AMOSSG/3-SoD
5/2/02

AERODROME METEOROLOGICAL OBSERVING SYSTEMS STUDY GROUP (AMOSSG)

THIRD MEETING

Miami, 22 to 25 January 2002

SUMMARY OF DISCUSSIONS

1. HISTORICAL

1.1 The third meeting of the Aerodrome Meteorological Observing Systems Study Group (AMOSSG) was held at the United States National Oceanic and Atmospheric Administration (NOAA) Atlantic Oceanographic and Meteorological Laboratory (AOML), Miami, Florida from 22 to 25 January 2002.

1.2 The meeting was opened by Dr. Kristina Katsaros, the Director of the AOML. In her opening remarks, she provided an overview of the activities of the laboratory.

1.3 The names and address of the participants are listed in Appendix A. Mr. Bryan Boase was elected Chairman of the meeting. The meeting was served by the Secretary of the AMOSSG, Dr. Olli M. Turpeinen, Acting Chief, Meteorology Section of the Air Navigation Bureau of ICAO.

1.4 The meeting considered the following items:

Agenda Item 1. Opening of the meeting

Agenda Item 2. Election of Chairman

Agenda Item 3. Adoption of working arrangements

Agenda Item 4. Adoption of the agenda

Agenda Item 5. Review of the requirements for meteorological observations and reports at aerodromes contained in Chapter 4 of Annex 3

Agenda Item 6. Assessment of the current capability of automatic weather observing systems to meet the expected future requirements

Agenda Item 7. Development of guidance material on automatic weather observing systems

Agenda Item 8. Future work programme of the group

(46 pages)
AMOSSG.3.SoD.en.wpd

Agenda Item 9. Any other business.

1.5 A list of study notes and information papers issued for the meeting is given at Appendix B to this summary of discussions.

2. AGENDA ITEMS 1 TO 4:OPENING OF THE MEETING; ELECTION OF CHAIRMAN; ADOPTION OF WORKING ARRANGEMENTS; ADOPTION OF THE AGENDA

2.1 These items are covered under Section 1: Historical

3. AGENDA ITEM 5: REVIEW OF THE REQUIREMENTS FOR METEOROLOGICAL OBSERVATIONS AND REPORTS AT AERODROMES CONTAINED IN CHAPTER 4 OF ANNEX 3

3.1 Background

3.1.1 The group recalled that the Annex 3 provisions relevant to the work of the group had been thoroughly reviewed at the AMOSSG/1 and AMOSSG/2 Meetings. At the second meeting, the Secretary had been tasked to incorporate the suggestions made by the group into the draft amendment to Annex 3 and circulate it to the group for comment.

3.2 Review of the amendment proposal

3.2.1 The group noted that, in addition to the changes made by the group at the AMOSSG/2 Meeting, a number of amendments had been introduced by the Secretary. Some of them were purely editorial improvements while others stemming from the European Air Navigation Planning Group (EANPG) were of a more substantial nature. All the changes made by the Secretary since the AMOSSG/2 Meeting are listed below together with explanatory comments:

a) 4.1.8 — 4.1.9. “Manual insertion” deleted as with the addition of “back-up procedures”, it would be up to the State to decide what type of back-up procedures are being used;

b) 4.1.10. “or cannot be ensured by other means” deleted (as the intent of this addition was not understood);

c) 4.2.3. A new paragraph introduced in response to the EANPG Conclusion 42/17 d);

d) 4.5.8 —4.5.10. Editorial clarifications how to report directional and speed variations;

e) 4.5.10. Proposed to be upgraded to a Standard;

f) 4.6.2. Aligned with 4.6.4 and 4.6.9;

g) 4.6.7. Rounding down added (required for instrumented systems);

h) 4.6.8. Proposed to be upgraded to a Standard;

i) 4.8.8. "Small hail" reintroduced (a request by IATA);

j) 4.8.9. The distance has been reduced from 30 to 20 km as, in accordance with the *Manual on the Observation of Clouds and Other Meteors* (WMO – No. 407), the upper limit for hearing thunder is 20 km; "showers of ice pellets" have been deleted since the WMO – No. 407 indicates that ice pellets "generally falls from Altostratus– or Nimbostratus–clouds";

k) 4.8.10. The paragraph has been substantially simplified to align the reporting of intensities to the practices used in the United States;

l) 4.9.9. Proposed to be upgraded to a Standard (safety implications);

m) 4.11.4. Proposed to be upgraded to a Standard (safety implications);

n) 4.13. A new paragraph introduced in response to the EANPG Conclusion 42/17 e); and

o) 6.2.5. A new paragraph introduced in response to the EANPG Conclusion 42/14.

3.2.2 Subsequently, the study group members had been invited to review and comment, as necessary, the updated draft amendment. The secretary had received substantial comments from Michel and Kevin. Furthermore, Wil and Benoit had provided comments and suggestions in their respective study notes. The complete draft amendment was carefully considered by the group in the light of all these comments. As a result, the group made some changes to the draft amendment 73 to Annex 3. Appendix C lists those draft Annex 3 provisions that were amended by the group as a result of this review.

3.2.3 The main issues raised, together with action agreed by the group, are listed below:

a) **4.1.10**. Kevin had suggested to change to a Standard. However, the group felt that this requirement could be costly since some of the automated systems did not allow the manual insertion. Therefore, the group preferred that this provision would remain a recommendation;

b) **4.2.3.** Kevin had pointed out that the US requirement was to have two reports not less than 30 minutes nor more than 1 hour apart. This allowed in his view for an adequate trend and enough information for the development of an aerodrome forecast in the TAF code form. The group shared this opinion and agreed to amend this provision accordingly;

c) **4.3.3.** In view of the amendment made to 4.2.2, paragraph 4.3.3 had to be aligned thereto. Furthermore, it was pointed out that SPECI reports were not issued in the EUR Region whenever half-hourly METAR reports are issued ; to accommodate the EUR practice, the words "as necessary" were added to the draft provision;

d) **4.5.1.** Wil pointed out to the group that most of the modern systems could provide the wind direction with a finer resolution than 10° as currently required and he further suggested that this information could be operationally useful with regard to cross-wind reporting. However, the group felt that there was no genuine operational requirement for changing the present practice; furthermore, it was indicated that such a change would require a major modification to most systems being used by States (including coding). Under these circumstances, the group agreed that the current resolution of 10° should be retained;

e) **4.5.3.** The formulation of this provision was aligned to that of 4.5.2 and the reference to the ill-defined term "lift-off zone" was deleted;

f) **4.5.8.** A new recommendation indicating the averaging period of 3 seconds for measuring variations in wind speed (gusts) was inserted in the draft amendment;

g) **4.5.9 b) 1) and 2); d).** Kevin had proposed that b) 1) should read "3 knots or more" and b) 2) "less than 3 knots", since this information was considered important for smaller aircraft and aircraft operating near the maximum limits of their performance envelope. The group agreed to this proposal noting that this amendment would involve software changes at most aerodromes, since the current Annex 3 provisions were being amended. Kevin had also indicated that in his view, the 100-kt cut-off appeared to be arbitrary with no relation to aviation. In this context, it was pointed out that the upper limit was part of the current Annex 3 provisions and that it had been necessary to introduce an upper limit for the range of the wind speeds for data-link applications. The users had been consulted and they had indicated that there was no operational requirement to give detailed wind information for winds 200 km/h (100 kt) or more. Finally, it was noted that a note had been added to the ICAO templates included in Appendix 2 to Annex 3 and to the WMO *Manual on Codes* (WMO—No. 306) to permit the use of wind speeds up to 200 kt to accommodate the US practice to use METAR reports for synoptic purposes. With regard to this paragraph, the group agreed to a proposal to improve the wording (using the words "referring to the past 10 minutes") and to delete redundant text under e);

h) **4.5.10.** Wil suggested that this provision was mature enough and should therefore be upgraded to a standard. The group agreed to his proposal;

i) **4.6.3**. Michel presented a study note which showed the difficulty to report correctly directional variations of visibility. He highlighted problems encountered at larger aerodromes where the observation station could well be kilometres away from some parts of the runways. As a result of ensuing discussions, the group concurred that the present formulation was unrealistic and agreed to drop the requirement of visibility observations being representative for the vicinity of the aerodrome;

j) **4.6.4.** The reference to the ill-defined term "lift-off zone" was deleted;

k) **4.6.9**. The issue how to report visibility in local reports along a particularly long runway where more than one instrument could be located around the mid-point of the runway was raised. It was suggested that perhaps a term "mid-section" could

be used. Since this proposal would also influence the way RVR is reported in local reports and could have implications for other Annexes and RAN plans, the Secretary was tasked to look into this issue and report his findings to the group by correspondence. If the inclusion of the mid-section did not pose any problems, the Secretary would prepare the corresponding draft amendment and send it to the group for comment; if, however, difficulties were encountered, the Secretary would inform the group accordingly and the issue of reporting visibility and RVR along particularly long runways would be included in the future programme of the group;

l) **4.6.10**. Michel suggested in his study note that, when directional variations in the visibility occurred, the indication of the directions in METAR/SPECI reports (e.g. 1000S) in relation with the meteorological station, as currently required by Annex 3, had become impracticable and meaningless, in particular at larger aerodromes. He showed the group examples where a certain direction in relation to the MET station could well be the opposite direction in relation to the operationally significant area. The group recognized the difficulties which were encountered but felt nevertheless that the indication of the direction could in some cases still provide information of some use and should not therefore be deleted;

m) **4.7.10**. Kevin and Bill suggested that "true" RVR reports should be done by automated means, not by human observers in view of the higher accuracy and better consistency of assessments made by automated systems. Therefore, they proposed that RVR based on human observers should be labelled differently. In this context, it was pointed out that, according to international provisions (thoroughly reviewed fairly recently by the RVRSG) RVR **could** still be assessed by human observers; Annex 3 did require the use of instrumented RVR measurements for Category II and III operations (subject to a Standard 4.1.8), while for other operations States continued to have an option to use human observers. This situation was also reflected in the RVR Manual (Doc 9328);

n) **4.7.12**. The issue of the light intensity used for assessing RVR had been addressed by the AMOSSG/1 and AMOSSG/2 Meetings where no final conclusions had been drawn. However, the group had agreed that for METAR/SPECI reports, the use of the maximum light intensity should be studied and the results addressed at this meeting. In the meantime, the EANPG had formulated a conclusion, not yet been acted upon by the ANC, calling for the use of the maximum light intensity both for local and METAR/SPECI reports. As a result of the ensuing discussions, the group agreed that, for METAR/SPECI reports, the 100 % light intensity would be included in the draft amendment. With regard to the local reports, no amendments to the current practice were proposed yet; the Secretary was tasked to consult the relevant ICAO operational bodies to seek their views on the proposed use of 100 % light intensity for the local reports. He would undertake this task as soon as the EANPG Conclusion was acted upon by the ANC;

