

## Quality Management System: 1, 2, 3

Glendell De Souza, Science and Technology Officer,  
Caribbean Meteorological Organization,  
Port of Spain, Trinidad

What does The ISO 90012:2008—Quality Management System (QMS) mean for practical application? The report was summarized by QMS Project Leader Scylla Sillayo of the World Meteorological Organization (WMO) Secretariat. The presentation, “WMO supported QMS Demonstration Project in Tanzania,” offers some easy tips:

- ◆ Write what you do
- ◆ Do what you wrote and provide evidence of compliance
- ◆ Identify errors in process and seize the opportunity to improve with preventive action to identify additional essential processes

### Write What You Do

The central component of QMS is its structured documentation showing how the organization works. In most cases, the documentation can be presented in three levels:

- ◆ **Strategic Level:** Quality policy, manual and objectives
- ◆ **Tactical Level:** Documented procedures
- ◆ **Operational Level:** Working instructions, guides, and records

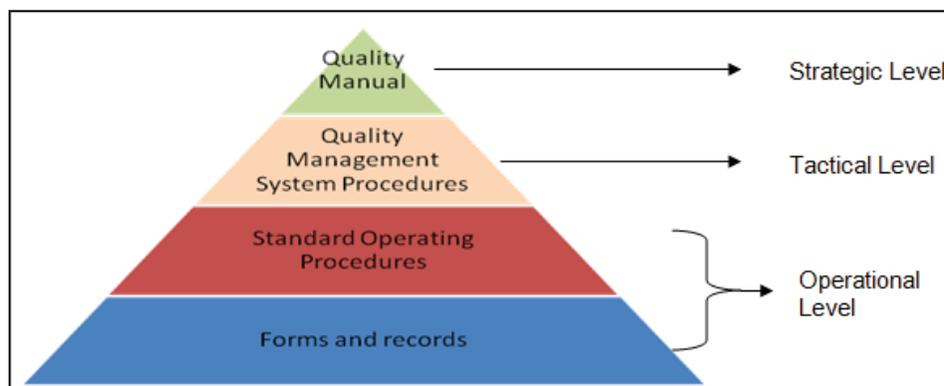


Figure 1. Levels of QMS Documentation

National Meteorological Services (NMS) must have Strategic and Operational Level documents and processes to provide services to all of its clients.

### Strategic Level

All NMS must have a strategic plan for the operations of its service to meet users' needs, which should include:

- ◆ Vision Statement
- ◆ Mission Statement
- ◆ Statement of Values and a written strategy to reach that vision

When developing an Aeronautical Services QMS, an NMS should modify its Strategic Vision to provide the Quality Policy, which in turn, the NMS can use to generate the Quality Objective.

Their Quality Policy should define the commitment to excellence by top NMS management. The policy will provide a framework for setting Quality Objectives. All staff should be made aware of the Quality Policy and what it requires.

The Quality Objectives are performance indicators measuring the degree of user satisfaction with the quality system. The Quality Objectives must be consistent with the Quality Policy. The objectives measurability must be agreed on by management and clearly communicated to all departments providing aviation services.

The Quality Manual defines the scope of the QMS and lists documentation related to the standard. The QMS may include or reference documented procedures

and describe how processes interact to form the QMS. The Quality Manual may be either a high level document with little detail describing how the work is done, or it may include considerable detail and be combined with System Procedures.

