

ISO 9001-2000 FOR FRENCH HYDROGRAPHIC OFFICE

A New Beginning

As pointed out by many preceding the French Hydrographic Office, SHOM, on the path of certification, the rapid growth of information systems and automation has often outpaced updating of procedures. This has resulted in a growing gap between what was being actually done and what was written on what was to be done. For organisations like SHOM, where safety and traceability are nearly sacred, this gap had to be filled. In addition, the systems used for surveys and for production ashore are growing in complexity and their quality has a direct impact on the quality of products, including integrity of information.

It was thus decided at the end of 2000 to take the measures necessary for ISO 9001-2000 certification of SHOM, covering all the aspects quoted above, including the design and development of systems. It has taken this time to focus everybody in the service, to prepare contracts for support and to upgrade the quality management system, including writing its formal description. We describe here the experiences we found most unique.

Approach via Product Category

At the beginning of the work the number of processes were minimised by the definition of generic processes that would apply to very large categories of products, including services. It was found impracticable to manage customer satisfaction and take into account the various specific human skills through the links between generic processes. We consequently shifted to processes structured according to categories of very similar products, from customer needs to customer satisfaction.

This led to the definition of thirteen processes providing products to external customers, eighteen processes providing only support to internal customers and three management processes. The thirteen "external"™ processes are management of the paper-chart portfolio, creation and management of the ENC portfolio, management of the nautical publications series (including sailing directions), realisation and distribution of catalogues, management of complementary publications, processing of urgent nautical information, processing of rapid nautical information, tidal prediction, production and distribution of tidal-stream publications, provision of non-catalogue nautical documents, realisation of hydrographic surveys, expertise in geodesy and positioning and external communication.

It was something of a surprise to discover that design and development were integrated and somewhat hidden in the processes. We thus had to handle these by specific objectives in the policy statement on quality for SHOM (see Figure 3).

No Weak Link

Safety suffers no compromise: all tasks having an impact on safety had to be included in the field of certification. This explains why there are so many processes for a relatively small organisation and why it took some time to achieve the goal of certification; another cause for delay was the length of administrative procedures for public contracts. Once the final formalisation process was launched with the necessary help of external consultants it took only eighteen months to achieve certification level: proof that the "traditional"™ processes were rigorous and well mastered.

These processes cover everything from surveying to distributing, including processing, data management, charting etc. As already stated, design and development also have to be certified and it may be said that the ISO 9000-2000 series is less prescriptive on this matter than ISO 9000-1994, where ISO 9001 was dedicated to design and development. ISO 9000 certification is not an absolute proof in itself; it is only proof that you are well organised and apply your procedures in the field you have chosen. We could have adopted a strategy of more progressive certification, beginning for instance with on-shore activities, but we felt that the mission of the service called for clear commitment and a clear image, internal as well as external, with which partial certification would have been incompatible.

Design and Development

Systems quality, necessary for safety and for cost-effectiveness, is obtained by following well-defined methods and procedures in their design and development. Many recommendations and standards exist for design and development but these do not constitute a set of sufficiently applicable rules; their teaching needs to be selected and adapted to your own service.

Surprisingly enough, despite the fact that many modern systems are based on information processing and go through numerous evolutions during their lifecycle, the handling of such evolutions is scantily specified in the main standards. We had to devise a set of recommendations for incremental development, where each increment is managed as a project in itself in ISO terms, with possible overlap of development phases of successive increments.

Many other aspects of lifecycle and procurement also had to be defined. As SHOM is a part of the Ministry of Defence, we decided to use the same methods and the same terminology. One of the main sources of know-how is the R.G. Aero set of recommendations; "Aero"™ referring to the organisation that produced the recommendations (Bureau de la normalisation de l'aéronautique et de l'espace). But the recommendations were actually designed for application in all fields of defence procurement, giving them a very broad spectrum and making them suited to almost any kind of application domain.

However, systems in our field are much smaller¹ than a lot of defence systems and it seemed unpractical to use the whole series of R.G. Aero recommendations². We thus selected the most appropriate ones for defining the frame and the organisation of systems:

- RG Aero 00040 general recommendation for the program management specification
- RG Aero 00023 guide for the application of the principles of the configuration management
- RG Aero 00008 guidelines for the drawing up of technical specification.