o) **4.7.18 b).** The Secretary had received comments indicating that it was not always possible for the MET observer to know which runway is in use and that therefore the existing limitation of including only up to four runways in METAR/SPECI reports should be eliminated. Other members felt, however, that without such a limitation, the messages would become very difficult to use and far too lengthy to disseminate. Therefore, it was agreed that the limitation to four runways should

remain; however, in view of the difficulties experienced by some States, the paragraph would not be proposed to be upgraded to a standard, it would remain a recommendation;

p) **4.8.9 and 4.8.10** Michel had identified an inconsistency between the use of "TS" as specified in 4.8.9 and the use of "VCTS" as specified in 4.8.10. Initially, he had proposed to delete the abbreviation "TS" from the list of phenomena allowed to be used in connection with "VC". The group agreed to his proposal. However, it also felt, that in view of the increasing use of automated systems, the thunderstorm and its associated lightning should be assessed in relation to the aerodrome reference point and that two categories of thunderstorms should be reported: those occurring up to a distance of 8 km from the aerodrome reference point and those occurring between 8 and 16 km from that point. The corresponding amendment proposal was developed by the group. The group noted that while "TS" would be used for the first category, a specific abbreviation to qualify the second category would have to be developed since the abbreviation "VC" was used in relation to the aerodrome perimeter. The Secretary was tasked to come up with a proposal after consulting with WMO. It was realized that this proposal would lead to a change in the METAR/SPECI code forms and that substantial software changes would have to be made by Contracting States;

q) **4.8.9** Kevin and Bill indicated that the NWS in their respective States did not concur with the intent of the proposed deletion of showers of ice pellets. The group was aware of the fact that this deletion had been based on guidance given in the *Manual on the Observation of Clouds and Other Meteors* (WMO – No. 407) which indicated that ice pellets originated from Nimbostratus clouds. To accommodate the North American practice, the group, nevertheless agreed to re-introduce the combination of ice pellets and showers;

r) **4.8.8**. Wil and Kevin had made a proposal to include a new precipitation type ("unknown precipitation") for cases where the automated system could not identify the precipitation type. It was emphasized that there was a continued operational requirement to make a distinction between the precipitation types and concerns were expressed that, if introduced without explanations into the list of precipitation types, there was a real risk that this category could be misused. Therefore, the group agreed that the "unknown precipitation" type could only be introduced in the list after consultation with WMO if its use were strictly limited to specific cases, i.e. to automated systems and to weather situations where the precipitation type was impossible to be determined by the automatic system;

s) **4.9.8 and 4.13.3**. Concerns were expressed about the proposed standard which would limit cloud information to those clouds with bases below 1 500 m (5 000 ft). It was suggested that cloud information should be included at all times and that the practice of using "NSC" or "CAVOK" should be eliminated. In this context, it was pointed out that the proposal in 4.9.8 was based on the present Annex 3 (introduced in Amendment 72) and that the paragraph had simply been reworded. Furthermore, the group was made aware that a number of States had recently changed their software to comply with this provision. The Secretary cautioned the group that it would not be appropriate to eliminate a provision which had only recently been introduced and which had been subject to the customary consultation and review

process involving all the Contracting States, international organizations and the ANC. He emphasized that limiting cloud information to that occurring below 1 500 m (5 000 ft) was in accordance with the aeronautical requirements as stated in Annex 11 and the PANS-ATM (Doc 4444) (e.g. MET information for ATIS) which only called for cloud information below 1 500 m (5 000 ft). He further pointed out that the term "CAVOK" had been initially introduced based on these aeronautical requirements, and that it was a long-standing practice followed by most Contracting States; if changes to this practice were considered to be desirable, the issue should be raised in a formal context and all the parties concerned should be properly consulted . Taking into account the points made, the group agreed that the proposed paragraph 4.9.8 should be replaced by the existing Annex 3 text and that provision be merged into 4.9.9. Moreover, the group concurred that paragraph 4.9.9 should remain a recommendation;

t) **4.9.9 and 4.9.10** Michel had raised the issue of reporting "TCU" which, in his view, should be re-addressed by the group once more. It was recalled that in an attempt to simplify the reporting of clouds, the towering cumulus clouds had been eliminated in the METAR/SPECI reports while they had been retained in local reports. It had been argued initially that this information would not be required at the flight planning stage and that hence, their deletion from reports in the METAR/SPECI code forms could be considered justified. On reflexion, the group felt, however, that for operational purposes, there was some merit in including "TCU" clouds also in METAR/SPECI reports; therefore, it agreed that "TCU" be re-introduced in METAR/SPECI reports;

u) **4.10.3** Kevin and Wil questioned the long-standing practice to use two different abbreviations for designating negative temperatures (i.e. "MS" and "M"). The group realized that aligning the abbreviation used in the local reports to that in use for METAR/SPECI reports would involve software changes in most operational systems. Nevertheless, it concluded that the alignment of the abbreviations was desirable and agreed to include the change in the draft amendment;

v) **4.13.1 and 6.2.5.** The initial formulation of 4.13.1 included in the documentation for the current meeting required that complete METAR reports should be available for the issuance and review of TAF forecasts. It was recalled that this formulation had been based on the Conclusion 42/17 e) of the EANPG and that it reflected the opinion of the Meteorological Group (METG) of the EANPG which had stated that "it was also agreed that fully automated meteorological reports should at present not be used for preparation and review of aerodrome forecasts" (EANPG/42 report refers). The group did not share this point of view expressed by EANPG. It was emphasized that in a number of States, information included in AUTO METAR/SPECI reports, together with information from other sources (e.g. satellite, radar), were being used to issue and review TAF forecasts. Under these circumstances, the group agreed that in 14.13.1 the sentence requiring " complete" METAR reports would be eliminated and that the note following 6.2.5 would be deleted.

3.3 **Use of the BUFR code form**

3.3.1 The group noted that, since the AMOSSG/2 Meeting, an additional task entitled MET-0101: Aeronautical MET data representation and codes had been added to the Technical Work Programme by the ANC. One of the objectives of this task was to "amend Annex 3 to allow the use of the BUFR and CREX code forms to transmit meteorological reports and aerodrome forecasts and to specify how the information is to be presented to aeronautical users". To make some initial progress with this task, it was noted that the terms "routine reports in the METAR code form", "special reports in the SPECI code form" and "aerodrome forecasts in the TAF code form" had been proposed to be amended all through Annex 3 to read "METAR reports", "SPECI reports" and "TAF forecasts", respectively. Moreover, paragraphs 4.2.2, 4.3.2 and 6.2.3 had been amended accordingly.

3.3.2 The group concurred with the suggested approach with the understanding that the traditional alphanumeric code forms could continue to be used, parallel to the digital code forms, until such time that the Contracting States would have migrated to the BUFR code form. It was noted that the groups dealing with the communication and dissemination systems for meteorological reports and aerodrome forecasts should be informed in time in order to be able to accommodate their systems to the use of the BUFR code form when it will appear.

3.4 **Identifiers for corrected and nil messages**

3.4.1 It was noted that the Meteorological Communications Group (MOTNEG) of the EANPG at its seventh meeting held in 2001 had called for the inclusion of identifiers for corrected ("COR") and nil ("NIL") reports in METAR and SPECI reports and TAF forecasts. These identifiers had been included in the draft amendment and no difficulties from the AMOSSG point of view were foreseen with these proposals.

3.5 **Introduction of prevailing visibility**

3.5.1 Next, the group undertook the review of the draft amendment which would introduce in Annex 3 "prevailing visibility" in lieu of "minimum visibility". Study notes related to this subject were presented by Earle, Michel and Wil. Earle addressed the integration considerations for RVR and visibility. His idea of using of common sensors was welcomed by the group. However, it was realized that further work was needed in this area. Wil presented a paper where he suggested that forecast elements were embedded in the concept of prevailing visibility and should not therefore in principle be included in METAR/SPECI reports. Michel had included draft definitions for prevailing visibility for consideration by the group. His suggestions were taken into account during the review of the draft amendment.

3.5.2 During the general discussion, the group emphasized that the introduction of "prevailing visibility" would not influence the definition of visibility (as included in Annex 3, Chapter 1); the "prevailing visibility" was simply a concept how to report visibility in order to meet the operational requirements, and the underlying observations would continue to be based on the definition of visibility.

3.5.3 The paragraphs amended by the group as a result of the review are reproduced in Appendix D. The following main issues were addressed during the review:

a) **Definition for "prevailing visibility"**. It was recalled that the ANC had instructed the Secretariat to develop an amendment introducing "prevailing visibility" as defined in the North American Region (subject to editorial changes to render the language comparable to the one used in ICAO Annexes). Under these circumstances, the group realized that no other concepts of "prevailing visibility"

could be considered in this context. The group agreed in principle to the draft definition as included in the Secretary' s study note. However, Michel drew the group's attention to the fact that the draft definition would be difficult to apply for automated systems. Therefore, the draft amendment was amended accordingly to cater for the automated systems and an explanatory note was added thereto;

b) **4.6.9 b)**. Andy proposed that the conditions under which the minimum visibility would have to be included in METAR/SPECI reports, in addition to the prevailing visibility, be amended. His proposal rendered the inclusion of the minimum visibility more stringent and systematic under low-visibility conditions. The group agreed to the proposal made and amended the paragraph accordingly; and

c) **4.6.9 c)**. With regard to the conditions when the visibility is fluctuating rapidly, Dick indicated that in the US, a "variable" prevailing visibility (with minimum and maximum values) was used. The group, nevertheless, felt that for safety reasons, it would be preferable if the minimum visibility were reported under these specific circumstances and agreed to the wording in the basic study note.

3.5.4 Consequential amendments to Annex 2 and PANS-ATM (Doc 4444) were reviewed by the group. The draft proposals made were endorsed by the group. An editorial improvement was introduced by the group in the draft definition of "ground visibility" which would allow, if amended as proposed, the use of automated systems.

3.5.5 The group concluded the discussion on the prevailing visibility by endorsing the concept. The Secretary was tasked to reflect this point of view in the working paper to be prepared for the upcoming MET Divisional meeting (2002). In this context, Andy reminded the group that reservations *vis-à-vis* the introduction of the prevailing visibility had been expressed by the EANPG which preferred the minimum visibility. These concerns were shared by the aeronautical authorities in the United Kingdom and in the Netherlands. The Secretary confirmed that the reservations expressed by the EANPG would have to be reflected, together with the general endorsement by the AMOSSG, in the working paper to be developed for the MET Divisional Meeting (2002).

4. ASSESSMENT OF THE CURRENT CAPABILITY OF AUTOMATIC WEATHER OBSERVING SYSTEMS TO MEET THE EXPECTED FUTURE REQUIREMENTS

4.1 Introduction

4.1.1 The group recalled that initial assessments of the capability of automatic weather observing systems to meet the expected future requirements had been undertaken at the previous two meetings. In these assessments, attention had been paid to five parameters which, according to Annex 3, cannot be measured using fully automated systems, i.e. visibility, present weather, cloud amount and type, and recent weather. These assessments had been carried out in two phases:

a) first, the scope of expected changes in the requirements had been estimated;

b) second, the capability of modern equipment to meet these requirements, at the present time or in the near future, had been assessed.

