially by means of the following documents:

- Technical reports (ex: Test Reports, Stress Reports).
- Procedures and operating modes (documents identified in the QMS).
- Recommendations, technical files, guides, user manuals (documents which control and formalism are specific to every job).

Knowledge criticality is depending from the following rules:

- information (to document) known by only on person: capitalization of knowledge and training for other people;
- information (to document) known by several people: capitalization of knowledge, homogenization of practices (efficiency).

Skill tables allow the recording of all these needs.

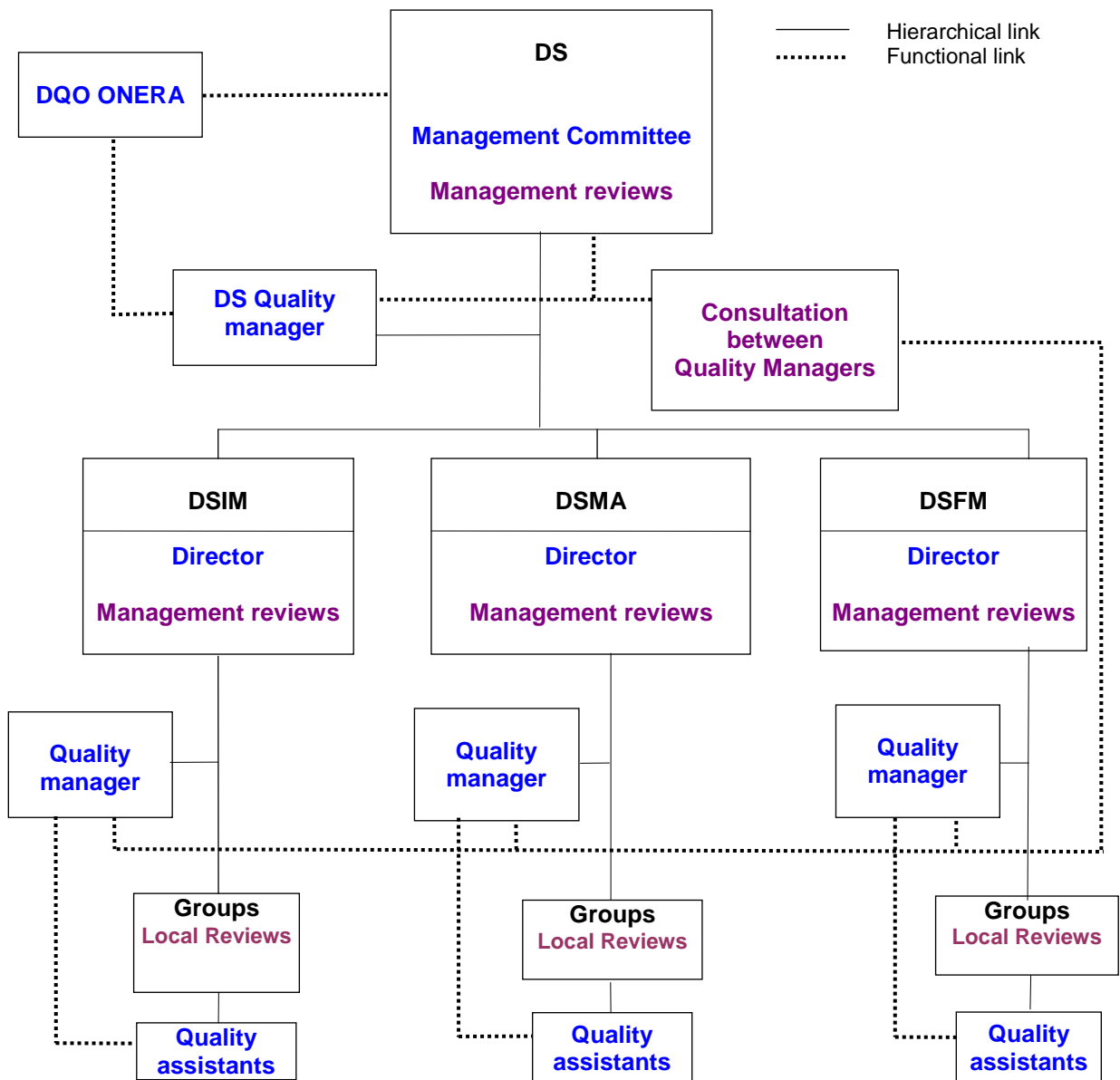
### **QMS Documentation:**

This consists of the quality manual (including the quality policy), the reference system which defines the main processes and associated procedures, the procedures, operating manuals and regulations (either common to DS or specific to one site), records of procedures and job descriptions defining the role and responsibilities of the DS personnel. Speaking generally, the documentation includes all the documents needed to plan, carry out and master the different processes. The records are the written evidence that the actions and processes conform to the QMS. In addition, within DS, each person is responsible for the quality of their own work and its effect on customer satisfaction. Quality plans are created whenever a need is felt.

#### QMS Procedures and other documents:

These are all the relevant documents used in the divisions and departments. These documents include the specific requirements or recommendations in relation to the methods used by the work units. They have been created to carry out the different tasks and processes described in the manual. For each process set out in the chart, the main procedures are mentioned in the manual.

**DS Quality Organization :**



The DS quality manager coordinates the activities of the department quality deputy managers through regular meetings. The goal of these coordination meetings is to ensure the harmonisation and coherence of the system throughout DS, in particular by harmonising the quality indicators used. These meetings also enable the quality action plans to be set up and updated. A report of the quality managers' meeting is written by ADQ and sent to all DS divisional and departmental heads as well as to ADQ.

The consultation meetings of the quality managers are the subject of a report drafted by the Central Quality Manager, distributed to all DS department heads, as well as to DQO.

The quality managers suggest ways of improving the system by inputting the director's reviews at the highest level in DS. QMS reviews extend to every relevant level, division, centre and department. In each part of DS, the Deputy Quality stands himself on specific Quality assistants appointed inside each work unit when required.

