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North American, Central American and Caribbean Office (NACC)
Seventh Central American Air Navigation Experts Working Group Meeting (CA/ANE/WG/7)
Ninth Central Caribbean Working Group Meeting (C/CAR/WG/9)
ICAO NACC Regional Office, Mexico City, Mexico, 5 to 9 March 2012

Agenda Item 3: Air Navigation Matters
3.3 Specific Developments in Air Navigation
- **AIM**

QMS/SMS HARMONIZATION

(Presented by Secretariat)

SUMMARY

QMS and SMS should work closely together to achieve organization's goals of aviation safety. Both systems need close harmonization, but it is necessary to clarify how to harmonize each other. It is important to minimise conflicts and manage overlaps between them. It is noted that SMS and QMS should be complementary.

References:
- ICAO Annex 15 –Aeronautical Information Services
- ICAO Annex 11 –Air Traffic Services
- ICAO Doc. 9859 - *Safety Management Manual (SMM)*

Strategic Objectives	*This working paper is related to Strategic Objectives A and C.*

1. Introduction

1.1 According to Annex 15, data quality is defined as a degree or level of confidence that the data provided meets the requirements of the data user in terms of accuracy, resolution and integrity. Ultimately, the quality of aeronautical information depends on its intended use and needs to be determined from this perspective.

1.2 A key enabler of the global air traffic management operational concept is access to common and Integra-table information, which is the basis for shared situational awareness, which, in turn, is the prerequisite for making operational decisions collaboratively. As can be seen, by taking the short-term view of creating a "cheap" source of information, we pay the price at the ATM system level. In either case, quality always comes with cost and the higher the quality of the information, the higher the cost involved in obtaining it.

1.3 In this regard, it is a fact that the quality of information becomes more transparent when integrating different sources of information. For example, the production of digital aeronautical charts saw the integration of several electronic databases, including terrain database, obstacle database, aeronautical information database, airport mapping database, cultural database, etc. In this case, it becomes obvious very quickly, if a piece of information from one database does not reconcile with another piece of information from another database.

1.4 The opportunity of integrating and graphically displaying the information throughout all information management processes (see figure 1.), and the transparency that this creates, will greatly help to reduce discrepancies and hence improve overall quality of aeronautical information – at no additional cost. This, together with the feedback mechanism of highly networked complex systems, is an important aspect of self-regulating adaptive systems.