4.1.2 With regard to the first phase, the group had concluded that the operational requirements concerning the critical parameters, i.e. visibility, present weather, cloud type and amount, and recent weather had not substantially changed and that similar information to that available currently would continue to be required in the future. Therefore, the task for the group consisted essentially of the assessment of automated weather systems to meet the **current** requirements.

4.1.3 As a result of discussions at the previous meetings, the group had concluded that the visibility was the only one of the five critical parameters which could be currently observed with fully automated systems. It had been recognized that substantial progress had also been made in other areas but some more work was still required before fully automated systems could be used in *lieu* of human observers.

4.2 Discussion

4.2.1 No new developments had been brought to the attention of the Secretary. Since no major developments in this area were reported at the AMOSSG/3 Meeting, Annex 3 would have to continue to reflect the fact that input from human observers would continue to be required for the observations of present weather, cloud amount and type, and recent weather. With respect to the cloud amount, it was suggested that automated systems already could meet the stated requirements and the harmonization of the techniques used was the only aspect which still needed to be addressed. This point of view was not shared by the entire group; it was felt that difficulties were still encountered under particular circumstances.

4.2.2 With regard to the present weather, it was suggested that the situation could change only if a critical review of the list of present weather phenomena required were undertaken. In this regard, the group recalled that it had carried out a thorough review at its second meeting and that no substantial simplifications in the present weather phenomena required had been achieved. Nevertheless, the group agreed that this issue could be re-addressed and therefore decided to include it in its future work programme.

4.3 Conclusion

4.3.1 The group agreed that the expected future requirements as included in the draft Amendment 73 to Annex 3 concerning the observation of present weather, cloud amount and type and recent weather could not yet be fully observed by automated systems without human intervention.

5. DEVELOPMENT OF GUIDANCE MATERIAL ON AUTOMATIC WEATHER OBSERVING SYSTEMS

5.1 Introduction

5.1.1 The group recalled that the need for guidance material had been addressed by the AMOSSG/1 and AMOSSG/2 Meetings and that an initial proposal developed by the Secretary had been considered at the second meeting.

5.2 Background

5.2.1 It was recalled that the group had been of the opinion that there was a need for guidance related to the use of automated observing systems. However, the group had realized that it would not be appropriate to include lengthy and detailed descriptions of automated weather observing systems in ICAO regulatory documents like Annex 3 — *Meteorological Service for International Air Navigation*. Therefore, the development of guidance material would seem to be the best solution.

5.2.2 Furthermore, the group had agreed at its second meeting that, in view of the fairly wide scope of the subject, the optimum solution would be the development, in coordination with WMO, of a new, stand-alone *Manual on Automated Weather Observing Systems at Aerodromes* rather than the inclusion of guidance in existing ICAO documents.

5.2.3 With regard to the time schedule to be followed, the group had concluded that it would not be realistic to develop a draft Manual before the proposed MET Divisional Meeting (2002) is convened due to two main reasons:

a) procedural reasons. The corresponding Standards and Recommended Practices (SARPs) would only be developed as part of Amendment 73 to Annex 3 for consideration by the MET Divisional Meeting (2002); and

b) practical reasons. The development of such a manual would be a major undertaking and active and prolonged participation by the members and advisors of the AMOSSG would be required.

In view of this, the group had agreed that the development of a manual on automated weather observing systems should be proposed to the MET Divisional Meeting (2002).

5.2.4 The group recalled that a draft outline of the content of the proposed *Manual on Automated Weather Observing Systems at Aerodromes* had been reviewed by the AMOSSG/2 Meeting. It had been agreed that, for initial planning purposes, the new manual would follow the structure of the second edition of the *Manual of Runway Visual Range Observing and Reporting Practices* (Doc 9328).

5.2.5 The group had noted that the outline was of a preliminary nature and that it did not include any details. It had been suggested that issues such as maintenance and back-up procedures should be well covered in the new manual under "Integrated automated observing systems". Also the importance of using common data processing for all the displays of meteorological information no matter whether they were located at the meteorological station or at an ATS unit should be highlighted. The importance of close coordination with WMO in developing the manual had been emphasized.

5.2.6 At this meeting, the importance of coordination with WMO was again highlighted. It was noted that the *Guide to Meteorological Instruments and Methods of Observation* (WMO — No. 8) included a lot of useful material and suggested that it should be used in this undertaking, where appropriate. With regard to coordination, Saad confirmed the point of view expressed by the Secretary concerning the excellent and continuous coordination between the two sister organizations.

5.2.7 Two additional issues were singled out by the group which should be covered to some extent in the guidance material to be developed: a) the use of remote sensing as part of automated weather observing systems; and b) the quality assurance of aeronautical meteorological observations.

5.3 **Draft content of the Manual**

5.3.1 The group agreed that following draft chapters should be included in the new Manual:

Introduction
Definitions and explanation of terms
Automatic observations of
surface wind

visibility
RVR
present weather
cloud
temperature and dew-point temperature
atmospheric pressure
supplementary information
Integrated automated observing systems
Use of remote sensing as part of automated weather observing systems
Reporting practices
Quality assurance of aeronautical meteorological observations

5.4 Conclusion

5.4.1 The group reconfirmed the course of action proposed at the AMOSSG/2 Meeting and agreed that a proposal for the development of a new *Manual on Automated Weather Observing Systems at Aerodromes* should be tabled for consideration by the upcoming MET Divisional Meeting (2002).

6. FUTURE WORK PROGRAMME OF THE GROUP

6.1 Introduction

6.1.1 Under this agenda item, the group reviewed its future work programme and addressed the need for the AMOSSG/4 Meeting.

6.2 List of tasks for future work

6.2.1 The group recalled that the future work programme had been last considered by the group at its second meeting in De Bilt (2001). The group updated its work programme. The updated version is at Attachment E. In this context, it was noted that, as a result of this meeting, the review of Chapter 4 of Annex 3 — *Meteorological Service for International Air Navigation* could be considered to be completed for the time being. The main future task would be the development of guidance material. The development of such guidance material would be considered by the upcoming MET Divisional Meeting (2002) and therefore, the task would be only undertaken by the group if endorsed by that meeting. Other future tasks included the continuing assessment of emerging weather observing systems to meet the Annex 3 requirements in respect of cloud amount and type, present weather and recent weather.

6.2.2 When reviewing the work programme, the group was aware of the fact that Amendment 73 to Annex 3 (applicability in 2004) would be considered by the upcoming MET Divisional Meeting (2002) and that the working papers for that meeting had to be completed during the next few weeks. Therefore, no additional material (except for the pending items identified in this SoD) could be included in the draft amendment to be submitted by the ICAO Secretariat after the AMOSSG/3 Meeting.

6.3 The AMOSSG/4 Meeting

6.3.1 The group was reminded that it was expected, like any study group, to progress the work by correspondence. In view of the rapid changes in the technology, it could, however, be assumed that all the issues could not be completed by correspondence and that another meeting would be required. For planning purposes, the group agreed that this meeting should be convened during the second half of the year 2003.

6.3.2 With regard to the venue, Bryan, the Chairman of the AMOSSG, made an offer to host the meeting in Perth, Australia. The group welcomed his kind offer. However, the Secretary indicated that, in view of the budget constraints of ICAO, a decisions had been made by the Air Navigation Bureau that all the study group meetings should be held at ICAO Headquarters in Montreal unless there were exceptional circumstances that would warrant another venue. The group took note of this information with some regret; it was felt that venues in States had permitted the Member of the host State to involve a larger number of advisors and experts in the work of the group which had been beneficial both for the group and the State concerned. In fact, such study group meetings had been an excellent opportunity for a larger number of experts to become familiar with the working methods and procedures of ICAO, which would not have been possible if the meetings had been held in Montreal.

— — — — — — — —

APPENDIX A

LIST OF PARTICIPANTS

NOMINATED BY	NAME	POSTAL ADDRESS	FAX/TELEX/CABLE
AUSTRALIA	Mr. Bryan Boase (member)	Regional Aviation and Defence Manager (Western Australia) Bureau of Meteorology P.O. Box 1370 West Perth WESTERN AUSTRALIA 6872	Tel.: + 61 8 92632205 Fax: + 61 8 92632297 E-mail: b.boase@bom.gov.au
CANADA	Mr. Bill Maynard (member)	Aeronautical Meteorologist Transport Canada (AARNB) Ottawa Ontario CANADA K1A 0N84	Tel: + 1 (613) 991 4946 Fax: + 1 (613) 998 7416 E-mail: maynarw@tc.gc.ca
	Mr. Earle Robinson (advisor)	AWOS-Next Manager Atmospheric Monitoring & Water Survey Directorate Meteorological Service of Canada 4905 Dufferin Street Downsview, Ontario M3H 5T4 CANADA	Tel: +1 416 739 4586 Fax: +1 416 739 4261 E-mail: earle.robinson@ec.gc.ca
FINLAND	Mr. Pekka Utela (alternate)	Vaisala Oy Business Unit Manager, Optical Sensors Surface Weather Division P. O. Box 26 FIN-00421 Helsinki FINLAND	Tel: + 358 9 894 92575 Fax: + 358 9 894 92568 E-mail: pekka.utela@vaisala.com
	Mr. Timo Honkanen (advisor)	Vaisala Oy Product Manager Aviation Weather Business Unit P. O. Box 26 FIN-00421 Helsinki FINLAND	Tel: + 358 9 894 92852 Fax: + 358 9 894 92980 E-mail: timo.honkanen@vaisala.com
FRANCE	Mr. Michel Leroy (member)	Météo-France Chef du Département de l'Observation au sol, DSO/DOS/D BP 202 78 195 Trappes Cedsc FRANCE	Tel: + 33 1 30 13 64 05 Fax: + 33 1 30 13 60 20 E-mail: michel.leroy@meteo.fr
	Mr. Denis Lambergeon (advisor)	Météo-France Direction Générale (D2I/Aéro) 1, Quai Branly 75340 Paris, Cedex 07 FRANCE	Tel: + 33 1 45 56 74 94 Fax: + 33 1 45 56 7005 E-mail: denis.lambergeon@meteo.fr

