International Civil Aviation Organization
CAR/SAM Regional Planning and Implementation Group (GREPECAS)
Eighth Meeting of the GREPECAS Aeronautical Meteorology Subgroup (AERMETSG/8)
Santiago, Chile, 9 to 13 October 2006

Agenda Item 2: WAFS Implementation in the CAR/SAM Regions

Regional Progress in the Implementation of the World Area Forecast System (WAFS)

(Presented by the Secretariat)

SUMMARY

This working paper presents information on the WAFS implementation status in CAR/SAM States/Territories, based on that agreed in the First Meeting of the WAFS Operations Group, in accordance with the *Modus operandi* between the WAFSOPSG and the PIRGS, and in GREPECAS.

References:

- Report of the Thirteenth Meeting of the CAR/SAM Regional Planning and Implementation Group (GREPECAS/13), (Santiago, Chile 14 to 18 December 2005);
- Report of the First Meeting of the WAFS Operations Group (WAFSOPSG/1), (Lima, Peru, 10 to 13 November 2003); and
- Report of the Second Meeting of the WAFS Operations Group (WAFSOPSG/2), (Bangkok, Thailand, 8 to 11 March 2005).

1. Introduction

1.1 The Meeting will recall that, according to its Terms of Reference, the WAFSOPSG, among others, reviews regularly "WAFS global procedures" contained in the air navigation plans/documents on facilities and services (ANP/FASID), and initiates amendments to all the ANP/FASID. Such proposals for amendment are subsequently referred to ICAO Regional Offices to be processed and retransmitted to the States/Territories, as appropriate.

2. Discussion

2.1 Regional progress in the implementation of Conclusions of the WAFS Operations Group (WAFSOPSG)

2.1.1 The WAFS Operations Group (WAFSOPSG) has met, until the preparation of this working paper, in two opportunities; the first one in November 2003 in Lima, Peru and the second one in

Bangkok, Thailand in March 2005, reviewing, in both meetings, a "global" version of WAFS related procedures of the ANP/FASID and formulating Conclusions 1/2 and 2/2 – Amendment to WAFS-related regional procedures in the ANP/FASID, respectively. The executive summary of both meetings was sent to CAR/SAM States; however, in order that the meeting be informed of the discussions, agreements and decisions of this Group, **Appendix A** to this working paper presents a copy of them.

2.1.2 In respect to the CAR/SAM Basic ANP related to conclusions previously mentioned, ICAO SAM Regional Office processed and circulated to the corresponding States/Territories and international organizations, proposal for amendment SAM No. 06/3 – MET to SAM FASID ANP and proposal for amendment SAM N° 06/2 – MET to SAM Basic ANP, informing of their approval on 4 May and 3 July 2006, respectively.

2.1.3 Following GREPECAS Conclusion 12/55 requesting the WAFSOPSG to study the possibility to develop an ISCS user Guide, the Group formulated Conclusion 2/5 – Development of the ISCS User Guide, which will be presented at the WAFSOPSG/3, Paris, to be held from 26 to 29 September 2006.

2.1.4 Additionally, the WAFSOPSG/2 discussed, among others, the issue related to the availability of WAFS forecasts in chart form beyond 1 July 2005 and formulated Conclusion 2/12 – Extension of the provision of SIGWX forecasts in chart form beyond 1 July 2005 for a limited period of time by WAFC London and Washington, requesting, in paragraph a), that the WAFC provider States extends the provision of these products until 30 November 2006, and in paragraph b), that ICAO Regional Offices carry out a survey to the States to verify the implementation of the reception and effective utilization of BUFR-coded in SIGWX forecasts.

2.1.5 Concerning paragraph a), States/Territories were informed in due course, and regarding paragraph b) the survey was circulated and a summary of the replies is included as **Appendix B** to this working paper. The Meeting could take note that the level of answers of CAR States/Territories is very poor, for which the group could agree to formulate the following draft Conclusion:

DRAFT CONCLUSION 8/XX REVIEW OF AGREEMENTS AMONG MET AND CIVIL AVIATION AUTHORITIES IN CAR/SAM STATES/TERRITORIES

That States of the CAR Region are urged to review the agreements with meteorological authorities, in order to improve the percentage of replies to the communications of NAAC Regional Office in respect of aeronautical meteorology.

2.2 Regional progress in the implementation of GREPECAS Conclusions

2.2.1 In respect of Conclusion 13/16 - Cost Recovery of Aeronautical MET services in the CAR/SAM Regions, unfortunately it was not implemented in most States/Territories. Regarding Conclusion 13/17, Survey on the ISCS Efficacy, paragraph a), **Appendix C** to this working paper includes the list obtained after the survey carried out to the States/Territories. In this sense, it is important to emphasize the fact that the ISCS provider State manages a list that does not correspond in every case to the information received in the survey, since in some States the Meteorological Authority is in charge of the Civil Aviation Authority (CAA), therefore, the administration and operation of the WAFS workstation is in charge of the CAA. Consequently, for Conclusion purposes, the replies received at ICAO Regional Offices will be considered.