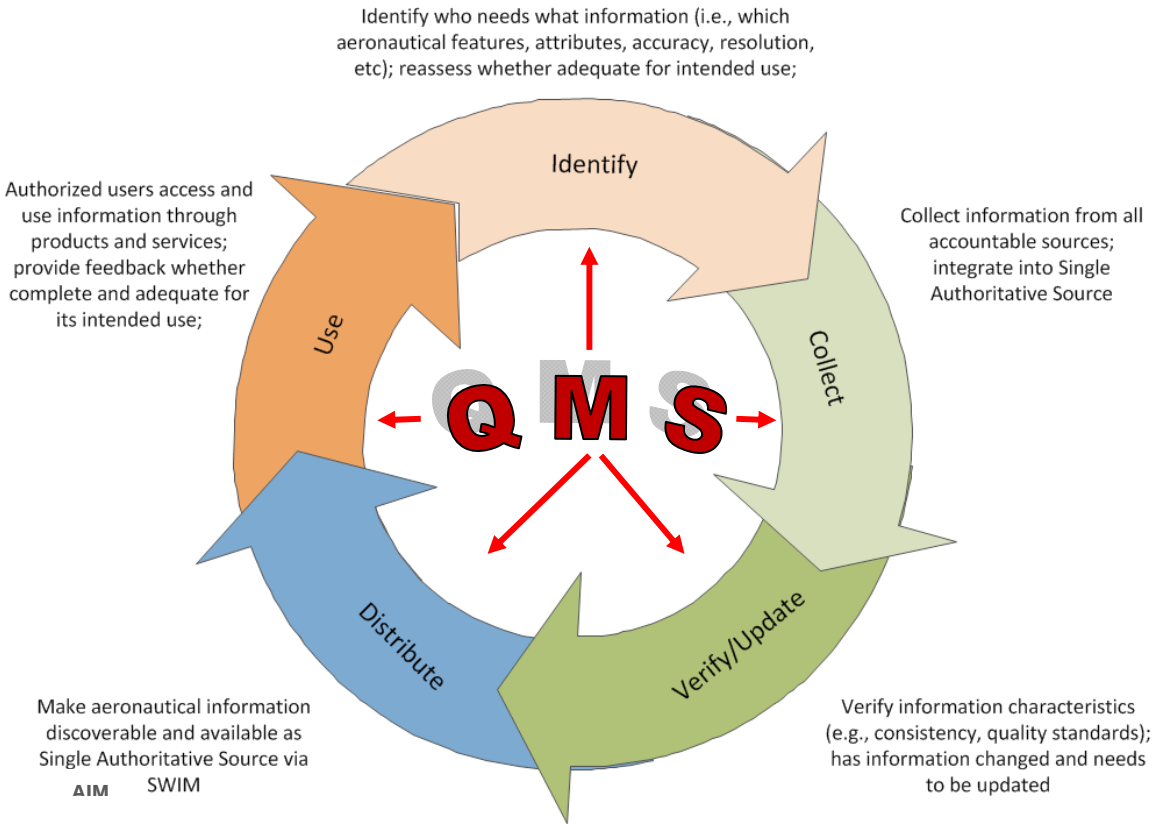

Figure 1.

1.5 Annex 11 provides the following SMS definition (also see guidance on defining safety performance is contained in the Safety Management Manual (SMM-Doc 9859)):

> "***Safety management system*** - A systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures"

1.6 States shall require, as part of their State safety programme, that an air traffic services provider implement a safety management system acceptable to the State that, as a minimum:

a) identifies safety hazards;
b) ensures the implementation of remedial action necessary to maintain agreed safety performance;
c) provides for continuous monitoring and regular assessment of the safety performance; and
d) aims at a continuous improvement of the overall performance of the safety management system

The main objectives of SMS and QMS are as follows:

- SMS: Ensure the safety of staff, customers or the public by ensuring all safety risks have been identified assessed and satisfactorily mitigated.

- QMS: Ensure an organization functions efficiently, and delivers its business goals including meeting customer requirements.

1.7 **SMS** focuses on the safety, human and organizational aspects of an organization. **QMS** focuses on the products/services of an organization and predominately takes into account the satisfaction of the customer/end user.

2. Discussion

2.1 QMS is based on process approach. One of methods of integration QMS and SMS is to add relative processes concerning risk management in the current QMS processes. Consequently this will lead to “assure safety” and achieve the objectives of SMS.

2.2 QMS and SMS should be complementary, both systems need close harmonization, but according several worldwide State practices it is not clear how to harmonize each other. ICAO Headquarters is working in Amendment 37 to Annex 15 (that could include relationship QMS and SMS), and ICAO QMS Manual that could support States to clarify how to harmonize QMS and SMS.

3. Suggested action.

3.1 The Meeting is invited to:

a) Take note of the information presented in this Working Paper;

b) consider the information on inventory of current practices presented in the Appendix to this working paper; and

c) report the ICAO NACC Regional Office progress in the QMS implementation QMS no later than 31st. August of 2012.