### Tactical Level

There are only six Documented Procedures mandated to meet the requirements of ISO 9001:2008:

- ◆ 4.2.3 Control of Documents
- ◆ 4.2.4 Control of Records
- ◆ 8.2.2 Internal Audit
- ◆ 8.3 Control of Nonconforming Products
- ◆ 8.5.2 Corrective Action
- ◆ 8.5.3 Preventive Action

## Operational Level

Operational Level documents are the standard operating procedures (SOPs) all NMS use in the production of services to aviation. These SOPs may be documented, although there may be times when they are passed from seniors to junior in oral fashion. Under QMS, these SOPs have to be documented. Further, the QMS requires other forms and records be created as detailed in the following clauses of ISO 9001:2008 - Quality Management System:

ISO 9001: 2008 Clause	Records Required
5.6.1	Responsibility and Authority
6.2.2	Competence, Awareness and Training
7.1	Planning of Product Realization
7.2.2	Review of the requirements related to the product
7.3.2	Design and Development Inputs
7.3.4	Design and Development Review
7.3.5	Design and Development Verification
7.3.6	Design and Development Validation
7.3.7	Control of Design and Development Changes
7.4.1	Purchasing Process
7.5.2	Validation of processes for Production and Service Provision
7.5.3	Identification and Traceability
7.5.4	Customer Property
7.6	Control of Monitoring and Measuring Equipment
8.2.2	Internal Audits
8.2.3	Monitoring and Measurement of Processes
8.2.4	Monitoring and Measurement of Product
8.3	Control of Non-Conforming Product
8.5.2	Corrective Action
8.5.3	Preventive Action

## Do What You Write and Provide Evidence of Compliance

One of the most important requirements of QMS is the internal audit, used to assess how effectively the documented processes and procedures are being used. Use records 8.2.2, 8.2.3 and 8.2.4 for this purpose. NMS management is responsible for identifying areas that aren't conforming, finding the reason for non-compliance and quickly establishing a correction plan.

## Identify Errors and Seize the Opportunity to Improve

Using QMS, NMS management should collect and analyze data demonstrating the suitability and effectiveness of its QMS. Management should evaluate where it can improve QMS effectiveness. The data will be generated as a result of the monitoring and measurement and it would provide information on:

- ◆ Customer satisfaction
- ◆ Conformity to product requirements
- ◆ Trends of processes and products, including opportunities for preventive action
- ◆ Supplier performance
- ◆ Human resources data such as turnover and employee suggestions

## Summary

The ISO 9001: 2008 Quality Management System is a documented QMS and not a system of documents. It does not aim to assure good quality by the more general definition, but rather to ensure an organization or product is consistent. There are four main quality components: planning, control, assurance, and improvement.

Quality management is focused not only on product and service quality, but also on the means to achieve it. It therefore uses quality assurance and the control of processes and products to achieve consistent quality.

It is the NMS, rather than the ISO Standard, which determines its needs and directions and how complex its QMS should be. Complexity in the QMS depends more on the characteristics of the staff and processes than on size of the organization. Highly skilled people require processes only be generally defined, while more working instructions must be provided to less skilled people.

## References

- Canada Standards Association: The ISO 9000 Essentials. Ontario, 2009*
- World Meteorological Organization: Quality Management Systems for National Meteorological and Hydrological Services. Geneva, 2004 →*

# Nassau, Bahamas: Aviation QMS Newsletter Aims to Get the Word Out

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Mary Butler, Department of Meteorology  
Nassau, Bahamas

After the QMS Workshop in Barbados on July 18- 22, 2011, the Bahamas Department of Meteorology has embarked on a number of projects to achieve ISO 9000 certification.

On August 2, the Bahamas Directorate, our top management, was presented with a draft copy of the Competency Assessment Plan for Aeronautical Meteorological Personnel.

On September 8, staff presented a Competency Plan for the Bahamas to the Directorate. The following documents were reviewed and critiqued:

- ◆ Draft Competency Assessment Plan
- ◆ Draft assessment forms for aeronautical meteorological forecasters and observers
- ◆ QMS forms for instrumentation with maintenance schedule
- ◆ Letter of Agreement between Air Traffic Control and the Department of Meteorology

## Letter of Agreement

Because Air Traffic Services is our biggest customer, we established a Letter of Agreement between this agency and the Meteorological Department.

A series of meetings was held with the QMS staff to finalize this document. On October 6, we updated the Directorate on changes made to this letter.

The QMS team and top management from Air Traffic Services held two more meetings in October and November to finalize the terms of the agreement.

