

C A R I B B E A N

M E T E O R O L O G I C A L

O R G A N I Z A T I O N

**ANNUAL MEETING OF DIRECTORS OF METEOROLOGICAL SERVICES Doc. 5**

St. James, BARBADOS, 16th NOVEMBER 2013

**OPERATIONAL MATTERS**

(Submitted by the Coordinating Director)

## INTRODUCTION

1. Several matters that are particularly related to the operations at National Meteorological Services (NMSs) are raised or addressed in this document. Some of the matters may be of immediate concern or require immediate action on the part of the NMSs, while others are raised to create awareness of issues upcoming in the near future.

## A. WMO Annual Global Monitoring

2. The WMO Manual on the Global Telecommunication System (GTS), in its Attachment 1‑5, refers to a plan for monitoring the operation of the World Weather Watch (WWW). This plan includes provisions for the internationally coordinated monitoring of the operation of the WWW on a non-real-time basis.

3. The Annual Global Monitoring (AGM) is carried out in October each year. The WWW centres are invited to monitor SYNOP, TEMP, PILOT, and CLIMAT reports from the *Regional Basic Synoptic Network* (RBSN) stations in accordance with the responsibility taken for the exchange of data on the GTS:

* The **National Meteorological Centres** (NMCs) should monitor data from their own territory;
* **Regional Telecommunication Hubs** (RTHs) should at least monitor data from their associated NMCs, and possibly from their own Region;
* **World Meteorological Centres**(WMCs) and RTHs located on the Main Trunk Network (MTN) should monitor the complete global data set.

4. The results of the AGM make it possible to compare the availability of the reports received from RBSN stations at the NMC responsible for inserting the data in the Regional Meteorological Telecommunication Network (RMTN), at the associated RTH and at MTN centres. The differences in the availability of data between centres are generally due to the following main reasons: (i) differences of requirements in the reception of data, (ii) shortcomings in the relay of the data on the GTS, (iii) data not monitored due to differences in the implementation of the monitoring procedures at centres.

5. There are ten (10) Members States of the Caribbean Meteorological Organization whose National Meteorological Service (NMS) are RBSN stations. These are Antigua and Barbuda, Barbados, Belize, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Saint Lucia and Trinidad and Tobago.

6. The Headquarters Unit reminded the RBSN stations of the AGM in August of this year and offered assistance in reporting the results to WMO. As at 30 October 2013, only Dominica availed itself of the assistance of the Headquarters Unit. It is not currently known how many actually participated in the AGM.

**B. Competency Standards for Aeronautical Forecasters and Observers**

7. The Meeting will recall that at the 2010 Meeting of the Directors of Meteorological Services (Cayman Islands, 20 November 2010) discussion ensued on the need for the development of a competence assessment toolkit to assist Meteorological Services to ensure that their personnel continue to qualify as a WMO Meteorologist and a WMO Meteorological Technician. The toolkit is based on a three-tier competency as follows:

1. **Top Level**: - WMO 49 Vol. 1 Standards;
2. **Second level**: - Describe and elaborate on the standards e.g.

* For each top-level competence, there is a:
* Competence description
* Performance criteria

1. **National Competencies**: - Use the second level to suit the national situation.

8. The WMO Commission for Aeronautical Meteorology (CAeM) Task Team on the Competency Assessment Toolkit prepared the first version of the toolkit. Included in the assessment toolkit were the top level and second level competencies, which the Meteorological Services had to adapt to its requirements. To assist, a competency workshop was held in Barbados from 18 to 22 July 2012, to provide Meteorological Services with the ability to:

1. Adapt the second level competencies to national requirements;
2. Design the assessment process;
3. Commence assessment process;
4. Complete first assessment process.

9. The Caribbean Institute for Meteorology and Hydrology and CAeM sent emails to the Meteorological Services during 2013, to ascertain their progress in adapting the second level competencies and commencing the assessment process.

10. The deadline for implementation of Aeronautical Meteorological Personnel (AMP) Competency Standards is 1 December 2013 and Meteorological Services that are having difficulty to have personnel assessed and found competent should consider mitigation options. Meteorological Services must also ensure that the assessors who are to be used in the assessment must also be competent.