2.2.2 Regarding paragraph b) of same conclusion, no agreement was reached with the Washington WAFC on the survey formulary until the preparation of this working paper, for this reason, it is expected to be defined during the Meeting, as well as the date to carry out the survey on ISCS efficacy.

2.2.3 The Meeting will also recall that the utilization of Protocol X.25 in ISCS transmissions ended on 31 July 2005 at 00:00 UTC; since this date, the ISCS provider State is transmitting the information of the World Area Forecast System (WAFC) using the new TCP/IP ISCS. This information was provided to CAR/SAM States/Territories in due course.

2.2.4 Conclusion 13/18[1] - Implementation Plan of the WAFS in CAR/SAM Regions has been implemented, and regarding Conclusion 13/19 – Provision of results of GFS Model Runs by WAFC Washington, requesting the WAFSOPSG to consider the possibility that WAFC Washington disseminates the analysis for the GFS (Global Forecast System) model run to user States concerned, will be discussed during WAFSOPSG/3.

3. Action by the Meeting

3.1 The Meeting is invited to:

a) take note of the content of this working paper;

b) consider the Draft Conclusion in paragraph 2.1.5; and

c) take action in respect of paragraph 2.2.3 and formulate a draft conclusion for GREPECAS/14 consideration.

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[1] AERMETSG/7 Conslusion 7/4 Pre-approved by GREPECAS Members on 22 August 2005.

APPENDIX A

FIRST MEETING OF THE WAFS OPERATIONS GROUP

(Lima, Peru, 10 to 13 November 2003)

EXECUTIVE SUMMARY[1]

1. INTRODUCTION

1.1 The first meeting of the World Area Forecast System Operations Group (WAFSOPSG/1), held in the ICAO South American (SAM) Regional Office, Lima, Peru, 10 to 13 November 2003, was attended by 23 experts from ten States, representing all the ICAO regions except for the AFI Region, the International Air Transport Association (IATA) and the World Meteorological Organization (WMO).

1.2 Mr. D. Visoiu (Romania) was elected Chairman; and Mr. A. Al Harthy (Oman) was elected Vice-Chairman. Mr. D. Visoiu presided over the meeting throughout its duration. Dr. O. M. Turpeinen, from ICAO Headquarters, Montreal, was Secretary of the meeting and he was assisted by Mrs. N. Arias, the Regional Officer, Meteorology from the SAM Office.

2. Tasks of the WAFSOPSG

2.1 The group noted that, in accordance with its terms of reference, it was expected to:

a) undertake work on specific tasks included in its work programme;

b) ensure the currency of

   1) world area forecast system (WAFS)-related provisions in Annex 3 - *Meteorological Service for International Air Navigation;* and

   2) WAFS-related procedures in the air navigation plan/facilities and services implementation documents (ANP/FASID).

2.2 With regard to specific tasks, the group addressed nine outstanding tasks of the disbanded World Area Forecast System Study Group and four WAFS-related issues raised by the MET Divisional Meeting (2002) and referred to the WAFSOPSG for follow-up.

2.3 With regard to the currency of Annex 3 provisions, the group agreed that Chapter 9 which had not undergone any major revision during the recent restructuring of Annex 3 should be subject to a thorough review by the Secretariat, in close coordination with the member from the WMO (Conclusion 1/1 refers). Furthermore, the group updated the WAFS procedures contained in ANP/FASID (Conclusion 1 /2 refers); these procedures were now global in nature and could no longer be considered in isolation by a single region.

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[1] The full report is available in English at the following open Web site: www.icao.int/anb/WAFSOPSG

3. **Operation of the WAFS**

3.1 To facilitate the future assessments of the WAFS implementation and operation, it was agreed that, similar to the Satellite Distribution System Operations Group (SADISOPSG), the world area forecast centre (WAFC) Provider States should prepare a joint concise management report for consideration by each WAFSOPSG Meeting which would cover the period elapsed since the previous meeting addressing the WAFS operations, highlighting recent developments and future plans for operational updates (Conclusion 1/3 refers). The group considered that the development of performance indicators for WAFS was an operational matter and that IATA should address this issue (Conclusion 1/4 refers).

3.2 Noting that all WAFS forecasts in the T4 chart form would be discontinued as of 1 July 2005, the group agreed that the WAFCs did not need to issue a new WAFS chart to cover polar air routes; the users requiring this chart should produce it from the operational WAFS BUFR data (Decision 1/5 refers).

3.3 In response to Conclusion 14/34 of the fourteenth meeting of the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG/14) (2003), calling for the WAFSOPSG to develop notification procedures to ensure that all States/users concerned be informed, with enough lead time, concerning significant changes to the WAFS operations, the group referred this issue to the WAFC Provider States (Conclusion 1/6 refers). The group’s attention was drawn by IATA to the discrepancies in the SIGWX forecasts in the areas where the products issued by the two WAFCs overlapped. To overcome the issue, the depiction of SIGWX would be harmonized by the WAFCs (Conclusion 1/12 refers).

3.4 It was noted that Attachment E to Annex 3 (Operationally desirable accuracy of forecasts) was being reviewed, with the assistance of the Aerodrome Meteorological Observing Systems Study Group (AMOSSG). With regard to the route and area forecasts, the AMOSSG had felt, however, that these should be referred to the WAFSOPSG for a final review, which was undertaken by the group (Conclusion 1/7 refers).