## Customer Care

The team next developed a questionnaire to obtain feedback on the products and services provided by the Department of Meteorology.

In November, the team contacted aviation groups such as Bahamasair Pilot's Association and the Local Pilot's Charter to update them about the questionnaire.

## Quality Manuals

The team is finalizing Quality Manuals and Guides for the forecasters and observers. These manuals will include:

- ◆ Office procedures
- ◆ Warning protocols
- ◆ Methods of forecasting weather parameters
- ◆ Instruments and methods of observations of weather parameters

## WMO and ICAO Publications

We are working to ensure the relevant WMO and ICAO publications are updated and copies placed in the Forecast Office. We used the government printing facility to print a few of these publications.

The Director of the Department of Meteorology was presented with a list of WMO publications to purchase on his next trip to Geneva. A request for ICAO publications from the Director of the Civil Aviation Department is pending.

A document describing how the documents from the department should be controlled has been written and awaits review by top management

## Training Records

We are currently reviewing the Directorate's personnel files for forecasters and observers to track training. This tracking also is verifying personnel are qualified to function in the Forecast Office as assessors during the assessment process. →

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***The team next developed a questionnaire to obtain feedback on the products and services provided by the Department of Meteorology.***

# TAF Climatology for Region IV

By Kathy-Ann Caesar, Caribbean Institute of Meteorology and Hydrology

Over the past several years, the Caribbean Institute of Meteorology and Hydrology has taken steps to introduce an aviation climatological tool. This program was initially developed in the U.S. National Weather Service to help forecasters and users better understand the impact of climatology.

- ◆ Statistically, Persistence and Climatology forecasts perform best.
- ◆ Most aeronautical meteorologists have at their disposal Conditional Climatology Tables (CCTs) indicating weather trends over several hours for their respective aerodromes.
- ◆ The CCTs provide the forecaster with a statistical probability of an event.
- ◆ What if this climate data could be graphically presented instantaneously?
- ◆ What if hourly climate data could be graphically displayed?

We can provide both services with the Terminal Aerodrome Forecast (TAF) Climatology Program. The program assimilates 30 years of Meteorological Actual Report (METAR) data into an observational climatological database, simulating the CCTs (Figure 1).

With this climatology tool, an aviation meteorologist can go through “what if” scenarios for a given wind direction. For example, when forecasters anticipate a wind change from east to west in 2 hours and the aerodrome they are forecasting is currently Instrument Flight Rules (IFR), the question asked is, “How quickly do the conditions being observed clear with a wind shift? Climatology is a powerful tool forecasters can use to improve

the TAF when events are expected to change favorably or unfavorably.

Forecasters can use the application in Figure 1 to apply climatology and improve their product by anticipating what the Wind, Visibility, Weather, and Ceiling will be at some point in time in the TAF. The program looks at a 30 year climatological database to provide a likelihood of a given combination occurring and immediately produces the bar chart in Figure 1.

Figure 2 provides another example of the output, which allows graphical manipulation of data. The chart helps the forecaster determine likely changes in flight conditions under different circumstances.

Finally, this tool can be used in Quality Control (QC). It can show the forecaster how many times the

