



International Civil Aviation Organization

**MIDANPIRG Meteorology Sub-Group
Third Meeting (MET SG/3)**

(Cairo, Egypt 19 to 21 December 2011)

Agenda Item 4: Status of Implementation of the Meteorological Services in the MID Region

4.1 Review implementation of WAFS and SADIS

SUMMARY OF RECENT AND FORTHCOMING DEVELOPMENTS TO THE WAFS

(Presented by WAFS London)

SUMMARY

This paper presents WAFS developments since the second meeting of the MID MET Sub Group December 2009. Some of these developments have had a direct impact on end users. A number of important developments are planned to the WAFS in future years and these are highlighted in this paper for the consideration of the group.

REFERENCES

WAFSOPSG/6 Report
WAFSOPSG/6 Follow-up Table

1. INTRODUCTION

1.1 This paper presents developments to the WAFS since the second meeting of the MID MET Sub Group in December 2009. For more details of the activities of the WAFS, users may wish to review information available on the ICAO WAFS Operations Group website at URL: <http://www2.icao.int/en/anb/met/wafsopsg/Pages/default.aspx>.

2. RECENT DEVELOPMENTS

Introduction of WAFS upper-air data in the GRIB 2 code form

2.1 WAFSOPSG/5¹ endorsed the implementation of the WAFS upper-air forecasts for the 'standard' parameters in the GRIB2 code form during 2010. Accordingly, the WAFCs made GRIB2 data available on their Internet based services (SADIS FTP/Secure SADIS FTP and WIFS) in March 2010 and over their satellite services (SADIS 2G, ISCS G2) in November 2010. The forecasts for CB cloud, icing and turbulence continue to be developed by the WAFCs and are available via Secure SADIS FTP and WIFS services only in folders marked 'TRIAL_FORECASTS'. It should be noted that the CB cloud, icing and turbulence forecasts in GRIB1 form were withdrawn in November 2010.

¹ 16th-18th September 2009, Paris, France

2.2 A brief summary of the benefits of GRIB2 WAFS upper-air forecasts is provided in **Appendix A** to this paper.

***Suggested action:** Note this information. Users should contact the suppliers of their visualization systems in order to confirm that their systems can visualize GRIB2 data from both WAFCs.*

WAFS Quality Management System Certification

2.3 At WAFSOPSG/6², the WAFCs updated the group with the status of Quality Management System (QMS) certification in relation to their respective operations.

2.4 WAFSOPSG London provided a Working Paper with a summary of its QMS processes and identified that it has independently audited ISO9001 certification.

2.5 WAFSOPSG Washington provided a working paper informing WAFSOPSG of its intent to establish an ISO9001 QMS process.

***Suggested action:** Note this information.*

WAFSOPSG text administrative messages for SIGWX corrections

2.6 On 31 December 2010 the WAFCs implemented a process whereby simple, text administrative message would be transmitted in the event that errors were identified in the SIGWX forecasts. The messages are identified by WMO Bulletin AHLs of FXUK65 EGRR and FXUS65 KKCI for WAFSOPSG London and WAFSOPSG Washington respectively.

2.7 Some users have requested clarification on what to do on receipt of such messages, and the WAFSOPSG Secretary, in coordination with IATA, IFALPA and the WAFSOPSG Provider States will report back to the WAFSOPSG/7 meeting on this matter.

***Suggested action:** Note this information, and monitor WAFSOPSG web site for future updates.*

Implementation of enhanced WAFSOPSG performance indicators

2.8 WAFSOPSG/6 was pleased to note that the following enhancements to the WAFSOPSG performance indicators had been implemented:

- a) mean and root-mean-square (RMS) vector wind error; mean and RMS temperature error;
- b) error against model analysis;
- c) at eleven flight levels: 050, 100, 180, 240, 300, 320, 340, 360, 390, 450 and 530; and
- d) for the 00 UTC and 12 UTC model runs combined

See section 0 regarding a study of the feasibility of the provision of additional performance indicators in the future.

***Suggested action:** Note this information.*

² 21st-24th March 2011, Dakar, Senegal

W AFC backup tests

2.9 The W AFC Provider States have continued to test their SIGWX backup procedures in the event that one W AFC is unable to produce SIGWX forecasts in the BUFR-code and PNG-chart format. Routine backup tests are conducted quarterly, with the results posted on the WAFSOPSG website at URL: <http://www2.icao.int/en/anb/met/wafsopsg/Reference%20Documents/Forms/AllItems.aspx?RootFolder=%2fen%2fanb%2fmet%2fwafsopsg%2fReference%20Documents%2fOperational%20Information&FolderCTID=&View=%7bD043F471%2dF02F%2d4D7D%2dB36A%2d775315BF76FD%7d>. Tests over the last 12 months have been largely successful, and transparent for the overwhelming majority of WAFS users. See also 0 with regard to the WAFCs attempts to increase transparency of backups.