3.5 Concerning back-up procedures between the two WAFCs , the group was pleased to note that WAFC London was installing a back-up circuit between WAFC Washington and the SADIS uplink site. This facility would provide higher levels of resilience, which was considered to be sufficient for the WAFS (Decision 1/8 refers). The group also reviewed the guidance on back-up included in Attachment C to Annex 3 and agreed that the latest version should be placed on the WAFSOPSG Web site (Conclusion 1/9 refers).

3.6 The group reviewed and endorsed a draft BUFR coding convention developed by WAFC London related to cloud information in medium-level SIGWX forecasts (SWM) (Conclusion 1/10 refers). Concerning the BUFR-coded SWM forecasts, the group recalled that SWM forecasts were produced only for the limited areas in accordance with the requirements in the ANPs/FASIDs whilst the end user visualisation software was global in its scope. The group agreed therefore that it was essential that the States and software vendors be made aware of the limited coverage of the SWM data and that charts be only produced by the users over the areas covered by the WAFS SWM forecasts. (Conclusion 1/11 refers).

4. Development of the WAFS

4.1 With regard to additional wind levels, it was noted that the current vertical resolution was about 40 hPa around the tropopause and that its improvement down to 25 hPa would be a major undertaking. In support of the opinion expressed by IATA, the group agreed that work on improved vertical resolution should nevertheless be pursued, taking full advantage of aircraft observations available from the flight levels around the jet stream. (Conclusion 1/13 refers). Concerning the inclusion of volcanic ash (VA) clouds in SIGWX forecasts, the group concurred that, in view of the availability of timely information from volcanic ash advisories, SIGMET, NOTAM/ASHTAM, disseminated to States and users through the ICAO satellite broadcasts, there was no need to include VA clouds in WAFS SIGWX forecasts (Decision 1/14 refers).

4.2 Regarding the forecasting of icing and turbulence, the group took note of the improvements of the numerical weather prediction models used by the two WAFCs, in terms of spatial resolution and the parametrization of micro-physics and agreed that a progress report on the development of an objective icing index to be used in WAFS SIGWX forecast should be presented by the WAFC Provider States to the WAFSOPSG/2 Meeting (Conclusion 1/15 refers). Concerning the improved forecast algorithms for turbulence and icing for operational use in WAFS SIGWX forecasts, the group considered that it would be feasible to provide new WAFS output products for turbulence and icing in grid point format in the foreseeable future, as a result of the improving model performance. The group tasked the WAFC Provider States to pursue this issue and to report back regularly to the WAFSOPSG meetings on progress made (Conclusion 1/16). To stimulate the development of forecast algorithms, the group concurred with the WAFC Provider States' proposal to convene a workshop on turbulence and icing in Exeter, the United Kingdom in autumn 2004, to deal with the technical issues surrounding the forecasting of icing and turbulence by the WAFCs (Conclusion 1/17 refers).

4.3 To meet the needs for a growing number of non-stop operations of 15 hours or longer, the group considered the feasibility of extending the lead time for issuance of SIGWX forecasts with the understanding that there was a need to reconcile the accuracy of the forecasts with the requirements of long-haul flights, and agreed that the issue should be studied by the WAFC Provider States (Conclusion 1/18 refers).

4.4 The group, when considering the requirement to indicate clouds other than cumulonimbus (CB) and towering cumulus (TCU) in SWM forecasts, recalled that Annex 3 stated that clouds (both the *cloud type* and *cloud coverage*) associated with SIGWX phenomena should be indicated in these forecasts. The group agreed that SWM forecasts should only include phenomena that may impact aircraft operations and that cloud coverage and types, other than CB and TCU, should be eliminated from SWM forecasts. (Conclusion 1/19 refers).

4.5 When addressing the quality control of MET information included in the automatic dependent surveillance (ADS) messages, the group noted that the WAFC Provider States had implemented procedures for the quality control of MET information in the ADS messages and agreed therefore, that as the next step, the WAFCs should address the feasibility of providing feed-back to the operators (Conclusion 1/20 refers).

4.6 The group addressed the guidelines for generating WAFS charts from the GRIB and BUFR coded data, in response to conclusions by the APANPIRG/14 and SADISOPSG/8 meetings. Concerning the requirement for producing WAFS charts for standard ICAO areas of coverage, the group agreed that, in view of the inherent advantages of the GRIB and BUFR code forms (e.g. reduced bandwidth, flexibility etc.), the coding of WAFS forecasts by the WAFCs should continue to be in the GRIB and BUFR code forms only and that no changes to Annex 3 should be proposed in this regard. The provision of flight documentation by States, however, was another matter and the group agreed that ICAO provisions should stipulate that States be required to make available WAFS forecasts in the chart form for the fixed areas of coverage. (Conclusion 1/21 refers). With regard to the depiction of meteorological and other features on WAFS forecast charts derived from the BUFR and GRIB data, the group noted that a number of software packages included the ability for the user to manually modify the positions of features on the chart, which was considered a useful function for some items, such as text boxes. However, the group concurred that whenever users extended this function to meteorological features, the forecast should no longer be labelled as a WAFS product. It was agreed that this point should be explicitly stated in Amendment 74 to Annex 3 and in general guidelines for the depiction of meteorological and other features, which were being developed by the WAFCs. (Conclusion 1/22 refers). Concerning the so called “edge effect” (i.e. jet streams occurring close to the edge of the chart displayed without the proper indication of the flight levels affected), it was considered that this effect could be resolved by such visualization software that would permit the interpolation of the flight level at the start and end of the jet, and at any points in between, as required (Decision 1/23 refers).

