



International Civil Aviation Organization

**SEVENTEENTH MEETING OF THE METEOROLOGY
SUB-GROUP (MET SG/17) OF APANPIRG**

Bangkok, Thailand, 13 – 16 May 2013

Agenda Item 11: Other MET issues (e.g. QMS, Competency & Training)

SURVEY ON THE IMPLEMENTATION OF QMS IN THE APAC REGION

(Presented by the Secretariat)

SUMMARY

This paper presents results of a survey on the implementation of quality management systems (QMS) in the Asia/Pacific Region for meteorological services for international air navigation.

1. Introduction

1.1 The meeting is reminded of the standard in ICAO Annex 3 – *Meteorological Service for International Air Navigation*, Chapter 2, 2.2.3, which became applicable from 15 November 2012, which requires that each Contracting State shall ensure that the designated meteorological authority establishes and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to users.

1.2 The meeting will also recall that, in light of the Annex 3 quality management system standard, and the notably high proportion of States in the Asia/Pacific Region that were yet to implement quality systems for aeronautical meteorological service at the time of the Twenty-third Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/23), held in Bangkok, Thailand, from 10 to 14 September 2012, APANPIRG/23 adopted Conclusion 23/45 – *Implementation of Quality Management Systems for Meteorological Service Provision* – that called for ICAO, in coordination with the World Meteorological Organization (WMO), to consider urgent strategies to foster the implementation of quality management systems for meteorological service amongst States in the Asia/Pacific Region.

2. Discussion

2.1 To obtain an updated status of the Asia/Pacific regional establishment and implementation of quality management systems (QMS) for aeronautical meteorological information, the ICAO Regional Office distributed an email to Contracting States and other Territories in the

Asia/Pacific Region on 19 November 2012 containing a survey comprising 3 questions on QMS implementation as follows:

Q1) Whether or not a quality system is implemented as described in Annex 3, Chapter 2, 2.2.3;

Q2) In cases where the quality system for meteorological information may not be fully implemented, please estimate if possible when full implementation is expected to be achieved and please indicate the current stage of the quality system's establishment or implementation; and

Q3) Where applicable, please provide comment(s) relevant to each provision in Annex 3 (2.2.3 – 2.2.8) in order to provide more information concerning the level of establishment and implementation of the quality system in your State.

2.2 The email survey distributed to States is reproduced in **Appendix A** to this paper. In total, responses were received with information on 18 States/Territories. A table containing all responses to the survey is provided in the **Appendix B** to this paper.

2.3 The meeting will be pleased to note that responses to the survey show that 13 States/Territories considered that a quality system is implemented as described in Annex 3, Chapter 2, 2.2.3, namely in: Australia, Cook Islands, Fiji, Hong Kong (China), Japan, Macao (China), Malaysia, New Caledonia, New Zealand, Pakistan, Republic of Korea, Singapore and United States. All of those indicated their quality systems were relatively long-established and/or comprehensively met the relevant recommendations in Annex 3 with the exception of Macao (China) and Pakistan, which both indicated that their well-established quality systems would reach full implementation status in mid-2013.

2.4 A total of 5 States responded indicating that a quality system is not implemented as described in Annex 3, Chapter 2, 2.2.3, namely in: Brunei Darussalam, India, Maldives, Nauru and Viet Nam. Of those, Brunei Darussalam, India, Maldives, and Viet Nam all indicated that plans were underway to establish and implement a quality system with implementation expected by July 2014 in Brunei Darussalam and Maldives, July 2013 in India and during 2013 (with support from another State required) in Viet Nam. Nauru indicated that assistance and resources, in terms of training and equipment, were required to establish and implement a quality system as described in Annex 3, Chapter 2, 2.2.3.

2.5 The meeting will note that the ICAO Regional Office encouraged those States/Territories that responded with established/implemented quality systems to provide assistance, where possible and appropriate, to other States in the Region where necessary, and vice-versa for those States/Territories that responded requiring assistance to contact neighboring States/Territories with well-established and implemented quality systems.

2.6 In this respect the meeting may also wish to acknowledge the cooperative assistance reported by States including New Zealand, Australia and Fiji in the establishment and implementation of quality systems (for aeronautical meteorological information) in the Asia/Pacific Region, as well as the ongoing assistance in the implementation of QMS in the Asia/Pacific Region provided by the WMO.

3. Action by the Meeting

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) provide updates to the table in the Appendix B to this paper; and
- c) discuss any relevant matters as appropriate.