NOMINATED BY	NAME	POSTAL ADDRESS	FAX/TELEX/CABLE
	Mr. Michel Rocca (advisor)	Direction Générale Aviation Civile (DGAC)	Tel: + 33 2 99 29 52 71 Fax: + 33 2 99 29 5272 E-mail: michel.rocca@aviation-civile.gouv.fr
NETHERLANDS	Mr. Wil van Dijk (member)	Royal Netherlands MET Institute (KNMI) Project Manager Observations & Modelling Department P.O. Box 201, 3730 AE De Bilt NETHERLANDS	Tel: +3l 30 2206324 Fax: +3l 30 2210407 E-mail: dijkvanw@knmi.nl
	Mr. Kees Blom (adviser)	KNMI Unit Nowcasting Forecasting & Advisory Department P.O. Box 201, 3730 AE De Bilt NETHERLANDS	Tel.: + 31 30 220 66 56 Fax: + 31 30 221 0407 E-mail: blom@knmi.nl
UNITED KINGDOM	Mr. Andy Wells (member)	UK Met Authority Civil Aviation Authority K6G5 CAA House 45-59 Kingsway London WC2B 6TE UNITED KINGDOM	Tel: + 44 (0) 20 7453 6527 Fax: + 44 (0) 20 7453 6565 E-mail: andy.wells@dap.caa.co.uk
	Mr. Darren Hardy (advisor)	The MET Office Sutton House London Road, Bracknell Berkshire RG12 2SY UNITED KINGDOM	Tel: + 44 1 344 85 6268/85 4892 Fax: + 44 1 344 85 4156 E-mail: darren.hardy@metoffice.com
UNITED STATES	Mr. Kevin Browne (member)	ARS-100 FEDERAL AVIATION ADMINISTRATION (FAA) 400 - 7th Street S.W. Washington, DC 20590 UNITED STATES	Tel: + 1 202-385-7706 Fax: +1 202-385-7701 E-mail: kevin.browne@faa.gov
	Mr. Richard Stone (advisor)	U.S. National Weather Service (0523) 1325 East-West Highway Silver Spring, MD 20910-3283 UNITED STATES	Tel: + 1 301 713 1726, ext. 153 Fax: + 1 301 713 1598 E-mail: richard.stone@noaa.gov
	Mr. Stephen Albersheim (advisor)	Senior Weather Analyst ARS-100 FEDERAL AVIATION ADMINISTRATION (FAA) 400 - 7th Street S.W. Washington, DC 20590 UNITED STATES or DOT/FAA/ARW-100 Washington, DC 20591 re: AMOSSG	Tel: + 1 202-385-7707 Fax: + 1202-385-7701 E-mail: steven.albersheim@faa.gov
ASECNA	Mr. Akoa Benoît Okossi (member)	Direction Générale ASECNA Chef Bureau Normalisation Réglementation et Procédures MET BP 10.622 Dakar SENEGAL	Tel.: + 221 633 00 99 Fax : + 221 849 68 07 E-mail: okossiben@asecna.org

NOMINATED BY	NAME	POSTAL ADDRESS	FAX/TELEX/CABLE
IATA	**Mr. Walter Pete Woveris (member)**	**Manager Weather Fedex 3796 Lamar Avenue 2nd Floor Memphis, TN 38118 UNITED STATES**	**Tel.: +1 901 224 8493 Fax: +1 901 224 8278 E-mail: wpwoveris@fedex.com**
	Mr. Marc Landreville (advisor)	**19495 County Road 43 RR#5 Alexandria. Ontario CANADA K0C 1A0**	**Tel.: +1 613 525 9954 Fax.: +1 613 347 3735 E-mail: marc@wxsat.com**
WMO	**Mr. Saad Benarafa (member)**	**Aeronautical Meteorology Unit World Weather Watch Applications Department World Meteorological Organization 7 bis, avenue de la Paix, Case postale 2300 CH-1211, Geneva 2 SWITZERLAND**	**Tel: + 41 22 730 84 08 Fax: + 41 22 730 80 21 E-mail: benarafa_s@gateway.wmo.ch**

Secretary:

Olli M. Turpeinen
999 University
Montreal, Québec
Canada H3C 5H7
tel.: +1 514 954 8219 ext. 8195
fax: +1 514 954 6759
E-mail: oturpeinen@icao.int

— — — — — — — —

APPENDIX B

LIST OF WORKING PAPERS

PART I — WORKING PAPERS IN ORDER OF WP NUMBERS

SN No.	Presented by	Title	Agenda Item
SN 01	Secretariat	Provisional Agenda	4
SN 02	Secretariat	Draft Amendment to Annex 3	5
SN 03	Secretariat	Assessment of the current capability of automatic observing systems to meet the expected future requirements	6
SN 04	Secretariat	Development of guidance material on automatic weather observing systems	7
SN 05	Secretariat	Future work programme of the group	8
SN 06	Wil van Dijk	Report of the GUST	5
SN 07	Wil van Dijk	Review of the proposed Amendment 73	5
SN 08	Wil van Dijk	Prevailing visibility	5
SN 09	Michel Leroy	Analysis of Annex 3 visibility requirements, definition of prevailing visibility	5
SN 10	Benoit Okossi	Comments on paragraphs 4.8.4 to 4.8.6 and 4.12.3	5
SN 11	E. Robinson	Integration considerations for RVR and visibility	5
SN 12	E. Robinson	Present weather reporting considerations	5

PART II — WORKING PAPERS IN ORDER OF AGENDA ITEMS

Agenda item	**WP No.**
4	SN 01
5	SN 02, SN 06, SN 07, SN 08, SN 09, SN 10, SN 11, SN 12
6	SN 03
7	SN 04
8	SN 05

— — — — — — — —

APPENDIX C

AMENDMENT PROPOSALS TO CHAPTER 4 AND 6 OF ANNEX 3
(including only provisions which have been amended by the group; the rest of proposal remains as indicated in Study Note No. 2)
TO BE INCLUDED IN DRAFT AMENDMENT 73 TO ANNEX 3

NOTE: PROVISIONS RELATED TO "PREVAILING VISIBILITY" ARE AT ATTACHMENT D

AMENDMENT PROPOSALS TO
ANNEX 3 FOR INCLUSION IN AMENDMENT 73
(applicable November 2004)

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

METEOROLOGICAL SERVICE
FOR INTERNATIONAL AIR NAVIGATION

Editorial Note.— Only provisions amended by the AMOSSG/3 Meeting are included in the summary of discussion. The rest of the provisions remain as in Study Note No. 2

CHAPTER 4. METEOROLOGICAL OBSERVATIONS AND REPORTS

• • • • •

4.1.10 **Recommendation.**— Where an integrated automatic system is used for the dissemination/display of meteorological information, it should be capable of accepting the manual insertion of data covering those meteorological elements which cannot be observed by automatic means.

• • • • •

4.2 Routine observations and reports

• • • • •

4.2.3 At aerodromes that are not operational throughout 24 hours in accordance with 4.2.1, two METAR reports shall be issued prior to the aerodrome resuming operations.

• • • • •

4.3 Special observations and reports

• • • • •

4.3.3 At aerodromes that are not operational throughout 24 hours in accordance with 4.2.1, SPECI reports shall be issued, as necessary, upon resumption of the issuance of METAR reports.

• • • • •

4.5 Observing and reporting of

surface wind

• • • • •

REPRESENTATIVENESS:

• • • • •

4.5.3 **Recommendation.** — ~~*Surface wind observations made for*~~ *For reports in the METAR/SPECI code forms, the surface wind observations should be representative of conditions at a height of ~~6 to~~ approximately 10 m (~~20 to~~ 30 ft) above the whole runway where there is only one runway and the whole runway complex where there is more than one runway.*

SITING:

4.5.3~~3~~4 Recommendation.— *Representative surface wind observations should be obtained by the use of sensors appropriately sited ~~as determined by local conditions~~. Sensors for surface wind observations for local routine and special reports should be sited to give the best practicable indication of conditions along the runway~~, e.g. lift-off~~ and touchdown zone~~s~~. At aerodromes where topography or prevalent weather conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.*

AVERAGING:

• • • • •

4.5.8 **Recommendation.**— *The averaging period for measuring variations in the mean wind speed (gusts) in accordance with 4.5.9 c) should be 3 seconds for local routine and special reports and for METAR and SPECI reports.*

REPORTING:

4.5.6~~9~~ ~~**Recommendation.**—~~ In local routine and special reports and in reports in the METAR/SPECI code forms:~~;~~

a) the units of measurement used for the wind speed shall be indicated;

b) variations in the mean wind direction ~~should~~ referring to the past 10 minutes shall be ~~given~~ reported as follows, if the total variation is 60° or more~~;~~:

1) when the total variation is between 60° and 180° and the wind speed is 6 km/h (3 kt) or more such directional variations ~~should be expressed~~ shall be reported as the two extreme directions between which the surface wind has varied ~~during the past 10 minutes.~~: and

2) when the total variation is 180° or more; or when the total variation is between 60° and 180° and the wind speed is less than 6 km/h (3 kt), the wind direction shall be reported as variable with no mean wind direction.

c) variations from the mean wind speed (gusts) during the past 10 minutes ~~should~~ shall be reported ~~only~~ when ~~the variation from~~ the maximum wind speed exceeds the mean speed ~~is~~ by 20 km/h (10 kt) or more; ~~such speed variations (gusts) should be expressed as the maximum and minimum speeds attained;~~

d) when a wind speed of 200 km/h (100 kt) or more is reported, it shall be indicated as 200 km/h (100 kt); and

e) when the 10-minute period includes a marked discontinuity in the wind direction and/or speed, only variations ~~in~~ from the mean wind direction and mean wind speed occurring since the discontinuity ~~should~~ shall be reported. ~~The variations in direction and speed should be derived:~~

~~a) for non-automated systems from the wind direction and speed indicators or from the anemograph recorder trace if available; and/or~~

~~b) for automated systems from the actual measured values of wind direction and speed, and not from the 2-minute and 10-minute running averages required under 4.5.5.~~

Note.— See note under 4.5.5.

4.5.~~8~~10 **~~Recommendation.—~~** In local routine and special reports:~~,~~

~~the name of the element should be given. The wind direction and speed and significant variations thereof should be given; the wind direction should be given in three figures rounded to the nearest 10 degrees true; this should be followed by "/" and by the wind speed; the units used for speed should be kilometres per hour or knots and should be indicated in the written form of the message.~~

a) if the surface wind is observed from more than one location along the runway, the locations for which these values are representative ~~should~~ shall be indicated, ~~as necessary~~;

b) when there is more than one runway in use and the surface wind related to these runways is observed, the available wind values for each runway ~~should~~ shall be given~~, as necessary~~, and the runways to which the values refer ~~should~~ shall be reported~~.~~;

c) when ~~directional~~ variations from the mean wind direction are ~~to be~~ reported in accordance with 4.5.8 b) 2), the two extreme directions between which the surface wind has varied ~~should~~ shall be reported ~~in degrees.~~;

d) when variations from the mean speed (gusts) are ~~to be~~ reported in accordance with 4.5.8 c), they ~~should~~ shall be reported as the maximum and minimum values of the wind speed attained ~~in kilometres per hour or knots. When the wind speed is less than 2 km/h (1 kt), this should be indicated as calm. When a wind speed of 200 km/h (100 kt) or more is reported, it should be indicated as 200 km/h (100 kt). No mean wind direction should be indicated for variable winds with a total variation of 60° or more when:~~;

~~a) variations in wind direction are less than 180° and the mean wind speed is 6 km/h (3 kt) or less ; the two extreme directions between which the wind has varied should be indicated; or~~

~~b) variations in wind direction are 180° or more; or where it is not possible to report a mean wind direction, for example, when a thunderstorm passes over the aerodrome; the wind should be indicated as variable with no reference to the two extreme directions between which the wind has varied.~~

• • • • •

4.6 Observing and reporting of visibility

• • • • •

REPRESENTATIVENESS

• • • • •

4.6.3 **Recommendation.**— ~~*Visibility observations made for*~~ *For reports in the METAR/SPECI code forms, the visibility observations should be representative of the aerodrome* ~~*and its immediate vicinity; in such observations special attention should be given to significant directional variations*~~*.*

SITING

4.6.4 **Recommendation.** — *When instrumented systems are used for the measurement of visibility, representative visibility observations should be obtained by the use of sensors appropriately sited. Sensors for visibility observations for local routine and special reports should be sited to give the best practicable indications of visibility along the runway and touchdown zone. The visibility should be measured at a height of approximately 2.5 m (7.5 ft).*

• • • • •

4.7 Observing and reporting of runway visual range

• • • • •

4.7.~~6~~3 ~~**Recommendation.**—~~ The runway visual range ~~should~~ observations made in accordance with 4.7.1 and 4.7.2 shall be reported in metres in accordance with the reporting steps specified in 4.7.14 throughout periods when either the ~~horizontal~~ visibility or the runway visual range is ~~observed to be~~ less than 1 500 m.