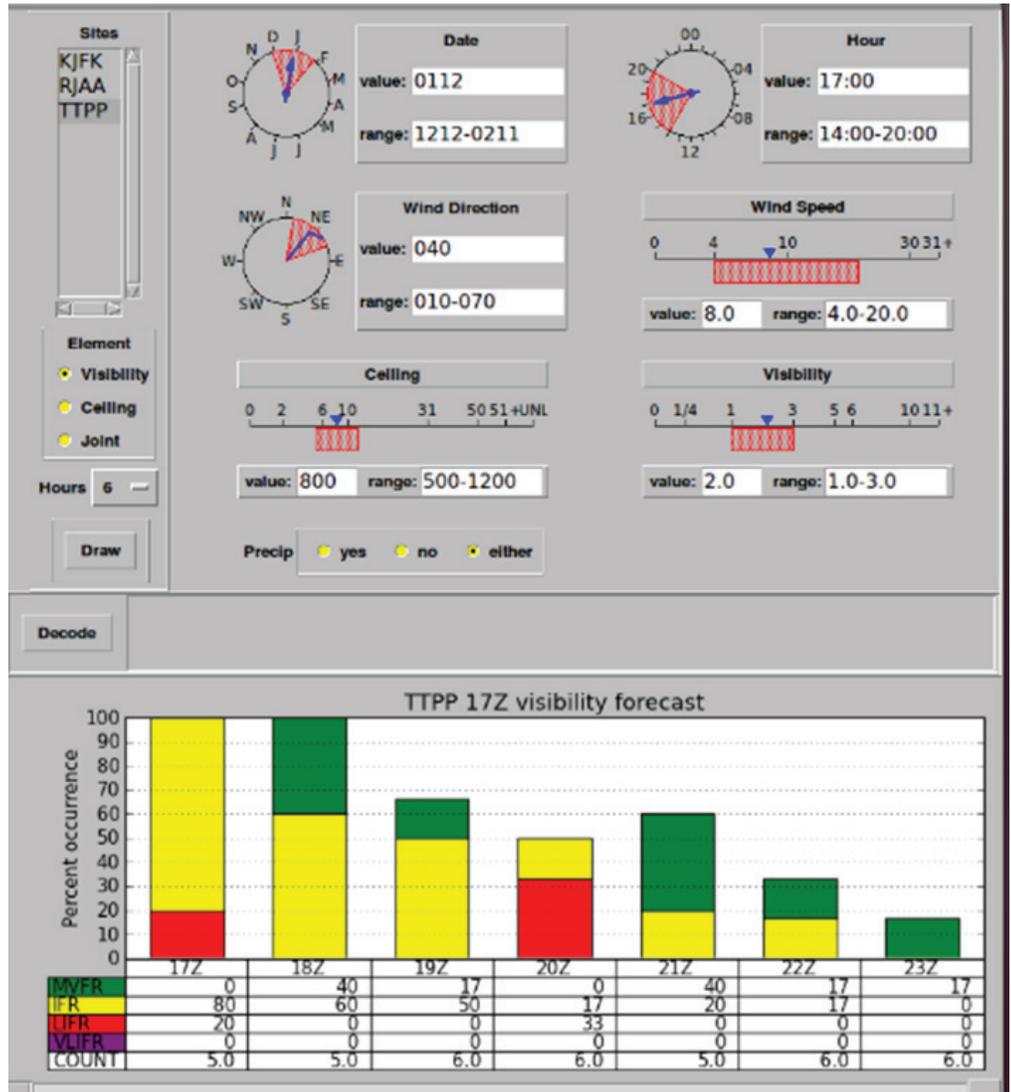


Figure 1: Apply climatology and improve products by anticipating what the Wind, Visibility, Weather, and Ceiling will be at some point in time in the TAF.

forecasted event has occurred over the past 30 years. In other words, it shows how often a particular combination of wind, weather, visibility and ceiling forecasted in a TAF has occurred.

For example a forecaster has a TAF line that reads 33007KT 2SM BR OVC003. The forecast period is for a given month/location during the early afternoon. The QC function may show that in the past 30 years, this

- ◆ Cig/Vis forecast for the next 1 to 6 hours.
- ◆ There are some limitations to this program. It does not predict good flying weather turning to bad flying weather. It does, however, predict bad weather getting worse or trending better.
- ◆ There were challenges in getting the TAF Climatology program to work, differences in