## Health, Safety and Environment:

### Process M3-SMSE (pilot: DHSE)

#### Principles

The President of ONERA defined the objectives, organization, resources, and delegations of responsibility for compliance with regulations. This is formalized in a Health - Safety - Environment Management Manual, approved by DS (signatory as checker). At each centre, a single document risk assessment for occupational safety and ICPE file (classified installations for environmental protection) have been prepared and are regularly updated. The directors of centre are the first delegates; delegation of authority chain is then passed through departmental directors and heads of unit or facility managers.

In practice, safety is everyone's concern, from the workforce responsible for applying the safety regulations in their work to the manager with safety responsibilities. As a result, DS has a policy of continually increasing safety awareness and organising specific safety training. This policy goes beyond simple compliance with the law.

In addition to the protection of the installations and equipment, customers benefit from these measures since events which could disturb the tests are minimised.

#### Aeras of risks specific to test centres

Test design and performance needs to respect the existing legislation, particularly in the following areas:

- pressurised devices: air pressure supply, storage, networks, models
- inflammable products: packing, handling, storage
- chemical products (particularly those used for the tests)
- laser instruments (for control or for testing)
- environment (gases, chemical products, noise, ...).

Risk management is based on setting up safety studies concerning the personnel and the installations: identification and assessment of the risks, preventive and protective measures (intervention procedures, in case of accident or incident, signposting and surveillance of limited access zones...).

Special procedures, to do with work safety, enable safety lapses to be dealt with and corrective or preventive actions to be set up. Occupational doctors, work inspectors, the health and safety committee, and the relevant manager are consulted and involved in creating these procedures.

Health, Safety and Environment items are integrated in the Quality Management System by means of the process P14. There is a broad consensus between the site manager and heads of departments DS. In addition, the DS Quality Manager also oversees quality for the entire management DS safety / environment related with management Safety and Environment (DHSE) and local safety services (SLSE).

## **Confidentiality:**

### **Processes M3-SMSID et M3-SMSSI (pilot : DSSE)**

#### **Scope**

**Defence Activities:** access and data protection is governed by official rules and placed under the authority of ONERA's central security officer (DSSE). Responsibility for specific tasks is given to unit directors and to local security officers. The security rules are themselves protected.

**Industrial Security:** this involves the interests of both ONERA and its clients. Industrial security is taken into account via instructions from central management as well as through specific rules in the different divisions (legal responsibility, credibility).

In practice many measures deal with defence and industrial security, thus enabling complete control of confidentiality. Required levels of clearance are detailed in the customers' contracts including particular requirements demanded by ONERA or the client. Furthermore, DRI Department carries out the computing security in order to protect information, networks and systems.

#### **General provisions**

General protection provisions cover:

- the individual commitment of all the personnel, official authorisations, creating and maintaining awareness of this issue
- the permanent or temporary control of access to the sites and to information
- the human and physical resources
- the data processing networks and systems.

The organization means and procedures used to ensure confidentiality are regularly audited by the relevant defence department or by internal auditors.

#### **Set up of contrats**

Points which are examined when drawing up contracts:

- scope and required confidentiality: title, objectives, programme, models, results (including photos and model visualisations), reports, authorisations,
- access details: definition of the rules, issue of access authorisations (security service),
- identification of authorised personnel and places, surveillance,
- protection of the clients' equipment on site and during transport,
- data protection: creation of documents (restrictions, circulation, filing and archiving),
- use of external communication systems, clients' specific requirements, equipment supplied or set up by clients, special software. Every time ONERA publishes a document referring to work done for a client, prior permission is sought (annual report...).

#### **Treatment of non-conformities**

All confidentiality nonconformities are of a « process » type and are dealt with internally in accordance with quality management system procedures.

**Communication at management level:**

Type of communication	Person responsible and participants	Inputs	Content	Outputs	Frequency
<b>ONERA Executive Committee (COMEX)</b>	<b>Resp. :</b> ONERA President <b>Part. :</b> ONERA top management including DS Director	ONERA strategy, investment, management rules, reports on ONERA's present state and development	ONERA representation on international bodies, Finance, Responsibilities and management	Meeting report, Policy and objectives, Instructions for management	Once a week
<b>DS directors committee</b>	<b>Resp. :</b> DS management <b>Part. :</b> Heads of divisions and departments	Instructions from ONERA general management Operating and equipment budgets Number of employees	Definition of tasks and responsibilities, DS marketing and management policy	Meeting report, Action points for the heads of divisions and departments	Twice a year
<b>Divisional and departmental meetings</b>  <b>Group meetings</b>	<b>Resp. :</b> Head of division or department <b>Part. :</b> Heads of units	Reports of executive committee meetings, Project and contract management, Budget and deadline controls.	Process and budget control	Meeting report, Action plans	At the initiative of heads of division, department or group
<b>Meeting with Constructors</b>	<b>Resp. :</b> DS management <b>Part. :</b> main clients, directors, heads of experimental units	DS annual report, Technical development, Investment	Presentation of main technical development actions Listening to clients' needs	Meeting report, Dealing with clients' demands	Every two years
<b>Technical development meetings</b>	<b>Resp. :</b> DS management <b>Part. :</b> Heads of divisions, relevant members of DT	Clients' needs Technological developments	Improvement and development of means and methods in the medium and long term	Meeting report, Action plans Equipment budget	Twice a year at CMA and CFM (common meetings)