4.7 With regard to guidance on software vendors, the group was pleased to note that the WAFC London, in response to a conclusion by the SADISOPSG, had become increasingly involved in assessing workstation software against a list of high-level criteria in the way in which the BUFR-coded WAFS products are displayed. To ensure that the software delivered products in compliance with Annex 3, it was agreed that the WAFCs should work together regarding the BUFR standard, in view of providing uniform guidance to software vendors related to high-level criteria (Conclusion 1/24 refers).

4.8 With regard to amendments to SIGWX forecasts, the group agreed that, with their frequent issuance (i.e. four times daily) and increasing quality, as of Amendment 74, no amendments to the SIGWX forecasts needed to be issued by the WAFCs. (Conclusion 1/25 refers). The group when dealing with the future of SWM forecasts, considered a number of options and favoured the one that would replace the SWM forecasts by new, global WAFS output products for turbulence, icing and CB and TCU clouds in grid point format; this solution, supported by IATA, was considered optimal since it would provide global information on all essential elements currently included in SWM forecasts in a user-friendly format. The group agreed that the WAFC Provider States should study the feasibility of this option (Conclusion 1/26 refers).

4.9 The group, when addressing the migration from GRIB1 to the GRIB2 code form, noted that the GRIB1 code form, maintained exclusively for aviation users, could not accommodate new parameters (e.g. WAFS output products). The group expressed interest in the migration to the GRIB2 code form; however, the migration should be undertaken only if its introduction would bring about benefits both for the WAFCs and WAFS users. The group agreed that the issue should be studied by the WAFCs (Conclusion 1/27 refers).

4.10 The group noted that the forecasts of heights above ground level of the standard WAFS flight levels were already provided to users through the ICAO satellite broadcasts, in response to a requirement by aeronautical users, including IATA. Since this information was being provided by WAFCs with a marginal cost, the group agreed that the corresponding requirement should be formalized in Annex 3 (Conclusion 1/28 refers).

4.11 With regard to the submission of proposals related to the development of the WAFS, it was agreed that all such proposals, to be considered by the WAFSOPSG, should first be evaluated by the WAFCs, not only based on their technical merits, but also taking into account the costs involved (Decision 1/29 refers).

5. Future work programme

5.1 The group reviewed the work programme and proposed additional changes based on the discussions under Agenda Items 5 and 6 (Conclusion 1/30 refers).

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SECOND MEETING OF THE WAFS OPERATIONS GROUP

(Bangkok, Thailand, 8 to 11 March 2005)

EXECUTIVE SUMMARY [1]

1. INTRODUCTION

1.1 The second meeting of the World Area Forecast System Operations Group (WAFSOPSG/2), held in the ICAO Asia/Pacific (ASIA/PAC) Regional Office, Bangkok, Thailand, 8 to 11 March 2005, was attended by 23 experts from nine States, the Agency for Air Navigation Safety in Africa and Madagascar (ASECNA), the International Air Transport Association (IATA), International Federation of Air Line Pilots' Associations (IFALPA) and the World Meteorological Organization (WMO).

1.3 Mr. D. Visoiu, Chairman of the WAFSOPSG presided over the meeting throughout its duration. Dr. O. M. Turpeinen, from ICAO Headquarters, Montreal, was Secretary of the meeting and he was assisted by Mr. D. Ivanov, the Regional Officer, Meteorology from the ASIA/PAC Office.

2. Follow-up of WAFSOPSG/1 conclusions

2.1 The group reviewed the follow-up action taken in response to twenty-five conclusions formulated by the WAFSOPSG/1 and agreed that action could be considered completed on all the issues except for Conclusions 1/13, 1/15 and 1/27 which were restated under Agenda Item 6 (Decision 2/1 refers).

3. Review of ICAO provisions related to WAFS

3.1 Under this agenda item, the group reviewed the regional procedures contained in the air navigation plans (ANP)/facilities and services implementation documents (FASID)and proposed amendments, which would render them compatible with Annex 3 - *Meteorological Service for International Air Navigation* provisions. The amended procedures would be referred to the ICAO Regional Offices concerned for processing. (Conclusion 2/2 refers).

3.2 Furthermore, the group reviewed a draft Amendment 74 to Annex 3, developed by the Secretariat, in coordination with WMO, in response to the relevant conclusions formulated by the WAFSOPSG/1 Meeting. The amendment goes beyond the issues customarily dealt with by the group since the action called for by the WAFSOPSG Conclusion 1/1 necessitated a complete revision of Chapter 9 and Appendix 8 of Annex 3 . The group endorsed this amendment which would simplify the provisions and was therefore expected to improve the readability of Annex 3 (Conclusion 2/3 refers).