Appendix A

Email survey on status of implementation of QMS in Asia/Pacific (Distributed on 19 November 2012)

Dear Sir/Madam

You are kindly requested to advise this office on the status of implementation (in your State) of the quality system, pertaining to meteorological information to be supplied to users, required by provisions in ICAO Annex 3 – Meteorological Service for International Air Navigation, Chapter 2, 2.2.3, which became applicable from 15 November 2012 (Note: for your ease of reference, the relevant section from Chapter 2 of Annex 3 is copied below with the applicable paragraph highlighted).

In particular, can you please reply to this email indicating the following:

- Q1) Whether or not a quality system is implemented as described in Annex 3, Chapter 2, 2.2.3;
- Q2) In cases where the quality system for meteorological information may not be fully implemented, please estimate if possible when full implementation is expected to be achieved and please indicate the current stage of the quality system's establishment or implementation; and
- Q3) Where applicable, please provide comment(s) relevant to each provision in Annex 3 (below) in order to provide more information concerning the level of establishment and implementation of the quality system in your State.

Your assistance in this matter is highly anticipated and all relevant information you provide will be much appreciated, particularly with regards to the development of regional strategies to foster the implementation of quality management systems for meteorological information.

Kind regards
ICAO Asia & Pacific Office, Bangkok

Annex 3 to the Convention on International Civil Aviation – *Meteorological Service for International Air Navigation*

2.2 Supply, use and quality management of meteorological information

2.2.1 Close liaison shall be maintained between those concerned with the supply and those concerned with the use of meteorological information on matters which affect the provision of meteorological service for international air navigation.

2.2.2 Recommendation.— Until 14 November 2012, in order to meet the objective of meteorological service for international air navigation, the Contracting State should ensure that the designated meteorological authority referred to in 2.1.4 establishes and implements a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2.

2.2.3 From 15 November 2012, each Contracting State shall ensure that the designated meteorological authority referred to in 2.1.4 establishes and implements a properly organized quality system

comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users listed in 2.1.2.

2.2.4 Recommendation.— The quality system established in accordance with 2.2.2 should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards and should be certified by an approved organization.

Note.— The International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme. The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization. Guidance on the establishment and implementation of a quality system is given in the Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation (Doc 9873).

2.2.5 Recommendation.— The quality system should provide the users with assurance that the meteorological information supplied complies with the stated requirements in terms of the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts. When the quality system indicates that meteorological information to be supplied to the users does not comply with the stated requirements, and automatic error correction procedures are not appropriate, such information should not be supplied to the users unless it is validated with the originator.

Note.— Requirements concerning the geographical and spatial coverage, format and content, time and frequency of issuance and period of validity of meteorological information to be supplied to aeronautical users are given in Chapters 3, 4, 6, 7, 8, 9 and 10 and Appendices 2, 3, 5, 6, 7, 8 and 9 of this Annex and the relevant regional air navigation plans. Guidance concerning the accuracy of measurement and observation, and accuracy of forecasts is given in Attachments A and B, respectively, to this Annex.

2.2.6 Recommendation.— In regard to the exchange of meteorological information for operational purposes, the quality system should include verification and validation procedures and resources for monitoring adherence to the prescribed transmission schedules for individual messages and/or bulletins required to be exchanged, and the times of their filing for transmission. The quality system should be capable of detecting excessive transit times of messages and bulletins received.

Note.— Requirements concerning the exchange of operational meteorological information are given in Chapter 11 and Appendix 10 of this Annex.

2.2.7 Recommendation.— Demonstration of compliance of the quality system applied should be by audit. If nonconformity of the system is identified, action should be initiated to determine and correct the cause. All audit observations should be evidenced and properly documented.

2.2.8 The meteorological information supplied to the users listed in 2.1.2 shall be consistent with Human Factors principles and shall be in forms which require a minimum of interpretation by these users, as specified in the following chapters.

Note.— Guidance material on the application of Human Factors principles can be found in the Human Factors Training Manual (Doc 9683).