• • • • •

DISPLAYS

4.7.9 Where runway visual range is determined by instrumented~~ means~~ systems, one~~ indicator~~ display or more if required, shall be located in the meteorological station with corresponding~~ indicators~~ displays, in the appropriate air traffic services units. The~~ indicators~~ displays in the meteorological station and in the air traffic services units shall be~~ connected~~ related to the same~~ measuring device(s)~~ sensors, and where separate sensors are required as specified in 4.7.6, the displays shall be clearly marked to identify the runway and section of runway monitored by each sensor.

• • • • •

LIGHT INTENSITY

4.7.11~~1~~2 **Recommendation.—** *When instrumented systems are used for the assessment of runway visual range, computations should be made separately for each available runway. Whatever intensities are used, RVR should not be computed for a light intensity of 3 per cent or less of the maximum light intensity available on a runway. For local routine and special reports, the light intensity to be used for the computation should be:*

a) for a runway with the lights switched on, the light intensity actually in use on that runway;

b) for a runway with lights switched off (or at the lowest setting pending the resumption of operations), the optimum light intensity that would be appropriate for operational use in the prevailing conditions.

In reports in the METAR/SPECI code forms, the runway visual range should be based~~ on the same light intensity settings as those appropriate for use during take-off and landing at the time the report is made~~ on the maximum light intensity available on the runway~~, but excluding any temporary changes in the light intensity settings~~.

Note.— Guidance on the conversion of instrumented readings into runway visual range is given in Attachment D.

• • • • •

REPORTING

• • • • •

4.7.16~~7~~ ~~**Recommendation.—**~~ In local routine and special reports~~ the name of the element should be given in abbreviated form and~~:

a) the units of measurement used~~ should~~ shall be included.~~ When runway visual range is above the maximum value which can be determined by the system in use, it should be reported using the term "ABV" followed by the maximum value that can be determined by the system. When the~~

~~runway visual range is below the minimum value which can be determined by the system in use, it should be reported using the term "BLW" followed by the minimum value that can be determined by that system.~~

b) if runway visual range is observed from only one location along the runway,~~ about 300 m from the threshold~~ i.e. the touchdown zone, it~~ should~~ shall be included without any indication of location~~.~~;

c) if the runway visual range is observed from more than one location along the runway, the value representative of the touchdown zone~~ should~~ shall be~~ given~~ reported first, followed by the values representative of the mid-point and stop-end~~. The~~ and the locations for which these values are representative~~ should~~ shall be indicated~~ as "TDZ", "MID" and "END", respectively.~~; and

d) when there is more than one runway in use, the available runway visual range values for each runway~~ should~~ shall be~~ given~~ reported and the runways to which the values refer~~ should~~ shall be indicated~~; if more than one runway is in use, but runway visual range is available only for one runway, that information should be indicated~~.

• • • • •

4.7.17~~7~~8 **Recommendation.—** *In reports in the METAR/SPECI code forms:*

e) only the value representative of the touchdown zone should be~~ given~~ reported and no indication of location on the runway should be included~~.~~;

f) where there is more than one runway available for landing, touchdown zone runway visual range values should be included for all such runways, up to a maximum of four, and the runways to which the values refer should be indicated.

• • • • •

4.8 Observing and reporting of present weather

• • • • •

Editorial Note.— Delete the proposed paragraph 4.8.6.

REPORTING

4.8.3~~6~~ ~~**Recommendation.—**~~ In local routine and special reports and in reports in the METAR/SPECI code forms, observed present weather phenomena~~ should~~ shall be reported in terms of type and characteristics and qualified with respect to intensity or proximity to the aerodrome, as appropriate.

• • • • •

4.8.5~~9~~ **Recommendation.—***In local routine and special reports and in reports in the METAR/SPECI code forms, the characteristics of the present weather phenomena which should be reported, as necessary, and their respective abbreviations are as follows:*

Thunderstorm *TS*

— Used to report a thunderstorm with rain "TSRA", snow "TSSN", ice pellets "TSPL", hail "TSGR" or small hail and/or snow pellets "TSGS" or combinations thereof, for example, "TSRASN". When thunder is heard or lightning is detected within 8 km of the aerodrome reference point during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" should be used without qualification. When thunder is heard or lightning is detected between 8 km and 16 km of the aerodrome reference point during the 10-minute period preceding the time of observation but no precipitation is observed at the aerodrome, the abbreviation "TS" with the qualifier "....." should be used.

Shower *SH*

— Used to report showers of rain "SHRA", snow "SHSN", ice pellets "SHPL", hail "SHGR", small hail and/or snow pellets "SHGS", or combinations thereof, for example "SHRASN". Showers observed in the vicinity of the aerodrome (see 4.8.6) should be reported as "VCSH" without qualification regarding type or intensity of precipitation.

Freezing (supercooled water droplets or precipitation, used only with FG, DZ and RA) *FZ*

Blowing *BL*

— Used to report DU, SA or SN ~~(including snowstorm)~~ raised by the wind to a height of 2 m (6 ft) or more above the ground; in the case of snow, also used to report snow falling from a cloud and mixed with snow raised by the wind from the ground.

Low drifting (used with DU, SA or SN raised by the wind to less than 2 m (6 ft) above ground level) *DR*

Shallow (less than 2 m (6 ft) above ground level) *MI*

Patches (fog patches randomly covering the aerodrome) *BC*

Partial (a substantial part of the aerodrome covered by fog while the remainder is clear) *PR*

4.8.~~6~~10 **Recommendation.—** *In local routine and special reports and in reports in the METAR/SPECI code forms, the relevant intensity or, as appropriate, the proximity to the aerodrome of the reported present weather phenomena should be indicated as follows:*

	(~~abbreviated plain language~~ local routine and special reports)	*(METAR/SPECI)*
Light	*FBL*	*–*
Moderate	*MOD*	*(no indication)*
Heavy	*HVY*	*+*

— Used only with~~: precipitation; SH and TS~~ DZ, GR, GS, PL, RA, SG and SN (or in combinations involving these present weather types; ~~(~~in these cases intensity refers to precipitation in accordance with 4.8.7); ~~BLDU; BLSA; BLSN;~~ DS; and SS~~; and PO, FC (~~in ~~these~~ the cases ~~HVY means well developed~~ of DS and SS only moderate and heavy intensities to be indicated).

Vicinity VC

— Not at the aerodrome but not further away than approximately 8 km from the aerodrome perimeter and used only in reports in the METAR/SPECI code forms with DS, SS, FG, FC, SH, PO, BLDU, BLSA, BLSN and VA~~ and TS~~ when not reported under 4.8.5.

• • • • •

4.9 Observing and reporting of cloud or vertical visibility

• • • • •

REPRESENTATIVENESS

4.9.~~3~~2 **Recommendation.—** *Cloud observations for local routine and special reports should be representative of the approach area .~~or, in the case of aerodromes with precision approach runways, of the middle marker site of the instrument landing system.~~*

~~*Note.— Specifications concerning the middle marker site of an instrument landing system are given in Annex 10, Volume I, Chapter 3 and Attachment C, Table C-5.*~~

MANUAL INSERTION

4.9.~~2~~4 **Recommendation.—** *Where~~ ceilometers~~ observations of cloud amount and the height of cloud base are made ~~used as a part of automated~~ using automatic observing equipment~~ to measure height of cloud base~~, provision should be made for manual insertion of cloud amounts and, where appropriate, cloud type~~(s)~~, together with the heights of those layers or masses not directly measurable by~~the ceilometer(s)~~ that equipment.*

SITING

4.9.5 **Recommendation.** — *When instrumented systems are used for the measurement of the cloud amount and the height of cloud base, representative observations should be obtained by the use of sensors appropriately sited. Sensors for cloud amount and height of cloud base observations for local routine and special reports should be sited to give the best practicable indications of the height of cloud base and cloud amount at the middle marker site of the instrument landing system or, at aerodromes where a middle marker beacon is not used, at a distance of 900 to 1 200 m (3 000 to 4 000 ft) from the landing threshold at the approach end of the runway.*

Note.— Specifications concerning the middle marker site of an instrument landing system are given in Annex 10, Volume I, Chapter 3 and Attachment C, Table C-5.

Editorial Note.— Delete the proposed paragraph 4.9.6.

• • • • •

REPORTING

Editorial Note.— Delete the proposed paragraph 4.9.8.

4.9.5~~7~~ Recommendation.— In local routine and special reports and in reports in the METAR/SPECI code forms, ~~the name of the element should be given together with~~

a) cloud amount should be reported using the abbreviations "FEW" (1 to 2 oktas), "SCT" (3 to 4 oktas), "BKN" (5 to 7 oktas) or "OVC" (8 oktas)~~.~~;

b) cumulonimbus clouds and towering cumulus clouds should be indicated as "CB" and "TCU", respectively;

c) the height of cloud base should be reported in steps of 30 m (100 ft) up to 3 000 m (10 000 ft) and in steps of 300 m (1 000 ft) above 3 000 m (10 000 ft);

d) the vertical visibility should be reported in steps of 30 m (100 ft) up to 600 m (2 000 ft);

e) if there are no clouds and no restriction on vertical visibility and the abbreviation "CAVOK" is not appropriate, the abbreviation "SKC"should be used~~.~~;

f) if there are no clouds of operational significance, i.e. below 1 500 m (5 000ft) or below the highest minimum sector altitude, whichever is greater, no cumulonimbus and no restriction on vertical visibility and the abbreviations "CAVOK" and "SKC" are not appropriate, the abbreviation "NSC" should be used~~. When the sky is obscured and information on vertical visibility is available, it should be reported. as shown in the template in Appendix 2.~~;

g) when several layers or masses of cloud of operational significance are observed, their amount and height ~~should~~ of cloud base shall be reported in the following order:

~~a~~1) the lowest layer or mass, regardless of amount to be reported as FEW, SCT, BKN or OVC as appropriate;

~~b~~2) the next layer or mass, covering more than 2/8 to be reported as SCT, BKN or OVC as appropriate;

~~c~~3) the next higher layer or mass, covering more than 4/8 to be reported as BKN or OVC as appropriate;

~~d~~4) cumulonimbus ~~(CB)~~ and/or towering cumulus clouds ~~(TCU)~~, whenever observed and not reported in a) to c) above.