[1] The full report is available in English at the following open Web site: www.icao.int/anb/WAFSOPSG

4. Operation of the WAFS

4.1 The group reviewed the management report prepared by the world area forecast centre (WAFC) Provider States, noted its content and expressed satisfaction with the scope of information provided. In this context, the group called for the WAFC Provider States to establish a tracking system displaying on the WAFSOPSG website the status of the implementation of operational changes to the WAFS (Conclusion 2/4 refers).

4.2 With regard to the possibility of developing an International Satellite Communications System (ISCS) User Guide, called for by the CAR/SAM Regional Planning and Implementation Group (GREPECAS) (Conclusion 12/55 refers), the group agreed that WAFC Washington should develop a guide similar to the *SADIS User Guide*, in time for the WAFSOPSG/3 Meeting (Conclusion 2/5 refers).

4.3 Concerning guidance on back-up procedures at the WAFCs, included in Annex 3, Attachment C, the group considered that, in view of its dynamic nature, the three-year amendment cycle involved in any Annex 3 material was too infrequent and agreed that Attachment C to Annex 3 should be deleted; only a reference to the WAFSOPSG website containing the up-to-date back-up procedures should be retained in Annex 3 (Conclusion 2/6 refers). In this context, the group also agreed that WAFC London should establish a bulletin monitoring facility to monitor the operation of the ISCS broadcast, on a real-time basis, in order to be able to provide an effective back-up service to the ISCS broadcast, when necessary (Conclusion 2/7 refers).

4.4 The group addressed the harmonization of the WAFS forecasts and agreed that, with regard to the depiction of the vertical depth of the jetstream, WMO should be invited to amend the model charts in Appendix 1 to Annex 3 to include only one jet depth information group per jetstream maximum and to change the depiction of the jet depth, currently expressed in terms of differences in flight levels, to flight levels (Conclusion 2/8 refers). It was also agreed that, in response to Conclusion 15/34 of the ASIA/PAC Air Navigation Planning and Implementation Regional Group (APANPIRG), the WAFC London should amend the *Guidelines for representing WAFS significant weather (SIGWX) data in BUFR* requiring that the WAFS visualisation software should automatically generate compliant SIGWX charts from the BUFR code for the standard ICAO areas and bring the amended guidelines to the attention of software vendors (Conclusion 2/9 refers). With regard to coinciding tropical cyclone, volcano and/or radiation events, the group endorsed a new plotting scheme, for inclusion in Annex 3, which would give the highest priority to volcanic ash, followed by radiation events and tropical cyclones (Conclusion 2/10 refers). The order of priority was based on an informal consultation with IATA.

4.5 When addressing the development of WAFS output performance indicators, the group concurred that the WAFC London Provider States, in coordination with WAFC Washington, should implement, on a trial basis, the performance indicators related to the root-mean-square vector wind and temperature errors for 24-hour forecasts at FL 340 for selected areas, and availability (in percentage) of BUFR and GRIB data at the WAFCs. This information would be provided to ICAO, on a quarterly basis using monthly statistics, for inclusion in the WAFSOPSG website. The WAFC Provider States would also prepare a report, in coordination with the IATA Member of the WAFSOPSG, on these trials, for consideration by the WAFSOPSG/3 Meeting, in view of the future operational implementation of the WAFS output performance indicators (Conclusion 2/11 refers).

4.6 Concerning the availability of WAFS forecasts in chart form beyond 1 July 2005, the group concurred with the APANPIRG and the European Air Navigation Planning Group (EANPG), in that the issuance of SIGWX forecasts in T4 chart form should be continued, in parallel with the use of BUFR code form, for a limited period of time until 30 November 2006. The group also felt that ICAO Regional Offices should carry out a survey in May 2006 to verify the implementation of the reception and utilization of BUFR-coded SIGWX forecasts by States, and that the Secretariat should present the results of this consultation for consideration and future action by the WAFSOPSG/3 Meeting (Conclusion 2/12 refers). It was reasonable to expect that States and users would be able to purchase the necessary BUFR decoding software in time for the new cut-off date; if an additional extension were considered necessary, the WAFSOPSG/3 Meeting would still be in a position to consider prolonging the provision of SIGWX forecasts in chart form beyond 30 November 2006. Another proposal related to SIGWX forecasts in chart form was formulated by the group calling for the WAFC Provider States to provide, on a trial basis, WAFS SIGWX forecasts in chart form for the fixed ICAO areas of coverage using the industry standard Portable Network Graphics (PNG) graphical format or an equivalent industry standard, place these charts on the WAFS FTP server by 1 July 2005 and to report back to the WAFSOPSG/3 Meeting which would assess the desirability of continuing the provision of WAFS SIGWX forecasts in chart form using the PNG format or an equivalent industry standard (Conclusion 2/13 refers).