11. A clear plan is necessary having the following basic structure:

1. Establish a prioritized list of personnel that requires assessment;
2. Assemble a team of assessors;
3. Develop an initial assessment methodology based on desk-top evaluations of quizzes, portfolios and existing evaluations including verification of products;
4. Develop a prioritized plan for individual, in-depth assessments of personnel based on the results of the desk-top evaluations;
5. Estimate the time and resources needed for the completion of these steps;
6. Seek cooperation arrangements with other Services, in particular where numbers of staff and resources are very limited.

12. WMO and the Commission for Aeronautical Meteorology developed a seven step process toward conformance which is provided in **ANNEX I**. It is important to note that the second bullet in Step 2 states:

*This person (or team) is then responsible for the implementation actions but the Director / CEO is accountable for ensuring that it is carried out*

**C Lightning Detection Systems**

13. A lightning detector is a device that detects lightning produced by thunderstorms. There are three primary types of detectors: *ground-based* systems using multiple antennas, *mobile systems* using a direction and a sense antenna in the same location (often aboard an aircraft), and *space-based systems*.

14. Each system used for lightning detection has its own limitations. These include:

* A ground-based lightning network must be able to detect a strike with at least three antennas to locate it with an acceptable margin of error. This often leads to the rejection of cloud-to-cloud lightning, as one antenna might detect the position of the strike on the starting cloud and the other antenna the receiving one. As a result, ground-based networks have a tendency to underestimate the number of strikes, especially at the beginning of storms where cloud-to-cloud lightning is prevalent.
* Since they use attenuation rather than triangulation, mobile detectors sometimes mistakenly indicate a weak lightning strike nearby as a strong one further away, or vice-versa.
* Space-based lightning networks suffer from neither of these limitations, but the information provided by them is often several minutes old by the time it is widely available, making it of limited use for real-time applications such as air navigation.

15. A lightning discharge generates both a radio frequency (RF) electromagnetic signal – commonly experienced as “static” on an AM radio – and very short duration light pulses, comprising the visible “flash”. A lightning detector that works by sensing just one of these signals may misinterpret signals coming from sources other than lightning, giving a false alarm. Specifically, RF-based detectors may misinterpret RF noise, also known as RF Interference or RFI. However, since RF signals and light pulses rarely occur simultaneously except when produced by lightning, RF sensors and light pulse sensors can usefully be connected in a “coincidence circuit”, which requires both kinds of signals simultaneously in order to produce an output.

16. If such a system is pointed toward a cloud and lightning occurs in that cloud, both signals will be received; the coincidence circuit will produce an output; and the user can be sure the cause was lightning. When a lightning discharge occurs within a cloud at night, the entire cloud appears to illuminate. In daylight these intra-cloud flashes are rarely visible to the human eye; nevertheless, optical sensors can detect them. This application led to development of the dual signal portable lightning detector which utilizes light flashes as well as the “sferics” signals detected by previous devices.

17. In the past, lightning detectors, both inexpensive portable ones for use on the ground and expensive aircraft systems, detected low frequency radiation because at low frequencies the signals generated by cloud-to-ground (CG) lightning are stronger (have higher amplitude) and thus are easier to detect. However, RF noise is also stronger at low frequencies. To minimize RF noise reception, low-frequency sensors are operated at low sensitivity (signal reception threshold) and thus do not detect less intense lightning signals.

18. The addition of an optical sensor and coincidence circuit not only eliminates false alarms caused by RF noise; it also allows the RF sensor to be operated at higher sensitivity and to sense higher frequencies characteristic of IC lightning and enable the weaker high frequency components of IC signals and more distant flashes to be detected.

19 Detection of IC flashes is important because they typically occur from 5 to 30 minutes before CG flashes and so can provide earlier warning of developing thunderstorms, greatly enhancing the effectiveness of the detector in personal-safety and storm-spotting applications compared to a CG-only detector. Increased sensitivity also provides warning of already-developed storms which are more distant but may be moving toward the user.

The Vaisala Global Lightning Dataset 360 (GLD360) which was introduced to the 2012 Meeting of Directors of Meteorological Services (Saint Lucia, 14 November 2012) and to which Forecast Offices have access, is a worldwide sensor network. The network sensors operate in the Very Low Frequency (VLF) band and approximately 70% cloud to ground flash detection with a median stroke location accuracy of 2 to 5 km.