**Communication during provision of a service:**

Type of communication	Person responsible and Participants	Input	Content	Output	Frequency
<b>Wind tunnel programming meetings</b>	<b>Resp. :</b> Head of wind tunnel department <b>Part. :</b> Heads of unit, and DSIM, if concerned	Drawing up and review of offer, Review of contract and amendments Clients' intentions in the medium term	Management of test programmes (facility business control)	Update of test programmes	Once a week for DSMA  When necessary for DSFM
<b>Project meetings</b>	<b>Resp. :</b> Mission leader, Project leader <b>Part. :</b> All relevant personnel, Clients	Planning, Client's contract and other data Specifications	Design reviews, Coordination of project participants	Meeting report Action plans	At start of project and whenever needed or specified
<b>Proposal, contract and intermediate reviews</b>	<b>Resp. :</b> CA, RP, RE <b>Part. :</b> Relevant managers, Client	Offer, Contract Test programme Design data	Review of output data from previous steps, Coordination of project participants	Review report Work progress, Dealing with nonconformities if needed	Whenever needed or specified
<b>End of contract reviews</b>	<b>Resp. :</b> CA, RP <b>Part. :</b> Participants in the contract	PTF, contract, Reports of previous reviews	Assessment of customer satisfaction	Final results, Corrective or preventive actions	At each step of the process
<b>Test meetings and reviews</b>	<b>Resp. :</b> Test manager <b>Part. :</b> Test team, client	Design, preparation and performance reviews	Study of previous review's results	Test process, Test results	At each step of the test process
<b>Steering committee meetings (large projects)</b>	<b>Resp. :</b> President of the committee <b>Part. :</b> Directors concerned, project manager	Project progress reports	Project review	Decisions relating to organisation, financing, technical choices	Whenever necessary

**Quality Management System Communication:**

Type of communication	Person responsible and participants	Input	Content	Output	Frequency
<b>ADQ meetings</b>	<b>Resp. :</b> DS quality manager <b>Part. :</b> Quality managers	Quality performance indicator chart of the different parts of DS, DS and local management reviews	Analysis of SMQ to improve coherence and homogeneity, Proposals for improvements, Preparation of input to DS management reviews.	Reports of meetings and action plans	Once every 3 months
<b>DS management reviews</b>	<b>Resp. :</b> DS Director <b>Part. :</b> DS director's committee (and including DS quality manager)	Action points from previous reviews; quality performance indicators, changes which could affect the system; possible improvements	Analysis of quality performance chart, Review of policy and objectives, Assessment of pertinence and effectiveness of quality management system	Review report Policy and objectives; resource needs; directives; assessment of SMQ efficiency	Twice a year
<b>Local centre or department management reviews</b>  <b>Process reviews</b>	<b>Resp. :</b> Heads of divisions and departments <b>Part. :</b> Heads of groups, RAQ et AAQs	Reports of DS management reviews, Results of missions, Centre or department performance indicator chart: NC, AC/AP, clients' demands, target achievement results	Analysis of quality performance chart, Policy and objectives review of centre or department, Assessment of pertinence and effectiveness of centre's or department's quality management system	Review report, Action plans, Objectives and performance indicators	Minimum twice a year  All processes in a three year period
<b>Informing personnel and increasing awareness</b>	<b>Resp. :</b> Heads of units Quality managers <b>Part. :</b> Personnel	Reports of division, centre or department reviews Group meetings Intranet, emails Posters In-house journal Internal memos	Presentation of policy and objectives Presentation of results Increasing awareness of quality and changes to standards Continuous improvement process Participation	Information for personnel, Involvement and commitment of all concerned	Following on from management reviews, and whenever necessary



## **DS definitions:**

The definitions for vocabulary specific to quality management are from the reference ISO 9000:2015 Quality management systems - Fundamentals and vocabulary.

The main definitions specific to the QMS DS are:

### **DS Director's committee**

It consists of the Director, Assistant Director, Assistant directors responsible for quality and finance, CMA director, heads of division and department. It meets twice a year to review the management system.

### **Mission**

All commercial and technical activities to do with the preparation and fulfilment of a contract with a customer. An affair can include a test, or a test with associated services, or several tests and/or associated services.

### **Test**

Experimental process in wind tunnel or in a specialised laboratory.

### **Mission leader (tests)**

Responsible for the whole of a mission (coordination of commercial and technical activities) from beginning to end he has the role of a project leader. He is the client's contact on behalf of the the wind tunnel department concerned, and follows through commercial and administrative aspects to the end of the contract including invoicing and payment.

### **Test manager**

In charge of activities necessary for carrying out a test, consults with the Mission leader (CA) for the duration and activities of the test. Normally delegated by the CA as technical contact person for the client within the limits of the contract agreement.

### **Engineering project manager**

Person in charge of technical and marketing aspects of a design and development project for equipment intended for ONERA use or for external clients. The engineering project manager is responsible for the management of these activities within the framework of the DS quality management system.

### **Internal contracting**

Contracts are set up formalising services provided by ONERA central management, divisions and departments.

### **Quality assistant**

Helps the Quality Deputy Manager by relaying quality issues within the work place, by assisting the quality manager apply quality procedures and by advising work colleagues ; he is in particular in charge of quality documents and circulating information. The Quality assistant also follows the processes set up in his group.

### **Quality deputy manager**

Person delegated by management to set up, maintain, and modify the DS quality management system within their structure (also named "quality manager").

### **DS main quality deputy manager**

Nominated by DS senior management, he coordinates the activities of the departmental or centre quality managers. Reporting directly to the DS director, his task is to pilot the implementation, maintenance, monitoring and improvement of the quality management system.

## Acronyms:

<b>AnQ</b>	:	Quality assistant
<b>ADQ</b>	:	Quality Manager
<b>CA</b>	:	Mission leader (tests)
<b>CFM</b>	:	Fauga-Mauzac test centre
<b>CMA</b>	:	Modane-Avrieux test centre
<b>COQ</b>	:	Coût d'obtention de la qualité
<b>CNQ</b>	:	Coût de non-qualité
<b>CRQ</b>	:	Coût relatif à la qualité (CRQ = COQ + CNQ)
<b>DA</b>	:	ONERA Purchasing division
<b>DCMA</b>	:	Modane-Avrieux centre services
<b>DCMP</b>	:	Fauga-Mauzac centre services
<b>DICO</b>	:	ONERA Infrastructure division
<b>DQO</b>	:	ONERA Security, Safety and Quality division
<b>DSI</b>	:	ONERA Network and Computing division
<b>DSIM</b>	:	DS Engineering and Model department
<b>DSFM</b>	:	DS Fauga-Mauzac wind tunnel department
<b>DSMA</b>	:	DS Modane-Avrieux wind tunnel department
<b>PDCA</b>	:	Plan, Do, Check, Act (Deming)
<b>RE</b>	:	Test Manager
<b>RI</b>	:	Facility Manager
<b>RP (CP)</b>	:	Project Manager
<b>DHSE</b>	:	ONERA Hygiene, Safety and Environment division
<b>SLSE</b>	:	Local Safety and Environment service
<b>SMC</b>	:	Knowledge management system
<b>SMQ</b>	:	Quality management system
<b>SMSE</b>	:	Safety & Environment management system
<b>SMSID</b>	:	Industry & Defence security management system
<b>SMSSI</b>	:	Information security management system