5. **Development of the WAFS**

5.1 When considering improvements in vertical resolution of WAFS forecasts, the group also addressed the issue of temporal resolution, in response to Conclusion 40/4 by the North Atlantic Systems Planning Group (NAT SPG). It was agreed that considerations should be generalized to encompass the improvements both in the temporal and spatial resolution of WAFS upper wind forecasts, and invited the WAFC Provider States to study the possibility of improving the temporal and spatial resolution of WAFS upper wind and other upper-air forecasts in the GRIB code form, in time of the WAFSOPSG/3 Meeting. It was expected that the impacts of adding two levels between FL 300 and 400 (e.g. FL 320 and 370), of improving the horizontal resolution to 60 km and of increasing the temporal resolution to 3 hours or less would be studied (Conclusion 2/14 refers).

5.2 The group underscored the importance of the development of an objective icing index which would harmonize icing information provided by the two WAFCs. It could also be used by meteorological watch offices to issue SIGMET in those States that use numerical weather prediction models. The group encouraged the WAFC Provider States to pursue work on this important issue and to present a progress report on the development of an objective icing index, in time of the WAFSOPSG/3 Meeting (Conclusion 2/15 refers). Concerning improved WAFS forecasts for icing and turbulence, the group agreed that the WAFC Provider States should continue work on the development of these forecasts based on a product description which also included convective clouds. It was agreed that the WAFC Provider States should carry out verification of the trial forecasts and report the results thereof back to the WAFSOPSG/3 Meeting (2006). It was further agreed that the development work should be progressed in view of its completion by the WAFSOPSG/4 Meeting (2008). This "road map" was expected to lead to the operational implementation of the improved forecasts for icing, turbulence and convective clouds as part of Amendment 75 to Annex 3 (November 2010) (Conclusion 2/16 refers) and these new products would replace the medium-level SIGWX forecasts (Decision 2/19 refers).

5.3 When addressing the needs of long-haul flights for SIGWX forecasts, the feasibility of amending the lead time of these forecasts was considered. The group felt that the development of new forecasts for icing, turbulence and convective clouds held the promise of providing airlines and other users with the information they required to plan for long-haul flights by the year 2010. However, to address the shorter-term needs, it was agreed that the WAFCs should advance the lead time of issuance of the existing SIGWX products to 13 hours before their validity time. Furthermore, the WAFC Provider

States were invited to consider the possibility of advancing the lead time further to 17 hours (Conclusions 2/17 and 2/18 refer).

5.4 In order to be able to introduce the new WAFS forecasts for icing, turbulence and convective clouds, it is necessary to migrate to the GRIB2 code form, which should be completed in time for Amendment 75 to Annex 3. The group agreed that, to ensure an orderly and timely migration to the GRIB2 code form within WAFS, the WAFC Provider States, in coordination with the WAFSOPSG Member from WMO, should develop a migration plan, in time for the WAFSOPSG/3 Meeting (Conclusion 2/20 refers).

5.5 Concerning the quality control of MET information in the automatic dependent surveillance (ADS) messages, the group reviewed the results of a feasibility study undertaken by WAFC London. Based thereon, it was agreed that the provision of feed-back to the operators concerned related to the quality of MET information included in the ADS messages was both feasible and desirable. Therefore, the group tasked the WAFC London Provider State, in coordination with the WAFC Washington Provider State and the WAFSOPSG Member from WMO, to develop appropriate software for quality control of the meteorological information data block of the ADS messages and contact procedures for feed-back with operators (Conclusion 2/21 refers). The resulting software could only become operational after the implementation of the new format of AIREP which would clearly identify ADS messages and which would include the registration number of the aircraft.

5.6 As a result of feedback from airlines operating in Hong Kong, China regarding new SIGWX charts generated from BUFR-coded WAFS forecasts, it was agreed that preference should be given to the letters of the cities over labels and text boxes with the understanding that the meteorological phenomena would continue to maintain the highest priorityat all times as far as the display was concerned; the *Guidelines for presenting WAFS SIGWX data in BUFR* concerning the depiction of aerodrome on SIGWX charts would be amended accordingly (Conclusion 2/22 refers).

6. Future work programme

6.1 The group reviewed the work programme and proposed additional changes based on the discussions under Agenda Items 5 and 6 (Conclusion 2/23 refers).

7. Any other business

7.1 The group considered a proposal by the WAFC London Provider State to organize an international SADIS seminar to bring SADIS stakeholders (users, software suppliers, SADIS Second-Generation (2G) hardware suppliers, and service providers) together. As this event would also be of interest to ISCS users, it was considered appropriate that the issue was addressed at the WAFSOPSG Meeting. It was agreed that the event should be organized, in coordination with ICAO and WMO, at the ICAO European and North Atlantic Office. The seminar should last one and a half days. To maximise participation and to minimise travel costs, it was agreed that the event should take place between the sixteenth meeting of the METG of the EANPG and the WAFSOPSG/3 Meeting (Conclusion 2/23 refers).