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October 2013

**Competencies**

**Seven steps towards conformance**

**Clarification: Competencies vs Qualifications**

Qualifications and competencies are different. In many countries, qualifications acquired in formal education and training link to staff categories and remuneration scales. Competency simply means the ability to do the job to the required/defined performance level. The required competencies are closely related to job descriptions and assigned duties for operational positions.

By 1 December 2013, all aeronautical meteorological air navigation service providers, including those from the private sector, must be able to demonstrate that their Aeronautical Meteorological Forecasters (AMF) and Aeronautical Meteorological Observers (AMO), for their designated area and airspace of responsibility, can do the job to a performance level that can be mapped through to the top level Aeronautical Meteorological Personnel (AMP) competency Standards.

ICAO will be looking for:

1. The local adaptation of the top level AMP competencies specified by WMO and how these map through to the top level competency Standards;
2. Detailed lists of which AMF and AMO are assigned to which tasks, and for AMF, what their underpinning meteorological qualifications are, and records of when and where they were last assessed for competency and by what methods;
3. What remedial actions are being taken to remedy any deficiencies identified;
4. Sound reasoning for the competency assessment methods chosen.

The WMO Commission for Aeronautical Meteorology, in close cooperation with the AEM Division and the ETR Department, is recommending the following **seven steps** as best practice to achieve conformance:

1. Access the top level WMO competency Standard statements;
2. Designate a team and leader to lead the competency assessment processes;
3. Map the top level Competency Standards to the national requirements and have them agreed by the Meteorological Authority of the country;
4. Develop and document the assessment process;
5. Trial the assessment process;
6. Undertake the assessment process and document the results;
7. Review and document the process.

**Step 1**

* Access the regulatory material as decided by Cg-XVI on aeronautical meteorological personnel competency standards from:

<http://library.wmo.int/opac/index.php?lvl=etagere_see&id=39>, or <http://www.caem.wmo.int/moodle>

(Click on Regulatory and Reference Material and then click "login as guest").

**Step 2**

* Designate a person or small team to develop and run the aeronautical meteorological personnel competency assessment programme;
* This person (or team) is then responsible for the implementation actions but the Director / CEO is accountable for ensuring that it is carried out.

**Step 3**

* Map the top level Competency Standards to the national requirements and have them agreed by the Meteorological Authority of the country. These needs will depend on the typical climatology and weather hazards and should be defined in consultation with users.

**Step 4**

* Review and develop options for undertaking and documenting the competency assessment processes – seek an independent review as per the best practice ‘twinning’ concept.  Note that a mix of approaches may be used, but their choice should be reasoned, documented and stable;
* Create teams of assessors building primarily on individuals that have participated in WMO assessment training workshops;
* Establish a prioritized list of personnel that requires assessment; (e.g. ensure that shift leaders/supervisors have first priority);
* Develop, as a first step, an initial assessment methodology based on desk-top evaluations of quizzes, portfolios and existing evaluations including individualized verification of products for all relevant personnel;
* Develop a prioritized plan for individual, in-depth assessments of personnel based on the results of the desk-top evaluations;
* Develop an estimate of the time and resources needed for the completion of these steps;
* Inform the Quality Management Team of the NMHS and the WMO Secretariat of this estimate;
* Determine a realistic frequency of the assessments (e.g. major assessments every three years with annual “spot checks”).

**Step 5**

* Trial assessment process to check details on a limited number of staff;
* Collect and analyse outcomes to build up a national training needs data base;
* Establish a realistic assessment plan and estimate of when first round of assessments can be completed;
* Inform the Quality Management Team of the NMHS and the WMO Secretariat of this estimate;
* Where national resources are scarce, seek cooperation arrangements with other Members of the region.

**Step 6**

* Carry out assessment plan, document and analyse results as a basis for identifying and taking any remedial actions as required

**Step 7**

* Undertake a management review of the documentation and processes to determine lessons learnt;
* Apply the lessons learnt;
* Start the process again building on the lessons learnt.

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