## PROCESS DIRECTORY

Annex 1: R2.1 – Design and perform a test

Annex 2: R2.2 – Design and manufacture a mechanical product

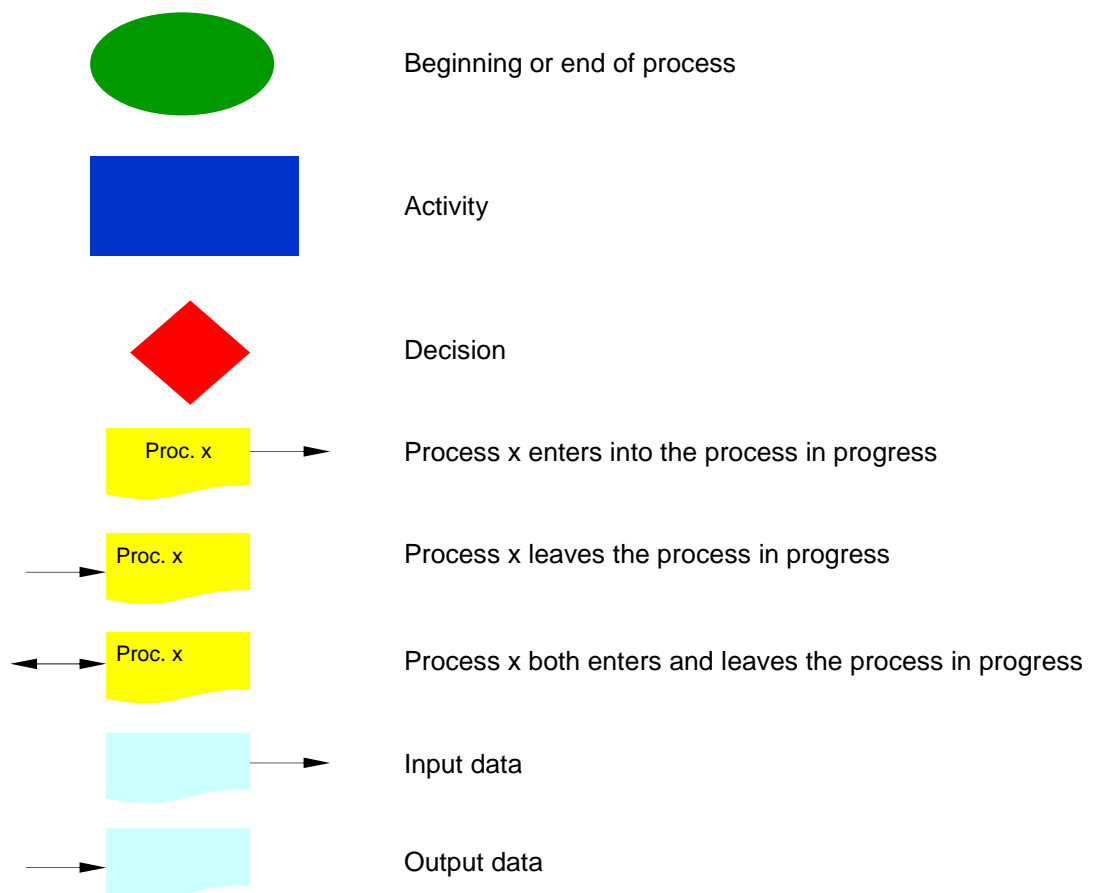
Annex 3: R2.3 – Develop new techniques for future

Annex 4: R3.1 – Setting up and maintaining facilities

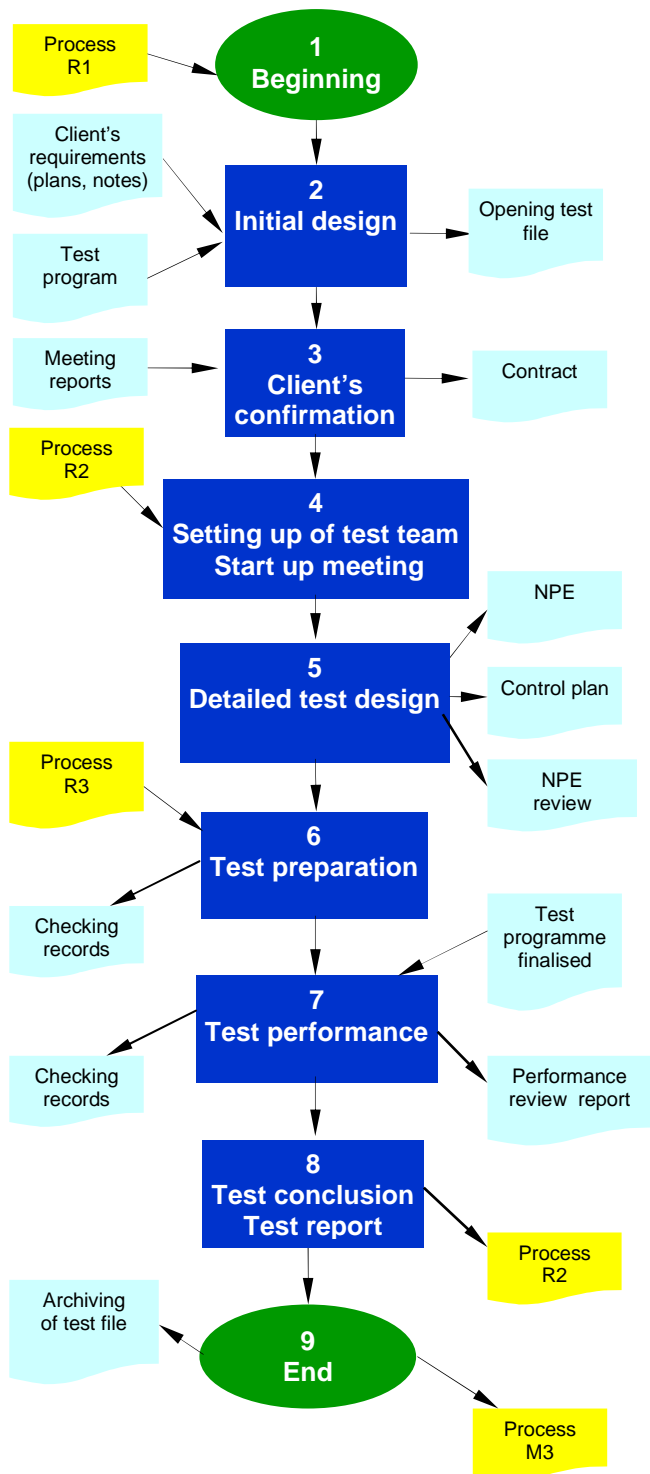
Annex 5: R3.2 – Mastering measuring equipment