~~The type of cloud should be identified only for cumulonimbus and towering cumulus when observed at or near the aerodrome. The height of the base of cloud should be reported in steps of 30 m (100 ft) up to 3 000 m (10 000 ft) together with the units used and in steps of 300 m (1 000 ft) above 3 000 m (10 000 ft).~~

h) when the cloud base is diffuse or ragged or fluctuating rapidly, the minimum height of the cloud, or cloud fragments, should be reported. ~~given, followed by the relevant abbreviation . When an individual layer (mass) of cloud is composed of cumulonimbus and towering cumulus clouds with a common cloud base, the type of cloud should be reported as cumulonimbus only.~~

Note.— Towering cumulus ~~is used to~~ indicates cumulus congestus clouds of great vertical extent.

4.9.8 In local routine and special reports,

a) the units of measurement used for the height of cloud base and vertical visibility shall be indicated;

b) when there is more than one runway in use and cloud heights are observed by instruments for these runways, the available cloud height values for each runway ~~should~~ shall be reported ~~given, as necessary,~~ and the runways to which the values refer ~~should~~ shall be indicated~~.~~

4.10 Observing and reporting of air temperature and dew-point temperature

• • • • •

REPORTING

4.10.3 ~~**Recommendation.—**~~ In local routine and special reports and in reports in the METAR/SPECI code forms, ~~the air temperature should be identified by "T" and the dew-point temperature by "DP". For~~ a temperature below 0°C ~~the value should~~ shall be preceded by ~~"MS"~~ "M".

Editorial Note: — Delete the proposed paragraph 4.10.4

4.11 Observing and reporting of pressure values

• • • • •

DISPLAY

4.11.2 When automated systems are used for the measurement of pressure, QNH and, if required in accordance with 4.11.3, QFE displays relating to the barometer shall be located in the meteorological station with corresponding displays in the appropriate air traffic services units. When QFE values are displayed for more than one runway, as specified in 4.11.3, the displays shall be clearly marked to identify the runway to which the QFE value displayed refers.

• • • • •

REPORTING

4.11.4 ~~**Recommendation.—**~~ In local routine and special reports:

a) QNH ~~should~~ shall be included ~~regularly and~~;

b) QFE ~~should~~ shall be included ~~either on request~~ if required by users or, if so agreed locally between the meteorological and air traffic services authorities and operators concerned, on a regular basis;

c) ~~. Those~~ the units of measurement used for QNH and QFE values ~~should~~ shall be included; and ~~rounded down to the nearest lower whole hectopascal and given in four digits together with the units used~~.

d) If QFE values are required for more than one runway, the required QFE values ~~should be indicated using four digits~~ for each runway shall be reported and the runways to which the values refer shall be indicated.

• • • • •

Editorial Note: — New text.

4.13 Reporting of meteorological information from automated meteorological observing systems

4.13.1 **Recommendation. —** *Where automated meteorological observing systems are used, during non-operational hours of the aerodrome, reports from automated meteorological observing systems should be issued in the METAR/SPECI code forms and these reports should be identified with the word "AUTO".*

REPORTING

4.13.2 **Recommendation. —** *In automated reports in the METAR/SPECI code forms, surface wind, runway visual range, cloud or vertical visibility, air temperature and dew-point temperature, pressure values and supplementary information should be reported in accordance with provisions relevant to reports in the METAR/SPECI code forms included in Sections 4.5, 4.7, 4.9, 4.10, 4.11 and 4.12, respectively.*

4.13.3 **Recommendation. —** *In automated reports in the METAR/SPECI code forms, visibility should be reported as the minimum value of the visibility readings available from all visibility sensors available at the aerodrome.*

4.13.4 **Recommendation.—** *In automated reports in the METAR/SPECI code forms, present weather should be reported in accordance with provisions relevant to reports in the METAR/SPECI code forms included in Section 4.8. However, in addition to the precipitation types listed under 4.8.5 a), the abbreviation UP should be used for unidentified precipitation when the type of precipitation cannot be identified by the automated observing system.*

Editorial Note: — Delete the proposed paragraphs 4.13.4, 4.13.5 and 4.13.6.

Editorial Note: — End of new text.

4.~~13~~14 Contents of reports

4.~~13~~14.1 ~~**Recommendation.—**~~ Local routine and special reports and routine and special reports in the METAR/SPECI code forms ~~should~~ shall contain the following information in the order indicated, except that local special reports need not contain information as provided for under 4.3.3:

a) identification of the type of report;

b) location indicator;

c) time of the observation;

d) surface wind direction and speed;

e) visibility;

f) runway visual range, when applicable;

g) present weather;

h) cloud amount, cloud type (only for cumulonimbus and towering cumulus clouds ~~at or near the aerodrome~~) and height of cloud base or vertical visibility;

i) air temperature and dew-point temperature;

j) QNH and, when applicable, QFE (QFE included only in local routine and special reports ~~by agreement between the meteorological and air traffic services authorities and operators concerned)~~;

~~k) supplementary information.~~

Note ~~1~~.— The location indicators referred to under b) and their significations are published in ICAO Doc 7910 — Location Indicators.

Note 2.— For explanation of towering cumulus see note following 4.9.~~5~~9.

Editorial Note: —Amend in 4.14.3 “obtain” to read “occur”.

CHAPTER 6. FORECASTS

• • • • •

6.2 Aerodrome forecasts

• • • • •

Editorial Note: —Delete the note following the proposed paragraph 6.2.5.

APPENDIX 2 TECHNICAL SPECIFICATIONS FOR LOCAL ROUTINE REPORTS, LOCAL SPECIAL REPORTS AND REPORTS IN THE METAR/SPECI CODE FORMS

(*See Chapter 4 of this Annex)*

Table 1. Template for the local routine (MET REPORT) and local special (SPECIAL) report

Key:

M = inclusion mandatory, part of every message
C = inclusion conditional, dependent on meteorological conditions
O = inclusion optional

Note 1. — The ranges and resolutions for the numerical elements included in the local routine and special reports are shown in Table 4 of this appendix.

Note 2.— The explanations for the abbreviations used can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

ELEMENT AS SPECIFIED IN CHAPTER 4	DETAILED CONTENT	TEMPLATE(S)				EXAMPLES
.....						
Present weather (C)[9,10]	Intensity or proximity of present weather (C)[11]	FBL *or* MOD *or* HVY	—	~~VC~~	CAVOK	
	Characteristics and type of present weather (M)[12]	DZ *or* RA *or* SN *or* SG *or* PL *or* ~~IC *or*~~ GR *or* GS *or* DS *or* SS *or* ~~TS *or*~~ TSRA *or* TSSN *or* TSPL *or* TSGR *or* TSGS *or* SHRA *or* SHSN *or* SHPL *or* SHGR *or* SHGS *or* FZRA *or* FZDZ ~~*or* BLSN *or* BLSA *or* BLDU *or* PO *or* FC~~	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* FZFG *or* BLSN *or* BLSA *or* BLDU *or* DRSN *or* DRSA *or* DRDU *or* MIFG *or* BCFG *or* PRFG	~~FG *or* PO *or* FC *or* DS *or* SS *or* TS *or* SH *or* BLSN *or* BLSA *or* BLDU~~		MOD RA; HZ; ~~VCFG;~~ HVY TSRA; FG; ~~VCSH;~~ HVY DZ; VA; ~~VCTS;~~ FBL SN; MIFG; ~~VCBLSA;~~ HVY TSRASN; FBL SNRA; FBL DZ FG; HVY SHSN ~~MOD~~ BLSN;
.....						
Supplementary information (C)[9]	Significant met. phenomena (C)[9]	CB *or* TS *or* MOD TURB *or* SEV TURB *or* WS *or* GR *or* SEV SQL *or* MOD ICE *or* SEV ICE *or* FZDZ *or* FZRA *or* SEV MTW *or* SS *or* DS *or* BLSN *or* FC[15]				FC IN APCH; WS IN APCH WIND AT 60M 360/50KMH; WS RWY 12;
	Location of the phenomenon (C)[9]	IN APCH *or* IN CLIMB-OUT *or* RWYnnn				

ELEMENT AS SPECIFIED IN CHAPTER 4	DETAILED CONTENT	TEMPLATE(S)					EXAMPLES
	Recent weather (C)[9]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RE[SH]SN *or* RE[SH]SG *or* RE~~[SH]~~PL *or* REIC *or* RE[SH]GR *or* RE[SH]GS *or* REBLSN *or* RESS *or* REDS *or* RETS *or* REFC *or* REVA					REFZRA; CB IN CLIMB-OUT RETS;
Trend forecast (O)[16]	Name of the element (M)	TREND					
	Change indicator (M)	NOSIG	BECMG or TEMPO				TREND NOSIG; TREND BECMG FEW 600M; (TREND BECMG FEW 2000FT);
	Period of change (C)[9]		FMnnnn *and/or* TLnnnn *or* ATnnnn				
	Wind (C)[9]		nnn/[ABV]nn[n]KMH [MAX[ABV]nn[n]] *or* nnn/[ABV]nnKT [MAX[ABV]nn]				TREND TEMPO 250/70KMH MAX 100; (TREND TEMPO 250/35KT MAX 50);
	Visibility (C)[9]		VIS nnnnM *or* VIS nnKM			CAVOK	TREND BECMG AT1800 VIS 10KM NSW; TREND BECMG TL1700 VIS 800M FG; TREND BECMG FM1030 TL1130 CAVOK;
	Weather phenomenon: intensity (C)[11]		FBL *or* MOD *or* HVY	—	NSW		TREND TEMPO TL1200 VIS 600M BECMG AT1200 VIS 8KM NSW NSC;
	Weather phenomenon: characteristics and type (C)[9, 10, 12]		DZ *or* RA *or* SN *or* SG *or* PL *or* ~~IC *or*~~ GR *or* GS *or* DS *or* SS ~~*or* TS~~ *or* TSRA *or* TSSN *or* TSPL *or* TSGR *or* TSGS *or* SHRA *or* SHSN *or* SHPL *or* SHGR *or* SHGS *or* FZRA *or* FZDZ ~~*or* BLSN *or* BLSA *or* BLDU *or* PO *or* FC~~	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* FZFG *or* BLSN *or* BLSA *or* BLDU *or* DRSN *or* DRSA *or* DRDU *or* MIFG *or* BCFG *or* PRFG			TREND TEMPO FM0300 TL0430 MOD FZRA; TREND BECMG FM1900 VIS 500M HVY SNRA; TREND BECMG FM1100 MOD SN TEMPO FM1130 ~~MOD~~ BLSN;
	Cloud amount and vertical visibility (C)[9]		FEW *or* SCT *or* BKN *or* OVC	OBSC	SKC *or* NSC		TREND BECMG AT1130 OVC 300M; (TREND BECMG AT1130 OVC 1000FT);
	Cloud type (C)[9]		CB *or* TCU	—			TREND TEMPO TL1530 HVY SHRA BKN CB 360M; (TREND TEMPO TL1530 HVY SHRA BKN CB 1200FT);
	Height of base or the value of vertical visibility (C)[9]		nnnnM *or* nnnnFT	[VER VIS nnnM *or* VER VIS nnnnFT]			