Appendix B

Responses to email survey on status of implementation of QMS in Asia/Pacific

State (Date)	Response	
Australia (14/01/2013)	Q1	Yes
	Q2	N/A
	Q3	<p>Quality management systems have been implemented for aviation meteorological services within Australia in accordance with all the relevant standards and recommended practices given in Annex 3, Chapter 2, Section 2.2.</p> <p>In addition to this the primary service provider, the Bureau of Meteorology, also has individual ISO 9001:2008 certification for the following aviation weather services areas: National Aviation Weather Services Program Office; Sydney Airport Meteorological Unit; Darwin Volcanic Ash Advisory Centre; and National Operations Centre Meteorological Unit.</p> <p>The Meteorological Authority also requires other services providers to have quality management systems in place that meets all of the relevant standards and recommended practices given in Annex 3, Chapter 2, Section 2.2, prior to those organisations being authorised to provide aviation meteorological services. Some of these providers also have ISO 9001:2008 certification.</p>
Brunei Darussalam (28/11/2012)	Q1	No
	Q2	<p>Brunei Darussalam has submitted a budget proposal to start the QMS process. It is anticipated that budget approval will only be obtained at the start of the next financial year, i.e. April 2013. In this regard we anticipate the full implementation of the QMS as described in Annex 3, Chapter 2, 2.2.3, will only be achieved by July 2014.</p>
	Q3	N/A
Cook Islands (19/11/2012)	Q1	Yes – as confirmed by NZ.
	Q2	N/A
	Q3	<p>As confirmed by NZ (who completed a consultancy for the Cook Islands Govt, which involved the implementation of a QMS and QA in the Cook Is Meteorological Service (CIMS). This included the training and appointment of a QA Manager in the CIMS and the revision/updating or rewriting of all the CIMS QMS and QA documents, operational practices and procedures. While the QA Manager had attended some QMS workshops in the Pacific over the past 2 or 3 years, and these were useful, he was not able to satisfactorily apply the knowledge gained in a practical way in the CIMS. The on-site training provided during the consultancy built on the workshop experiences and included hands-on internal auditing, which he is now applying very satisfactorily) – the Cook Islands now has a QMS in place, which is fully compliant with ICAO Annex 3, Chapter 2, and was implemented by the deadline specified in the Annex (15 November 2012).</p>

State (Date)	Response	
Fiji (28/11/2012)	Q1	Yes
	Q2	N/A
	Q3	2.2.4/2.2.6-7: Fiji Meteorological Service attained ISO certification of its aviation MET services in January 2012 and has been in full operations since.
Hong Kong, China (30/11/2012)	Q1	Yes
	Q2	N/A
	Q3	Please be advised that, in our case, an ISO 9001 based quality management system has been established for the provision of aviation meteorological services for international air navigation since 2002. Thus there is no difference in the level of implementation of the respective SARP (viz. Section 2.2.3 of Chapter of ICAO Annex 3).
India (27/11/2012)	Q1	Not implemented
	Q2	By 30 June 2013; Pilot project of getting ISO certification for MWO New Delhi is in the final stages. Process for hiring a consultant for the rest of the airport met offices is in the final stages. Meanwhile updating of basic documents is being carried out.
	Q3	2.2.3: Quality management system not fully implemented. Implementation of QMS for Aviation met offices which provide services to international operations will be completed by 30 June 2013. 2.2.4: It is also planned to obtain ISO 9000 series certification for the aviation met offices. 2.2.5-7: Will be taken into account while implementing the quality system.
Japan (28/12/2012)	Q1	Yes
	Q2	N/A
	Q3	2.2.2-2.2.3: JMA has implemented quality management system since April 2010. 2.2.4: JMA's quality system is in conformity with ISO 9001, but not certified by an approved organization. 2.2.5: Before provision of METAR, TAF etc., JMA uses automatic error correction system and operational staff checks whether the information complies with the requirements. 2.2.6: JMA manages transmission and reception time log of METAR, TAF etc in our communicating system, therefore JMA can detect excessive transit times of messages and bulletins received. 2.2.7: JMA conducts internal audit regularly and records its result. Also, If non-conformity of the system is identified, JMA takes necessary

State (Date)	Response	
		corrective action.
Macao, China (28/12/2012)	Q1	Yes – in so far as ISO 9001:2008 is certificated since 28th December, 2010 in our Airport Meteorological Office (AMO), and the quality system operated in the AMO for meteorological information is partly implemented as described in Annex 3, Chapter 2, 2.2.3
	Q2	It is applied to all scope of ISO 9001:2008 quality management system except article 7.3 and 7.6 of the requirements in the AMO. The full implementation of quality system is expected to be achieved in the first half year of 2013
	Q3	N/A
Malaysia (29/11/2012)	Q1	Yes
	Q2	N/A
	Q3	2.2.3: Aviation Meteorology is provided by the Malaysia Meteorological Department. 2.2.4/2.2.7: The main aviation meteorology unit based at the KL International Airport has implemented MS ISO 9001 since 2000, migrating to 9001: 2008 in April 2010; nine other stations migrated to MS ISO 9001:2008 in July 2010; the last station migrated to MS ISO 9001:2008 in August 2011.
Maldives (13/12/2012)	Q1	No. A quality system has not been implemented yet as described in Annex 3, Chapter 2, 2.2.3, in the Maldives.
	Q2	Full implementation is expected to be completed by 01st July 2014. So far Awareness Creation has been done within the Organization on QMS and started making customer focused policy. In 1st half of 2013, we plan to write quality manual (process and procedures) send questioners and invite customers to office to discuss. The second half we try to complete feedback from customers, do gap analysis and incorporate feedback. Hopefully, we can do consultation for internal audit in December 2013. The rest are expected to complete by May 2014.
	Q3	N/A
Nauru (27/11/2012)	Q1	No, it has not yet been implemented
	Q2	Nauru has no personnel whom is capable of implementing the standard
	Q3	Need personnel training and equipment to implement the standard
New Caledonia	Q1	Yes