Annex 6: R3.3 – Mastering computer tools and systems

### Key:



## R2.1 Design and perform a test



### 1 Experimentation Unit Head

- Nominates the Test manager

### 2 Test manager

- Analyses client's needs and requirements
- Plans the means (set-up, measuring equipment, data acquisition software and treatment) methods, tasks, operators and integration within the wind tunnel test programme

### 3 Test manager

- Checks that test design corresponds to client's requirements by consulting client, head of mission and the managers concerned
- Completes any information needed

### 4 Facility manager

- Gives approval to the set-up design

### 5 Test manager

- Writes the test preparation document (NPE)
- Writes the checking plan to be carried out during test preparation and performance

### Facility manager

- Gives approval to the safety aspects and writes, if need be, risk prevention documents

### 6 Test manager

- Coordinates test set-up and informs client of test preparation progress
- Coordinates pre-test checks
- Gives approval to test start-up

### 7 Test manager

- Coordinates test performance in accordance with the test programme and records the data
- Records incidents, deals with breakdowns
- Coordinates analysis of test results during the test and prepares data output
- Coordinates changes to the test programme in agreement with the client and the head of mission concerning the contract
- Coordinates the post-test checks in accordance with
- Carries out a test performance appraisal with the client and personnel concerned; on the spot client satisfaction is assessed
- Ensures test dismantling
- Ensures protection of client's equipment

### 8 Test Manager

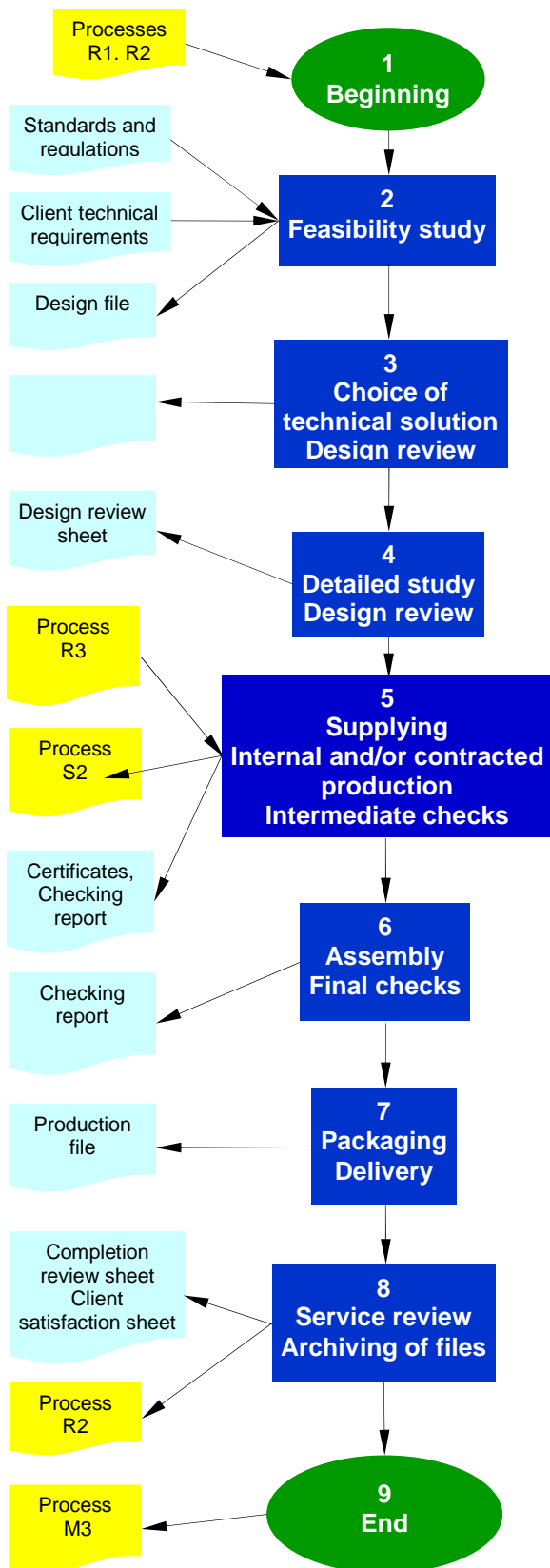
- Writes out the test report
- Provides the necessary information for the financial balance sheet

### 9 Experimentation Unit Head

- Writes out the recap form to launch the improvements actions.