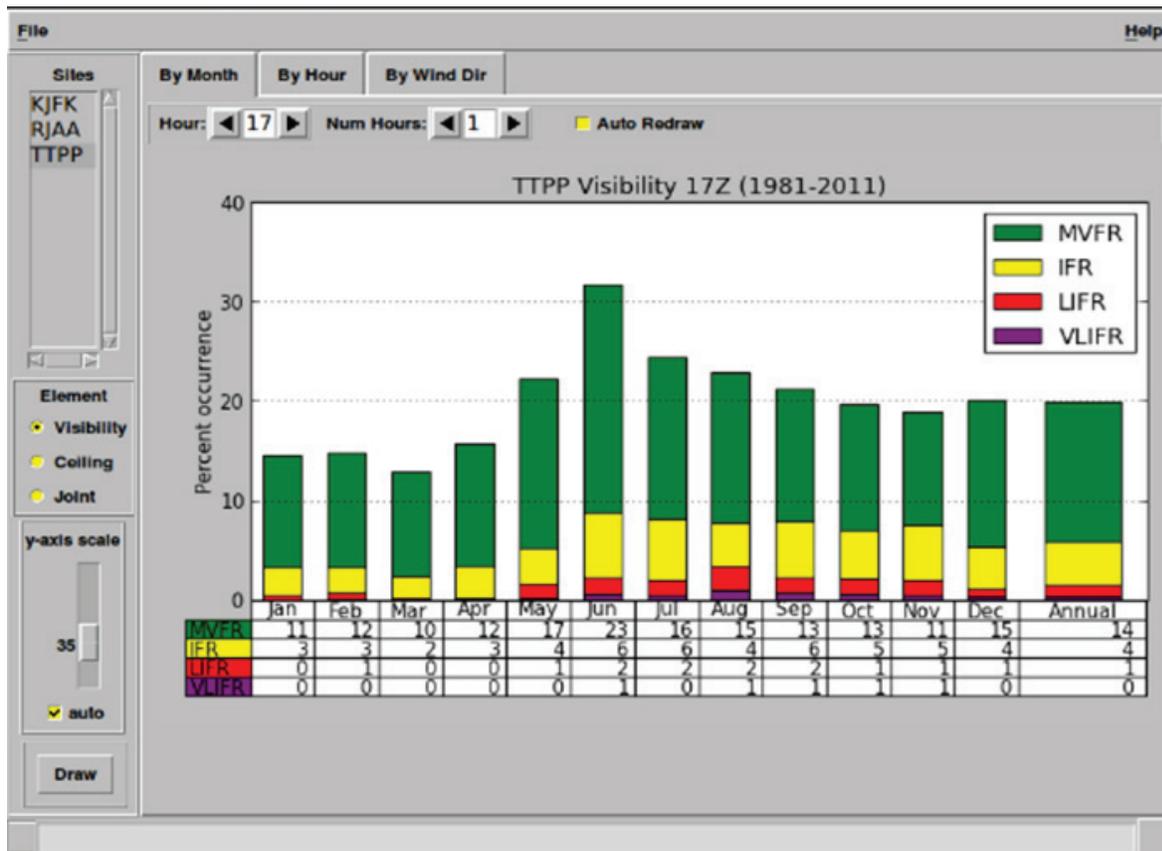


Figure 2. The probability of various ranges over the year of visibility based on flight categories for Piarco, Trinidad (TTPP) during the 1700 UTC hour.

combination occurred only twice. This statistic may incline forecasters to reconsider their forecast. Some final thoughts:

- ◆ Aviation climatology is a database of observations for a given TAF site; the database contains Ceiling, Visibility, Wind Speed and Wind Direction, and weather data for every day and hour for the past 30 years. Not all sites offer a 30 year record.
- ◆ Given a fairly normal climatological day, climatology is probably the best forecast tool for ceiling and visibility changes. For any given ceiling and visibility, the climatology tool will produce a

METAR for example. Despite these setbacks, the program is a valuable tool. The next challenge will be to make it operational. It is expected that it will be introduced to the regional forecast office by April and ready for distribution by the end of the year. →

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**Program Manager:** Mike Graf: michael.graf@noaa.gov  
**Managing Editor:** Melody Magnus  
**Editor:** Nancy Lee  
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