Notes. —

1. Fictitious location;
2. Optional values for one or more runways;
3. Optional values for one or more sections of the runway;
4. To be included if the maximum is exceeding the mean speed by 20 km/h (10 kt);
5. To be included if the directional variations $ 60Ebut < 180°and the wind speed ~~> 6 km/h (3 kt)~~ $ 6 km/h (3 kt);
6. To be included if visibility or RVR < 1500 m;

7. To be included if more than one runway in use;
8. To be included if RVR is observed from more than one location along the runway;
9. To be included whenever applicable;
10. One or more, up to a maximum of three groups;
11. To be included whenever applicable; ~~only qualifiers MOD and HVY (i.e. well-developed) to be used with PO and FC;~~
12. Precipitation types DZ, RA, SN, SG, PL, IC, GR and GS may be combined, where appropriate. Only moderate or heavy precipitation to be indicated in trend forecasts;
13. Up to four cloud layers;
14. Optional element;
15. Any of the phenomena, or combinations thereof. Abbreviated plain language to be used to amplify the phenomena, as necessary.
16. To be included subject to Regional Air Navigation Agreement;

• • • • •

Table 2. Template for reports in the METAR/SPECI code forms

Key: M = inclusion mandatory, part of every message
C = inclusion conditional, dependent on meteorological conditions or method of observation
O = inclusion optional

Note 1. — The ranges and resolutions for the numerical elements included in reports in the METAR/SPECI code forms are shown in Table 5 of this appendix.

Note 2.— The explanations for the abbreviations used can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

ELEMENT AS SPECIFIED IN CHAPTER 4	DETAILED CONTENT	TEMPLATE(S)	EXAMPLES
Identification of the type of report (M)	Type of the report (M)	METAR, METAR COR, SPECI *or* SPECI COR	METAR; METAR COR; SPECI
Location indicator (M)	ICAO location indicator (M)	nnnn	YUDO[1]
Time of the observation (M)	Date and time of the observation in UTC (M)	nnnnnnZ	221630Z
Identification of a missing report (C)[16]	Missing report identifier (C)	NIL	NIL
END OF THE METAR REPORT IF THE REPORT IS MISSING			
Identification of reports from automated meteoro-logical observing systems (C)[17]	Identification of the report	AUTO	AUTO

ELEMENT AS SPECIFIED IN CHAPTER 4	DETAILED CONTENT	TEMPLATE(S)				EXAMPLES
Present weather (C)[9,10]	Intensity or proximity of present weather (C)[11]	- *or*+	—	VC	CAVOK	
	Characteristics and type of present weather (M)[12]	DZ *or* RA *or* SN *or* SG *or* PL *or* ~~IC *or*~~ GR *or* GS *or* DS *or* SS *or* ~~TS *or*~~ TSRA *or* TSSN *or* TSPL *or* TSGR *or* TSGS *or* SHRA *or* SHSN *or* SHPL *or* SHGR *or* SHGS *or* FZRA *or* FZDZ ~~*or* BLSN *or* BLSA *or* BLDU *or* PO *or* FC~~ *or* UP	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* FZFG *or* BLSN *or* BLSA *or* BLDU *or* DRSN *or* DRSA *or* DRDU *or* MIFG *or* BCFG *or* PRFG	FG *or* PO *or* FC *or* DS *or* SS *or* ~~TS *or*~~ SH *or* BLSN *or* BLSA *or* BLDU *or* VA		RA; HZ; VCFG; +TSRA; FG; VCSH; +DZ; VA; ~~VCTS;~~ -SN; MIFG; VCBLSA; +TSRASN; -SNRA; -DZ FG; +SHSN BLSN;
Cloud (M)[13]	Cloud amount and height of base or vertical visibility (M)	FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	SKC *or* NSC		FEW015; VV005;SKC; OVC030; VV///; NSC; SCT010 OVC020;
	Cloud type (C)[9]	CB ~~*or* TCU~~	—			BKN009~~TCU~~; SCT008 BKN025CB;
.....						
Supplementary information (C)[9]	Recent weather (C)[9, 10]	REFZDZ *or* REFZRA *or* REDZ *or* RE[SH]RA *or* RE[SH]SN *or* RE[SH]SG *or* RE[SH]PL *or* REIC *or* RE[SH]GR *or* RE[SH]GS *or* REBLSN *or* RESS *or* REDS *or* RETS *or* REFC *or* REVA				REFZRA; RETS;
	Wind shear (C)[9]	WS RWYnn[n] *or* WS ALL RWY				WS RWY03; WS ALL RWY;
	Sea-surface temperature and state of the sea (C)[14]	W[M]nn/Sn				W15/S2;
	State of the runway (C)[14] — Runway designator (M)	nn		SNOCLO		99421594; SNOCLO;
	State of the runway (C)[14] — Runway deposits (M)	n *or* /	CLRD//			14CLRD//
	State of the runway (C)[14] — Extent of runway contamination (M)	n *or* /				

ELEMENT AS SPECIFIED IN CHAPTER 4	DETAILED CONTENT		TEMPLATE(S)				EXAMPLES
		Depth of deposit (M)	nn *or* //				
		Friction coefficient or braking action (M)	nn *or* //				
Trend forecast (O)[14]	Change indicator (M)[15]		NOSIG	BECMG or TEMPO			NOSIG; BECMG FEW020;
	Period of change (C)[9]			FMnnnn *and/or* TLnnnn *or* ATnnnn			
	Wind (C)[9]			nnn[P]nn[n][G[P]nn[n]]KMH *or* nnn[P]nn[G[P]nn]KT			TEMPO 25070G100KMH; (TEMPO 25035G50KT);
	Visibility (C)[9]			nnnn		CAVOK	BECMG FM1030 TL1130 CAVOK; BECMG TL1700 0800 FG;
	Weather phenomenon: intensity (C)[11]			-*or*+	—	NSW	BECMG AT1800 9000 NSW; BECMG FM1900 0500 +SNRA; BECMG FM1100 SN TEMPO FM1130 BLSN; TEMPO FM0330 TL0430 FZRA;
	Weather phenomenon: characteristics and type (C)[9,10,12]			DZ *or* RA *or* SN *or* SG *or* PL ~~*or* IC~~ *or* GR *or* GS *or* DS *or* SS ~~*or* TS~~ *or* TSRA *or* TSSN *or* TSPL *or* TSGR *or* TSGS *or* SHRA *or* SHSN *or* SHPL *or* SHGR *or* SHGS *or* FZRA *or* FZDZ ~~*or* BLSN *or* BLSA *or* BLDU *or* PO *or* FC~~	IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* FZFG *or* BLSN *or* BLSA *or* BLDU *or* DRSN *or* DRSA *or* DRDU *or* MIFG *or* BCFG *or* PRFG		

ELEMENT AS SPECIFIED IN CHAPTER 4	DETAILED CONTENT	TEMPLATE(S)					EXAMPLES
	Cloud amount and height of base or vertical visibility (C)[9]		FEWnnn *or* SCTnnn *or* BKNnnn *or* OVCnnn	VVnnn *or* VV///	S K C *or*		TEMPO TL1200 0600 BECMG AT1200 8000 NSW NSC; BECMG AT1130 OVC010;
	Cloud type (C)[9]		CB *or* TCU	—	N S C		TEMPO TL1530 +SHRA BKN012CB;

Notes. —

1. Fictitious location;
2.. To be included if the maximum is exceeding the mean speed by 20 km/h (10 kt);
3. To be included if the directional variations $ 60Ebut < 180°and the wind speed > 6 km/h (3 kt);
4. To be included if the visibility in one or more directions is more than 50 per cent above the minimum visibility;
5. To be included if the minimum visibility is less than 1500 m and the visibility in another direction is more than 5000m;
6. To be included if visibility or RVR < 1500 m; for up to a maximum of four runways;
7. To be included if the one-minute RVR values during the 10-minute period immediately preceding the observation vary from the mean value more than 50 m or more than 20 per cent, whichever is greater; the one-minute mean minimum and the one-minute mean maximum values are reported (instead of the 10-minute mean value);
8. To be included if the RVR values during the 10-minute period preceding the observation have shown a distinct tendency such that the mean RVR during the first 5 minutes varies by 100 m or more from the mean during the second 5 minutes of the period. No tendency indication where not available;
9. To be included whenever applicable;
10. One or more, up to a maximum of three, groups;
11. To be included whenever applicable. No qualifier for *moderate* intensity~~; only qualifier "+" (i.e. well-developed) to be used with PO and FC~~;
12. Precipitation types DZ, RA, SN, SG, PL, IC, GR and GS may be combined, where appropriate. Only moderate or heavy precipitation to be indicated in trend forecasts;
13. Up to four cloud layers;
14. To be included subject to Regional Air Navigation Agreement;
15. Number of change indicators to be kept to a minimum; normally not exceeding three groups~~.~~;
16. Followed by "NIL" for a missing report;
17. Identification for reports from automated meteorological observing systems during non-operational hours of the aerodrome.

• • • • •

APPENDIX 4 TECHNICAL SPECIFICATIONS FOR AERODROME FORECASTS IN THE TAF CODE FORM

(See Chapter 6 of this Annex)

Table 1. Template for aerodrome forecasts in the TAF code form

Key: M = inclusion mandatory, part of every message
C = inclusion conditional, dependent on meteorological conditions or method of observation
O = inclusion optional

Note.— The ranges and resolutions for the numerical elements included in aerodrome forecasts in the TAF code form is shown in Table 3 of this appendix.