2.10 Forthcoming backup tests are outlined in the same document, and a description of the W AFC Backup procedures is also available from the web page given. Notification of W AFC backup tests is promulgated on the SADIS broadcasts in advance, by way of administrative messages.

Suggested action: *Note this information and regularly visit the WAFSOPSG website to obtain information pertaining to W AFC backup tests and procedures.*

Introduction of OCNL CB in high level SIGWX forecasts

2.11 Following a review of Annex 3 - *Meteorological Service for International Air Navigation* the WAFCs had identified the requirement to include OCNL CB in high level SIGWX forecasts (separate to and in addition to OCNL EMBD CB). The WAFCs implemented this change with effect from the SIGWX forecasts issued at approximately 1900 UTC on 15th June 2011 (SIGWX forecasts valid for 1200 UTC 16th June 2011).

Suggested action: *Note this information.*

Fixed areas of WAFS forecasts in chart form

2.12 W AFC London implemented its new SIGWX production platform on 11th October 2011 and took the opportunity to remove differences between the dimensions/orientation of its SIGWX forecasts in PNG format and those of W AFC Washington. This would remove the problems encountered by some users during W AFC Backup events (test or real) when charts of different dimensions/orientation are received from the W AFC performing the backup role. As a result of this work, it was identified that the areas the W AFC SIGWX charts actually covered were not identical to the definitions in Annex 3 - *Meteorological Service for International Air Navigation*, and that since the WAFCs had been issuing their charts for many years without any day to day impact, it would be appropriate to update the definitions in Annex 3 (App 8, Figures A8-1, A8-2 and A8-3).

Suggested action: *Note this information.*

Development of WAFS web-based server forecasts

2.13 Following on from the Workshop on the gridded WAFS forecasts for CB cloud, icing and turbulence (Paris, September 2009) immediately preceding the WAFSOPSG/5 meeting, the requirement for the WAFCs to develop WAFS web-based servers was temporarily suspended.

Suggested action: *Note this information only.*

3 FORTHCOMING DEVELOPMENTS

Access to Internet based services (SADIS FTP/Secure SADIS FTP/WIFS)

3.1 SCRAG/11, WAFSOPSG/6 and SADISOPSG/16 were apprised of the need to confirm and clarify the access policies for the Internet based services for delivering WAFS data; namely SADIS FTP/Secure SADIS FTP and WIFS. The group concurred that although the Internet based services had 'global'³ footprints, the Regional Air Navigation Plans were to be used to identify from which service (SADIS or ISCS/WIFS) WAFS data was to be obtained for primary data supply. Users would be permitted to obtain accounts for accessing the alternative providers Internet based services for backup/contingency purposes only.

Suggested action: Note this information.

Additional geopotential flight level data to be provided by the WAFCs

3.2 The WAFc Provider States will make available data for an additional geopotential flight level - FL410, 175 hPa - as part of the GRIB2 WAFS upper-air forecast dataset with the implementation of the next amendment to Annex 3 - *Meteorological Service for International Air Navigation* (November 2013).

Suggested action: Note this information.

Prioritization of GRIB2 WAFS Aviation Forecasts against the GRIB1 WAFS Aviation Forecasts

3.3 In order to manage the transition from WAFS upper-air forecasts in the GRIB1 code form to those in the GRIB2 form, and the eventual withdrawal of GRIB1 (planned for November 2013) it is necessary to change the priority of GRIB1 and GRIB2 data. As such, it is currently planned that GRIB2 data will be made available before GRIB1 with effect from the 1200 UTC data time on 5th July 2012. This date will be confirmed closer to the time, and the subsequent timetable for delivering data is as given in **Appendix B** to this paper.

Suggested action: Note this information.

Withdrawal of WAFS upper-air forecasts in GRIB1 code form

3.4 The long term plan of the WAFSOPSG continues to indicate the intention to withdraw WAFS upper-air forecasts in the GRIB1 code form in November 2013.

Suggested action: Users should confirm that their visualisation systems have been (or will be) updated to display GRIB2 data; and that they are using GRIB2 data before the withdrawal of GRIB1 data.

Guidance and Training for States on the use and visualization of new gridded WAFS forecasts

3.5 The WAFSOPSG/5 meeting noted that the need for training related to the "roll-out" of the new gridded forecasts had been recognized by most planning and implementation regional groups (PIRGs) which had formulated conclusions calling for the WAFc Provider States to organize training seminars on the use of the new gridded WAFS forecasts for CB clouds, icing and turbulence.

³ It should be noted that some States have limited connection to the internet, as a result of issues such as bandwidth, reliability and cost, whilst other States have legislation or other legal barriers that prohibits the use of the public Internet for aeronautical Met data. Therefore, the term 'global' in relation to the provision of data via the public Internet should be used with care and qualification

3.6 WAFSOPSG/6 reviewed the status concerning guidance and training for States and WAFS users on the intended use of new gridded WAFS forecasts for CB clouds, icing and turbulence. The group concurred that the development of such training should be deferred until visualization standards for these elements had been finalized.