There exist many more and we think that our designers, project managers and engineers will be able to use them when needed once they have assimilated the basic ones.

A Lot of Semantics

As can be seen in the previous paragraphs, quality, methods and organisation use a lot of general words, which require to be given more precise meaning in the interests of efficient management. Of course, ISO 9000 is widely used for basic concepts, definitions and schemes. But this is not enough, and we also had to define very general and common words like project, system, engineering, increment et cetera. One reason for this is that the huge wealth of existing standards and recommendations is not perfectly coherent, despite very high quality and usefulness. The choices made here are not universal owing to the well-known fact that methodologies have to be adapted to the environment in which they are used. This was a great burden on SHOM staff, which hardly reached the necessary "critical mass". Some more standardisation in the hydrographic field would probably help middle-sized Hydrographic Offices and the future organisation of the International Hydrographic Organization (IHO) should allow for a more rapid progression towards such goals. Like quality, semantics is not an end in itself; it is only a tool for those who use it. What is important in improving semantics is that the people in the organisation have a tool for improving their communication and consequently the efficiency of their teamwork.

Documentation Overhaul

Many Service reference documents were managed in different (hand-held) repositories, some of them somewhat out-dated. We had to sort out all our references and this was a considerable task for which we felt that only automation could give us the necessary capacity. Instead of resorting to a commercial documentary system, for which a lengthy procurement process would have been inevitable, one of our best software people developed a small tool based on an off-the-shelf workflow package. It was thus very cheap and proved to be very efficient. All in all, we reached approximately 1,000 references, which seems fairly high. We will certainly reduce this and make it more rational, but we won't change the order of magnitude, which shows that our profession needs very elaborate skills and procedures: safety does not come cheap.

Customer Needs

One of the important features of ISO 9000-2000 is the prominence given to users of the products and services: "the customer". We were helped in this area by the fact that a few years ago we had already identified the necessity of improving marketing and hired a specialist in the field. This may seem obvious to some hydrographic offices, but for those many carrying government tasking it might be useful to consider that techniques used in marketing are also useful for quality.

Quality rests on the analysis of user needs and so does marketing; a lot of the processes necessary for quality are more or less common to marketing too, for instance market segmentation or inquiries into customer satisfaction. But customer satisfaction cannot be the only criterion for a government service fundamentally limited by its public mission. For us this is producing charts and nautical documents and information necessary for safe navigation and going beyond that into the competitive market is precluded. We thus had to specify this limitation in our policy statement on quality.

Another issue is the difference between the need expressed by users and the necessities of safety. For a lot of users progress is measured mainly by automation and user friendliness, whereas automation systems entail new risks. Such an issue cannot be dealt with in a few words, but let us note that preventing disasters cannot be achieved only by running a Quality Management System (QMS) because disasters are (hopefully) too few for a "normal" improvement rate by virtue of QMS. Know-how from other fields, where a number of standards exist for safe information systems, must be taken into account in the maritime world, a task mainly devolving upon the IMO, with the IHO being involved for the use of charting and nautical information.

The effect of this implicit need is to apparently slow down the development of some products or services. But in the meantime we are developing really safe products, giving priority to safety over commercial considerations.

Efficient Tool for Future Progress

We do not live in a static world. We either progress or regress and the choice is mainly ours. A quality management system is not a complete guarantee for progress, but it is one of the necessary tools for that purpose. First of all, certification has to be maintained on at least an annual basis and this is a powerful incentive against regression. Secondly, the new, formal homogeneous description of SHOM processes is a good tool for improving the organisation, and so is the new vision on reference documents now easily accessible to everybody in SHOM.

As SHOM is not only in charge of hydrography but also of oceanography and meteorology for the Navy, we have decided to certify these more military parts in a second step. Part of this work is already well advanced. This is because some of the progress we have made in general procedures is already applied everywhere in SHOM, because the certification process has been closely followed by all the executives in SHOM and because the approach by processes has already been launched in the form of functional analysis.

We now in SHOM have a brand-new tool for progress, albeit with a lot of ancient parts. But it is only a tool. What is most important is the skill and dedication of everybody in the Service, which will be the more effective with a renewed quality management system. Of paramount importance also is improvement in communication inside the Service and with external partners, which is one of the benefits of quality enhancement. Communication connects people more than do machines. And people, as shown in several observations above, are what really count in the end.