State (Date)	Response	
(29/11/2012)	Q2	N/A
	Q3	2.2.4/2.2.6: The meteorological services for air navigation services have been certified ISO 9001 since December 2005
New Zealand (21/02/2013)	Q1	Yes
	Q2	N/A
	Q3	NZ implemented QMS (ISO 9001) way back in 1994, and now we are in the process of including SMS in the NZ Civil Aviation Rules (which have QMS as a foundation).
Pakistan (07/12/2013)	Q1	Yes – in so far as the Quality Management System (QMS) as described in Annex-3, Chapter2, 2.2.3 has been established and implemented with effect from 6th November, 2012 in the Main Meteorological Watch Offices at Jinnah International Airport Karachi (OPKC) and Allama Iqbal International Airport Lahore (OPLA). The ISO 9001:2008 compliant QMS has been endorsed by the United Kingdom Accreditation Service (UKAS).
	Q2	The establishment and implementation of QMS is in progress at the rest of the Aeronautical Meteorological Offices estimated to be completed by mid-2013 fully compliant with ISO 9001:2008 standards.
	Q3	2.2.1-4: Close liaison with Meteorological Service provider and the users is maintained. 2.2.5: The meteorological information supplied to the users complies with the stated requirements in terms of geographical and spatial coverage, format and contents, time and frequency of issuance and period of validity, as well as the accuracy of measurements, observations and forecasts. Meteorological information/reports which do not comply with the stated requirements are not passed on until it is verified, rectified, and validated as required by QMS. 2.2.6: For the exchange of meteorological information for operational purposes established QMS has included the verification and validation procedures and resources for monitoring adherence to the prescribed transmission schedules for individual messages and/or bulletins required to be exchanged, and the times of their filing for transmission. 2.2.7: For compliance of QMS 6-monthly internal audits have been planned along with annual surveillance audit to be carried out by the registrar. The nonconformities are identified followed up by the corrective actions. All audit observations are evidenced and properly documented. 2.2.8: The meteorological information supplied to the users are consistent with Human Factors principles and as such are in forms and format which require a minimum of interpretation by the users.
Republic of Korea (07/01/2013)	Q1	Yes – Korea Aviation Meteorological Agency (KAMA) has been established Quality Management System for Aviation Meteorological Service
	Q2	N/A