3.7 The group agreed to develop guidance on the interpretation (Conclusion 6/12) of the forecasts for CB cloud, icing and turbulence, and that the WAFS Provider States would then review the training requirements.

3.8 With regard to the visualization of gridded WAFS forecasts, the group noted the continued need for receiving information presented in a similar manner to the existing SIGWX charts and agreed that the IATA Member should develop a concept of operations which would include requirements for the provision of probabilistic forecasts of icing and turbulence expressed in terms of indices (Conclusion 6/16). The group further agreed that for the time being, the WAFS Provider States should continue with the provision of WAFS SIGWX forecast in the current formats (BUFR code and PNG chart forms (Decision 6/17)).

Suggested action: *Note this information.*

WAFS output performance indicators

3.9 WAFSOPSG/6 called for the WAFS Provider States study the feasibility of providing the additional WAFS performance indicators listed below, and to report back to WAFSOPSG/7:

- a) the number of times a complete set of SIGWX BUFR messages were not issued by the standard issue time;
- b) the number of times a complete set of SIGWX BUFR messages were not issued by the validity time of the data;
- c) the number of invalid or incomplete sets of SIGWX BUFR messages transmitted;
- d) the number of times a complete set of GRIB messages was not issued by the standard issue time, including the time at which each complete GRIB dataset was made available; and
- e) the number of SIGWX correction messages transmitted

See section 0 relating to actions implemented.

Suggested action: *Note this information.*

Use of maximum icing for use in ETOPS operations

3.10 Decision 6/14 of WAFSOPSG/6 stated that the WAFS gridding icing forecast be endorsed as operationally acceptable for the use in extended range operations by twin-engined aeroplanes (ETOPS⁴) flight planning.

Suggested action: *Note this information.*

⁴ Note that the Air Navigation Commission recommend replacing ETOPS with EDTO (Extended Diversion Time Operations)

Harmonization and Verification of WAFS CB cloud, icing and turbulence WAFS Forecasts

3.11 The WAFSOPSG was informed of developments to harmonize the provision of forecasts of CB cloud, icing and turbulence, both in terms of the algorithms and processes used as well as the blending of the outputs, to improve the forecasts. The group was presented with promising initial verification results of blended forecasts and it was noted that further verification activities are planned and will be presented to WAFSOPSG/7. Noting the user requests to begin the operational evaluation and use of the forecasts, Conclusion 6/18 determined that Note 1 at Paragraph 1.2.2 of Appendix 2 to Annex 3 regarding the experimental label “trial forecasts”, be removed as part of Amendment 76.

Suggested action: Note this information.

4. ACTION BY THE MEETING

4.1 The meeting is invited to review the content of this working paper and consider the suggested actions.

APPENDIX A**BRIEF SUMMARY OF THE BENEFITS OF WAFS UPPER-AIR FORECASTS IN THE GRIB2
CODE FORM COMPARED TO GRIB1**

GRIB 2 WAFS data benefits from higher spatial and temporal resolution, and additional fields, compared to its GRIB 1 predecessor – for example, the GRIB 2 WAFS data is based on a regular 1.25*1.25 degree (unthinned) grid, provides forecast data from T+6 to T+36 at 3-hourly time intervals, and includes additional flight level information at FL270, FL320 and FL360. Forecasts for CB cloud, icing and turbulence continue to be developed, and currently have 'trial status'.

APPENDIX B

TABLES INDICATING THE DELIVERY SCHEDULE OF GRIB1/GRIB2 WAFS UPPER AIR FORECASTS BEFORE AND AFTER THE CHANGE OF PRIORITY

Priority up to and including 0600 DT dataset, 5th July 2012.

	<i>Time that DT 0000 UTC data is made available</i>	<i>Time that DT 0600 UTC data is made available</i>	<i>Time that DT 1200 UTC data is made available</i>	<i>Time that DT 1800 UTC data is made available</i>
GRIB1	0315-0345	0915-0945	1515-1545	2115-2145
GRIB2	0345-0500	0945-1100	1545-1700	2145-2300

Table 1: Table listing the current times at which WAFS Aviation GRIB1 and GRIB2 data are made available, and suggested to remain so until 0600 DT dataset on 5th July 2012, or until such a time as WAFSOPSG determines.

Priority from and including 1200 DT dataset, 5th July 2012.

	<i>Time that DT 0000 UTC data will be made available</i>	<i>Time that DT 0600 UTC data will be made available</i>	<i>Time that DT 1200 UTC data will be made available</i>	<i>Time that DT 1800 UTC data will be made available</i>
GRIB2	0315-0430	0915-1030	1515-1630	2115-2230
GRIB1	0430-0500	1030-1100	1630-1700	2230-2300

Table 2: Table listing the proposed times at which WAFS Aviation GRIB1 and GRIB2 data are made available, as of the 1200 DT dataset on 5th July 2012, or from such a time as WAFSOPSG determines.

Note - the transition date will be confirmed closer to the time of implementation