Related procedures: Mastery of test design  
Test design review  
Writing of NPE  
Test performance organisation  
Test preparation and test preparation review  
Protection of client's equipment  
Test performance  
End of test  
Writing of test report

## R2.2 Design and manufacture a mechanical product



### 1 Line manager

- Following on from client's request, starts off the process by nominating a project leader (engineering or BE)

### 2 Project manager

- Oversees the feasibility study using internal or external specialists

### 3 Project manager

- Undertakes one, or several, design reviews, enabling a technical solution, with the client's agreement, to be validated

### 4 Project and sub-project manager

- Carry out the project and do the studies (overall plans, detailed plans, calculations etc.)
- Undertake the necessary design review(s) with those concerned: technical and production managers, contractors... Clients are invited whenever necessary.

### 5 Project and sub-project manager

- Set up the supplies needed (in advance of each step whenever possible)
- Set off production (internal and contracted out)
- Oversee the processes and associated checks

### 6 Project and sub-project manager

- Oversee assembly and integration
- Make sure final checks are carried out

### 7 Project and sub-project manager

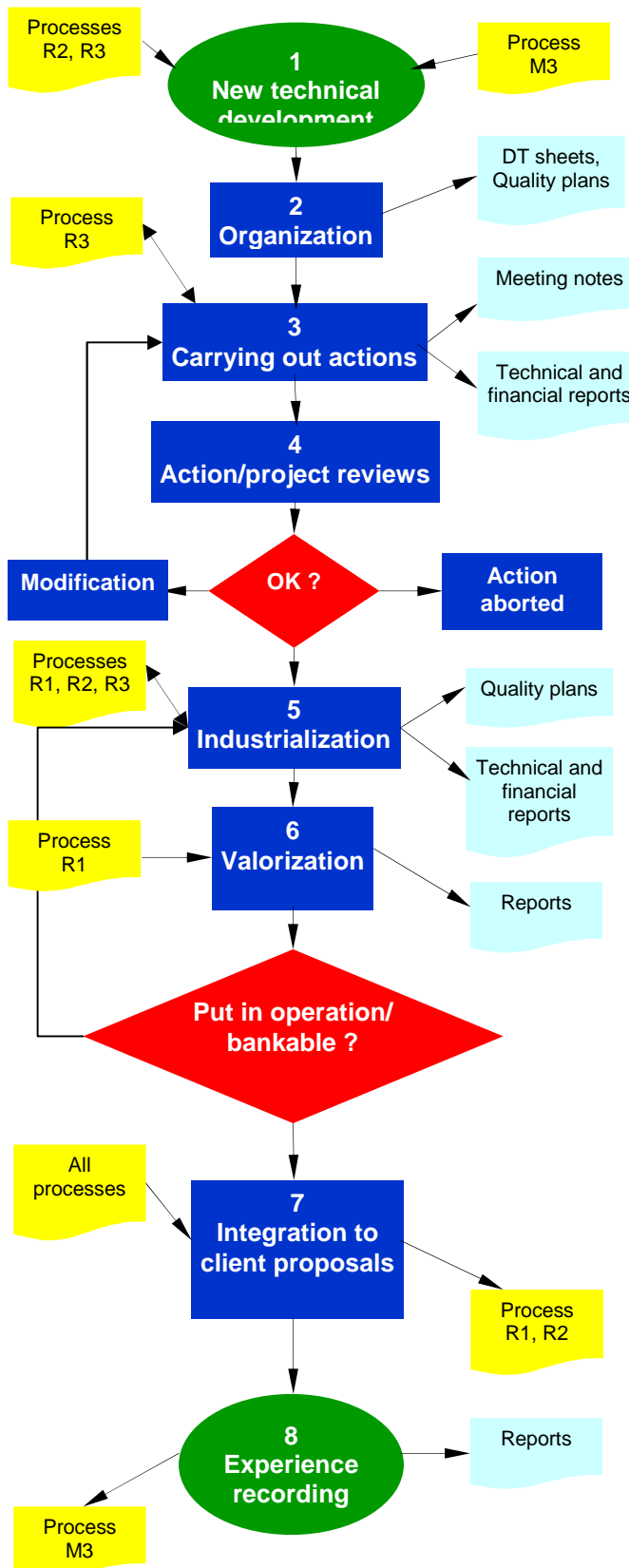
- Once the products have passed the checks, ensure they are packaged, despatched and delivered to the customer

### 8, 9 Project manager

- Undertakes the service provision review (technical and financial results of the project)
- Orders archiving of the files
- Records the extent of customer satisfaction

Related procedures: Performing an engineering project  
Mastering BE design  
Mastering engineering works

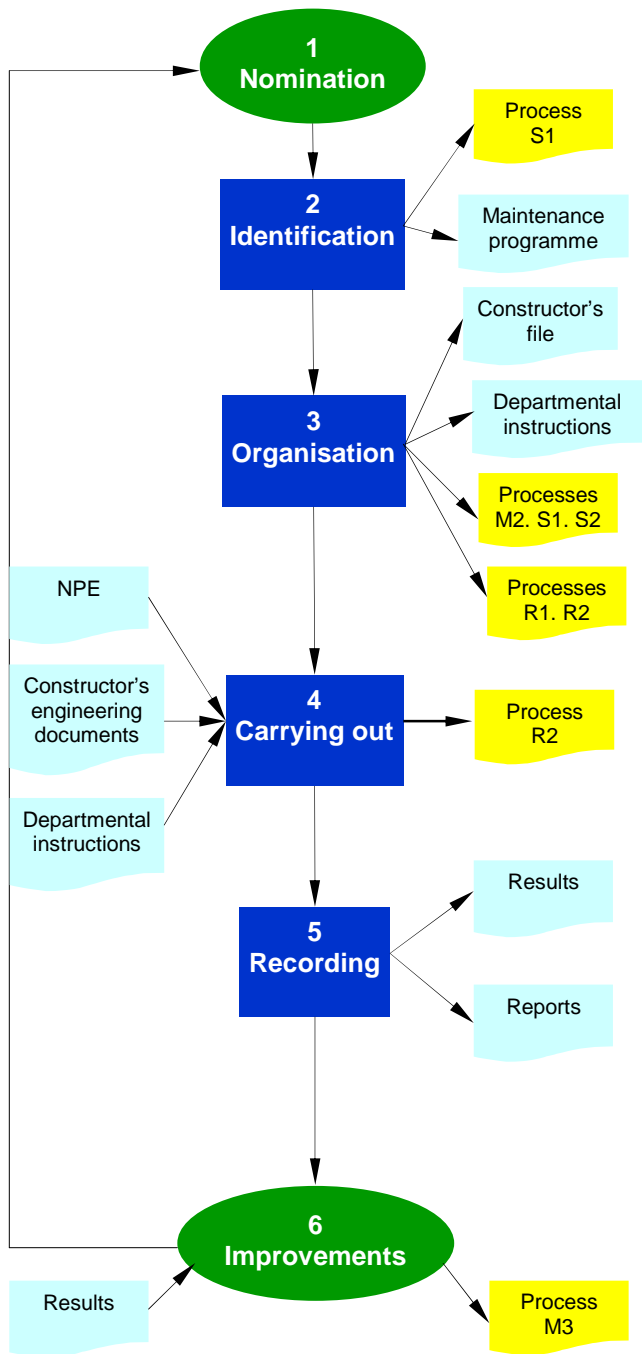
## R2.3 Carry out new techniques for future