State (Date)	Response	
	Q3	2.2.2-3: KAMA has been established and implemented Quality management system since 2003. 2.2.4: The QMS of KAMA has been assessed ISO 9001:2008 2.2.5-6: KAMA provides aviation meteorological information in accordance with Annex 3 2.2.7: We do surveillance audit by the outer organization annually.
Singapore (27/11/2012)	Q1	Yes
	Q2	N/A
	Q3	2.2.3: The Meteorological Service Singapore (MSS) is the meteorological service provider for international air navigation in Singapore. 2.2.4: MSS has fully implemented the ISO 9001 Quality Assurance System since 2001. 2.2.7: A re-certification is conducted every two years, and MSS was recently re-certified on 23 October 2012.
United States (29/11/2012)	Q1	Yes – a quality system has been implemented in the United States. The FAA, as the designated meteorological (MET) Authority for the U.S., ensures that U.S.-provided aviation weather information conforms to the requirements of the International Civil Aviation Organization (ICAO), Annex 3 for global aviation operations. The National Weather Service (NWS) is the MET services provider to the FAA. By interagency agreement, FAA and NWS cooperate in providing aviation meteorological services to the aviation public. In following ICAO ANNEX 3 recommendations regarding the need for a QMS to be applied to Aviation Meteorological Services, an ISO 9001-2008 based QMS was established for the verification of operational aviation weather products. The FAA began the QMS using a product by product based approach. The first product under QMS was the Terminal Aerodrome Forecasts (TAFs) disseminated from 29 Core airport locations. Now, the NWS has begun the establishment of QMS processes at their aviation weather production facilities – starting with the Aviation Weather Center (AWC) located in Kansas City, Missouri. According to their QMS manager: “A quality system is implemented as described in Annex 3, Chapter 2, 2,2,3 for the AWC including Washington Area Forecast Center (WAFC) products and services.” (Please see attached AWC QMS Manual) As MET authority, the FAA’s role will consist of systematic oversight of this and other aviation weather production facilities’ QMS processes, products and procedures.
	Q2	The QMS the FAA has in place for TAFs is fully implemented. Additionally, the AWC quality system is fully implemented. The FAA is currently producing SOPS to effect oversight of this facility and plans to begin this oversight over the next 6 months.
	Q3	2.2.1: The QMS developed by the FAA and AWC maintain close liaisons with end users. The feedback mechanisms available include: on-line questionnaires/surveys, e-mail, and telephone. User feedback is evaluated by the QMS Coordinators and reported to QMS management for decisions/actions resulting from this feedback. According to the AWC’s Quality Manual, the purpose of their customer input and feedback process is: “To identify the method used by AWC for customer communication regarding changes to customer requirements, both driven by the customer and AWC. This process also defines methods for obtaining customer feedback regarding the products and services provided by AWC, documenting this feedback, and reviewing it in order to determine the appropriate actions which are required, and for determining the level of customer satisfaction. This process also defines the controls and related responsibilities and authorities for dealing with nonconforming product

State (Date)	Response	
		<p>(ISO 9001:2008, §8.3).”</p> <p>2.2.2: The FAA has established and implemented a properly organized quality system. The FAA and AWC quality systems are comprised of the necessary QMS supporting documents, processes and procedures.</p> <p>2.2.3: From November 15 2012, the FAA will ensure the continued establishment of properly organized procedures, processes and resources necessary to provide for the quality management of meteorological information.</p> <p>2.2.4: The QMS is in conformance with the ISO-9000 series of standards framework and was formulated using ISO 9000 guidance.</p> <p>2.2.5-6: The NWS’s Aviation Forecast Preparation System (AvnFPS) is used as a quality control tool and provides this monitoring component. The AvnFPS website is located at: http://www.nws.noaa.gov/mdl/pgb/AvnFPS/OB8.3/AvnFPSOB8.3.html and is used for monitoring TAFs and other meteorological products such as METARs.</p> <p>According to the AWC Quality Manual, the AWC process is as follows: (please refer to the AWC Quality Manual attached for more information)</p> <p>“Forecasters and Lead Forecasters: Evaluate data and create products according to Station Duty Manual instructions; transmit products according to Station Duty Manual schedule; update forecasts and cancel warnings as needed; monitor transmission reports; resolve product and delivery issues; respond to customer/user communication; record issues and response/resolution in Shift Log (ISO 9001:2008, §7.5.1).</p> <p>Forecasts that do not meet all requirements are corrected upon identification of the nonconformance and a corrected forecast is issued, coding the non-routine transmission in the Shift Log as a correction (ISO 9001:2008, §8.3). The Domestic and International Branch Chiefs will initiate, maintain, and record corrected and late forecast products and investigate possible root causes for the non-conformity (ISO 9001:2008, §7.5.2). Identification traceability and preservation of products throughout the product creation and delivery process are maintained through the Information Technology and Configuration Management Process. Records of delivered products are maintained internally for a period of 30 days (ISO 9001:2008, §7.5.3).”</p> <p>2.2.7: The AWC is in the process of conducting internal audits. Results from the internal audits are documented. The FAA, as QMS overseer, has visibility into audit findings. Findings are then reported to QMS management.</p> <p>The FAA is in the process of establishing an audit plan and procedures for TAFs. A TAF internal audit is scheduled for late 2013.</p> <p>2.2.8: Based on the expertise of Subject Matter Experts and user feedback, meteorological information provided to users is consistent with Human Factors principles.</p>
Viet Nam (21/11/2012)	Q1	Not fully implemented

State (Date)	Response	
	Q2	CAAV has 4 aviation MET [service] providers: MWO Gialam, MO Noibai, MO Danang and MO Tansonnhat. MO Noibai use ISO since 2006 but QMS certificate common for airport, not separate for MET services. MO Tansonnhat is planning to implement QMS (step 1). CAAV has planned to implement competency assessment system for aeronautical meteorological personnel next year (2013), as part of QMS. Viet Nam is planning to implement QMS in 2013 and needs support from a country with more experience in QMS
	Q3	N/A