Note.— The explanations for the abbreviations used can be found in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

ELEMENT AS SPECIFIED IN CHAPTER 6	DETAILED CONTENT	TEMPLATE(S)				EXAMPLES
Identification of the type of report (M)	Type of the report (M)	TAF *or* TAF AMD *or* TAF COR				TAF; TAF AMD;
Location indicator (M)	ICAO location indicator (M)	nnnn				YUDO[1]
Date and time of origin of forecast (M)	Date and time of the origin of the forecast in UTC (M)	nnnnnnZ				160000Z
Date and period of validity of forecast (M)	Date and period of the validity of the forecast in UTC (M)	nnnnnn				160624; 080918
Identification of a missing report (C)[16]	Missing report identifier (C)	NIL *or* CNL				NIL; CNL
END OF THE TAF FORECAST IF THE FORECAST IS MISSING OR CANCELLED						
•••••						
Weather (C)[4, 5]	Intensity of weather phenomena (C)[6]	- *or* +		—	CAVOK	
	Characteristics and type of weather phenomena (M) [7]	DZ *or* RA *or* SN *or* SG *or* PL *or* ~~IC *or*~~ GR *or* GS *or* DS *or* SS *or* ~~TS *or*~~ TSRA *or* TSSN *or* TSPL *or* TSGR *or* TSGS *or* SHRA *or* SHSN *or* SHPL *or* SHGR *or* SHGS *or* FZRA *or* FZDZ ~~*or* BLSN *or* BLSA *or* BLDU *or* PO *or* FC~~		IC *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* FZFG *or* BLSN *or* BLSA *or* BLDU *or* DRSN *or* DRSA *or* DRDU *or* MIFG *or* BCFG *or* PRFG		RA; HZ; +TSRA; FG; -FZDZ; PRFG; +TSRASN; SNRA FG;
•••••						
Expected significant changes to one or more of the above elements during the period of validity (C)[4, 10]	•••••					
	Weather phenomenon: intensity (C)[6]	- *or* +	—	NSW	CAVOK	BECMG 1214 RA;

ELEMENT AS SPECIFIED IN CHAPTER 6	DETAILED CONTENT	TEMPLATE(S)				EXAMPLES
	Weather phenomenon: characteristics and type (C)[4, 7, 10]	DZ *or* RA *or* SN *or* SG *or* PL~~ *or* IC *or* GR *or* GS~~ *or* DS *or* SS *or* ~~TS *or*~~ TSRA *or* TSSN~~ *or* TSPL *or* TSGR *or* TSGS~~ *or* SHRA *or* SHSN *or* SHPL *or* SHGR *or* SHGS *or* FZRA *or* FZDZ~~ *or* BLSN *or* BLSA *or* BLDU *or* PO *or* FC~~	IC *or* GR *or* GS *or* FG *or* BR *or* SA *or* DU *or* HZ *or* FU *or* VA *or* SQ *or* PO *or* FC *or* TS *or* TSGR *or* TSGS *or* FZFG *or* BLSN *or* BLSA *or* BLDU *or* DRSN *or* DRSA *or* DRDU *or* MIFG *or* BCFG *or*			TEMPO 0304 FZRA; FM1030 SN TEMPO 1215 BLSN; PROB40 TEMPO 0608 0500 FG;
	.....					

Notes. —

1. Fictitious location;
2. To be included if the maximum is exceeding the mean speed by 20 km/h (10 kt);
3. To be used only if the wind speed # 6 km/h (3 kt);
4. To be included whenever applicable;
5. One or more, up to a maximum of three, groups;
6. To be included whenever applicable. No qualifier for *moderate* intensity;~~ only qualifier "+" (i.e. well-developed to be used with PO and FC;~~
7. Precipitation types DZ, RA, SN, SG, PL, IC, GR and GS may be combined, where appropriate. Only moderate or heavy precipitation should be indicated;
8. Up to four cloud layers;
9. To be included subject to Regional Air Navigation Agreement;
10. To be included when a change in some or all of the elements forecast is expected to occur; may be placed after any element forecast, as appropriate; and
11. Number of change indicators to be kept to a minimum; normally not exceeding five groups.

— — — — —

APPENDIX D

AMENDMENT PROPOSALS TO CHAPTER 4 (relevant parts) OF ANNEX 3 CONCERNING "PREVAILING VISIBILITY" FOR INCLUSION IN AMENDMENT 73 (applicable November 2004)

CHAPTER 1. DEFINITIONS

• • • • •

Prevailing visibility. The visibility value, observed in accordance with the definition of "visibility", which is reached or exceeded within at least half the horizon circle or within at least half of the surface of the aerodrome. These areas could comprise contiguous or non-contiguous sectors.

Note. — This value may be assessed by human observation and/or instrumented systems. When instruments are installed, they are used to obtain the best estimate of the prevailing visibility.

• • • • •

CHAPTER 4. METEOROLOGICAL OBSERVATIONS AND REPORTS

• • • • •

4.6 Observing and reporting of visibility

• • • • •

4.6.5~~9~~ **Recommendation.—** *In reports in the METAR/SPECI code forms~~, when the visibility is not the same in different directions~~:*

a) *the ~~lowest~~ prevailing visibility should be reported~~.~~; ~~When the visibility is not the same in different directions and~~*

b) *when the lowest visibility is less than 1 500 m or ~~visibility in one or more directions is more~~ less than 50 per cent ~~above~~ of the ~~lowest~~ prevailing visibility, the lowest visibility observed should also be reported and its general direction in relation to the ~~site of the meteorological station~~ aerodrome indicated by reference to one of the eight points of the compass. If the lowest visibility is observed in more than one direction, then the most operationally significant direction should be reported~~.~~; and*

~~*Directional variations in visibility should be reported when the lowest visibility is less than 1 500 m and the visibility in another direction is more than 5 000 m. Where such variations in visibility are observed in more than one direction, then the most operationally significant direction should be reported.*~~

c) *when the visibility is fluctuating rapidly, and ~~significant directional variations~~ the prevailing visibility cannot be ~~given~~ determined, only the lowest visibility should be reported, with no indication of direction.*

• • • • •

Editorial Note: — **New text.**

4.13 Reporting of meteorological information from automated meteorological observing systems

4.13.1 Recommendation. — *Where automated meteorological observing systems are used, during non-operational hours of the aerodrome, reports from automated meteorological observing systems should be issued in the METAR/SPECI code forms and these reports should be identified with the word "AUTO".*

REPORTING

4.13.2 Recommendation. — *In automated reports in the METAR/SPECI code forms, surface wind, visibility, runway visual range, cloud or vertical visibility, air temperature and dew-point temperature, pressure values and supplementary information should be reported in accordance with provisions relevant to reports in the METAR/SPECI code forms included in Sections 4.5, 4.6, 4.7, 4.9, 4.10, 4.11 and 4.12, respectively.*

4.13.3 **Recommendation.—** *In automated reports in the METAR/SPECI code forms, present weather should be reported in accordance with provisions relevant to reports in the METAR/SPECI code forms included in Section 4.8. However, in addition to the precipitation types listed under 4.8.5 a), the abbreviation UP should be used for unidentified precipitation when the type of precipitation cannot be identified by the automated observing system.*

Editorial Note: — End of new text.

Editorial Note: — Consequential amendments to Annex 2 — *Rules of the Air*, and to the *Procedures for Air Navigation Services — Rules of the Air and Air Traffic Services* (PANS-RAC, Doc 4444) as follows:

ANNEX 2
RULES OF THE AIR

• • • • •

CHAPTER 1. DEFINITIONS

• • • • •

Ground visibility. The visibility at an aerodrome as reported by an accredited observer or automated systems..

• • • • •

Editorial Note: — Add after the definition of visibility the following note:

Note 2. - The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in reports in the METAR/SPECI code forms and to the observations of ground visibility.

— — — — —

PROCEDURES FOR AIR NAVIGATION SERVICES
RULES OF THE AIR
AND
AIR TRAFFIC SERVICES (DOC 4444)

CHAPTER 1. DEFINITIONS

• • • • •

Editorial Note: — Add after the definition of visibility the following note:

Note 2. - The definition applies to the observations of visibility in local routine and special reports, to the observations of prevailing and minimum visibility reported in reports in the METAR/SPECI code forms and to the observations of ground visibility.

• • • • •

— — — — — — — —

APPENDIX E

LIST OF TASKS FOR FUTURE WORK OF THE AERODROME METEOROLOGICAL OBSERVING SYSTEMS STUDY GROUP (AMOSSG)

The AMOSSG is envisaged to assist the Secretariat in pursuing the specific tasks as follows:

TASK NO.	TASK (ANNEX 3 PROVISIONS WHICH MAY NEED TO BE AMENDED INDICATED IN BRACKETS)	REFERENCE	ESTIMATED DATE FOR COMPLETION	RESPONSIBILITY (LEAD IN BOLD)	NOTE ON PROGRESS
1.	Review of operational requirements in Chapter 4 to Annex 3 (Annex 3, Chapter 4)	AMOSSG/1–SoD, Section 4	end 2001		initial reviews undertaken at the AMOSSG/1 and AMOSSG/2; completed at the AMOSSG/3
2.	Revision of the provision for the manual insertion of elements in case of a system failure (Annex 3, 4.1.8 & 4.1.9)	AMOSSG/1 – SoD, 4.4.1 b)	end 2001		completed at the AMOSSG/3
3.	Introduction of "prevailing visibility" (including the revision of the reporting of visibility in local reports and reports in the METAR/SPECI code forms) (Annex 3, 4.6.2-4.6.5)	AMOSSG/1 – SoD, 4.4.1 c)	end 2001		initial proposal presented to AMOSSG/2; proposal completed at the AMOSSG/3
4.	Reassessment of the light intensity to be used to assess RVR in reports in the METAR/SPECI code forms (Annex 3, 4.7.11)	AMOSSG/1 – SoD, 4.4.1 d)	end 2001		completed at the AMOSSG/3
5.	Use of modern observing techniques (e.g. remote sensing) (Annex 3, definitions (if necessary), 3.5.2 a) & a new section under Chapter 4)	AMOSSG/1 – SoD, 4.4.1 a); 4.4.3	Continuing	Michel	a proposal, as necessary, expected for AMOSSG/~~3~~4
6.	Revision of the weather phenomena to be reported under "present weather" and "recent weather" (Annex 3, 4.8.4 - 4.8.6 & 4.12.3)	AMOSSG/1 – SoD, 5.3.1 c)	end 2003	**Earle**, Benoit, Kevin, Pete, Will	initial proposal presented at the AMOSSG/2; to be re-addressed at AMOSSG/4

TASK NO.	TASK (ANNEX 3 PROVISIONS WHICH MAY NEED TO BE AMENDED INDICATED IN BRACKETS)	REFERENCE	ESTIMATED DATE FOR COMPLETION	RESPONSIBILITY (LEAD IN BOLD)	NOTE ON PROGRESS
7.	Monitoring of results from research on the automatic detection of cloud types (Annex 3, 4.9.5)	AMOSSG/1 – SoD, 5.3.1 e)	continuing	AMOSSG	
8.	Finalization of the assessment of the capability of AWS to meet the expected future requirements (Annex 3, 4.1.10, 4.6.2, 4.8.2, 4.9.2 & 4.12.2)	AMOSSG/1 – SoD, 6.2.2 b)	continuing	AMOSSG	assessments carried out at the AMOSSG/1, AMOSSG/2 and AMOSSG/3
9.	Specific tasks concerning the use of "NSC" and "VC" (Annex 3, 4.9.5 & 4.8.6)	AMOSSG/1 – SoD, 5.3.1 d)	end 2001		initial proposals presented at the AMOSSG/2; completed at the AMOSSG/3
10.	Preparation of guidance material	AMOSSG/1 – SoD, 5.3.1 e)	AMOSSG/4 Meeting	AMOSSG, consultant	draft outline presented at the AMOSSG/2; to be addressed at AMOSSG/4

— END —