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APPENDIX

INVENTORY OF CURRENT PRACTICES	
State or group of States	**Practice**
Japan	Aeronautical Information Service Centre (AISC) in Japan implemented SMS in APR 2008 by order of JCAB. When establishing SMS manual of AISC, we found overlaps in management responsibility, policy/objectives, safety plan, internal audit, resource management, improvement, and documentation. In addition we found differences in regard to identifying safety hazards and risk management. Considering that quality of products directly might affect the safety of aviation, we assumed that an identifying safety hazards and risk management were the same as that an identifying causes of nonconformity and the processes of corrective/preventive action in QMS. Consequently current SMS manual in AISC contains many references to the provision of QMS manual in several items and there is no provisions about "safety assessment" For example, safety policy and objectives are provided as "regarded as quality policy and objectives", and internal safety audit is provided as "regarded as internal audit in the QMS manual" and so on
Australia	Australia has been developing Civil Aviation Safety Regulation (CASR) Part 175 regulating the provision of AIS. A project has been underway since 2008 and currently instructions have been submitted to the Attorney General's Department for legal drafting. Much consideration was given to the relative merits of an SMS over a QMS and vice versa during development of Part 175. Australia's safety philosophy is based on risk management and therefore an SMS is the basis of the safety framework for both the CASA (regulator) and Airservices Australia (service provider). The SMS is the overarching system by which an organisation manages safety and describes the processes to identify risk and mitigate those factors. A QMS is but one means of demonstrating that quality procedures exist for the way data is processed. A QMS can be an integral part of an SMS. A QMS on its own though cannot guarantee that an organisation has a system in place to identify and eliminate safety risks involved in the collection, processing and publication of aeronautical data. In order to ensure that the QMS is relevant to the processing of aeronautical data the QMS provisions in Part 175 have been made more relevant so as to include the quality management requirements contained in RTCA/DO-200A/EUROCAE ED-76. A project is underway in CASA to standardise and update all of the SMS provisions in the CASRs to align them with the ICAO requirements. Part 175 has been drafted to incorporate the ICAO Framework for Safety Management Systems (SMS).
Europe	Over the last year in Europe work has been performed on looking closer to the issue of SMS applicability to AIS/AIM. The reason was that the specificities of European regulation (SES, Common Requirements, ADQ) impact in different ways the applicability of SMS depending on the set-up of AIM within the ANSP -a- under the managerial control of the ATS provider or –b- as an external service to the ATS provider. Recommendations to date are to include text in the QMS procedures to meet the safety management objectives. These safety objectives are defined as: • to minimise the contribution to the risk of an aircraft accident arising from data errors as far as reasonably practicable • to promote awareness of safety around the organisation by sharing lessons arising from safety activities and by involving all staff to propose solutions to identified safety issues and improvements to assist the effectiveness and efficiency of the processes, • to ensure that a function is identified within the organization being responsible for development and maintenance of the safety management objectives • to ensure that records are kept and monitoring is carried out to provide safety assurance of their activities • to ensure improvements are recommended, where needed, to provide assurance of the safety of activities. Further requirements are that: The achievement of the safety management objectives shall be afforded the highest priority over commercial, operational, environmental or social pressures. System changes or introduction of new systems are to be preceded by a safety assessment including hazard identification, risk assessment and mitigation. During that safety assessment, the following requirements shall be considered as safety requirements and shall be taken into consideration, as a minimum.

	• the public availability of the most current update cycles applicable to AIP amendments and AIP supplements; • data set specifications; • aeronautical data exchange formats; • data quality requirements. Further work in Europe has been carried out to better understand and identify governance principles for managing Managements Systems (quality, safety, environment, security). It also looked at Risk Management. The main conclusion for the moment is that there is no best approach but that a conscious management decision per organisation should be taken on the optimal implementation.
China	Several regional ATMBs have established quality management systems and acquired certification before 2009. In order to harmonize the implementation of QMS in the ATM system, the Air Traffic Management Bureau (ATMB) of CAAC issued two documents to provide guidance for development and implementation of QMS in the whole ATM system in 2009: • QMS Development Requirements for ATM Operation; and • QMS Implementation Guidelines for ATM Operation. At the same time, ATMB of CAAC developed a strategic plan for the integration of QMS and SMS, and has started drawing up the outline for the QSMS(Quality and Safety Management System) Manual and the guidance materials for merging QMS and SMS into an Operation Manual. The aforementioned documents will be released in late 2010 and implemented in 2011. SMS is complementary to QMS. QMS controls the process of operation and management by the establishment of operational procedures and the specification of their key points so as to achieve quality objectives. SMS plays a complementary role through identifying, preventing and controlling the source of hazards in the current quality management system. The source of hazards usually means the shortcomings of the current quality management process and any possible factors which may interfere with the existing quality management in achieving its objectives. SMS, acting as the management system for the "preventive actions" in QMS, is a management mechanism which provides concrete measures to ensure the effective implementation for the "preventive actions" in QMS. Risk Management is the step of ***reviewing*** for some QMS processes. SMS is a mechanism to ensure all QMS processes are carried out in accordance with the established procedures. The QSMS of ATM, by the merging of policies, objectives, internal audit and management review in SMS together with those in QMS and the corresponding combination of processes in QMS with those in SMS, such as the internal communication with safety information management, process monitoring and measurement with safety performance management, product monitoring and measurement with the continuous monitoring of risk, etc., could reduce the overlap and achieve, more efficiently, the objectives of QMS and SMS. QSMS developments in the Xinjiang regional ATMB and Northeast regional ATMB(on trail) show that QMS and SMS have no conflicts and overlaps. Although QMS and SMS have the same *items for the same process*, the contents of the items are different. As a result, many items can be implemented through adding complementary contents to the same process, i.e. integrated implementation, which could simultaneously and more efficiently achieve the requirements and objectives of QMS and SMS.