- 1 Top management, heads of divisions and groups**
  - Sets off the technical development process in relation to needs, possible improvements to means and methods, and available resources
  - Survey technical development needs by:
    - listening to client's needs
    - watching competitor's developments
    - keeping up to date with scientific and technical developments
- 2 Top management**
  - Allocates human and financial resources for technical development actions in relation to financial possibilities
- Heads of divisions and groups**
  - Plan actions, nominate managers, and set off the DT process
- 3 Project managers**
  - Carry out the planned actions
- 4 Top management**
  - Carry out DT action reviews twice a year, in December and June, at CMA and CFM
  - Adjust planned actions or redefine new actions in relation to needs
- 5 Project managers**
  - Carry on DT actions, in industrialization stage
  - Adjust planned actions or redefine new actions in relation to needs
  - Carry out all industrialization actions
- 6 Project managers**
  - Transmit the reports to managers concerned, Present the results of the main actions at the constructors' annual meeting
- Top management**
  - Analyse the innovation proposed
  - Approve the propositions
- 7 Heads of department**
  - Formalize the new standards of technical business
  - Monitor the business development
  - Organize internal audits
- 8 Operational managers**
  - Complete projects in compliance with new standards
  - Make technical and financial reporting
  - Record new experience

Related procedure: Technical development

## R3.1 Setting up and maintaining facilities



### 1 Head of division

- Names the people in charge of setting up and maintaining the facilities (heads of wind tunnel, mechanical and electrical maintenance)

### 2 Heads of facility and maintenance

- Contribute to the test programme
- Identify the maintenance needs of the equipment (both regular and occasional)
- Prepare the test and maintenance programmes

### 3 Heads of facility and maintenance

- Organise the implementation or maintenance of:
  - test interventions
  - management of teams and contractors
  - management of documents and internal procedures
  - Identify future equipment needs
  - contribute to the accident prevention plan for outside companies

### 4 Internal teams or contractors

- Carried out the planned work in accordance with the procedures, operating methods and instructions, constructors' instructions etc.

### Heads of facility and maintenance

- Supervise the work
- Manage the spare parts and materials

### 5 Heads of facility and maintenance

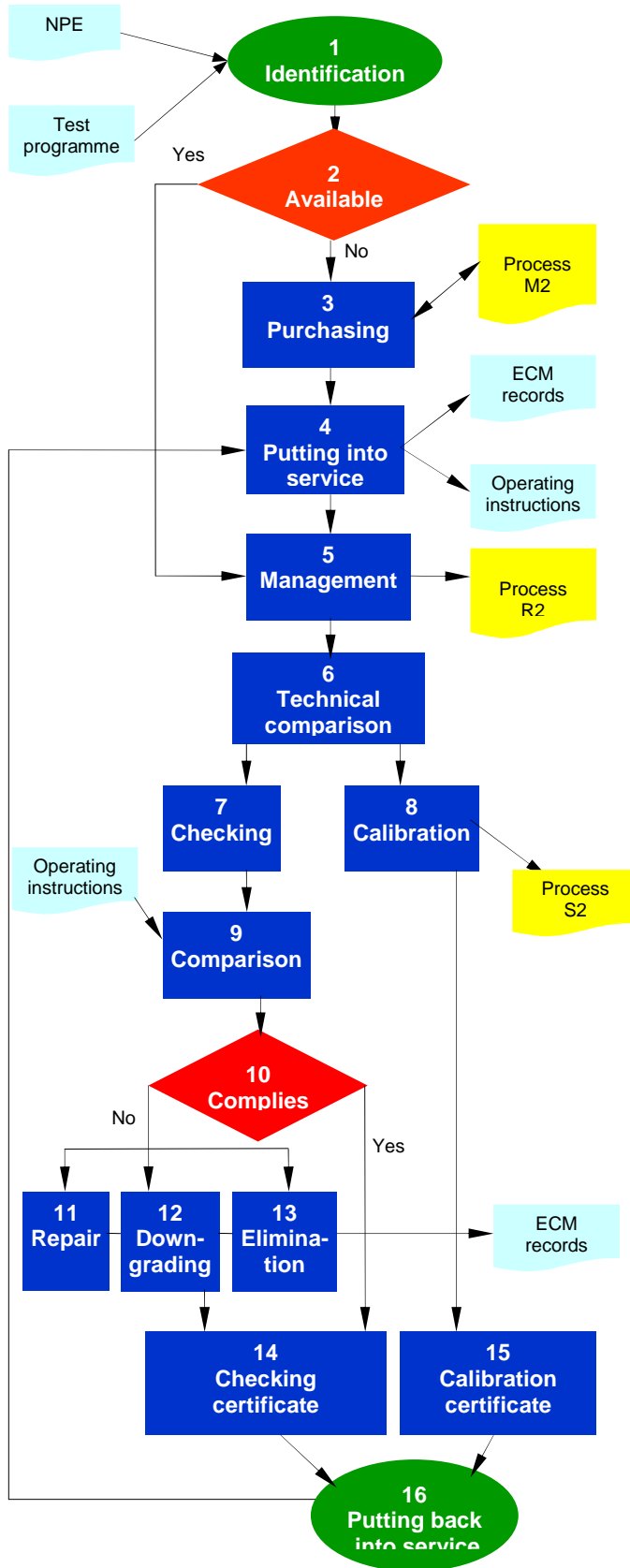
- Record the results in the operational and maintenance reports
- Update the equipment's documentation if needed