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APPENDIX B

Survey to verify the implementation of the reception and effective utilization of BUFR-coded in SIGWX forecasts - WAFOPSG/2 Conclusion 2/12	
SAM	
STATE	**COMMENTS**
Argentina	Supplier: COROBOR SYSTEMES Package: MESSIR - VISION
Bolivia	No Date of expected implementation: Second half of 2006.
Brasil	Yes. Supplier: INFO-ELECTRONICS H P SYSTEMS INC. Package: ISCS/WAFS Workstation Software (ULTIMATE). Is being adequated to the "Guidelines for representing WAFS SIGWX data in BUFR", is expected to finish in Nov. 2006.
Chile	Yes. Supplier: MORCOM Package: MESSIR
Colombia	No. Date of expected implementation : August 2008
Ecuador	Supplier: NETSYS INTERNATIONAL INC. Package: FLIGHTMAN
French Guiana	Yes. Supplier: METEO-FRANCE Package: SYNERGIE
Guyana	
Panama	Yes. Supplier: 3.Sin Package: METLAB
Paraguay	Yes. Supplier : MORCOM / COROBOR Package: MESSIR - ISCS
Perú	Yes. Supplier: MORCOM / COROBOR Package: MESSIR - ISCS
Suriname	Yes. Supplier : MESSIR – ISCC COROBOR PROGRAM Package : MESSIR - ISCC COROBOR PROGRAM
Uruguay	No. Date of expected implementation : No estimation can be done. Requested through the PVC of the OMM. .
Venezuela	No. Date of expected implementation : Augost 2006

CAR	
STATE	**COMMENTS**
Barbados	No. Date of expected implementation: October 2006
Belize	No. Date of expected implementation: Uncertain
Bermuda	No. Date of expected implementation: No date currently available.
Canada	No. Date of expected implementation: November 30th 2007.
Cuba	Yes. Supplier : Info-Electronics Systems Canada. Package : Ultimate
Mexico	Si. Supplier : COROBOR - MORCOM Package : MESSIR VISION, MESSIR COMM

APPENDIX/APÉNDICE C

ISCS OPERATIONAL FOCAL POINTS/
PUNTOS FOCALES OPERACIONALES DEL ISCS

Updated on/Actualizada el _________

Note. - This list is kept up-to-date by the ICAO Secretariat based on the input from States
Nota . - Esta lista será actualizada por la Secretaría de la OACI con base en la información suministrada por los Estados

Nominated by/ Nominado por	**Name/Nombre**	**Postal address/ Dirección Postal**	**Contact information/ Información de contacto**
ANGUILLA (United Kingdom)			Tel: Fax: Cel/Mobile: E-mail:
ANTIGUA AND BARBUDA			Tel: Fax: Cel/Mobile: E-mail:
ARGENTINA	Ariel Ventura	25 de Mayo 658 Buenos Aires, C.P. 1002 ARGENTINA	Tel: +5411 5167 6702 Fax: +5411 5167 6709 Cel/Mobile: E-mail: arielventura@meteofa.mil.ar
ARUBA (Netherlands)			Tel: Fax: Cel/Mobile: E-mail:
BAHAMAS			Tel: Fax: Cel/Mobile: E-mail:
BARBADOS	E. Anthony Archer	Block 4 Grantley Adams Industrial Park Grantley Adams Int’l Airport Christ Church BARBADOS	Tel: +1-246 428 0930 Fax: +1-246 428 2539 Cel/Mobile: +1-246 203-6022 E-mail: civilav@sunbeach.net
BELIZE			Tel: Fax: Cel/Mobile: E-mail:
BOLIVIA	Javier Günther Viscarra, Jefe Nacional División Meteorología AASANA	Calle Felix Reyes Ortiz No. 74 Edif. FEDE Petrol Piso 6 La Paz, Bolivia	Tel: +591 2 2317090 Fax: +591 2 2124043 Cel/Mobile: +591 71572246 E-mail: jgunther@aasana.bol
BRAZIL	Martim Roberto Matschinske	Av. Gen. Justo, 160 – Centro, 2º andar, Río de Janeiro RJ – Brasil CEP 20021-130	Tel: +21 21016285 Fax: +21 21016283 Cel/Mobile: E-mail: dmet@decea.gov.br
	Luiz Carlos dos Santos Filho	QI 05 ÁREA ESPECIAL 12 Lago Sul, Brasilia – DF CEP 71615-600	Tel: +61 33648383 Fax: +61 33648737 Cel/Mobile: E-mail: dmet@cindacta1.aer.mil.br