### 6 Heads of facility and maintenance

- Implement improvements through:
  - targeted staff training
  - organisational changes
  - equipment budgets
  - improving the equipment's reliability and availability

Related procedures: Setting up of facilities  
Facility maintenance

## R3.2 Mastering the measuring equipment



### 1 ECM manager

- Identifies and analyses the needs and choice of monitoring and measuring equipment
- Proposes equipment supplies to line manager

### 2 ECM Manager

- If required equipment is in stock, goes to step 5

### 3 ECM Manager

- Prepares and places equipment order in relation to required accuracy, and assembly and connection characteristics (process 2.1)

### 4 ECM Manager

- Starts record files and completes the equipment's data base
- Identifies the equipment by means of a serial or equipment number
- Defines the accuracy class, the time interval for calibration checks
- Defines the storage and protection conditions
- Files the documents

### 5 ECM Manager

- Undertakes the initial controls: technical, scheduling
- Supervises the preparation and performance stages

### 6 ECM Manager

- Carries out the necessary technical comparisons

### 7 ECM Manager

- Ensures the equipment is checked

### 8 ECM Manager

- Calibrates the equipment or has it calibrated by connecting it to the reference standards

### 9 ECM Manager

- Compares the results with the specifications

### 10,11,12,13 ECM Manager

- Records the results and updates the documents (database)
- Identifies the materials that don't conform
- Orders removal of unusable equipment

### 14,15 ECM Manager

- Formalises the certificates (checking or calibration)

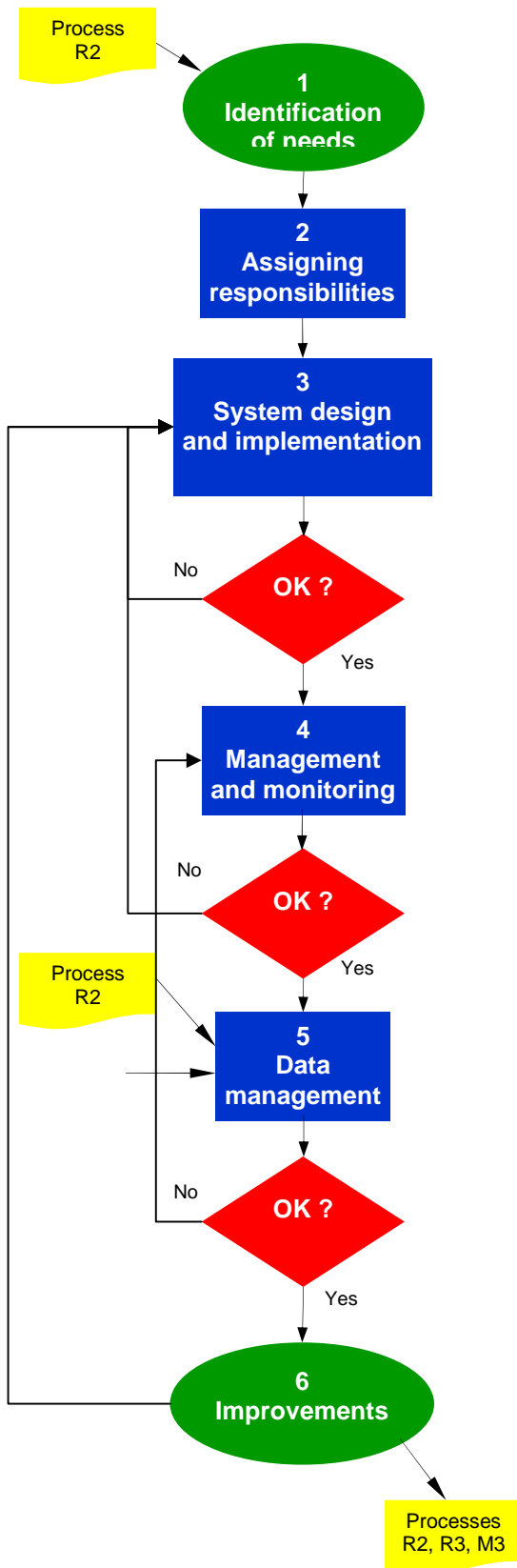
### 16 ECM Manager

- Puts the operational equipment back into service

[Related procedure: mastery of measuring equipment](#)



## R3.3 Mastering the computer tools and systems



### 1 Head of division

- Defines the requirements of the system to be installed (including intranet) with respect to:
  - data and information to be supplied to the client
  - data and information to be stored
  - availability and access
  - data protection (confidentiality)

### 2 Head of division

- Names the people responsible for defining, implementing and managing the systems

### 3 IT managers

- Define the systems according to hardware and software requirements
- Set up and ensure system security
- Ensure the necessary backups are carried out
- Ensure system and network maintenance is done

### 4 IT managers

- Oversee and assess system performance in terms of:
  - availability and access
  - efficiency of data availability
  - stability
  - security
  - confidentiality

### 5 IT managers

- Ensure data backup and storage
- Control access by personnel concerned

### 6 IT managers

- Assess system performance and report to management
- Suggest improvements and changes

Related procedures: DSMA and DSFM technical procedures