Nominated by/ Nominado por	**Name/Nombre**	**Postal address/ Dirección Postal**	**Contact information/ Información de contacto**
CAYMAN ISLANDS (United Kingdom)			Tel: Fax: Cel/Mobile: E-mail:
CHILE	Reinaldo Gutiérrez Cisterna		Tel: +562 4364541 Fax: +562 4378212 Cel/Mobile: +09 2202175 E-mail: rgutierrez@meteochile.cl
COLOMBIA			Tel: Fax: Cel/Mobile: E-mail:
COSTA RICA			Tel: Fax: Cel/Mobile: E-mail:
CUBA	Juan Ayón Alfonso	Calle 23 No. 64, Vedado, Plaza de la Revolución, Ciudad Habana, Cuba	Tel: +537 55 1146 Fax: +537 834 4571 Cel/Mobile: E-mail: juan.ayon@iacc.avianet.cu dan@iacc.avianet.cu
DOMINICA			Tel: Fax: Cel/Mobile: E-mail:
DOMINICAN REPUBLIC			Tel: Fax: Cel/Mobile: E-mail:
ECUADOR	Bolívar Pérez Mármol Jefe de Meteorología del Aeropuerto “Mariscal Sucre” Quito	Meteorología Aeropuerto “Mariscal Sucre”, Avenida Amazonas sin número	Tel: +593 2 330 1515 Fax: +593 2 3301515 Cel/Mobile: +593 99 099703346 E-mail: sequymyx@ecnet.ec
EL SALVADOR			Tel: Fax: Cel/Mobile: E-mail:
FRENCH ANTILLES (France)	Stéphane JAMONEAU	METEO FRANCE – DIRAG BP 645 97262 Fort-de-France Cedex FRANCE	Tel: +596 596639947 Fax: +596 596639955 Cel/Mobile: +596 696222164 E-mail: stephane.jamoneau@meteo.fr
FRENCH GUIANA (France)	Stéphane JAMONEAU	METEO FRANCE – DIRAG BP 645 97262 Fort-de-France Cedex FRANCE	Tel: +596 596639947 Fax: +596 596639955 Cel/Mobile: +596 696222164 E-mail: stephane.jamoneau@meteo.fr
GRENADA			Tel: Fax: Cel/Mobile: E-mail:
GUATEMALA	Francisco Leonel García Moreira Gerente de Operaciones DGAC	Aeropureto Internacional La Aurora, Zona 13 PBX 2331-2684 – 2332-5377	Tel: +502 23326084 Fax: +502 23326084 Cel/Mobile: +502 54031009 E-mail: atc@dgac.com.gt frangarcia62@yahoo.com
GUYANA			Tel: Fax: Cel/Mobile: E-mail:

Nominated by/ Nominado por	Name/Nombre	Postal address/ Dirección Postal	Contact information/ Información de contacto
HONDURAS			Tel: Fax: Cel/Mobile: E-mail:
JAMAICA			Tel: Fax: Cel/Mobile: E-mail:
MEXICO	Ing. José Javier Roch Soto Director de Aviación DGAC	Providencia 807 – 3º piso Col. Del Valle C. P. 03100 México, D. F.	Tel: +56 87 79 41 Fax: +55 23 62 75 Cel/Mobile: E-mail: jjrochso@sct.gob.mx
MONTSERRAT (United Kingdom)			Tel: Fax: Cel/Mobile: E-mail:
NETHERLANDS ANTILLES (Netherlands)			Tel: Fax: Cel/Mobile: E-mail:
NICARAGUA			Tel: Fax: Cel/Mobile: E-mail:
PANAMA	Erick Montero	Autoridad de Aeronáutica Apartado 7615 Panamá, 5 Panamá	Tel: +507 315-9815 Fax: +507 315-9809 Cel/Mobile: +507 6569-0533 E-mail: emontero@aeronautica.gob.pa
PARAGUAY	Raúl Enrique Rodas Franco	Casilla de Correo 1131	Tel: +595-21 222139 Fax: +595-21 222139 Cel/Mobile: +595-991-790266 E-mail: gsom_dmh@dinac.gov.py
PERU	Ing. MET Julio Quezada Pacheco Jefe del Equipo de Pronóstico y Climatología	Apartado 680 Aeropuerto Internacional “Jorge Chávez” Callao 1 - Perú	Tel: +511 626 1179 Fax: +511 626 1181 Cel/Mobile: E-mail: jquezada@corpac.gob.pe
PUERTO RICO (United States)	Robert (Bob) Gillespie Program Manager	National Weather Service W/OPS 17,1325 East West Highway Silver Spring, Maryland 20910, USA	Tel: +1301 713-9478 x 140 Fax: +1301 713-1128 Cel/Mobile: E-mail: robert.gillespie@noaa.gov
	Patrick Gillis (alternate) Program Leader		Tel: +1301 713-1743 x 104 Fax: +1301 713-1128 Cel/Mobile: E-mail: patrick.gillis@noaa.gov
SAINT KITTS AND NEVIS			Tel: Fax: Cel/Mobile: E-mail:
SAINT LUCIA			Tel: Fax: Cel/Mobile: E-mail:
SAINT VINCENT AND THE GRENADINES			Tel: Fax: Cel/Mobile: E-mail:
SURINAME			Tel: Fax: Cel/Mobile: E-mail:

Nominated by/ Nominado por	Name/Nombre	Postal address/ Dirección Postal	Contact information/ Información de contacto
TRINIDAD AND TOBAGO			Tel: Fax: Cel/Mobile: E-mail:
TURKS AND CAICOS ISLANDS (United Kingdom)			Tel: Fax: Cel/Mobile: E-mail:
URUGUAY			Tel: Fax: Cel/Mobile: E-mail:
VENEZUELA	MT2 (Av.) Néstor Sanabria Segovia	Edificio ATC, Piso 1, Oficina DIV. AIS, Maiquetía – Estado Vargas Frente al Aeropuerto Internacional Simón Bolívar	Tel: +0058 2123552967 Fax: +0058 2123552967 Cel/Mobile: +0058 4141018618 E-mail: n.sanabria@inac.gov.ve
VIRGIN ISLANDS (United Kingdom)			Tel: Fax: Cel/Mobile: E-mail:
VIRGIN ISLANDS (United States)			Tel: Fax: Cel/Mobile: E-mail: