FOURTEENTH MEETING

OF THE SADIS OPERATIONS GROUP (SADISOPSG/14)

(Bangkok, Thailand, 15 to 17 July 2009)

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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Agenda Item 1: Opening of the meeting

1.1 Place and duration

1.1.1 The fourteenth meeting of the SADIS Operations Group was held in the Asia and Pacific (APAC) Regional Office, Bangkok, Thailand, 15 to 17 July 2009.

1.1.2 The meeting was opened on 15 July 2009 at 0900 hours by Mr. C. Keohan, Regional Officer, Meteorology, on behalf of Mr. M.A. Awan, Regional Director, ICAO APAC Regional Office, who reviewed the recent achievements of the SADISOPSG and welcomed it to the APAC Regional Office, and by Dr. T. van Stijn, the Chairman of the group, who highlighted the group's main tasks.

1.2 Attendance

1.2.1 The list of participants is given in Appendix A.

1.3 Chairman and officers of the Secretariat

1.3.1 The Chairman of the group, Dr. T. van Stijn, presided over the meeting throughout its duration.

1.3.2 Dr. O. M. Turpeinen, from the ICAO Headquarters, Montreal, was the secretary of the meeting, assisted by Mr. C. Keohan from the APAC Regional Office, Bangkok.

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Agenda Item 2: Organizational matters
2.1: Adoption of working arrangements

2.1.1 The meeting adopted appropriate working arrangements.

Agenda Item 2: Organizational matters
2.2: Adoption of the agenda

2.2.1 The following agenda was adopted

Agenda Item 1: Opening of the meeting

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Agenda Item 3: Follow-up of SADISOPSG/13 Conclusions

3.1 Introduction

3.1.1 The group recalled that the SADISOPSG/13 Meeting had formulated twenty conclusions, and nine decisions (with no follow-up required). No draft conclusions had been formulated for consideration by ICAO planning and implementation regional groups (PIRGs).

3.2 Detailed follow-up

3.2.1 With regard to the detailed status of follow-up of the conclusions, the group was pleased to note that action had been completed on all the issues except for Conclusion 13/27 related to the future utilization of the SADIS satellite bandwidth. The group recalled that, from the outset, the action corresponding to Conclusion 13/27 had been expected to be completed only in 2010. Therefore, in order to ensure appropriate follow-up, the group agreed to re–instate this conclusion under Agenda Item 10.

3.2.2 The group formulated the following decision:

Decision 14/1 — Follow-up of the SADISOPSG/13 conclusions

That, the follow-up action on the SADISOPSG/13 conclusions be considered completed, except for Conclusion 13/27.

Note. — An appropriate conclusion has been formulated under Agenda Item 10 to address the outstanding issue.

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Agenda Item 4: Operation of the SADIS
4.1: SADIS management report

4.1.1 The group noted that, in accordance with Conclusion 7/1, the SADIS Provider State had prepared a management report which had been placed on the ICAO SADISOPSG website more than two months prior to this meeting. The group expressed its compliments to the SADIS Provider State for providing a detailed and informative report on the web. The group was pleased to note that the complete management report included statistics on the non-scheduled OPMET messages received at the SADIS uplink station (as called for by Conclusion 8/8) and a list of aerodromes, corresponding to Annex 1 to the SADIS User Guide, whose OPMET data had not been received at the SADIS uplink station (as called for by Conclusion 8/7 b)).

4.1.2 A concise summary of the management report highlighting the main issues and developments that had taken place between March 2008 and February 2009 was noted by the group. No issues requiring particular attention by the SADIS Provider State were singled out.

Agenda Item 4: Operation of the SADIS
4.2: SADIS focal points

4.2.1 The group recalled that the PIRGs had endorsed the SADISOPSG/4 draft conclusion concerning the nomination by SADIS user States of SADIS operational focal points; such a list was considered to provide useful contacts for the SADIS Provider State and the ICAO regional offices to resolve issues regarding, inter alia, missing or incorrectly formatted messages and headers. The current list of focal points, updated by the Secretary based on a consultation with all SADIS user States in response to Conclusion 13/2 and on input by the SADISOPSG Members, is given in Appendix B to this report.

4.2.2 In view of the importance of the list of SADIS focal points, it was agreed that ICAO should consult all the SADIS user States to ensure that the information remained current. After reviewing the list of SADIS operational focal points, the group formulated the following conclusion:

Conclusion 14/2 — Update of the list of SADIS focal points

That, the Secretariat consult all the SADIS user States in order to update the list of the SADIS focal points in time for the dispatch of the SADIS efficacy questionnaire in December 2009.

Agenda Item 4: Operation of the SADIS
4.3: Operational efficacy of the SADIS

4.3.1 **Results of the consultation**

4.3.1.1 It was recalled that, in accordance with SADISOPSG Conclusions 1/4 and 2/3, the group had agreed to provide an annual statement of SADIS operational efficacy to the SADIS Cost Recovery Administrative Group (SCRAG), based on the views of States/users, solicited by ICAO prior to each meeting. The Secretariat had made the questionnaire available to all States under the SADIS "footprint" and to the Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar (ASECNA). To improve the response rate of the annual SADIS questionnaire, the questionnaire had been placed on the SADISOPSG website in an interactive format and sent, in addition to users and States, to the SADIS focal points, in response to Conclusion 6/2. The group noted that, the number of replies had remained fairly stable over the last few years, i.e. 44 compared to 48 and 42, in 2008 and 2007, respectively.

4.3.1.2 A tabulated summary had been compiled by the Secretariat based on the completed questionnaires returned by States. Specific comments provided by States had also been included under the remarks. In accordance with Decision 9/3, the summary had been subsequently forwarded to the SADIS Provider State which had prepared, on behalf of the SADISOPSG Operational Efficacy Assessment Team, a report on the operational efficacy, as called for by Decision 4/4.

4.3.1.3 An analysis of the completed questionnaires indicated the following (the statistics for year 2007-2008 in brackets, in accordance with Conclusion 6/3; indicated in percentage, out of a total of 44 and 48 replies, respectively, rounded to the nearest 5 per cent):

a) concerning the need for repairs:

   1) 10 (15) per cent of receivers had to be returned for repairs; and

   2) 5 (0) per cent of replies indicated shipping problems;

b) 5 (10) per cent of States considered that the administrative messages were not adequate;

c) concerning the data:

   1) 85 (75) per cent of States reported good availability of upper-air data in the GRIB code form;

   2) 85 (80) per cent of States reported good availability of SIGWX data in the BUFR code form; and

   3) 85 (80) per cent of States reported good availability of OPMET messages;

d) concerning the occurrence of signal quality problems with the VSAT, 10 (10) per cent of States reported such problems;

e) concerning the availability of WAFS SIGWX forecasts:

1) 70 (60) per cent of States were in a position to covert the BUFR-coded SIGWX forecasts into WAFS charts; and

2) 60 (60) per cent of States were using WAFS forecasts in the PNG format;

f) 95 (70) per cent of States reported that they had implemented the SADIS 2G reception; and

g) 70 (70) per cent of States reported that they had not used the 24-hour service desk.

4.3.1.4 It was agreed that the figures were comparable to those received last year and that any change of 5 per cent or less could not be considered significant. The group was pleased to single out two positive developments over the last year:

a) *roll-out of SADIS 2G*, which had significantly increased and now reached the level of full implementation; and

b) *availability of upper-air data in the GRIB code form*, which had improved to "good" in 85 per cent of States.

4.3.1.5 Based on the responses received, the group reiterated its satisfaction with the quality of SADIS service considered good by a clear majority of users and with the fact that the number of States with serious difficulties with their SADIS VSAT had remained small.

4.3.2 **Format of the questionnaire**

4.3.2.1 The group recalled that the questionnaire on SADIS efficacy had been developed by the Secretariat in consultation with the Chairman of the SADISOPSG and the SADIS Provider State and last revised at the SADISOPSG/12 Meeting (Decision 12/3 refers) to reformulate the question related to the usefulness of the PNG format, in view of their use as a back-up to the BUFR-coded SIGWX forecasts, in accordance with the World Area Forecast System Operations Group (WAFSOPSG) Conclusion 3/9. The group was pleased to note that the Secretariat, in coordination with the SADIS Provider State, had undertaken a thorough revision of the questionnaire to improve its clarity and to include a section related to the SADIS FTP service in view of its increased use.

4.3.2.2 The group reviewed the format and content of the questionnaire and formulated the following decision:

Decision 14/3 — SADIS efficacy questionnaire

That, the questionnaire accessible through Appendix C to this report be used in future consultations with States/users on the operational efficacy of the SADIS broadcast and SADIS FTP service.

Note 1. — A question related to "Suggested future developments" will be added to the questionnaire by the Secretariat; and

Note 2. — The preferred mode of replying would be through the interactive questionnaire available at the SADISOPSG website; replies received through e-mail would be accepted

4.3.3 **Annual statement**

4.3.3.1 The group, including IATA, agreed that, in the light of comments received, the SADIS broadcast continued to meet the operational requirements during the period under review and formulated the following conclusion:

Conclusion 14/4 — Annual statement of operational efficacy of SADIS 2008/2009

That, the Chairman of the SADISOPSG be invited to inform the Chairman of the SCRAG that during the period 2008/2009 the SADIS continued to meet the operational requirements.

Agenda Item 4: Operation of the SADIS
4.4: SADIS inventory

4.4.1 The latest inventory which formed the basis for SADIS cost recovery purposes had been developed by the SADISOPSG/13 Meeting and used by the SCRAG at its ninth meeting (SCRAG/9) held in London in October 2008. In order to ensure the currency of the SADIS inventory, proposals for amendments to the inventory were made by the SADIS Provider State. The group reviewed these draft amendments, endorsed them and formulated the following conclusion:

Conclusion 14/5 — SADIS Inventory 2009-2010

That, the Chairman of the SADISOPSG be invited to forward the updated SADIS inventory given in Appendix D to this report to the Chairman of SCRAG.

Note. — In the inventory, the requirements for man power will be expressed in terms of "man-days per annum" for all the personnel as of the SADIS Inventory 2010-2011.

4.4.2 The group noted with some concern the increases in human resources included in the SADIS Inventory, which had led to substantial additional costs to be allocated to the SADIS programme; it did, however, realize that such increases were the result of an omission in the inventory since a number of years. The group noted that the SCRAG/9 Meeting while concurring with the principle that the SADIS Provider State be able to charge the *full* costs related to the services provided, had agreed that only 80 per cent of the 2009 estimated costs should be applied in the calculation of the assessments for 2009 and that the difference would be charged in the adjustment of the 2009 actual costs (when calculating the assessments for 2011). The SCRAG had suggested that the SADISOPSG should assess the need for services corresponding to the additional costs.

4.4.3 Accordingly, the group reviewed the description of the additional costs and concurred that they were in accordance with current and future service level requirements for the SADIS service. In this regard, the group formulated the following decision and conclusion:

Decision 14/6 — Assessment of additional SADIS costs

That, the additional costs proposed by the SADIS Provider State are in accordance with current and future service level requirements for the SADIS service.

Note. – Background information related to additional SADIS costs is given in Appendix E to this report.

Conclusion 14/7 — Review of additional SADIS costs

That, the Chairman of the SADISOPSG be invited to forward the background information related to the additional SADIS costs given in Appendix E to this report, together with the statement that the services outlined therein are in accordance with current and future service level requirements, to the Chairman of the SCRAG.

4.4.4 The group recalled that the SADIS Agreement placed obligations on the SADIS Provider State to provide, operate and maintain the SADIS in accordance with the details defined in Annex I to the SADIS Agreement which had been initially approved by the ICAO Council and which could be amended by the SCRAG, as necessary. Since the specifications given in Annex I were somewhat outdated (e.g. it did not take into account the developments in regards to the SADIS FTP Service infrastructure), the group felt that it was important to prepare a draft amendment to Annex I and agreed that it should be forwarded to the SCRAG for formal amendment. In this context, the group formulated the following conclusion:

Conclusion 14/8— Update of Annex I to the SADIS Agreement

That, the Secretariat forward the amendment to Annex I to the Agreement on the Sharing of Costs of the SADIS, as contained in Appendix F to this report, to the Secretary of SCRAG for approval.

Note. — The SADIS User Guide will be amended accordingly after the approval of the amendment.

4.4.5 In order to moderate future increases in States' contributions for the SADIS programme, the SCRAG/9 Meeting had invited the SADISOPSG to review the inventory thoroughly in view of finding savings which could at least partly compensate for the cost increases stemming from the increase in human resources. In this context, the group took note of the underlying technical issues related to the current and future service provision provided by the SADIS Provider State, and concurred with the SADIS Provider State that the key elements which made up the SADIS service were essential. The group agreed, however, that in order to improve the cost effectiveness of service provision, the potential strategic changes to the SADIS service should be taken into account, in particular:

a) the accelerated development of the public Internet infrastructure; and

b) global introduction of the ATN Aeronautical Message Handling System (AMHS).

Furthermore, the group considered that there were currently a number of resource-intensive manual operations provided by the SADIS Provider State in response to the current SADIS service requirements and that modifications (e.g. automation) to such activities should be considered with the understanding that there could be some impact on service levels.

4.4.6 In order to address the issues raised by the SCRAG/9 Meeting, the group agreed that further study related to the long-term strategy for the SADIS service was required involving all the parties concerned and formulated the following conclusion:

Conclusion 14/9 — Review of the long-term strategy for the SADIS service

That, the SADIS Provider State, in coordination with the SADIS Technical Developments Team and the ISCS Provider State, conduct a review of the long-term strategy for the SADIS service, in time for the SADISOPSG/15 Meeting.

Note. .— The review will consider alternative, Annex 3 compliant methods of service provision that reduce costs, including further automation and its potential impact on service.

Agenda Item 4: Operation of the SADIS
4.5: SADIS implementation

4.5.1 With regard to SADIS implementation, the group was pleased to note that the number of States and users had increased during 2008/2009 to 99 (95 in 2007/2008) Contracting States relying on a total of 109 SADIS 2G VSAT receivers (133 SADIS 1G and 2G VSAT receivers in 2007/2008) and 46 FTP servers (seventeen in 2007/2008)[1]. A further eight (eleven in 2007/2008) Contracting States have received authorized access, some of which were in the process of installing SADIS 2G VSAT receivers and/or FTP servers. It was noted that, during the past year, with the phase-out of the SADIS 1G, the number of SADIS FTP users had almost tripled while the total number of SADIS VSAT stations had decreased by some 20 per cent.

[1] Only the exclusive users of the FTP server considered.

Agenda Item 5: Content of the SADIS broadcast
5.1: OPMET information

5.1.1 METAR, SPECI AND TAF

General considerations concerning the requirements and actual content of the SADIS broadcast

5.1.1.1 The group recalled that the requirements by States and users for METAR, SPECI and TAF to be broadcast on the SADIS were given in Annex 1 to the *SADIS User Guide* (SUG) which was extracted from a global OPMET database maintained by the ICAO Secretariat. Annex 1 included OPMET information from both AOP (i.e. aerodromes included in the aerodrome operational planning (AOP) tables of the regional air navigation plans) and non-AOP aerodromes. With regard to additional information included in Annex 1, the group recalled that three categories characterizing the hours of issuance of OPMET data had been incorporated, in view of limiting the monitoring of the availability of OPMET data to aerodromes which provided OPMET data on a 24-hour basis. Furthermore, aerodromes for which 30-hour TAF were required had been clearly identified in Annex 1 (Conclusion 13/6 refers).

5.1.1.2 In response to Conclusion 8/6, OPMET information from all the AOP aerodromes was included in Annex 1. All AOP aerodromes issued METAR and SPECI, as a minimum (with few exceptions in the EUR Region), while the requirements for TAF were subject to formal regional air navigation (RAN) agreement which was reflected in the Tables MET 1A of all the facilities and services implementation documents (FASID). The group recalled that, since February 2008, similar to Annex 1, all FASID Tables MET 1A were extracted from the global OPMET database thus ensuring the consistency of information between the FASID Tables MET 1A and Annex 1. This arrangement also implied that Annex 1 now reflected, at all times, the formal requirements displayed in FASID Tables MET 1A. Furthermore, the group had agreed that any proposals for amendments related to OPMET data from AOP aerodromes should be addressed directly to the ICAO Regional Office concerned (Decision 13/8 refers). This approach eliminated the need for a lengthy procedure (i.e. formulation by the SADISOPSG of draft conclusions for endorsement by the PIRGs concerned) and substantially expedited the implementation of new requirements.

5.1.1.3 With regard to non-AOP aerodromes, the group was aware of the fact that OPMET information from these aerodromes could be included in Annex 1 only if the State concerned had no objection to its distribution on the SADIS and with the understanding that States did not have any obligation of providing such data for non-international aerodromes. OPMET requirements from these aerodromes could be amended by the group annually, subject to an agreement by the State concerned.

5.1.1.4 It was further recalled that the actual OPMET information that was currently broadcast on SADIS was indicated in Annex 2 (listing the aerodromes included in the bulletins) and Annex 3 (listing the bulletin headers). These annexes were updated bi-annually, with the assistance of the EUR Bulletin Management Group (BMG).

Non-implementation of requirements for OPMET data by States

5.1.1.5 The variability of reception of OPMET data from some aerodromes had been cause for adverse comments in the past. However, where such comments concerned aerodromes not listed as a requirement in Annex 1, the SADIS Provider State was not obliged to ensure that these aerodromes were available. Non-availability of OPMET data from aerodromes listed in Annex 1 was a different matter and, when notified by users, had been systematically brought to the attention of the States concerned by the appropriate ICAO regional office which had kept on monitoring such deficiencies until their resolution. The group concurred that such a real-time approach had turned out to be efficient and had led, in most cases, to the timely resolution of the deficiencies identified.

5.1.1.6 The group noted with some concern that certain States continued issuing two types of TAF for aerodromes, in contradiction with the Annex 3 provision which required that only one type of TAF per aerodrome should be prepared. The group felt that States should be reminded of the importance of this provision and formulated the following conclusion:

Conclusion 14/10 — Elimination of redundant TAF

That, the Secretariat remind States that, in accordance with Annex 3, only one type of TAF should be issued for international aerodromes.

Draft amendments to Annex 1 to the SUG

5.1.1.7 The group reviewed the OPMET data required from non-AOP aerodromes based on a proposal made by IATA. It was noted that the proposal attempted to render the requirements consistent with OPMET data that was actually made available by States. In this regard, the group concurred that any proposed deletions could be undertaken by the Secretariat without need for consulting the States concerned while any proposed additions would have to be endorsed by them. When concluding the review, the group endorsed the proposed changes and formulated the following conclusion:

Conclusion 14/11 ─ Revision of the requirements of OPMET data from non-AOP aerodromes in Annex 1 to the SUG

That, the Secretariat

a) seek concurrence by the States concerned concerning the provision of additional OPMET information from non-AOP aerodromes as given in Appendix G to this report; and

b) based on the States' replies received as part of action taken under a) above, amend Annex 1 to the SUG accordingly.

Note 1. ─ There is no need to seek concurrence related to deletions; and.

Note 2. ─ The classification and names of aerodromes and States used in Appendix G are based on the proposal made by IATA and do not reflect the official ICAO nomenclature.

Harmonization of the OPMET content in SADIS and ISCS

5.1.1.8 Since Annex 1 reflected the global requirements by users (e.g. airlines) and States for OPMET data, the group considered that they should be applicable for both the SADIS and ISCS broadcasts. Their validity for the ISCS broadcast was confirmed by the fact that Annex 1 to the SUG had been included, without any changes, in the *ISCS User Guide.*

5.1.1.9 The group was pleased to learn as part of the report by the SADISOPSG Gateway Development Team under Agenda Item 6.1 that the overall harmonization between the SADIS and ISCS broadcasts had been completed.

5.1.1.10 However, the group noted the results of a study by IATA which indicated that some residual differences in the availability of OPMET data between the ISCS and SADIS broadcasts continued to persist. In view of the importance for IATA and other aviation users of the completion of the full harmonization of the OPMET data content in the two broadcasts, the group formulated the following conclusion:

Conclusion 14/12 – Harmonization of the SADIS and ISCS broadcast for OPMET data

That, the SADIS Provider State and the ISCS Provider State complete their efforts in view of the full harmonization of the OPMET information broadcast on SADIS and ISCS.

Note. – The goal is to ensure that 95 per cent of OPMET data prescribed in Annex 1 to the SADIS User Guide *be broadcast both on SADIS and ISCS as soon as possible, and preferably by the SADISOPSG/15 Meeting.*

5.1.2 **Non-scheduled OPMET information**

5.1.2.1 In view of the importance of non-scheduled OPMET information for aviation (e.g. SIGMET, AIRMET, tropical cyclone and volcanic ash advisories), the group recalled that it had agreed that the reception of these messages should be monitored by the SADIS Provider State, which should compile annual statistics showing the number of all types of non-scheduled OPMET information received at the SADIS uplink station and present these results to the SADISOPSG as part of the annual management report (Conclusion 8/8 refers). The group was pleased to note that this information which was considered to be highly relevant had been included in the management report.

Agenda Item 5: Content of the SADIS broadcast
5.2: WAFS forecasts

5.2.1 The group recalled that the GRIB 2-coded WAFS forecasts were expected to be provided as of September 2009 on the SADIS FTP. Therefore, in view of preparing the SADIS users for such forecasts, the list of GRIB forecasts in Annex 4 had been complemented, since the SADISOPSG/13 Meeting, to include the:

a) description of the content of all GRIB-coded WAFS forecasts; and

b) list of GRIB 2-coded WAFS forecasts.

In this context, the group endorsed the updated Annex 4 and formulated the following decision:

Decision 14/13 — Updated Annex 4 to the SADIS User Guide

That, the updated Annex 4 as given at the following website:
www.icao.int/anb/sadisopsg/sug/sug_annex4.pdf be endorsed.

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Agenda Item 6: Development of the SADIS
6.1: Report of the SADISOPSG Gateway Development Team

6.1.1 The group recalled that the SADIS gateway function had been developed in response to the EANPG Conclusion 38/33 and that at subsequent meetings, it had developed a set of high-level technical requirements, including the real-time monitoring. It had also finalized the *SADIS Gateway Operations Handbook* which was available on the SADISOPSG website, in accordance with Conclusion 8/15. The system was fully operational since 2003.

6.1.2 The Rapporteur of the SADISOPSG Gateway Development Team reported on the progress made since the SADISOPSG/13 Meeting. The group's attention was drawn to three specific issues:

a) real-time monitoring and validation of SIGMET at the SADIS gateway;

b) harmonization of the OPMET content between the SADIS broadcast, SADIS FTP service and the ISCS broadcast; and

c) impact of Amendment 74 (in particular, the new TAF code) on the SADIS gateway.

Validation of SIGMET at the SADIS gateway

6.1.3 Concerning the real-time monitoring and validation of SIGMET, the group recalled that SADISOPSG Conclusion 12/11 had called for the Secretariat to invite States to implement the SIGMET format in accordance with Amendment 74 to Annex 3 — *Meteorological Service for International Air Navigation*. The implementation of the correct format had been considered essential by the group since the low-level of implementation rendered the real-time monitoring of SIGMET at the SADIS gateway impracticable. The results in 2008 had indicated, however, a low rate of compliance (i.e. 29 per cent as far as the inclusion of the name of the FIR on the second line of SIGMET was concerned). The group had concurred that such a poor level of compliance fell short of the target of 80 per cent and was thus insufficient to trigger the automatic real-time monitoring and validation of SIGMET at the SADIS gateway. The group had therefore formulated Conclusion 13/12 calling for the Secretariat to send a further reminder to States regarding the compliance of SIGMET bulletins with the Annex 3 provision, urging non compliant States to take action, as a matter of priority.

6.1.4 The group reviewed the results from the 14-day SIGMET monitoring prepared by the SADIS Gateway Development Team. The group was pleased to note that the insertion of a FIR indicator before the FIR name in the SIGMET had been substantially improved, with a 64 per cent compliance rate. While this level of compliance was still insufficient to trigger the automatic validation at the SADIS gateway, the results nevertheless yielded a clear indication that the States with the most significant number of non compliances were becoming compliant and that the validation of SIGMET may become possible in 2010. It was also noted that the situation varied from region to region and was worse than elsewhere in the SAM Region. The group concurred that the Rapporteur of the SADISOPSG Gateway Development Team should re-assess the situation during the next few weeks; the Secretariat would subsequently take appropriate action through the ICAO regional Office(s) concerned in view of improving the level of compliance of SIGMET.

Harmonization of the OPMET content between SADIS and ISCS

6.1.5 With regard to the harmonization of the OPMET content between the SADIS and international satellite communications system (ISCS) broadcasts, it was recalled that the SADISOPSG/13 Meeting had endorsed a road map to this effect. The group was pleased to note that the ISCS Provider State had taken necessary steps towards harmonization with the SADIS broadcast and that with the additional efforts singled out in Conclusion 14/11 (Agenda Item 5.1 refers), it could be expected that optimal harmonization be achieved by the SADISOPSG/15 Meeting.

Impact of Amendment 74 on the SADIS gateway

6.1.6 The group considered that the implementation of the new TAF code form (comprising the addition of the date to the time groups) included in Amendment 74 to Annex 3 had constituted a major challenge for States. Therefore, not surprisingly the SADIS Gateway had received non-compliant TAF which had led to problems with the auto-correction functions that was producing anomalous corrections. To address these problems, the SADIS Provider State had considered that it was necessary to remove the auto-correction function.

6.1.7 The group endorsed action taken by the SADIS Provider State and agreed that the *SADIS Gateway Operations Handbook* be amended accordingly. In this regard, the group formulated the following conclusion:

Conclusion 14/14 — Removal of auto-correction function from the *SADIS Gateway Operations Handbook*

That, the SADIS Provider State remove the parts dealing with the auto-correction function from the *SADIS Gateway Operations Handbook* by 30 September 2009.

Note. — The Secretariat will subsequently update this handbook on the SADISOPSG website.

Agenda Item 6: Development of the SADIS
6.2: Report of the SADISOPSG Strategic Assessment Team

6.2.1 Based on a report provided by the SADISOPSG Strategic Assessment Team, the group reviewed the format and content of the strategic assessment tables. It was noted that the current figures for 2009 had been obtained from an analysis of the OPMET data promulgated to SADIS via the SADIS Gateway and that the draft figures for 2010-2013 had been prepared by the SADIS Provider State using the current figures as a base line. This would ensure that projected figures were consistent with the current OPMET data distributed on the SADIS. On completion of the review of the tables, the group requested the Secretariat to forward the tables to the MET sub-groups (SGs) of the planning and implementation regional groups concerned in 2009, in view of forming the basis for the next regional update of future SADIS requirements, including the figures for the year 2013. In this regard, the group formulated the following conclusion:

Conclusion 14/15 — SADIS Strategic Assessment Tables

That,

a) the SADIS Provider State take note of the completed SADIS Strategic Assessment Tables, provided in Appendix H to this report, to form the basis for the future development of the SADIS; and

b) the Secretariat forward the SADIS Strategic Assessment Tables to the subgroups of the PIRGs concerned for update in respect of future requirements.

Note 1.— Any major changes to the SADIS will be subject to draft conclusions, to be formulated by the SADISOPSG, to be endorsed by the relevant PIRGs, and to be noted, as necessary, by the Commission or Council.

Note 2.— Completed SADIS Strategic Assessment Tables are provided by ICAO Regional Offices to the SADISOPSG following consideration at appropriate sub-group meetings of the PIRGs concerned.

6.2.2 With regard to the format of the strategic assessment tables, the group agreed that there was no need to include any provision for binary data due to the fact that migration to BUFR-coded OPMET had come to a halt. The tables to be provided to the MET SGs reflected the new format.

Agenda Item 6: Development of the SADIS
6.3: Report of the SADISOPSG Technical Developments Team

6.3.1 The group recalled that the SADISOPSG Technical Developments Team was expected to monitor, report on and propose action on technological developments having an impact on SADIS. Over the last 12 months, the major technical development addressed by this team were related to:

a) GRIB2 data transmission trial performed by the Provider State and selected end users on 29 to 30 April 2009; and

b) implementation of the second-generation SADIS broadcast (SADIS 2G) and in particular, the associated data loss problems experienced by some users.

Results from the GRIB 2 trial

6.3.2 It was recalled that the SADISOPSG/13 Meeting had formulated Conclusion 13/17 calling for the SADIS Provider State, in co-ordination with the SADIS Technical Developments Team, to perform a trial with compressed GRIB2 WAFS forecasts on the SADIS 2G satellite broadcast; minimizing any downstream impacts on existing SADIS users, by ensuring that the SADIS 2G broadcast of the GRIB2 trial data would not interfere with pre-existing transmission schedules. The GRIB2 data trial was to involve a limited number of selected SADIS 2G users where decompressed and decoded data were to be provided on a dedicated FTP site to allow comparison with user *decompressed* data.

6.3.3 The group noted that the GRIB 2 data trial had taken place 29 to 30 April 2009. In the trial, WAFC London had produced *uncompressed* GRIB 2 WAFS forecasts for wind, temperature, relative humidity, icing, turbulence and CB clouds since compressed GRIB 2 forecasts could not be made available until September 2009. The group noted with appreciation that the end user participation had been performed at no cost to the SADIS programme while the Met Office and VADOS Systems had participated at a minimal cost. The following SADIS users had been involved: IBL Software Engineering, Lufthansa Systems Aeronautics, MeteoSwiss and NetSys. VADOS Systems had configured a fourth channel at the Exeter and Whitehill uplink sites so as to avoid any conflict with regular SADIS users. During the test, 1077 bulletins had been transmitted which had amounted, as expected, to about 50 MB. Apart from some initial set-up problems at end-user locations, immediately corrected by VADOS Systems, the test had been carried out successfully.

6.3.4 The group noted that the following results had been obtained by all the end user involved:

a) *Transmission Time:* around 1 hr 55 min, compared to 30 min or less with the GRIB 1 data set. Compression was expected to shrink the data to 25 MB with a reduction of transmission time accordingly; and

b) *Data Completeness:* achieved apart from some identified problems at MeteoSwiss (e.g. missing bulletins, incorrect level of precision).

In view of these results, the group concluded that the feasibility of GRIB 2 data transmission via the SADIS 2G link had been demonstrated. In view of the encouraging results obtained, the group agreed

that work on the implementation of GRIB 2-coded WAFS forecasts should be pursued and formulated the following conclusion:

Conclusion 14/16 – Transmission of GRIB 2 data on the SADIS 2G

That,

The SADIS Provider State, in coordination with the SADISOPSG Technical Developments Team:

a) complete the trial of compressed GRIB 2 coded data by 30 September 2009; and

b) present proposals, for endorsement by the SADISOPSG/15 Meeting, for further steps in view of introducing the transmission of GRIB 2 coded data on the SADIS 2G broadcast, as an operational procedure.

Note. 1. — The inclusion of GRIB 2 forecasts for CB clouds, icing and turbulence will be subject to endorsement by the WAFSOPSG;

Note 2. — The decoding and decompression software will be made available at no cost to SADIS users; and

Note. 3 — Inclusion of the GRIB 2 data in the SADIS 2G broadcast is to be performed in coordination with the ISCS Provider State.

Data losses and their mitigation

6.3.5 With regard to data losses, the group was aware that the SADISOPSG/13 Meeting had formulated Conclusion 13/16 calling for the SADIS Provider State, in coordination with the SADISOPSG Technical Developments Team, to study ways and means to improve the provision of information on data losses on the SADIS 2G broadcast and their mitigation. It had been understood that the SADISOPSG/14 Meeting would be informed on the desirability and feasibility to:

a) generate hourly administrative messages with the transmitted headers available to the users;

b) issue administrative messages proactively in the case of a data loss problem;

c) report the reason for data loss via an administrative message; and

d) achieve an acceptable level of service.

6.3.6 In order to address the issues raised, in June 2008 the SADIS Provider State had established, with the assistance of the EUR Bulletin Management Group, a simple mechanism whereby in the event of an outage of 10 minutes at the SADIS 2G reception systems of Switzerland, the Netherlands and Romania, an automated AFTN message would be routed to the SADIS Gateway. Upon receiving such an AFTN message, the SADIS Provider State would investigate the report and initiate recovery of the service, if applicable. The group was pleased to learn that since June 2008, there had been few occasions where it had been necessary for the SADIS Provider State to undertake remedial action and that no data loss had occurred on the transmission and downlink of GRIB data. The results further suggested that an isolated report of data loss was an indication of a local problem (e.g. with the reception system), which was, in principle, outside of the control of the SADIS Provider State. Nevertheless, the SADIS Provider State indicated its willingness to look into this issue, in coordination with VADOS Systems.

6.3.7 It was noted that MeteoSwiss and KNMI had more recently informed the Met Office Service Desk of intermittent data losses between December 2008 and March 2009 lasting *less than* 10 minutes on the GRIB and OPMET channels. The SADIS Provider State could not rule out the possibility that there might be an issue on the primary communications chain between Exeter and Whitehill; however, investigations which had thus far been inconclusive would continue by the SADIS Provider State, in coordination with the SADIS Technical Developments Team. The group was encouraged by the planned hardware refresh for SADIS 2G uplink infrastructure, endorsed under Agenda Item 10, which would improve the tools available at the SADIS Provider State to monitor the data losses in the future.

6.3.8 Based on the experience gained, the SADIS Provider State has assessed the proposals listed under 6.3.5 above; the group endorsed their findings as listed below:

a) *Generate hourly administrative messages containing the headers of transmitted bulletins*. In view of the substantial resource overheads, it would be impracticable to generate such administrative messages on a hourly basis;

b) Issue administrative messages proactively in the case of data loss. Considering the procedures in place at the Service Desk, it was concluded that the proactive issuance of administrative messages was already adequately catered for;

c) Report the reason for data loss via an administrative message. No specific action was required to be taken by the SADIS Provider State, since the cause(s) for any data loss, when known, were already communicated to users via an administrative message; and

d) *Achieve an acceptable level of service.* The level of accuracy could be considered acceptable if the annual statement based on the SADIS efficacy questionnaire qualified the SADIS service as “meeting the operational requirements” and if the data availability was in compliance with Annex 10 — *Aeronautical Telecommunications,* Volume III — *Communication Systems,* Chapter 10, 10.2 e).

6.3.9 To formalize the consensus reached, the group formulated the following decision:

Decision 14/17 — Administrative messages related to data losses

That, the group concur that:

a) the generation and issuance of hourly administrative messages (with the transmitted headers available to users) not be a practicable option due to substantial overheads;

b) proactive administrative messages in the event of a data loss or service outage continue to be issued as part of the operational service desk procedures; and

c) a consensus based on the SADIS efficacy questionnaire, together with conformance with the ICAO Annex 10 — *Aeronautical Telecommunications,* Volume III — *Communication Systems* data availability requirement, be an acceptable level of service performance for SADIS.

Note. 1 – It is not always feasible to indicate reasons for unscheduled interruptions of the broadcast resulting in data losses, however, the reason(s) will be included in an administrative message, whenever possible; and

Note 2. – The acceptable level of service reflected in c) above refers to the current situation; however, it is to be improved by the SADIS Provider State, in coordination with the SADISOPSG Technical Developments Team, taking, inter alia, advantage of the planned hardware refresh .

Agenda Item 6: Development of the SADIS
6.4: SADIS Internet-based FTP Service

6.4.1 The group recalled that at its last meeting it had formulated Conclusion 13/19 calling for the SADIS Provider State, in coordination with the SADIS Technical Developments Team, to complete the development of a SADIS FTP Enhanced service (to be referred as "Phase 1"), for implementation by 31 January 2009; and provide further information (including costs, scope and timescales) to the SADISOPSG/14 Meeting relating to a SADIS FTP Secure service (to be referred as "Phase 2").

Implementation of Phase 1 enhancements

6.4.2 The group recalled that the SADIS FTP Enhanced service (Phase 1) had been considered low risk, with easily implemented work packages that would attract little additional cost to support. Operational introduction of the Phase 1 solution had been expected to take place by the end of January 2009.

6.4.3 The group noted, however, that during the implementation phase unexpected problems had been encountered related to interference with other operational services. Therefore, the SADIS Provider State had decided not to embark on further trials related to Phase 1 enhancements on the operational platform; the Phase 1 enhancements should rather be transferred onto a new virtual server environment available at the Met Office.

6.4.4 The group was pleased to note that in spite of the above initial difficulties, the Phase 1 enhancements had been successfully implemented by the SADIS Provider State in April 2009.

Scope, cost and timescale for Phase 2 proposal

6.4.5 With regard to the scope, cost and timescale to implement the SADIS FTP Secure service (Phase 2) enhancements, the SADIS Provider State had completed a risk assessment of Phase 2 proposal,. The risk assessment showed that the vast majority of threats that were considered medium or high impact could be mitigated by implementing appropriate technical and security measures. The one exception to this rule was the mitigation of a theft of a users access token (i.e. username and password credentials). In order to mitigate such a risk, user access to Phase 2 could be restricted to a specific IP address, or unique Digital Certificates could be issued for each customer; however, such a course of action would lead to an additional management and operational overhead. Therefore, the group agreed that specific IP address access and unique digital certificates for each user should not be included.

6.4.6 The group reviewed the in-scope and out-of-scope aspects of the Phase 2 proposal. It agreed that the generation of an FTP delivery mechanism for SADIS data which could allow data to pass securely between the Met Office FTP server and an FTP user at the user's location was essential and would therefore have to be within the scope of the Phase 2 proposal. A project manager would be assigned to the Phase 2 project who would be responsible for all the service and technical aspects that would arise during the development and testing of the service. The group noted that the following aspects would be beyond the scope of the Phase 2 proposal:

a) end-user workstations;

b) data delivery to the FTP server at the Met Office; and

c) any changes to the current Met Office Internet connectivity.

6.4.7 Subsequently, the group reviewed the service description which was in conformity with guidance contained in the *Guidelines on the Use of the Public Internet for Aeronautical Applications* (Doc 9855). It was noted that the service description would be formalized as part of the Phase 2 project which would include the following milestones:

a) development of a service plan;

b) performing of a risk assessment;

c) development of a system design;

d) development of an "in-service" plan;

e) obtaining a service authorization; and

f) delivery and monitoring of the service, keeping performance data for renewal.

6.4.8 The group also reviewed the technical description containing the system design proposal for Phase 2. It was noted that the architecture was almost identical to the proposal reviewed and endorsed at the SADISOPSG/13 Meeting.

6.4.9 Regarding the cost of implementation of Phase 2, the group noted that the total cost was estimated at £69 000 ± £25 000. A more exact project cost would be determined by the SADIS Provider State and submitted to the SCRAG/10 Meeting. The annual operating costs for Phase 2 were estimated to be similar to those of the existing SADIS FTP service.

6.4.10 Concerning the timescales required for implementation of Phase 2, the group noted that the technical project duration was expected to be between 13 and 26 weeks, which would, in principle, ensure an operational Phase 2 service by November 2010, in time for the applicability of Amendment 75 to Annex 3 which would include provisions enabling the use of the public Internet for non time-critical OPMET information.

6.4.11 In view of progressing the implementation of Phase 2, the group formulated the following conclusion:

Conclusion 14/18 – Development of SADIS FTP Secure service ("Phase 2")

That,

a) the SADIS Provider State, in coordination with the SADIS Technical Developments Team

1) proceed with the development of a SADIS FTP Secure service ("Phase 2") in accordance with the design proposal at Appendix I to this report; and

2) provide a progress report on the status of the implementation of Phase 2 to the SADISOPSG/15 Meeting;

b) the Chairman of the SADISOPSG be invited to inform the Chairman of the SCRAG of the estimated cost and timescale for implementation of Phase 2; and

c) the SADIS Provider State present a more exact assessment of the project cost relating to Phase 2 to the SCRAG/10 Meeting.

Note 1.— Phase 2 will benefit from dual server capability and network address translation, and incorporate security enhancements in accordance with Doc 9855, Guidelines on the Use of the Public Internet for Aeronautical Applications*;*

Note 2. – Estimated total cost is of the order of £69 000 ± £25 000; and

Note 3. — Phase 2 is expected to be operational by November 2010 (Amendment 75 to Annex 3) and will run in parallel with the existing SADIS FTP Enhanced service ("Phase 1") for at least 12 months to afford users sufficient time to migrate to the new service.

Future bandwidth needs in the light of SADIS FTP utilisation

6.4.12 The group considered the future bandwidth needs in the light of the present and expected utilisation of the SADIS FTP service taking, in particular, into account the implementation of new WAFS forecasts in the GRIB 2 code form, to be placed on the SADIS FTP server by September 2009. To facilitate this assessment, the group reviewed statistics given by the SADIS Provider State generated from weekly access logs. The group noted that users were increasingly downloading OPMET information (including the GRIB data) from this service and that the FTP service had played a particularly important role during the GRIB data losses in 2007 experienced by some SADIS 2G users.

6.4.13 It was noted that if the current trend in usage were to continue, with no additional products placed on the server, by the SADISOPSG/15 Meeting (2010) some 37 000 products would be accessed by around 80 users on a typical day. Additional products, such as WAFS forecasts in the GRIB 2 code form would have the effect of encouraging more users to access SADIS FTP, and thus download a greater volume of data.

6.4.14 At present, the SADIS FTP service was implemented with 2 Mbps, bursting to 4 Mbps available between the server and Met Office Internet service provider (ISP). Individual user connections were guaranteed a minimum speed of 38 Kbps bursting to 256 Kbps between server and ISP.

6.4.15 The group realized that with the introduction of the WAFS forecasts in the GRIB 2 code form, the data volumes would increase to around 30 MB (assuming a two-to-one compression) which implied that the volume would triple. With a large number of users, and user connections, it would take approximately 1 hour 48 minutes to download a 30 MB GRIB 2 data volume. Since the new GRIB 2-coded WAFS forecasts would not be initially included in the ISCS and SADIS satellite broadcasts (in accordance with the plans by the WAFSOPSG), the sole means of accessing the GRIB 2 WAFS data for SADIS users would be through SADIS FTP service, at least in the near-term. Under these circumstances, the group agreed that the current SADIS FTP bandwidth was not suitable to meet the future demands and that a service running at 4 Mbps bursting to 8 Mbps would be essential to meet future requirements. Simultaneously, it would be important to increase the guaranteed individual user connection speeds *from* "38 kbps bursting to 256 kbps" *to* "64 kbps bursting to 512 kbps". The group also took note of a budgetary estimate related to the implementation of these proposals, i.e. an expected increase from £ 11 000 to £ 14 000 per year.

6.4.16 In order to meet the future bandwidth needs, the group formulated the following conclusion:

Conclusion 14/19 – SADIS FTP internet bandwidth allocation

That,

a) the SADIS Provider State increase the SADIS FTP Internet bandwidth allocation to 4 Mbps bursting to 8 Mbps between server and Internet service provider (with individual client connections guaranteed at 64 kbps, bursting to 512 kbps), in time for the SADISOPSG/15 Meeting; and

b) the Chairman of the SADISOPSG be invited to inform the Chairman of the SCRAG of the estimated costs of increasing the SADIS FTP Internet bandwidth allocation.

Note. – Annual costs are expected to increase from £ 11 000 to £ 14 000 (i.e. £ 3 000 increase).

Agenda Item 6: Development of the SADIS
6.5: Changes to the back-up configuration

6.5.1 The group recalled that at its last meeting it had formulated Conclusion 13/20 calling on the SADIS Provider State, upon completion of the installation and testing of a back-up data service for SADIS 2G, prove resilience of the service by way of planned back-up test(s) in coordination with the ISCS Provider State.

6.5.2 The group noted that the original plan to provide backup by means of an ISCS VSAT had not been pursued due to the costs associated with its installation and maintenance; instead, the SADIS Provider State had decided to retry the transatlantic integrated services digital network (ISDN) connection, in spite of the fact that it had proved to be unsuccessful in earlier years. The group was therefore encouraged to note that, based on initial results from a transatlantic test undertaken in February 2009, a large number of products could be successfully transmitted from Washington to the SADIS Gateway Test Facility on a 64-K ISDN basic rate interface. The group took note of the further tests undertaken and agreed that the configuration as suggested by the SADIS Provider State would be sufficient for the back-up configuration, and that no additional work on this issue would be required to be undertaken by the SADIS Provider State over the next few years. It was agreed that issues related to the operational aspects of the back-up configuration would be presented by the SADIS Provider State as part of its annual management report.

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Agenda Item 7: Long-term planning of SADIS

7.1 The group recalled that it had formulated Conclusion 11/22 calling for the SADIS Provider State to elaborate and maintain a concise long-term plan for the major development of the SADIS system covering a period of five years, for review and endorsement by the SADISOPSG. It was also recalled that the group had formulated Conclusion 12/22 calling for the SADIS Provider State to include an estimate of the scope (i.e. major *versus* minor) and nature (i.e. hardware and/or software impacted) of the changes on SADIS users, as part of the long-term plan.

7.2 The group was pleased to note that an update to the progressive long-term plan had been prepared by the SADIS Provider State. It paid due consideration to the life expectancy of SADIS related services and systems and also took into account the amendment cycle of Annex 3 – *Meteorological Service for International Air Navigation* in order to minimise the frequency of changes, and the corresponding operational and financial implications to the users. Furthermore, the SADIS Provider State had ensured that the updates to the plan were harmonized with the equivalent WAFS 5-year plan that had been developed by the WAFC Provider States and endorsed by the WAFSOPSG. To assist workstation vendors and users alike to better understand the proposals outlined in the long-term plan, additional background information had been included in the long-term plan.

7.3 The group reviewed and endorsed the updates to the plan, and formulated the following decision:

Decision 14/20 — SADIS long-term plan 2010-2014

That, the concise long-term plan covering a period of five years, given in Appendix J be endorsed.

Note. — The long-term plan is a planning tool and certain milestones are still subject to formal endorsement by the SADISOPSG and/or WAFSOPSG.

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Agenda Item 8: The SADIS User Guide

8.1 The group recalled that it had endorsed the new fourth edition of the *SADIS User Guide* (SUG) at its thirteenth meeting (Decision 13/22 refers) which had brought about major changes, i.e. those emanating from Amendment 74 to Annex 3 and the phasing out of the SADIS 1G broadcast.

8.2 Since the SADISOPSG/13 Meeting, only two minor changes related to the SADIS 2G Configuration (Appendix C of the SUG refers) and the list of SADIS 2G hardware, data processing and display suppliers (Appendix L to the SUG refers) had been made in response to a request by the SADIS Provider State which had developed the updated Appendices C and L.

8.3 The group reviewed Appendices C and L available at the SADISOPSG website, endorsed their contents and formulated the following decision:

Decision 14/21 — Appendices C and L to the *SADIS User Guide*

That, the amended Appendices C and L to the *SADIS User Guide* given at

www.icao.int/anb/sadisopsg/sug/SUG-English/SUG-4th-EN.pdf

be endorsed.

8.4 The group agreed that other amendments to the SUG were not required at this stage.

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Agenda Item 9: Future work programme

Terms of reference

9.1 The group reviewed the composition of the group and its terms of reference.. The group recalled that the terms of reference reflected the overall tasks of the group and needed to be revised only when major changes were introduced to the SADIS programme. Furthermore, any change (except for editorials and factual changes) would have to be subject to a draft conclusion to be endorsed by all the planning and implementation regional groups (PIRGs) concerned. It was agreed that there was no need to amend the terms of reference at this meeting except for the addition of Switzerland and elimination of the Russian Federation from the list of members, the latter being a State which no longer contributed to the SADIS cost recovery. It was noted that this change was factual and was in full accordance with the SADISOPSG/6 Draft Conclusion (2001), subsequently endorsed by all the PIRGs concerned whereby a State not contributing to the SADIS cost recovery could not maintain its membership on the SADISOPSG.

Revision of the work programme

9.2 The group reviewed its work programme noting that it had been subject to only editorial improvements which did not influence its substance; when reviewing the work programme, the group updated the following elements:

a) future work programme for 2009 to 2013;

b) executive summaries for each recurrent task; and

c) terms of reference of the following teams:

1) SADISOPSG Gateway Development Team:

2) SADISOPSG Strategic Assessment Team; and

3) SADISOPSG Technical Developments Team.

9.3 On the completion of this review, the group formulated the following decision:

Decision 14/22 — Future work programme of the SADISOPSG

That, the deliverables of the group be updated as shown in Appendix K to this report.

Note. — The Secretariat will place the updated work programme on the SADISOPSG website.

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Agenda Item 10: Any other business

Evaluation of available SADIS workstation software

10.1 Concerning a SADIS workstation software evaluation, the group recalled that it had formulated Decision 13/28 endorsing modified software evaluation criteria in view of recent changes to the WAFS forecast requirements (contained in Amendment 74 to Annex 3) and Conclusion 13/29 calling for the SADIS Provider State to conduct an evaluation of available workstation software from software vendors based on the modified criteria.

10.2 The group was pleased to learn that the SADIS Provider State had subsequently conducted an evaluation of available software; the third time since 2004. The evaluation had been carried out during late 2008 and early 2009 against criteria agreed upon at the SADISOPSG/13 Meeting, using the approach endorsed by the SADISOPSG/10 Meeting.

10.3 The group noted that, by 21 May 2009, eight out of nine listed software vendors on http://www.metoffice.gov.uk/sadis/about/manufacturers_full.html had had their software evaluated. Of the eight software packages assessed, seven can be considered compliant, providing visualisation software that could depict global OPMET and WAFS data to the ICAO Standards and requirements. The group was pleased to note that the following packages could be considered compliant (in alphabetical order):

a) 3SI/GST – METLAB v1.95;

b) Corobor – Messir Aero v7.1.0.0;

c) IBL Software Engineering – AeroWeather v3.1.13;

d) Info Electronic Systems (IES) – Ultima v3.30;

e) Institute of Radar Meteorology (IRAM) – MeteoExpert v9.01;

f) MapMaker Group Ltd – GIS Meteo v3.75; and

g) NetSys International – nsWAFS v2.1.0/v2.10.0.

Hardware refresh proposal for SADIS 2G uplink infrastructure

10.4 The group was aware of the fact that the SADIS second-generation broadcast system (SADIS 2G) had been in operation since November 2004, and had become the sole satellite distribution service since January 2009, following the cessation of the SADIS first-generation system (SADIS 1G). Owing to the rate of development within the telecommunications industry, and the fact that SADIS 2G hardware was installed in the months leading up to November 2004, a number of hardware components that were used as part of the SADIS 2G uplink infrastructure were now 5 years old, and considered to be nearing or already at the end of their useful life. Consequently, it became clear to the group that it would be necessary for the SADIS Provider State to assess whether integral components of the SADIS 2G uplink should be replaced or upgraded as part of a hardware refresh, and the associated costs that would arise from such an undertaking.

10.5 It was noted that if a hardware refresh were not undertaken, support and maintenance costs would become significantly more expensive; furthermore, a failure of a critical component could interrupt delivery of the SADIS service and leave the Provider State in breach of its obligations under the SADIS Agreement.

10.6 In parallel with considering the need for a SADIS 2G hardware refresh, the SADIS Provider State, in consultation with VADOS Systems, had investigated whether the SADIS 2G uplink (i.e. hardware at Exeter and Whitehill, plus interconnection) could be simplified so as to have no detrimental impact on existing SADIS 2G users, but result in improved service availability ratings.

10.7 The group first reviewed the current SADIS 2G uplink infrastructure taking note of the costs involved to support and maintain the equipment before considering two future options: Option 1 ("a *like-for-like* refresh") and Option 2 ("a *simplified* SADIS 2G uplink topology"), their respective technical merits and related installation and support costs. It concurred with the view of the SADIS Provider State that Option 2, would be would be the most prudent proposal to implement since it would be *less expensive* to install and maintain/support, and would provide *higher system availability* (than either the present infrastructure or Option 1).

10.8 Concerning the SADIS 2G uplink protocol, the group noted that, as part of a wider Met Office initiative to migrate its IT systems away from a reliance on the legacy X.25 protocol, consideration would have to be given to passing data between Exeter and Whitehill purely over the "Internet protocol" (IP). However, both Option 1 and Option 2 would support any elected protocol, including IP.

10.9 The group agreed that, in order to improve system availability and monitoring, it would be prudent to also purchase the Option 2 optional hardware (spares) and install the so-called splitter function.

10.10 In order to progress the foregoing issues, the group formulated the following conclusions:

Conclusion 14/23 — Hardware refresh proposal for SADIS 2G hub equipment

That,

a) the SADIS Provider State, in coordination with the SADIS Technical Developments Team, refresh the SADIS 2G hub equipment at Exeter and Whitehill in line with the option (based on simplified topology) given in Appendix L to this report, by 31 December 2009 to benefit from reduced support and maintenance costs in 2010 onwards; and

b) the Chairman of the SADISOPSG be invited to inform the Chairman of the SCRAG of the associated costs of the order of £ 65 000 related to the SADIS 2G hardware refresh.

Note. — Refreshed hardware is to include the optional spares and splitter functionality.

Conclusion 14/24— SADIS 2G uplink protocols

That, the SADIS Provider State, in co-ordination with the SADIS Technical Developments Team and VADOS Systems

a) conduct an investigation into the most efficient protocol to transmit SADIS 2G data between the Met Office Exeter and Whitehill uplink facility; and

b) present their findings to the SADISOPSG/15 Meeting.

Note.— The investigation is deemed essential in view of a Met Office initiative to migrate away from a reliance on legacy X.25 protocol in the next 15 to 18 months. Consideration should be given to promulgation of data over IP and increasing communication circuits to 128 kbps between Exeter and Whitehill.

Future utilisation of the SADIS satellite bandwidth

10.11 Concerning the future use of the SADIS satellite bandwidth, the group recalled that follow-up action on Conclusion 13/27 had not been completed (Agenda Item 3 refers) and that therefore the conclusion should be re-instated. Accordingly, the group formulated the following conclusion:

Conclusion 14/25 — Future utilization of the SADIS satellite bandwidth

That, the SADIS Provider State, in coordination with the SADISOPSG Technical Developments Team:

a) review SADIS satellite bandwidth allocation taking into account the expected changes in the WAFS forecasts (e.g. dissemination of GRIB 2-coded WAFS forecasts); and

b) report back the findings thereof to the SADISOPSG/15 Meeting.

Note. – Need for any end-user hardware changes is to be considered in this context.

Election of Vice Chairman

10.12 The group recalled that it did not have currently any vice chairman and felt that it would be desirable that a vice chairman be elected. Based on a nomination by Mr. M. Nageib (Egypt), seconded by Mr. S. Albersheim (United States), Mr. V. Ahago, the SADISOPSG Member from Kenya, was elected Vice Chairman.

Future meetings

10.13 The group reconfirmed that it continued to be necessary to schedule annual meetings of the group for the foreseeable future. Regarding the venue for the next meeting in 2010, it was noted that the group had held meetings in ICAO regions served by SADIS on a rotational basis. Since the last four meetings had been held in Cairo (2006), Bangkok (2007, 2009) and Dakar (2008), the group noted that the SADISOPSG/15 Meeting should be held at the EUR/NAT (European/North Atlantic) Regional Office in Paris. Therefore, the Secretary was tasked to investigate the possibility of holding the SADISOPSG/15 Meeting in the EUR/NAT Regional Office, Paris 24 to 26 May 2010.

10.14 The group also considered that it would be desirable to convene a meeting of the SADISOPSG Technical Developments Team during the fourth quarter of 2009. Such a meeting would involve the SADIS Provider State and would address, inter alia, the GRIB 2 data trials, mitigation of data losses occurring on the SADIS 2G broadcast and the long-term strategy for the SADIS programme in view of ensuring that appropriate action be taken in response to conclusions formulated at this meeting.

Acknowledgements

10.15 The group expressed special thanks to the members of the SADISOPSG Gateway Development and Technical Developments Teams, and the IATA Member of the group who had contributed towards the progress of a number of key issues.

10.16 The group also took the opportunity to express its appreciation to the SADIS Provider State, and Mr. G. Brock, in particular, for his continuous support both during the past three years and at the last three SADISOPSG Meetings. His role and contributions were considered to be essential in the highly successful transition from the SADIS 1G to the SADIS 2G broadcasts. In view of his new functions, the group wished him well and looked forward to cooperating with him in his new capacity as the ICAO Regional Officer, Meteorology, Paris.

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APPENDIX A

LIST OF PARTICIPANTS

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APPENDIX B

SADIS OPERATIONAL FOCAL POINTS

(Updated on 05 August 2009)

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APPENDIX C

ASSESSMENT OF THE OPERATIONAL EFFICACY OF THE SADIS 2009-2010

http://www2.icao.int/en/AOESB2008-2009/Lists/AOESB20082009/NewForm.aspx?Source=http%3A%2F%2Fwww2%2Eicao%2Eint%2Fen%2FAOESB2008%2D2009%2FLists%2FAOESB20082009%2Foverview%2Easpx

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APPENDIX D

SADIS INVENTORY

The inventory items identified below cover the equipment and staffing required to provide, operate and maintain the SADIS. The inventory includes: hub infrastructure (including all additions following the completion of the hub enhancement project) and communications circuits, ISCS data back up system, procured services, and staff. It should be noted that some equipment items are under lease and form part of a wider infrastructure. Costs of individual items cannot be separated from the required infrastructure that includes a significant part of the development of the software and technical configuration. The inventory is in accordance with the SADIS User Guide.

1. EQUIPMENT

A. Key Components of Hub Infrastructure and Communications Circuits

~~The SADIS 1G hub infrastructure connection to the Met Office message switch (Frost) consists of a number of units developed in conjunction with EADS Astrium and other suppliers. These are installed either at Exeter or at the uplink site at Whitehill, Oxfordshire, UK.~~

~~Additional hub infrastructure has been installed at Exeter and Whitehill to provide resilient SADIS 2G service. This hardware is physically separate from the SADIS 1G infrastructure.~~

The SADIS 2G hub infrastructure connection to the Met Office message switch (Frost) consists of a number of units developed in conjunction with VADOS Systems and other suppliers. These are installed either at Exeter or at the uplink site at Whitehill, Oxfordshire, UK.

The SADIS FTP hub infrastructure connection to the Met Office message switch (Frost) consists of a number of units installed at Exeter.

i) ***Solely procured for SADIS (major components)***

SADIS Gateway function software (developed specifically for the gateway as part of the NATS CoreMet system; see items under “Not procured principally for SADIS”).

~~Hewlett Packard L Class~~ Dell Poweredge R900 servers to provide SADIS FTP Service (see section 1C)

ii) ***Principally procured for SADIS***

a) At the Met Office

See section 1C for itemised components

b) communications between ~~Whitehill and~~ Met Office Exeter and Whitehill uplink facility

~~1) 2 Fibre Optic 64 Kbps circuits in support of SADIS 1G service~~

2) 1) 2 Fibre Optic 64 Kbps circuits in support of SADIS 2G service.

c) the uplink site (Whitehill)

~~3) units forming part of a totally integrated rack structure to provide SADIS 1G service, with back-up, referred to as Chain A and Chain B (see the list under sections 1C);~~

~~4)~~1) units and services leased from Cable and Wireless Communications Ltd. to support SADIS ~~1G and~~ 2G service~~s~~:

(a) 1 (70 to 140 MHz) convertor

(b) use of 1 (140 to C band) convertor

(c) use of satellite hub (lease represents only a very small part of this large aperture) for SADIS ~~1G and~~ 2G service~~s~~; and

~~5)~~2) units forming part of a totally integrated rack structure to provide SADIS 2G service, with back-up, (see the list under sections 1C)

~~d) communication link (SVC) between SADIS Gateway and Met Office in support of SADIS 1G service; and~~

~~e)~~ d) dual contingent communication links (utilising WMO TCP/IP sockets protocol) between SADIS Gateway and Met Office in support of SADIS 2G service.

iii) Not procured principally for SADIS

~~a) Message switch (FROST): Total investment, £1.34M[1] of which 2.40 per cent is attributable to SADIS usage: switching data to operational (1G) broadcast service and to 1G monitoring system — Corobor Comparitor.~~

a) Met Office Message switch (FROST): Total investment, ~~£1.34~~1.26M[1] of which ~~1.25~~1.22 per cent is attributable to SADIS FTP service usage: switching data to operational FTP service;

Note. — The percentage attributable to the SADIS FTP service will increase as GRIB 2 WAFS data is routed to the server by FROST before the end of 2009.

b) Met Office Message switch (FROST): Total investment, ~~£1.34~~1.26M[1] of which ~~0.60~~0.63 per cent is attributable to SADIS usage: switching data to operational (2G) broadcast service and to 2G monitoring system (Corobor Comparator);

[1] budgeted cost for providing FROST service during the fiscal year 200~~8~~9/200~~9~~10.

~~*Note: The percentage attributable to the SADIS FTP service has increased, in part, due to the provision of the gridded icing/turbulence/CB data on SADIS FTP, and the provision of a contingent FTP feed to supply GRIB and BUFR data during a SADIS FTP service interruption in October 2007*~~

c) Allocated bandwidth (2 Mbps bursting to 4 Mbps) between server and Internet Service Provider (ISP) in support of the SADIS FTP service; ~~and~~

d) NATS Message switch (CoreMet System)~~.~~:

Note.— Some elements of the CoreMet System are exclusively for the support of the SADIS gateway function.

e) SADIS FTP equipment running costs;

Note.:— These costs are applied to all Met Office internet facing services and primarily relate to costs associated with ensuring high levels of IT security.

f) Met Office Service Desk equipment; and

Note.:— Equates to 3.5 per cent of the total share of Met Office IT Operations equipment.

g) Met Office Serial Communications.

Note:— Equates to 20% of total share of Met Office Serial Communications. Includes cost of switching serial data from FROST Message Switch to SADIS 2G, comprising staff and equipment costs of supporting serial WAN, TTL Routers, Serial Modems and TTL matrix switches.

B. SADIS data back-up system

ISCS VSAT receiving system, including TCP/IP receiver and cables, on SADIS Provider (UK Met Office) premises.

Note 1.— This hardware is not currently used in an operational environment

Note 2..— The SADIS Gateway (UK NATS) continues to procure ~~an ISCS VSAT receiving system,~~ a dedicated SADIS data backup arrangement with the ISCS Provider State. The backup infrastructure will include an ISDN connection between the NWS Telecommunications Gateway and the SADIS Gateway, and an ~~including~~ ISDN connection ~~to~~ between the SADIS Gateway and Whitehill uplink facility, to provision SADIS data backup.

C. Hub equipment and services located at Exeter and Whitehill

Item	*Description*	*Quantity*
~~1.~~	~~**Exeter Equipment to support SADIS 1G**~~	
~~1.1~~	~~Network Management System (NMS Computer)~~	~~1~~
~~1.2~~	~~MemoTech PAD (for NMS)~~	~~1~~
~~1.3~~	~~Telecoms interface units Megabox~~	~~2~~
~~1.4~~	~~CX1000 Frame Relay Switch (for NMS)~~	~~1~~
~~1.5~~	~~Product display console including software (COROBOR)~~	~~1~~
~~1.6~~	~~Communications rack floor space in IT hall 1 and space in stores to locate spare equipment~~	~~1~~
~~2.~~	~~**Exeter Equipment (Spares) to support SADIS 1G**~~	
~~2.1~~	~~Telecoms interface units Megabox~~	~~2~~
~~2.2~~	~~NMS Spare CPU~~	~~1~~
~~2.3~~	~~MemoTech PAD (for NMS)~~	~~1~~
~~2.4~~	~~CX1000 Frame Relay Switch (for NMS)~~	~~1~~
	~~*Note: communication links in support of SADIS 1G service are included in section 1.1 of Inventory.*~~	
~~3.~~	~~**Whitehill earth station (SADIS 1G uplink equipment)**~~	
~~3.1~~	~~Telecoms controller Megapac V rack assembly Station interface unit (SIU)~~	~~2~~
~~3.2~~	~~8360 Modulator~~	~~2~~
~~3.3~~	~~8471 Receive Demodulators~~	~~2~~
~~3.4~~	~~8550 Modem Switch~~	~~12~~
~~3.5~~	~~140 L band upconverter~~	~~1~~
~~3.6~~	~~X Term NMS simulator~~	~~2~~
~~3.7~~	~~Equipment Rack Assembly (Chain 1)~~	~~1~~
~~3.8~~	~~Equipment Rack Assembly (Chain 2)~~	~~1~~
~~3.9~~	~~Communications rack floor space for two communications racks~~	~~1~~
~~3.10~~		~~2~~
~~4.~~	~~**Whitehill earth station SADIS 1G (spares)**~~	
~~4.1~~	~~8471 Receive Demodulators~~	~~1~~
~~4.2~~	~~Station interface unit (SIU)~~	~~1~~
~~4.3~~	~~MegaPAC V rack assembly~~	~~2~~
~~4.4~~	~~MegaPAC V Frad units~~	~~2~~
~~4.5~~	~~140 L band upconverter~~	~~1~~
~~4.6~~	~~8360 Modulator~~	~~1~~
~~4.7~~	~~8550 Modem Switch~~	~~1~~

~~5.~~1.	**Whitehill services (leased from Cable & Wireless)**	
~~5.1~~1.1	70 MHz to 140 MHz converters~~s~~	~~2~~1
~~5.2~~1.2	140 MHz to C band converter	~~2~~1
~~5.3~~1.3	Satellite Hub leased bandwidth	1 slot
~~6.~~	~~**Test Rig at Poynton**~~	
~~6.1~~	~~Enhanced (SADIS 1G) Simulator~~	~~1~~
~~7.~~2.	**ISDN back-up service to Washington (NWSTG)**	
~~7.1~~2.1	MegaPAC 2003 router (MP-2003)	1
~~7.2~~2.2	MegaPAC 2003 router plus expansion (MP-2003-3-B)	1
~~7.3~~2.3	ISDN 2e circuit	1
~~7.4~~2.4	A/B switch	1
~~7.5~~2.5	Interface cables	1
	Note.— Hardware listed ~~items~~ under Section ~~7~~2 ~~are~~ is located at Whitehill.	
~~8.~~3.	**SADIS FTP Service**	
~~8.1~~3.1	~~HP L2000~~ Dell Poweredge R900 servers with ~~2~~1 Gb RAM	2
~~8.2~~3.2	~~18~~26.8 Gb internal disk drives	2
~~8.3~~3.3	~~DVD-ROM~~VMWave Virtual Platform with Red Hat Linux 5.3 OS	2
3.4	Intel Xeon X7350, 2.93 GHz Processors	2
~~8.4~~3.5	Licenses, misc. support and maintenance costs	1

Note. — Hardware listed under Section 3 is located at Exeter.

~~9.~~4. ~~Operational~~ SADIS 2G Infrastructure

~~9.1~~4.1	FROST port	1
~~9.2~~4.2	MegaPAC V System Dual PSU	3*
~~9.3~~4.3	MegaPAC 2003 (Exeter)	3*
~~9.4~~4.4	Uplink modem (Comtech EF Data SDM-300a)	3*
~~9.5~~4.5	Communications cabinet and lease	1
~~9.6~~4.6	MegaWatch including Enterprise Reports, and PC	1
4.7	Comtech SDM300L demodulator (NER5 downlink)	1
~~9.7~~4.8	Corobor comparator software and PC	
~~9.8~~4.9	XIO Modules	1
~~9.9~~4.10	SIO Modules	12**
~~9.10~~4.11	8Mb RAM Modules	3*
~~9.11~~4.12	Communications rack floor space at Exeter in IT hall 1 and	3*
	IT hall 2, and at Whitehill	3
~~9.12~~4.13	Space in stores at Exeter to locate spare hardware	
~~9.13~~4.14	VadEGDE 4202 – 1U	1
~~9.14~~4.15	WAN module	2
~~9.15~~4.16	Comtech EF Data SMS 301 – redundancy switch	2
~~9.16~~4.17	Interface cabling	2*
		15

**Includes one unit/module stored as a cold spare.*
***Includes four modules stored as cold spares.*
Note. ─ Hardware listed under section 4 is located at Exeter and Whitehill.

2. PROCURED SERVICES

A. Space segment annual lease: 1.5MHz wide frequency band of which 57% is utilised to support SADIS ~~1G and~~ 2G, with ~~minimum data rates at 38.4 Kbps for both services~~ 64Kbps data rate (less communications overhead);

Note. ─ SADIS 1G was terminated on 5th January 2009. The percentage of satellite space segment has, however, remained unchanged because the SADIS 1G satellite bandwidth allocation was maintained in 2009 and 2010, as called for by SADISOPSG Decision 13/26.

B. Annual maintenance of Met Office Exeter and Whitehill uplink site equipment (~~1G,~~ SADIS 2G and SADIS FTP server); and

C. Gateway function:

i) communication circuits between Met Office and NATS infrastructure site; and

ii) System maintenance.

3. ANNUAL STAFF REQUIREMENTS

A. United Kingdom Met Office

i) Service Desk

Note.— The Service Desk acts as a first point of contact for all inquiries, including those concerning the OPMET Gateway function. Complex inquiries will be passed to a relevant expert. Experts are available either on a 24-hour rota basis, or as a daytime support with limited on-call capability.

~~*Normal working hours*~~*24-hour Weather Desk support*	*Skill*
1. Service Desk (first point of contact)	Scientific supervisor
2. Additional Service Desk operator	Systems analyst

~~*Note.— Outside normal working hours, the Service Desk facility is provided by the 24-hour positions below.*~~

Note. — Total support for SADIS provided by the Met Office Service Desk team equates to 0.3 per cent of the total Weather Desk budget.

24-hour IT Operations support	*Skill*
~~1. Operations Systems Analyst (OSA)~~	~~Systems analyst~~
~~2.~~1. Technical Team Leader (TTL)	Computer engineer
~~3.~~2. Networks and Systems Supervisor (NSS)	Technical supervisor
~~4. Operations Service Delivery (OSD) Service Assurance~~	~~Scientist~~

Note. — Total support for SADIS provided by the Met Office IT Operations team equates to 3.5 per cent of the total IT Operations budget.

Normal working hours support	*Skill*
1. Change and problem manager (CPM)	Systems analyst
~~2. Additional Service Desk operator~~	~~Systems analyst~~

~~*Note.— The total support for SADIS is considered as 1 percent of the total support provided by the Service Desk and operational support function. These functions comprise 4 * 24-hour rosters of six staff each, an additional three-man team (CPM), and one further 5-roster team providing further (normal working hours) Service Desk support.*~~

ii) Additional support

~~*Additional* *Day support*	~~*Skill*~~*Resource*
1. Systems integration team	~~30~~10 per cent of network computer engineer and 10 per cent of CIDA
2. Message Switching Manager	10 percent of MSS manager

~~2.~~3. Administrator	75 per cent of executive officer
~~3.~~4. International aviation management	15 per cent of manager
~~4.~~5. Data traffic	5 per cent communications engineer
~~5.~~6. Contract Procurement and Management	5 per cent of senior procurement officer
~~6.~~7. UNIX support	10 per cent of computer engineer
~~7.~~8. Web team support	10 per cent of web site designer

Note 1.— Support by the UNIX Team of the SADIS FTP Service will incur some additional costs in excess of simple human resources. These costs are applied to all internet facing services and primarily relate to costs associated with ensuring high levels of IT security.

Note 2.— CIDA is the Co-ordinating Installation Design Authority. The Met Office CIDA Installation Design and Engineering team are technical authorities who work alongside project managers to co-ordinate the efforts of a number of different groups.

B. NATS infrastructure site – CACC (OPMET Gateway function)

Note.— The CACC provides the OPMET Gateway function, which is provided from a single operational site, but with full capability at an alternative site. Staff are available either on a 24-hour basis, or as a daytime support with on-call capability.

~~*The staff is made up of*~~ *The resource demand of 610 days required to provide the SADIS Gateway service comprises 6 watches of 1 ATSA4 and 1 ATSA3 each (Operations), 1 ATCE4 (Engineering Watchkeeping) and 3 ATCE4 (Engineering Day Support).*

24 hour support	~~*Skill*~~*Resource*
1. Operational staff support	~~10 per cent of ATSA4~~523 man-days per annum ~~10 per cent of ATSA3~~
2. Engineering staff support	~~10 per cent of systems engineer~~22 man-days per annum
Day Support	*Resource*
3. SADIS administration support	~~40 per cent of ATSC T & SC~~50 man-days per annum
4. Engineering (including on-call)	~~10 per cent of 75 per cent of ATCE4~~15 man-days per annum

C. Bought-in Services

Additional support and maintenance agreements with third parties are in-place to provide third line support of the SADIS ~~1G and~~ 2G service~~s~~.

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APPENDIX E

BACKGROUND INFORMATION RELATED TO ADDITIONAL SADIS COSTS

1. UK MET OFFICE

1.1. Service Desk support of SADIS 2G and SADIS FTP

SADIS 2G passes through the MATRIX switch to the SADIS 2G Comparator System where the Network Systems Supervisor (NSS) is able to monitor the data feed from satellite with the expected transmission message count. The NSS uses DSView application to connect to the SADIS 2G Comparator System (SADIS 2G MON) and it's from here that NSS monitors SADIS 2G using Corobor software.

Using a dedicated MegaWATCH PC located in IT Hall 2, the Technical Teal Leader (TTL) has visibility of the two SADIS 2G MegaPAC 2003's located in our IT Halls and has the ability to manage the ports and communication links connected to them. The TTL is also able to access the SADIS 2G MegaPAC-V's located at Whitehill but has no control over the communications and equipment that lie beyond this point. The MegaWATCH is monitored by TIVOLI and TTL responds to these messages as required.

The SADIS FTP server is monitored by TIVOLI and the NSS responds to messages as required.

Service Desk equipment equates to 3.5 per cent of £448k budget for Met Office IT Operations equipment. This comprises share of workstation, central infrastructure and manager costs.

Service Desk staffing comprises 3.5 per cent of TTL and 7 per cent of NSS and equates to 3.5 per cent of £948k Met Office IT Operations staff costs.

1.2. Service Desk Serial Communications

Costs of switching serial data from FROST Message switch to SADIS 2G, comprising staff and equipment costs of supporting serial WAN, TTL Routers, Serial Modems and TTL matrix switches. This equipment is shared with the Met Office observations network. Costs have fallen significantly since the budgetary estimate provided in 2008 due to the de-commissioning of SADIS 1G.

Service Desk serial communications equates to 20 per cent of £68k budget for Met Office HQ data switching.

1.3 CIDA and Infrastructure Engineer (Systems Integration Team)

Previously, this activity was included within the 30 per cent allocation of a network computer engineer within the Systems Integration Team. To improve transparency of costs, this activity is now split between 10 per cent of a network computer engineer, 10 per cent of the Met Office

CIDA installation Design and Engineering team and 10 per cent of the Message Switching Manager. Total effort remains the same at 30 per cent of a day-working member of staff and there is therefore no overall increase in cost for this area of activity.

2. UK NATS (SADIS Gateway)

2.1 Overview

NATS deliver quality controlled OPMET data for broadcast globally, real time monitoring & investigation, data searches to improve availability and fault restoration. Management of the data has increased beyond NATS' traditional role and since Public Private Partnership (PPP) is not part of NATS' licence obligation. The Agreement for provision of the SADIS Gateway therefore needs to be able to cover its costs and be sustainable. NATS as a national service provider is willing to support the ongoing provision of this service. Ongoing contributions from other areas are not included in the costing.

2.2 2009 Resource Cost Base Breakdown

Staff	Duties	Av. Jobs/day	Time (secs)/job	Total time (hours)/day	Hours/Year	Mandays
Operational Staff	Rejected messages	1055	30	8.8	3209	459
Operational Staff	Real-time monitoring	15	180	0.75	274	39
Operational Staff	Communications (apportionment)			1.5	548	78
Admin Support	Helpdesk queries/Orphans queue/data search/config.			1.5	378	54
				12.55	4409	630

2.3 2009 Proposed Revised Costing

As per the Agreement, NATS provides the following skill set

- Operational Staff 523 days
- Engineering Staff 22 days
- Database Admin Support 50 days
- Asset Engineering 15 days

Total of 610 days at a commercial cost of £298k including SADISOPSG support costs

- Asset charge of £18k
- Finance charges £1k

Total charge for 2009 £317k

It can be seen from the resource breakdown given in the table in section 2.2, that in order to deliver the SADIS Gateway service NATS actually requires 630 days. However, 20 days can be offset against related activities and so it is considered that only 610 days are chargeable.

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APPENDIX F

PROPOSAL FOR AMENDMENT TO ANNEX I TO THE SADIS AGREEMENT

1. BROADCAST SERVICE

a) distribution of WAFS upper-air ~~wind/temperature~~ forecasts in GRIB code ~~(including scheduled repeat of whole data set)~~;

~~b) distribution of WAFS upper wind/temperature forecasts in T4 facsimile chart form;~~

b) distribution of WAFS SIGWX forecasts in BUFR code ~~T4 facsimile chart form~~;

c) distribution of WAFS SIGWX forecasts in PNG chart form ~~numerical code form as determined by ICAO~~;

d) distribution of OPMET information in alphanumeric format (METARs, TAFs, SIGMET, special AIREPs, volcanic ash and tropical cyclone advisories) from those regions whose OPMET information is needed to satisfy approved requirements in the regions served by SADIS;

~~e) istribution of amendments to the foregoing, as necessary, and responses to requests for repeat of data as determined by the SADISOPSG~~.

e) distribution of meteorological information in graphical format (e.g. Volcanic Ash Trajectory and Dispersion Graphics)

2. COLLECTION SERVICE

a) collection of relevant OPMET information by the SADIS Gateway~~, including the Two-Way facility,~~ from States in accordance with approved requirements stated by PIRGs and actioned by SADISOPSG;

b) monitoring~~, and~~ validation and repair of data received at the SADIS Gateway~~, including the Two-Way,~~ to the required standards, for the provision of real-time scheduled reports and for off-line quality control analysis.

3. BACK-UP SERVICE

Reception of US ISCS broadcasts for back-up purposes.

4. USER SUPPORT SERVICE

4.1 24-hour help line/faults desk;

4.2 Dissemination of administrative messages, including amendments to bulletin headers given in the SADIS User Guide ~~via the SADIS broadcast (and by customary hard copy)~~.

5. .....FILE TRANSFER PROTOCOL SERVICE

Provision of facilities dedicated to establishing and receiving an FTP connection, using password protected access, to the SADIS FTP server that enables the transfer of WAFS upper-air forecasts in GRIB code, WAFS SIGWX forecasts in BUFR code, WAFS SIGWX forecasts in PNG chart form and OPMET data over the Public Internet.

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APPENDIX G

Revised and New Requirements for OPMET data and availability on international distribution from Non-AOP aerodromes in the ICAO regions

15 March 2009

I

The following tables contain the proposed changes for SUG Annex 1. There are new IATA requirements of OPMET data exchange and monitoring as well as changes of requirements for aerodromes already listed in the SUG Annex 1. Only differences to the existing SUG Annex 1 are listed in the tables.

Most of the proposed changes are already available on the SADIS broadcast. The proposal is a contribution to harmonize the SADIS broadcast and the SUG Annex 1.

Legend

Column 1: ICAO Location Indicator (Tables are sorted according the ICAO location indicator)
Column 2: Name of aerodrome (Non-AOP Aerodrome)
Column 3: Country
Column 4: METAR (SA), SPECI (SP)
Y – SA and SP is required for international distribution
Column 5: Short TAF (FC), Long TAF (FT)
C - Requirement for 9-hour validity aerodrome forecasts in TAF code (9H)
T - Requirement for 18/24-hour validity aerodrome forecasts in TAF code (18/24H)
X - Requirement for 30-hour validity aerodrome forecasts in TAF code (30H)
Column 6: Long TAF (FT), if Y then FT are required for international distribution
Y – 24H FT is required for international distribution
X – 30H FT is required for international distribution
Column 7: Remark

Note.— IATA does not have any requirement for Short TAF (FC).

Changes of requirements listed in the currently valid SUG Annex 1 are highlighted as shown in the examples below.

Examples:

For **DABT FT** is required instead of **FC**

ICAO Location	**Listed in AOP Tables**	**Country**	**SA/SP**	**FC/FT**	SA/SP	FC/FT
			NEW		ACTUAL	
DABT	BATNA/MOSTEPHA BEN BOULAID	Algeria	Y	**T**	Y	~~**C**~~

For **DABT FT** is now additionally required

DABT	**BATNA/MOSTEPHA BEN BOULAID**	**Algeria**	Y	**T**	Y	

For **DABT 30H FT** is now required

DABT	**BATNA/MOSTEPHA BEN BOULAID**	**Algeria**	Y	**X**	Y	~~**T**~~

For **PGUM SA and FT** is required (**new requirement**)

DABT	**BATNA/MOSTEPHA BEN BOULAID**	**Algeria**	**Y**	**T**		

DABT is not longer required

~~**DABT**~~	~~**BATNA/MOSTEPHA BEN BOULAID**~~	~~**Algeria**~~			~~**Y**~~	~~**T**~~

List of aerodromes for the required OPMET data

AFRICA-INDIAN OCEAN (AFI) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
DABT	**BATNA/MOSTEPHA BEN BOULAID**	**Algeria**	**Y**	**T**		
DAOR	BECHAR	Algeria	Y	**T**	Y	
DATM	**BORDJ MOKHTAR**	**Algeria**	**Y**	**T**		
DAAD	BOU-SAADA	Algeria	Y	**T**	Y	
DAOI	**ECH CHELIT**	**Algeria**	**Y**	**T**		
DAOY	**EL BAYADH**	**Algeria**	**Y**	**T**		
DAUE	EL GOLEA	Algeria	Y	**T**	Y	
DAOV	GHRISS	Algeria	Y	**T**	Y	~~C~~
DAFH	**HASSI RMEL**	**Algeria**	**Y**	**T**		
DATG	IN GUEZZAM	Algeria	Y	**T**	Y	~~C~~
DATG	IN GUEZZAM	Algeria	Y	**T**	Y	~~C~~
DAUL	**LAGHOUAT AFB**	**Algeria**	**Y**	**T**		
DAAY	**MECHERIA AIRFORCE BASE**	**Algeria**	**Y**	**T**		
DAOL	**ORAN/TAFARAOUI**	**Algeria**	**Y**			
DAAS	**SETIF**	**Algeria**	**Y**	**T**		
DAOF	**TINDOUF**	**Algeria**	**Y**	**T**		
FHAW	WIDEAWAKE/ASCENSION	Ascension Is. (United Kingdom)	**Y**	T		T
FBFT	FRANCISTOWN	Botswana	Y	**T**	Y	
FBJW	**JWANENG**	**Botswana**	**Y**			
FBKE	KASANE	Botswana	Y	**T**	Y	
FBMN	MAUN	Botswana	Y	**T**	Y	
FBSP	SELEBI-PHIKWE	Botswana	Y	**T**	Y	
FBTS	**TSHABONG**	**Botswana**	**Y**			
GVNP	**PRAIA INTL**	**Cape Verde**	**Y**	**T**		
GVBA	**RABIL/BOA VISTA ISLAND**	**Cape Verde**	**Y**	**T**		
GVSV	**SAO PEDRO/SAO VICENTE ISLAND**	**Cape Verde**	**Y**	**T**		
FTTC	**ABECHE**	**Chad**	**Y**			
FTTY	**FAYA LARGEAU**	**Chad**	**Y**			

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
FMCZ	DZAOUDZI	Comoros	Y	**T**	Y	
HEMA	MARSA ALAM	Egypt	Y	**T**	Y	
HADR	DIRE DAWA	Ethiopia	Y	**T**	Y	
DGTK	**TAKORADI**	**Ghana**	**Y**	**T**		
FMEP	**SAINT PIERRE/PIERREFONDS**	**Île De La Réunion (France)**	**Y**	**T**		
HLLQ	**EL BEIDA / LABRAQ**	**Libyan Arab Jamahiriya**	**Y**	**T**		
HLGN	**GAMAL ABD EL NASSER AIR BASE**	**Libyan Arab Jamahiriya**	**Y**	**T**		
HLGD	**GARDABYA**	**Libyan Arab Jamahiriya**	**Y**	**T**		
HLGT	**GHAT**	**Libyan Arab Jamahiriya**	**Y**	**T**		
HLON	**HON**	**Libyan Arab Jamahiriya**	**Y**	**T**		
HLKF	KUFRA	Libyan Arab Jamahiriya	Y	**T**	Y	
HLLM	**TRIPOLI/MITIGA**	**Libyan Arab Jamahiriya**	**Y**	**T**		
FMNA	ANTSIRANANA	Madagascar	Y	**T**	Y	
FMMS	**SAINT MARIE**	**Madagascar**	**Y**			
FMST	**TOLIARA**	**Madagascar**	**Y**	**T**		
FIMR	RODRIGUES/PLAINE CORAIL	Mauritius	Y	**T**	Y	
GMMC	**CASABLANCA/ANFA**	**Morocco**	**Y**			
FQCH	**CHIMOIO**	**Mozambique**	**Y**	**T**		
FQIN	**INHAMBANE**	**Mozambique**	**Y**	**T**		
FQLC	**LICHINGA**	**Mozambique**	**Y**	**T**		
FQPB	**PEMBA**	**Mozambique**	**Y**	**T**		
FQVL	**VILANKULO**	**Mozambique**	**Y**	**T**		
FYGF	**GROOTFONTEIN**	**Namibia**	**Y**	**T**		
FYOA	**ONDANGWA**	**Namibia**	**Y**	**T**		
FYWE	**WINDHOEK/EROS**	**Namibia**	**Y**	**T**		
DRRM	**MARADI**	**Niger**	**Y**			
DRRT	**TAHOUA**	**Niger**	**Y**			
DNMN	**MINNA**	**Nigeria**	**Y**			

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
DNIM	**OWERRI**	**Nigeria**	**Y**	**T**		
DNYO	**YOLA**	**Nigeria**	**Y**	**T**		
HRZA	**KAMEMBE**	**Rwanda**	**Y**	**T**		
FAEL	EAST LONDON	South Africa	Y	**T**	Y	
FAGG	GEORGE/P.O.BOTHA	South Africa	Y	**T**	Y	
FAHS	**HOEDSPRUIT AFB**	**South Africa**	**Y**	**T**		
FAKM	KIMBERLEY (KIMBERLEY AIRPORT)	South Africa	Y	**T**	Y	
FAKN	**KRUGER MPUMALANGA INT**	**South Africa**	**Y**	**T**		
FALM	**MAKHADO**	**South Africa**	**Y**	**T**		
FAPM	**PIETERMARITZBURG**	**South Africa**	**Y**	**T**		
FAPN	**PILANESBERG**	**South Africa**	**Y**	**T**		
FAPP	**POLOKWANE INTERNATIONAL**	**South Africa**	**Y**	**T**		
FAWB	**PRETORIA/WONDERBOOM**	**South Africa**	**Y**	**T**		
FARB	**RICHARDS BAY**	**South Africa**	**Y**	**T**		
FAUT	**UMTATA**	**South Africa**	**Y**	**T**		
HSSM	**MALAKAL**	**Sudan**	**Y**	**T**		
DTTR	**EL BORMA**	**Tunisia**	**Y**	**T**		
HUMI	**MASINDI**	**Uganda**	**Y**			
HTDO	**DODOMA**	**United Republic of Tanzania**	**Y**			
HTKA	**KIGOMA**	**United Republic of Tanzania**	**Y**			
HTMB	**MBEYA**	**United Republic of Tanzania**	**Y**			
HTMT	**MTWARA**	**United Republic of Tanzania**	**Y**			
HTPE	**PEMBA**	**United Republic of Tanzania**	**Y**			
HTSY	**SHINYANGA/IBADAKULI**	**United Republic of Tanzania**	**Y**			
HTSO	**SONGEA**	**United Republic of Tanzania**	**Y**			
HTTB	**TABORA**	**United Republic of Tanzania**	**Y**			
FLKS	**KASAMA**	**Zambia**	**Y**			
FLMG	**MONGU**	**Zambia**	**Y**			
FVCZ	**CHIREDZI/BUTALO RANGE**	**Zimbabwe**	**Y**	**T**		
FVTL	**GWERU/THORNHILL**	**Zimbabwe**	**Y**	**T**		
FVWN	**HWANGE NATIONAL PARK**	**Zimbabwe**	**Y**	**T**		
FVKB	**KARIBA**	**Zimbabwe**	**Y**	**T**		
FVMV	**MASVINGO**	**Zimbabwe**	**Y**	**T**		

ASIA (ASI) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
YAMB	**AMBERLEY**	**Australia**	**Y**	**T**		
YBRM	BROOME/BROOME INTL	Australia	**Y**	T		T
YCIN	**CURTIN/DERBY**	**Australia**	**Y**	**T**		
YSDU	DUBBO	Australia	**Y**	T		T
YFRT	**FORREST**	**Australia**	**Y**	**T**		
YMLT	**LAUNCESTON**	**Australia**	**Y**	**T**		
YPLM	LEARMONTH	Australia	**Y**	T		T
YWLM	**WILLIAMTOWN**	**Australia**	**Y**	**T**		
YPWR	**WOOMERA**	**Australia**	**Y**	**T**		
ZUGY	**GUIYANG**	**China**	**Y**	**T**		
ZSCN	**NANCHANG/CHANGBEI**	**China**	**Y**			
ZBSJ	**SHIJIAZHUANG/ZHENGDING**	**China**	**Y**	**T**		
ZSYT	**YANTAI/LAISHAN**	**China**	**Y**			
ZHCC	**ZHENGZHOU/XINZHENG**	**China**	**Y**	**T**		
NFNR	**ROTUMA**	**Fiji**	**Y**			
VAAU	**AURANGABAD**	**India**	**Y**	**T**		
VOBL	**BANGALORE/DEVANAHALLI**	**India**	**Y**	**T**		
VABM	**BELGAUM**	**India**	**Y**	**T**		
VABV	**BHAVNAGAR**	**India**	**Y**	**T**		
VABP	**BHOPAL**	**India**	**Y**	**T**		
VOCB	**COIMBATORE**	**India**	**Y**	**T**		
VAID	**DEVI AHILYABAI HOLKAR**	**India**	**Y**	**T**		
VAGO	**GOA**	**India**	**Y**	**T**		
VOHS	**HYDERABAD/RAJIV GANDHI**	**India**	**Y**	**T**		
VAJB	**JABALPUR**	**India**	**Y**	**T**		
VAJM	**JAMNAGAR**	**India**	**Y**	**T**		
VAKJ	**KHAJURAHO**	**India**	**Y**	**T**		
VOMD	**MADURAI**	**India**	**Y**	**T**		
VOML	**MANGALORE**	**India**	**Y**	**T**		
VAPO	**PUNE**	**India**	**Y**	**T**		
VARP	**RAIPUR**	**India**	**Y**	**T**		
VARK	**RAJKOT**	**India**	**Y**	**T**		
VOTP	**TIRUPATI**	**India**	**Y**	**T**		
VABO	**VADODARA**	**India**	**Y**	**T**		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
VOBZ	VIJAYWADA	India	Y	T		
VEVZ	VISHAKHAPATNAM	India	Y	T		
WIPT	PADANG PARIAMAN/MINANGKABAU	Indonesia	Y			
WARS	SEMARANG	Indonesia	Y			
RJTI	AKASAKA PRESS CENTER HELIPORT	Japan	Y			
RJSK	AKITA	Japan	Y	T		
RJKA	AMAMI	Japan	Y			
RJSA	AOMORI	Japan	Y	T		
RJEC	ASAHIKAWA	Japan	Y	T		
RJTF	CHOFU	Japan	Y			
RJSF	FUKUSHIMA	Japan	Y	T		
RJTH	HACHIJOJIMA	Japan	Y			
RJSI	HANAMAKI	Japan	Y			
RJOI	IWAKUNI	Japan	Y	T		
RJAW	IWOJIMA	Japan	Y			
RJOC	IZUMO	Japan	Y	T		
RODN	KADENA	Japan	Y	T		
RJFR	KITAKYUSHU	Japan	Y	T		
RJOK	KOCHI	Japan	Y	T		
RJNK	KOMATSU	Japan	Y	T		
RJCK	KUSHIRO	Japan	Y	T		
RJAF	MATSUMOTO	Japan	Y			
RJOM	MATSUYAMA	Japan	Y	T		
RJCM	MEMANBETSU	Japan	Y	T		
RJFM	MIYAZAKI	Japan	Y	T		
RJEB	MONBETSU	Japan	Y			
RJCN	NAKASHIBETSU	Japan	Y			
RJBD	NANKI SHIRAHAMA	Japan	Y			
RJCB	OBIHIRO	Japan	Y	T		
RJTO	OSHIMA	Japan	Y			
RJFG	TANEGASHIMA	Japan	Y			
RJOR	TOTTORI	Japan	Y			
RJNT	TOYAMA	Japan	Y	T		
RJDT	TSUSHIMA	Japan	Y			
RJCW	WAKKANAI	Japan	Y			
RJSC	YAMAGATA	Japan	Y			
RJDC	YAMAGUCHI-UBE	Japan	Y			
RJOY	YAO	Japan	Y			

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
RJTY	**YOKOTA**	**Japan**	**Y**	**T**		
WBGB	BINTULU	Malaysia	Y	**T**	Y	~~C~~
WMKB	**BUTTERWORTH**	**Malaysia**	**Y**	**T**		
WMKE	**KERTEH**	**Malaysia**	**Y**	**T**		
WMKC	KOTA BHARU/SULTAN ISMAIL PETRA	Malaysia	Y	**T**	Y	
WBGY	**SIMANGGANG**	**Malaysia**	**Y**			
NWWL	**LIFOU-OUANAHAM**	**New Caledonia (France)**	**Y**	**T**		
NWWM	**NOUMEA/MAGENTA**	**New Caledonia (France)**	**Y**	**T**		
AYGN	**ALOTAU/GURNEY**	**Papua New Guinea**	**Y**			
AYDU	DARU	Papua New Guinea	Y	**T**	Y	~~C~~
AYGA	GOROKA	Papua New Guinea	Y	**T**	Y	~~C~~
AYMD	MADANG	Papua New Guinea	Y	**T**	Y	~~C~~
AYMH	MOUNT HAGEN	Papua New Guinea	Y	**T**	Y	~~C~~
AYNZ	NADZAB	Papua New Guinea	Y	**T**	Y	~~C~~
RPML	**CAGAYAN DE ORO**	**Philippines**	**Y**	**T**		
RPVD	**DUMAGUETE**	**Philippines**	**Y**	**T**		
RPMR	**TAMBLER**	**Philippines**	**Y**	**T**		
RKTH	**POHANG**	**Republic of Korea**	**Y**			
RKPS	**SACHON**	**Republic of Korea**	**Y**			
VCCB	**BATTICALOA**	**Sri Lanka**	**Y**	**T**		
VTSH	**SONGKHLA**	**Thailand**	**Y**	**T**		
VTPO	**SUKHOTHAI**	**Thailand**	**Y**	**T**		
VTPT	**TAK/TAK**	**Thailand**	**Y**	**T**		
PFYU	**FORT YUKON**	**United States**	**Y**			
PAGS	**GUSTAVUS**	**United States**	**Y**	**T**		
PAPG	**JOHNSON PETERSBURG**	**United States**	**Y**	**T**		
PHJR	**KAPOLEI/KALAELOA/JOHN ROGERS**	**United States**	**Y**	**T**		
PASY	**SHEMYA/EARECKSON AFS**	**United States**	**Y**			
PAWG	**WRANGELL**	**United States**	**Y**	**T**		
NVVW	**TANNA/WHITE GRASS**	**Vanuatu**	**Y**	**T**		

ICAO Location	**Listed in AOP Tables**	**Country**	**SA /SP**	**FC / FT**	SA /SP	FC/ FT
			NEW		ACTUAL	
VVDL	DALAT /LIENKHUONG	Viet Nam	Y	**T**	Y	~~C~~
VVDB	DIENBIEN	Viet Nam	Y	**T**	Y	~~C~~
VVNT	NHATRANG	Viet Nam	Y	**T**	Y	~~C~~

CARIBBEAN (CAR) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
MUCF	CIENFUEGOS JAIME GONZALES	Cuba	Y	T		
MUGM	GUANTANAMO US-NAVAL AIR BASE	Cuba	Y			
MUMZ	MANZANILLO/CUBA	Cuba	Y	T		
MUSC	SANTA CLARA/ABEL SANTAMARIA	Cuba	Y			
TDCF	CANEFIELD	Dominica	Y			
MDAB	SAMANA ARROYO BARRIL INTL	Dominican Republic	Y	T		
MDCY	SAMANA EL CATEY INTL	Dominican Republic	Y	T		
MDJB	SANTO DOMINGO	Dominican Republic	Y	T		
MMCT	CHICHEN ITZA	Mexico	Y			
MPHO	BALBOA/HOWARD AFB	Panama	Y	T		

SOUTH AMERICAN (SAM) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
SARC	CORRIENTES	Argentina	Y			
SARL	PASO DE LOS LIBRES	Argentina	Y			
SAOC	RIO CUARTO	Argentina	Y			
SAWE	RIO GRANDE	Argentina	Y	T		
SLSI	SAN IGNACIO DE VELASCO	Bolivia	Y			
SLSA	SANTA ANA DEL YACUMA	Bolivia	Y			
SLVM	VILLAMONTES/TCNL. RAFAEL PABON	Bolivia	Y			
SLYA	YACUIBA	Bolivia	Y	T		
SBAT	ALTA FLORESTA	Brazil	Y			
SBHT	ALTAMIRA	Brazil	Y			
SBAN	ANAPOLIS/BASE AEREA	Brazil	Y			
SBAR	ARACAJU/SANTA MARIA	Brazil	Y	T		
SBBG	BAGE INTL/GUSTAVO KRAEMER	Brazil	Y	T		
SBBQ	BARBACENA	Brazil	Y			
SBBW	BARRO DO GARCAS	Brazil	Y			
SBBU	BAURU	Brazil	Y			
SBBH	BELO HORIZONTE/PAMPULHA	Brazil	Y			
SBLP	BOM JESU DA LAPA	Brazil	Y			
SBKG	CAMPINA GRANDE/JOAO SUASSUNA	Brazil	Y			
SBAA	CONCEICAO DO ARAGUAIA	Brazil	Y			
SBBI	CURITIBA/BACACHERI PR	Brazil	Y			
SBFN	FERNANDO DE NORONHA	Brazil	Y	T		
SBGO	GOIANIA/SANTA GENOVEVA	Brazil	Y			
SBGW	GUARATINGUETA	Brazil	Y			
SBST	GUARUJA/BASE AEREA	Brazil	Y			
SBIL	ILHEUS	Brazil	Y			
SBIZ	IMPERATRIZ	Brazil	Y			
SBIH	ITAITUBA	Brazil	Y			
SBEK	JACAREACANGA	Brazil	Y			
SBJP	JOAO PESSOA/PRES CASTRO PINTO	Brazil	Y	T		
SBJF	JUIZ DE FORA/FRANCISC DE ASSIS	Brazil	Y			

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
SBLO	LONDRINA	Brazil	Y	T		
SBME	MACAE	Brazil	Y			
SBMN	MANAUS/PONTA PELADA	Brazil	Y			
SBMA	MARABA	Brazil	Y	T		
SBMK	MONTES CLAROS/MARIO RIBEIRO	Brazil	Y			
SBMS	MOSSORO/DIX SEPT ROSADO	Brazil	Y			
SBNF	NAVEGANTES/MINIS VICTOR KONDER	Brazil	Y	T		
SBCC	NOVO PROGRESSO/CACHIMBO	Brazil	Y			
SBOI	OIAPOQUE	Brazil	Y	T		
SBPJ	PALMAS/TOCANTINS	Brazil	Y			
SBCJ	PARAUAPEBAS/CARAJAS	Brazil	Y	T		
SBPB	PARNAIBA	Brazil	Y			
SBUF	PAULO ALFONSO	Brazil	Y			
SBPK	PELOTAS	Brazil	Y	T		
SBYS	PIRACUNUNGA/CAMPO FONTENELLE	Brazil	Y			
SBPC	POCOS DE CALDAS	Brazil	Y			
SBCO	PORTO ALEGRE/CANOAS	Brazil	Y			
SBPN	PORTO NATIONAL	Brazil	Y			
SBPV	PORTO VELHO INTL/GOV J.T.DE O.	Brazil	Y	T		
SBDN	PRESIDENTE PRUDENTE	Brazil	Y			
SBRP	RIBEIRAO PRETO/LEITE LOPES	Brazil	Y	T		
SBRB	RIO BRANCO/PRESID MEDICI INTL	Brazil	Y	T		
SBAF	RIO DE JANEIRO/AFONSOS	Brazil	Y			
SBJR	RIO DE JANEIRO/JACAREPAGUA	Brazil	Y			
SBSC	RIO DE JANEIRO/SANTA CRUZ	Brazil	Y			
SBRJ	RIO DE JANEIRO/SANTOS DUMONT	Brazil	Y	T		
SBSM	SANTA MARIA	Brazil	Y			
SBSJ	SAO JOSE DOS CAMPOS	Brazil	Y	T		
SBSP	SAO PAULO/CONGONHAS	Brazil	Y	T		
SBMT	SAO PAULO/MARTE	Brazil	Y			
SBES	SAO PEDRO DA ALDEIA	Brazil	Y			
SBPL	SENADOR NILO COELHO	Brazil	Y			
SBTK	TARAUACA	Brazil	Y			
SBTF	TEFE	Brazil	Y	T		
SBTE	TERESINA/SENADOR	Brazil	Y	T		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
	PETRONIO PORT					
SBTU	**TUCURUI**	**Brazil**	**Y**			
SBUR	**UBERABA**	**Brazil**	**Y**			
SBUL	**UBERLANDIA**	**Brazil**	**Y**			
SBVH	**VILHENA**	**Brazil**	**Y**			
SBQV	**VITORIA DA CONQUISTA**	**Brazil**	**Y**			
SBVT	**VITORIA/GOIABEIRAS**	**Brazil**	**Y**			
SKBG	BUCARAMANGA/PALONEGRO	Colombia	Y	**T**	Y	
SKMD	**MEDELLIN/OLAYA HERRERA**	**Colombia**	**Y**			
SKSM	**SANTA MARTA/SIMON BOLIVAR**	**Colombia**	**Y**			
SPTU	PUERTO MALDONADO/PADRE ALDAMIZ	Peru	Y	**T**	Y	
SPME	TUMBES/PEDRO CANGA	Peru	Y	**T**	Y	
SPMS	YURIMAGUAS/M.BENZAQUEN RENGIFO	Peru	Y	**T**	Y	
SVCS	**CHARALLAVE**	**Venezuela**	**Y**			
SVVG	**EL VIGIA/J.P.PEREZ ALFONZO**	**Venezuela**	**Y**			
SVGD	**GUASDUALITO**	**Venezuela**	**Y**			
SVPR	**GUAYANA/MANUEL CARLOS PIAR**	**Venezuela**	**Y**			
SVLF	**LA FRIA**	**Venezuela**	**Y**			
SVBS	**MARACAY/MARISCAL SUCRE**	**Venezuela**	**Y**			
SVPC	**PUERTO CABELLO**	**Venezuela**	**Y**			
SVSP	**SAN FELIPE**	**Venezuela**	**Y**			
SVSZ	**SANTA BARBARA**	**Venezuela**	**Y**			
SVVL	**VALERA**	**Venezuela**	**Y**			

EUROPEAN (EUR) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
UMMI	LIPKI	Belarus	Y	**T**	Y	~~C~~
LCRA	**AKROTIRI**	**Cyprus**	**Y**	**T**		
LCEN	**ERCAN**	**Cyprus**	**Y**	**T**		
LKKB	**KBELY**	**Czech Republic**	**Y**			
LKKU	KUNOVICE	Czech Republic	Y	**T**	Y	~~C~~
LKLN	**PLZEN/LINE**	**Czech Republic**	**Y**			
LKPO	**PREROV**	**Czech Republic**	**Y**			
EKSV	SKIVE	Denmark	Y	**T**	Y	~~C~~
EFET	ENONTEKIO	Finland	Y	**T**	Y	~~C~~
EFJY	JYVASKYLA	Finland	Y	**T**	Y	~~C~~
LFAQ	**ALBERT-BRAY**	**France**	**Y**	**T**		
LFJR	**ANGERS/MARCE**	**France**	**Y**	**T**		
LFLP	ANNECY-MEYTHET	France	Y	**T**	Y	~~C~~
LFMV	**AVIGNON/CAUMONT**	**France**	**Y**	**T**		
LFMU	BEZIERS/VIAS	France	Y	**T**	Y	~~C~~
LFLD	BOURGES	France	Y	**T**	Y	~~C~~
LFMK	CARCASSONNE/SALVAZA	France	Y	**T**	Y	~~C~~
LFMW	CASTELNAUDARY-VILLENEUVE	France	Y	**T**	Y	~~C~~
LFLX	**CHATEAUROUX/DEOLS**	**France**	**Y**	**T**		
LFBG	COGNAC/CHATEAUBERNARD	France	Y	**T**	Y	~~C~~
LFOE	EVREUX/FAUVILLE	France	Y	**T**	Y	~~C~~
LFKF	FIGARI/SUD CORSE	France	Y	**T**	Y	~~C~~
LFMI	ISTRES/LE TUBE	France	Y	**T**	Y	~~C~~
LFBL	LIMOGES/BELLEGARDE	France	Y	**T**	Y	~~C~~
LFJL	METZ/NANCY LORRAINE	France	Y	**T**	Y	~~C~~
LFSN	**NANCY/ESSEY**	**France**	**Y**	**T**		
LFPT	**PONTOISE/CORMEILLES EN VEXIN**	**France**	**Y**			
LFCR	RODEZ/MARCILLAC	France	Y	**T**	Y	~~C~~
LFOP	ROUEN/VALLEE DE SEINE	France	Y	**T**	Y	~~C~~
LFVP	SAINT PIERRE	France	Y	**T**	Y	~~C~~
LFLN	**SAINT-YAN**	**France**	**Y**	**T**		
LFQB	TROYES/BARBEREY	France	Y	**T**	Y	~~C~~

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
LFLV	VICHY/CHARMEIL	France	Y	**T**	Y	~~C~~
UGSB	**BATUMI**	**Georgia**	**Y**	**T**		
EDJA	**MEMMINGEN/ALLGAU**	**Germany**	**Y**	**T**		
LGKZ	**KOZANI**	**Greece**	**Y**			
LGPA	**PAROS**	**Greece**	**Y**			
LGST	**SITIA**	**Greece**	**Y**	**T**		
LGSO	**SYROS**	**Greece**	**Y**			
LHPR	**GYÖR-PER**	**Hungary**	**Y**	**T**		
LHPA	**PAPA**	**Hungary**	**Y**	**T**		
LHPP	PECS/POGANY	Hungary	Y	**C**	Y	
LHSN	**SZOLNOK**	**Hungary**	**Y**	**T**		
LLBS	BEER SHEBA-TEYMAN	Israel	Y	**T**	Y	~~C~~
LLIB	**ROSH-PINA/ MAHANAIM-I.BEN-YAA**	**Israel**	**Y**			
LIPO	**BRESCIA/MONTICHIARI**	**Italy**	**Y**	**T**		
LICZ	**CATANIA/SIGONELLA**	**Italy**	**Y**	**T**		
LIPF	FERRARA	Italy	Y	**T**	Y	~~C~~
LIBF	FOGGIA/GINO LISA	Italy	Y	**T**	Y	~~C~~
LIMB	MILANO/BRESSO	Italy	Y	**T**	Y	~~C~~
LIMR	NOVI LIGURE	Italy	Y	**T**	Y	~~C~~
LIQN	RIETI	Italy	Y	**T**	Y	~~C~~
LIRI	**SALERNO PONTECAGNANO**	**Italy**	**Y**			
LIQW	SARZANA	Italy	Y	**T**	Y	~~C~~
LIMA	**TORINO/AERITALIA**	**Italy**	**Y**			
LIPS	**TREVISO/ISTRANA**	**Italy**	**Y**	**T**		
UACP	PETROPAVLOVSK	Kazakhstan	Y	**T**	Y	~~C~~
LYPG	**PODGORICA**	**Montenegro**	**Y**	**T**		
LYVR	**VRSAC**	**Montenegro**	**Y**	**T**		
EHTW	ENSCHEDE/TWENTHE	Netherlands	Y	**T**	Y	~~C~~
EHVB	LEIDEN/VALKENBURG	Netherlands	Y	**T**	Y	~~C~~
ENDU	BARDUFOSS	Norway	Y	**T**	Y	~~C~~
ENBS	**BATSFJORD**	**Norway**	**Y**			

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
ENBV	BERLEVAG	Norway	Y	**C**	Y	
ENEK	EKOFISK H (OIL RIG)	Norway	Y	**T**	Y	~~C~~
ENBL	**FORDE/ BRINGELAND**	**Norway**	**Y**			
ENDI	GEILO/DAGALI	Norway	Y	**T**	Y	~~C~~
ENHK	**HASVIK**	**Norway**	**Y**			
ENHV	**HONNINGSVAG/VALAN**	**Norway**	**Y**			
ENLK	**LEKNES**	**Norway**	**Y**			
ENLI	LISTA	Norway	Y	**T**	Y	~~C~~
ENMH	**MEHAMN**	**Norway**	**Y**			
ENRA	**MOI RANA/ROSSVOLL**	**Norway**	**Y**	**T**		
ENML	**MOLDE/ARO**	**Norway**	**Y**	**T**		
ENMS	**MOSJOEN/KJAERSTAD**	**Norway**	**Y**			
ENNM	**NAMSOS**	**Norway**	**Y**			
ENNK	**NARVIK/FRAMNES**	**Norway**	**Y**			
ENNO	**NOTODDEN**	**Norway**	**Y**			
ENOL	ORLAND	Norway	Y	**T**	Y	~~C~~
ENOV	**ORSTA-VOLDA/HOVDEN**	**Norway**	**Y**			
ENRS	**ROST**	**Norway**	**Y**			
ENSD	**SANDANE, ANDA**	**Norway**	**Y**			
ENST	**SANDNESSJOEN/STOKKA**	**Norway**	**Y**			
ENSN	**SKIEN/GEITERYGGEN**	**Norway**	**Y**			
ENSG	**SOGNDAL/HAUKASEN**	**Norway**	**Y**			
ENSR	**SORKJOSEN**	**Norway**	**Y**			
ENSK	**STOKMARKNES,SKAGEN**	**Norway**	**Y**			
ENSO	**STORD SORSTOKKEN**	**Norway**	**Y**	**T**		
ENVD	**VADSO**	**Norway**	**Y**	**T**		
ENSS	**VARDO/SVARTNES**	**Norway**	**Y**			
LPFL	FLORES	Portugal (Madeira and Azores) (Portugal)	Y	**T**	Y	~~C~~
ULDD	**AMDERMA**	**Russian Federation**	**Y**			
UESO	**CHOKURDAKH**	**Russian Federation**	**Y**	**T**		
UOII	**IGARKA**	**Russian Federation**	**Y**	**T**		
USHH	**KHANTY-MANSIYSK/KHANTYM**	**Russian Federation**	**Y**	**T**		
UOHH	**KHATANGA**	**Russian Federation**	**Y**	**T**		
UOOO	**NORILSK ALYKEL**	**Russian Federation**	**Y**	**T**		
USMU	**NOVY URENGOY**	**Russian Federation**	**Y**	**T**		
UHSH	**OKHA**	**Russian Federation**	**Y**	**T**		
UWPP	**PENZA**	**Russian Federation**	**Y**	**T**		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
UEST	TIKSI	Russian Federation	Y	**T**	Y	
UUYH	**UKHTA**	**Russian Federation**	**Y**	**T**		
UWLL	**ULYANOVSK**	**Russian Federation**	**Y**	**T**		
UUYS	**USINSK**	**Russian Federation**	**Y**	**T**		
ULWW	**VOLOGDA**	**Russian Federation**	**Y**	**T**		
LYBT	**BEOGRAD/BATAJNICA**	**Serbia**	**Y**	**T**		
BKPR	PRISTINA	Serbia	Y	**T**	Y	~~C~~
LYPR	PRISTINA	Serbia	Y	**T**	Y	~~C~~
LEAB	**ALBACETE**	**Spain**	**Y**	**T**		
LERL	**CIUDAD REAL/CENTRAL**	**Spain**	**Y**	**T**		
LEBA	CORDOBA	Spain	Y	**T**	Y	~~C~~
LELN	LEON	Spain	Y	**C**	Y	
LETO	MADRID/TORREJON	Spain	Y	**T**	Y	~~C~~
ESUT	**HEMAVAN**	**Sweden**	**Y**			
ESGL	**LIDKOPING**	**Sweden**	**Y**			
ESCF	**LINKOPING/MALMEN**	**Sweden**	**Y**	**T**		
ESIB	**SATENAS**	**Sweden**	**Y**	**T**		
ESGR	**SKÖVDE**	**Sweden**	**Y**			
ESNY	**SODERHAMN**	**Sweden**	**Y**			
ESCM	**UPPSALA**	**Sweden**	**Y**	**T**		
ESPE	**VIDSEL**	**Sweden**	**Y**	**T**		
UTFA	**ANDIZHAN**	**Tajikistan**	**Y**	**T**		
UTFN	**NAMANGAN**	**Tajikistan**	**Y**	**T**		
LTAH	**AFYON**	**Turkey**	**Y**			
LTAP	**AMASYA/MERZIFON**	**Turkey**	**Y**			
LTAE	**ANKARA/AKINCI**	**Turkey**	**Y**			
LTAD	**ANKARA/ETIMESGUT**	**Turkey**	**Y**			
LTAB	**ANKARA/GUEVERCINLIK**	**Turkey**	**Y**			
LTBF	**BALIKESIR**	**Turkey**	**Y**			
LTBG	**BALIKESIR/BANDIRMA**	**Turkey**	**Y**			
LTBH	**CANAKKALE**	**Turkey**	**Y**	**T**		
LTAY	**DENIZLI/CARDAK**	**Turkey**	**Y**	**T**		
LTCC	**DIYARBAKIR**	**Turkey**	**Y**	**T**		
LTCD	**ERZINCAN**	**Turkey**	**Y**	**T**		
LTBI	**ESKISEHIR**	**Turkey**	**Y**			
LTBY	**ESKISEHIR/ANADOLU**	**Turkey**	**Y**	**T**		
LTDA	**HATAY**	**Turkey**	**Y**	**T**		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
LTFC	**ISPARTA/SÜLEYMAN DEMIREL**	**Turkey**	**Y**	**T**		
LTBL	**IZMIR/CIGLI**	**Turkey**	**Y**			
LTBQ	**IZMIR/TOPEL**	**Turkey**	**Y**			
LTAT	**MALATYA/ERHAC**	**Turkey**	**Y**	**T**		
LTCK	**MUS**	**Turkey**	**Y**	**T**		
LTCS	**SANLIURFA/GAP/INTERNATIONAL**	**Turkey**	**Y**	**T**		
UTAM	**MARY**	**Turkmenistan**	**Y**	**T**		
UTAV	TURKMENABAT	Turkmenistan	Y	**T**	Y	~~C~~
UKCM	**MARIUPOL INTL**	**Ukraine**	**Y**	**T**		
EGAE	LONDONDERRY EGLINTON	United Kingdom	Y	**C**	Y	
EGYP	MOUNT PLEASANT/FALKLAND ISLAND	United Kingdom	Y	**T**	Y	~~C~~
EGHQ	**NEWQUAY**	**United Kingdom**	**Y**	**T**		
UTFF	FERGANA	Uzbekistan	Y	**C**	Y	
UTSK	KARSHI	Uzbekistan	Y	**C**	Y	
UTSA	**NAVOI**	**Uzbekistan**	**Y**	**T**		

MIDDLE EAST (MID) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
OAIX	**BAGRAM**	**Afghanistan**	**Y**	**T**		
OIAW	**AHWAZ**	**Iran (Islamic Republic of)**	**Y**	**T**		
OIKK	**KERMAN**	**Iran (Islamic Republic of)**	**Y**	**T**		
OICC	**KERMANSHAH**	**Iran (Islamic Republic of)**	**Y**			
OIBK	**KISH ISLAND**	**Iran (Islamic Republic of)**	**Y**	**T**		
OIGG	**RASHT**	**Iran (Islamic Republic of)**	**Y**			
OITR	UROMIYEH	Iran (Islamic Republic of)	**Y**	T		T
OIYY	**YAZD / SHAHID SADOOGHI**	**Iran (Islamic Republic of)**	**Y**			
ORAA	**AL ASAD AB**	**Iraq**	**Y**	**T**		
ORAT	**AL TAQADDUM**	**Iraq**	**Y**	**T**		
ORBD	**BALAD SOUTHEAST AIRFIELD**	**Iraq**	**Y**	**T**		
ORKK	**KIRKUK**	**Iraq**	**Y**	**T**		
ORBM	**MOSUL**	**Iraq**	**Y**	**T**		
ORTL	**TALUL**	**Iraq**	**Y**	**T**		
ORSH	**TIKRIT/AL SAHRA AAF**	**Iraq**	**Y**	**T**		
OPSK	**SUKKUR**	**Pakistan**	**Y**	**T**		
OTBH	**AL UDAID AIR BASE**	**Qatar**	**Y**	**T**		
OEAH	**AL-AHSA**	**Saudi Arabia**	**Y**	**T**		
OEHL	HAIL	Saudi Arabia	**Y**	T		T
OEKM	**KHAMIS MUSHAIT/KING KHALED AB**	**Saudi Arabia**	**Y**	**T**		
OEDR	**KING ABDULAZIZ AIR BASE DHARAN**	**Saudi Arabia**	**Y**	**T**		
OEKK	**KING KHALED MIL CITY**	**Saudi Arabia**	**Y**	**T**		
OEDM	**PRINCE SALMAN BIN ABDULAZIZ**	**Saudi Arabia**	**Y**	**T**		
OERY	**RIYADH AIRBASE**	**Saudi Arabia**	**Y**	**T**		
OETF	TAIF	Saudi Arabia	**Y**	T		T
OEYN	YENBO	Saudi Arabia	Y	**T**	Y	~~C~~
OSDZ	**DEIR ZZOR**	**Syrian Arab Republic**	**Y**			
OSKL	**KAMISHLY**	**Syrian Arab Republic**	**Y**			

ICAO Location	**Listed in AOP Tables**	**Country**	**SA /SP**	**FC / FT**	SA /SP	FC/ FT
			NEW		ACTUAL	
OYSQ	**SOCOTRA/MOORI**	**Yemen**	**Y**			

NORTH AMERICA (NAM) REGION

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
CZBF	BATHURST	Canada	Y	T		
CYLD	CHAPLEAU	Canada	Y	T		
CYCS	CHESTERFIELD INLET	Canada	Y			
CZUM	CHURCHILL FALLS	Canada	Y	T		
CYDL	DEASE LAKE	Canada	Y	T		
CYXR	EARLTON/TIMISKAMING REGIONAL	Canada	Y	T		
CZEM	EASTMAIN RIVER	Canada	Y			
CYET	EDSON	Canada	Y			
CYGH	FORT GOOD HOPE	Canada	Y	T		
CYFR	FORT RESOLUTION	Canada	Y			
CYLU	KANGIQSUALUJJUAQ GEORGES RIVER	Canada	Y			
CYLC	KIMMIRUT	Canada	Y			
CYGK	KINGSTON	Canada	Y	T		
CYSP	MARATHON	Canada	Y	T		
CYXP	PANGNIRTUNG NWT	Canada	Y	T		
CYWA	PETAWAWA	Canada	Y	T		
CZPC	PINCHER CREEK	Canada	Y			
CYQZ	QUESNEL	Canada	Y	T		
CYRT	RANKIN INLET	Canada	Y	T		
CYQF	RED DEER REGIONAL	Canada	Y	T		
CYRL	RED LAKE	Canada	Y	T		
CYQR	REGINA INTL SK	Canada	Y	T		
CYUT	REPULSE BAY	Canada	Y	T		
CYRB	RESOLUTE BAY	Canada	Y	T		
CYRJ	ROBERVAL	Canada	Y	T		
CYUY	ROUYN-NORANDA	Canada	Y	T		
CYSY	SACHS HARBOUR	Canada	Y	T		
CYZP	SANDSPIT	Canada	Y	T		
CYZR	SARNIA/CHRIS HADFIELD	Canada	Y	T		
CYAM	SAULT STE. MARIE	Canada	Y	T		
CYSC	SHERBROOKE	Canada	Y	T		
CYXL	SIOUX LOOKOUT	Canada	Y	T		
CYZH	SLAVE LAKE	Canada	Y	T		
CYYD	SMITHERS	Canada	Y	T		
CYAY	ST. ANTHONY	Canada	Y	T		
CYSN	ST. CATHARINES	Canada	Y	T		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
CYSL	**ST. LEONARD**	**Canada**	**Y**			
CYSF	**STONY RAPIDS**	**Canada**	**Y**	**T**		
CYSB	**SUDBURY**	**Canada**	**Y**	**T**		
CYYN	**SWIFT CURRENT**	**Canada**	**Y**	**T**		
CYYH	**TALOYOAK**	**Canada**	**Y**	**T**		
CYTQ	**TASIUJAQ**	**Canada**	**Y**	**T**		
CYXT	**TERRACE**	**Canada**	**Y**	**T**		
CYQD	**THE PAS**	**Canada**	**Y**	**T**		
CYTH	**THOMPSON**	**Canada**	**Y**	**T**		
CYTS	**TIMMINS**	**Canada**	**Y**	**T**		
CYAZ	**TOFINO**	**Canada**	**Y**	**T**		
CYKZ	**TORONTO BUTTONVILLE MUNI**	**Canada**	**Y**	**T**		
CYTZ	**TORONTO CITY CENTRE**	**Canada**	**Y**	**T**		
CYTR	**TRENTON**	**Canada**	**Y**	**T**		
CYUB	**TUKTOYAKTUK**	**Canada**	**Y**	**T**		
CYMU	**UMIUJAQ**	**Canada**	**Y**			
CYOY	**VALCARTIER**	**Canada**	**Y**	**T**		
CYQH	**WATSON LAKE**	**Canada**	**Y**	**T**		
CYXZ	**WAWA**	**Canada**	**Y**	**T**		
CYNC	**WEMINDJI**	**Canada**	**Y**			
CYXN	**WHALE COVE**	**Canada**	**Y**			
CYZU	**WHITECOURT**	**Canada**	**Y**	**T**		
CYVV	**WIARTON**	**Canada**	**Y**	**T**		
CYWL	**WILLIAMS LAKE**	**Canada**	**Y**	**T**		
CYWY	**WRIGLEY**	**Canada**	**Y**			
CYQI	**YARMOUTH**	**Canada**	**Y**	**T**		
CYQV	**YORKTON MUNI**	**Canada**	**Y**	**T**		
KOAJ	**ALBERT J ELLIS AIRPORT**	**United States**	**Y**	**T**		
KAST	**ASTORIA**	**United States**	**Y**	**T**		
KPDK	ATLANTA/DE KALB-PEACHTREE	United States	Y	**T**	Y	
KAUG	**AUGUSTA STATE**	**United States**	**Y**	**T**		
KDAG	**BARSTOW DAGGETT**	**United States**	**Y**	**T**		
KBVI	**BEAVER CO**	**United States**	**Y**	**T**		
KBJI	**BEMIDJI BELTRAMI CO AIRPORT**	**United States**	**Y**	**T**		
KBPI	**BIG PINEY**	**United States**	**Y**	**T**		
KBIH	**BISHOP**	**United States**	**Y**	**T**		
KBMI	**BLOOMINGTON/CENTRAL IL RGNL**	**United States**	**Y**	**T**		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
KBLF	BLUEFIELD	United States	Y	T		
KBLH	BLYTHE	United States	Y	T		
KBWG	BOWLING GREEN	United States	Y	T		
KBRD	BRAINERD LAKES RGNL	United States	Y	T		
KBNO	BURNS	United States	Y	T		
KCRQ	CARLSBAD/MC CLELLAN PALOMAR	United States	Y	T		
KCWA	CENTRAL WISCONSIN	United States	Y	T		
KCDR	CHADRON MUNI AIRPORT	United States	Y	T		
KCNU	CHANUTE	United States	Y	T		
KCLT	CHARLOTTE/DOUGLAS INTL	United States	Y	T		T
KDPA	CHICAGO - DUPAGE	United States	Y	T		
KCDS	CHILDRESS	United States	Y	T		
KCSM	CLINTON-SHERMAN	United States	Y	T		
KCOD	CODY/YELLOWSTONE REGIONAL	United States	Y	T		
KCOE	COEUR D ALENE AIR TERMINAL	United States	Y	T		
KDLS	COLUMBIA GORGE RGNL/DALLES MUN	United States	Y	T		
KCON	CONCORD	United States	Y	T		
KDHT	DALHART MUNI	United States	Y	T		
KDRT	DEL RIO INTL	United States	Y	T		
KAPA	DENVER/ARAPAHOE/CENTENNIAL	United States	Y	T		
KTRM	DESERT RESORTS REGL,PALM SPRGS	United States	Y	T		
KDIK	DICKINSON	United States	Y	T		
KDUG	DOUGLAS/BISBEE-DOUGLAS	United States	Y	T		
KDBQ	DUBUQUE REGIONAL	United States	Y	T		
KMPV	EDWARD F KNAPP STATE/BARRE	United States	Y	T		
KELY	ELY	United States	Y	T		
KFMH	FALMOUTH/OTIS AFB	United States	Y	T		
KXNA	FAYETTEVILLE (SPRINGDALE) AR	United States	Y	T		
KFYV	FAYETTEVILLE DRAKE FLD	United States	Y	T		
KFDY	FINDLAY	United States	Y	T		
KFOD	FORT DODGE RGNL AIRPORT	United States	Y	T		
KFMN	FOUR CORNERS RGNL/FARMINGTON	United States	Y	T		
KFKL	FRANKLIN VENANGO REGIONAL	United States	Y	T		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
KFXE	FT LAUDERDALE EXECUTIVE	United States	Y	T		
KFMY	FT MYERS PAGE FLD	United States	Y	T		
KFPR	FT PIERCE ST LUCIE CO INTL	United States	Y			
KRIL	GARFIELD COUNTY RGNL	United States	Y	T		
KGCC	GILLETTE-CAMPBELL CO	United States	Y	T		
KGDV	GLENDIVE DAWSON COMMUNITY	United States	Y	T		
KGLD	GOODLAND RENNER FLD (GOD.MUNI)	United States	Y	T		
KGMU	GREENVILLE DOWNTOWN	United States	Y	T		
KGLH	GREENVILLE MID DELTA REG.	United States	Y	T		
KRME	GRITISS AFLD	United States	Y	T		
KGON	GROTON/NEW LONDON	United States	Y	T	Y	
KSUN	HAILEY - FRIEDMAN MEMORIAL	United States	Y	T		
KHVR	HAVRE CITY-CO	United States	Y	T		
KHYS	HAYS REGIONAL	United States	Y	T		
KHBR	HOBART	United States	Y	T		
KHOB	HOBBS LEA CO REGIONAL	United States	Y	T		
KHUL	HOULTON	United States	Y	T		
KIPL	IMPERIAL CO	United States	Y	T		
KITH	ITHACA TOMPKINS REGIONAL	United States	Y	T		
KJKL	JACKSON JULIAN CARROLL	United States	Y	T		
KJHW	JAMESTOWN CHAUTAUQUA CO	United States	Y	T		
KJCT	JUNCTION KIMBLE CO	United States	Y	T		
KGPI	KALISPELL/GLACIER PARK INTL	United States	Y	T		
KISM	KISSIMMEE GATEWAY A/P ORLANDO	United States	Y	T		
KLAF	LAFAYETTE/PURDUE UNIV	United States	Y	T		
KWJF	LANCASTER, GEN WMJ FOX AIRFLD	United States	Y	T		
KLND	LANDER	United States	Y	T		
KLVS	LAS VEGAS MUNI	United States	Y	T		
KLSV	LAS VEGAS/NELLIS AFB	United States	Y	T		
KLWB	LEWISBURG/GREENBRIER VALLEY	United States	Y	T		
KLWS	LEWISTON NEZ PERCE	United States	Y	T		
KLWT	LEWISTOWN MUNI	United States	Y	T		
KAAA	LINCOLN	United States	Y			
KLGU	LOGAN-CACHE	United States	Y	T		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
KLOL	LOVELOCK,DERBY FIELD	United States	Y	T		
KLFK	LUFKIN ANGELINA CO	United States	Y	T		
KMCW	MASON CITY MUNI	United States	Y	T		
KMYL	MC CALL MUNICIPAL	United States	Y	T		
KMCB	MC COMB-PIKE CO-JOHN E LEWIS	United States	Y	T		
KMCK	MC COOK MUNI	United States	Y	T		
KMCE	MERCED MUNI/MACREADY FLD	United States	Y	T		
KDRA	MERCURY DESERT ROCK	United States	Y	T		
KTMB	MIAMI/TAMIAMI	United States	Y	T		
KMBG	MOBRIDGE MUNI	United States	Y	T		
KMTJ	MONTROSE REGIONAL	United States	Y	T		
KMWH	MOSES LAKE/GRANT COUNTY INTL	United States	Y	T		
KEED	NEEDLES	United States	Y	T		
KARA	NEW IBERIA/ACADIANA RGNL	United States	Y	T		
KOLS	NOGALES INTL	United States	Y	T		
KOFK	NORFOLK KARL STEFAN MEMORIAL	United States	Y	T		
KVGT	NORTH LAS VEGAS	United States	Y	T		
KCRE	NORTH MYRTLE BEACH	United States	Y	T		
KPNE	NORTHEAST PHILADELPHIA	United States	Y	T		
KOPF	OPA LOCKA	United States	Y	T		
KPGA	PAGE MUNI	United States	Y	T		
KPSC	PASCO/TRI-CITIES	United States	Y	T		
KPDT	PENDLETON - EASTERN OREGON REG	United States	Y	T		
KPBF	PINE BLUT - GRIDER FLD	United States	Y	T		
KPBG	PLATTSBURG INTL AIRPORT	United States	Y	T		
KPNC	PONCA CITY RGNL	United States	Y	T		
KHIO	PORTLAND/HILLSBORO	United States	Y	T		
KTTD	PORTLAND/TROUTDALE	United States	Y	T		
KPVU	PROVO MUNI	United States	Y	T		
KPUW	PULLMAN/MOSCOW REGIONAL	United States	Y	T		
KRWL	RAWLINS	United States	Y	T		
KRDM	REDMOND/ROBERTS FIELD	United States	Y	T	Y	
KRWF	REDWOOD FALLS MUNI	United States	Y	T		
KRHI	RHINELANDER/ONEIDA COUNTY	United States	Y	T		
KRIW	RIVERTON	United States	Y	T		
KRSL	RUSSELL MUNI	United States	Y	T		

ICAO Location	Listed in AOP Tables	Country	SA /SP	FC / FT	SA /SP	FC/ FT
			NEW		ACTUAL	
KSLE	SALEM - MCNARY FIELD	United States	Y	T		
KSMN	SALMON - LEMHI COUNTY	United States	Y	T		
KALS	SAN LUIS VALLEY RGNL-BERGMAN F	United States	Y	T		
KSAF	SANTA FE	United States	Y	T		
KSTS	SANTA ROSA / SONOMA COUNTY	United States	Y	T		
KSNY	SIDNEY MUNI/LLOYD W. CARR FLD	United States	Y	T		
KSDY	SIDNEY-RICHLAND	United States	Y	T		
KMQY	SMYRNA	United States	Y			
KSGU	ST GEORGE MUNI	United States	Y	T		
KTTS	TITUSVILLE/NASA SHUTTLE LDGFAC	United States	Y	T		
KTPH	TONOPAH	United States	Y	T		
KTOP	TOPEKA - PHILIP BILLARD MUNI	United States	Y	T		
KFOE	TOPEKA FORBES	United States	Y	T		
KTRK	TRUCKEE-TAHOE	United States	Y	T		
KRVS	TULSA - RICHARD LLOYD JONES JR	United States	Y	T		
KUNV	UNIVERSITY PARK/STATE COLLEGE	United States	Y	T		
KVTN	VALENTINE / MILLER FIELD	United States	Y	T		
KVNY	VAN NUYS AIRPORT	United States	Y	T		
KVEL	VERNAL	United States	Y	T		
KAUW	WAUSAU DOWNTOWN	United States	Y	T		
KEAT	WENATCHEE PANGBORN MEM	United States	Y	T		
KENV	WENDOVER	United States	Y	T		
KHLG	WHEELING OHIO CO	United States	Y	T		
KSPS	WICHITA FALLS/SHEPPARD AFB	United States	Y	T		
KISN	WILLISTON SLOULIN FIELD INTL	United States	Y	T		
KILN	WILMINGTON AIRBORNE PARK	United States	Y	T		
KWMC	WINNEMUCCA	United States	Y	T		
KINW	WINSLOW	United States	Y	T		
KOLF	WOLF POINT L M CLAYTON	United States	Y	T		

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APPENDIX H

STRATEGIC ASSESSMENT TABLES

SUMMARY OF THE STRATEGIC ASSESSMENT TABLES: CURRENT AND PROJECTED DATA VOLUMES 2010-2013

Table 1. OPMET data volumes per day (in K bytes)

Region	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
AFI	877	888	911	934	-
ASIA	973	991	1015	1038	-
EUR	4061	4081	4106	4131	-
MID	327	340	352	365	-
TOTAL	**6238**	**6300**	**6384**	**6468**	**-**

Table 2. PNG data volumes per day (in K bytes)

Region	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
AFI	0	200	200	200	-
ASIA	0	200	200	200	-
EUR	0	200	200	200	-
MID	0	0	0	0	-
TOTAL	**0**	**600**	**600**	**600**	**-**

Table 3. AIS data volumes per day (in K bytes)

Region	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
AFI	0	2	2	2	-
ASIA	0	2	2	2	-
EUR	1	2	2	2	-
MID	0	1	1	1	-
TOTAL	**1**	**7**	**7**	**7**	**-**

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SADIS STRATEGIC ASSESSMENT TABLES
CURRENT AND
PROJECTED DATA VOLUMES 2010-2013

Note.— 1 octet = 1 byte = 1 character.

Table 1. AFI— OPMET data volumes

OPMET data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC DATA					
Number of **FC bulletins** issued per day	134	140	145	150	-
Number of **FT bulletins** issued per day	334	340	350	360	-
Number of **SA bulletins** issued per day	2127	2150	2200	2250	-
Number of **SP bulletins** issued per day	43	45	50	55	-
Number of **SIGMET bulletins** issued per day Number of other bulletins issued per day	12	15	15	15	-
TOTALS					
Total number of OPMET bulletins per day	2650	2690	2760	2830	-
Average size of OPMET bulletin (bytes)	330	330	330	330	-
Total estimated OPMET data volume per day (in K bytes)	**875**	**888**	**911**	**934**	-

Note.— No provision is being made for the distribution of BUFR-coded OPMET data. Capacity for this data may need to be included in future depending on the issuance of this data in the region.

Table 2. AFI — PNG data volumes

Graphical information in the PNG chart form	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
TOTALS					
Total number of PNG charts per day	0	2	2	2	-
Average size of charts (bytes)	100000	100000	100000	100000	-
Total estimated volume of PNG charts per day (in K bytes)	**0**	**200**	**200**	**200**	-

Note.— Provision is made for the distribution of PNG-encoded VAG

Table 3. AFI — AIS data volumes

AIS data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC AIS DATA (NOTAM related to volcanic ash, ASHTAM)					
Number of ASHTAM bulletins issued per day	0	2	2	2	-
Number of NOTAM bulletins issued per day	0	2	2	2	-
TOTALS					
Total number of AIS bulletins per day	0	4	4	4	-
Average size of AIS bulletin (byte)	600	600	600	600	-
Total estimated volume of AIS data per day (in K bytes)	**0**	**2**	**2**	**2**	**-**

Note.— *Provision is made for the distribution of ASHTAM and NOTAM related to volcanic ash.*

Table 4. ASIA— OPMET data volumes

OPMET data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC DATA					
Number of **FC bulletins** issued per day	145	150	155	160	-
Number of **FT bulletins** issued per day	366	375	385	395	-
Number of **SA bulletins** issued per day	2319	2350	2400	2450	-
Number of **SP bulletins** issued per day	35	40	45	50	-
Number of **SIGMET** bulletins issued per day	84	90	90	90	-
TOTALS					
Total number of OPMET bulletins per day	2949	3005	3075	3145	-
Average size of OPMET bulletin (bytes)	330	330	330	330	-
Total estimated OPMET data volume per day (in K bytes)	**973**	**992**	**1015**	**1038**	**-**

Note.— No provision is being made for the distribution of BUFR-coded OPMET data. Capacity for this data may need to be included in future depending on the issuance of this data in the region.

Table 5. ASIA — PNG data volumes

Graphical information in the PNG chart form	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
TOTALS Total number of PNG charts per day	0	2	2	2	-
Average size of charts (bytes)	100000	100000	100000	100000	-
Total estimated volume of PNG charts per day (in K bytes)	**0**	**200**	**200**	**200**	**-**

Note.— Provision is made for the distribution of PNG-encoded VAG.

Table 6. ASIA — AIS data volumes

AIS data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC AIS DATA (NOTAM related to volcanic ash, ASHTAM) Number of ASHTAM bulletins issued per day	0	2	2	2	-
Number of NOTAM bulletins issued per day	0	2	2	2	-
TOTALS Total number of AIS bulletins per day	0	4	4	4	-
Average size of AIS bulletin (byte)	600	600	600	600	-
Total estimated volume of AIS data per day (in K bytes)	**0**	**2**	**2**	**2**	**-**

Note.— Provision is made for the distribution of ASHTAMs and NOTAMs related to volcanic ash.

Table 7. EUR— OPMET data volumes

OPMET data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC DATA					
Number of **FC bulletins** issued per day	1093	1100	1105	1110	-
Number of **FT bulletins** issued per day	698	710	720	730	-
Number of **SA bulletins** issued per day	10072	10100	10150	10200	-
Number of **SP bulletins** issued per day	261	265	270	275	-
Number of **SIGMET** bulletins issued per day	65	70	75	80	-
Number of **GAMET/AIRMET bulletins** per day	119	120	120	120	-
TOTALS					
Total number of OPMET bulletins per day	12308	12367	12442	12517	-
Average size of OPMET bulletin (bytes)	330	330	330	330	-
Total estimated OPMET data volume per day (in K bytes)	**4062**	**4081**	**4106**	**4131**	-

Note.— No provision is being made for the distribution of BUFR-coded OPMET data. Capacity for this data may need to be included in future depending on the issuance of this data in the region.

Table 8. EUR — PNG data volumes

Graphical information in the PNG chart form	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
TOTALS					
Total number of PNG chart form per day	0	2	2	2	-
Average size of charts (bytes)	100000	100000	100000	100000	-
Total estimated volume of PNG charts per day (in K bytes)	**0**	**200**	**200**	**200**	-

Note.— Provision is made for the distribution of PNG-encoded VAG.

Table 9. EUR — AIS data volumes

AIS data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC AIS DATA (NOTAM related to volcanic ash, ASHTAM)					
Number of ASHTAM bulletins issued per day	0	2	2	2	-
Number of NOTAM bulletins issued per day	2	2	2	2	-
TOTALS					
Total number of AIS bulletins per day	2	4	4	4	-
Average size of AIS bulletin (byte)	600	600	600	600	-
Total estimated volume of AIS data per day (in K bytes)	**1**	**2**	**2**	**2**	**-**

Note.— Provision is made for the distribution of ASHTAM and NOTAM related to volcanic ash.

Table 10. MID— OPMET data volumes

OPMET data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC DATA					
Number of **FC bulletins** issued per day	23	25	30	35	-
Number of **FT bulletins** issued per day	185	190	195	200	-
Number of **SA bulletins** issued per day	772	800	825	850	-
Number of **SP bulletins** issued per day	1	5	7	10	-
Number of **SIGMET** bulletins issued per day	9	10	10	10	-
TOTALS					
Total number of OPMET bulletins per day	990	1030	1067	1105	-
Average size of OPMET bulletin (bytes)	330	330	330	330	-
Total estimated OPMET data volume per day (K bytes)	**327**	**340**	**352**	**365**	**-**

Note.— No provision is being made for the distribution of BUFR-coded OPMET data. Capacity for this data may need to be included in future depending on the issuance of this data in the region.

Table 11. MID — PNG data volumes

Graphical information in the PNG chart form	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
TOTALS					
Total number of PNG charts per day	0	0	0	0	-
Average size of charts (bytes)	100000	100000	100000	100000	-
Total estimated volume of PNG charts per day (in K bytes)	**0**	**0**	**0**	**0**	**-**

Note. – No distribution of PNG-encoded VAG expected as no VAAC are located in the MID Region.

Table 12. MID — AIS data volumes

AIS data	*Current 2009*	*Projected 2010*	*Projected 2011*	*Projected 2012*	*Projected 2013*
ALPHANUMERIC AIS DATA (NOTAM related to volcanic ash, ASHTAM)					
Number of ASHTAM bulletins issued per day	0	1	1	1	-
Number of NOTAM bulletins issued per day	0	1	1	1	-
TOTALS					
Total number of AIS bulletins per day	0	2	2	2	-
Average size of AIS bulletin (byte)	600	600	600	600	-
Total estimated volume of AIS data per day (in K bytes)	**0**	**1**	**1**	**1**	**-**

Note. – Modest provision is made for the distribution of ASHTAM and NOTAM related to volcanic ash.

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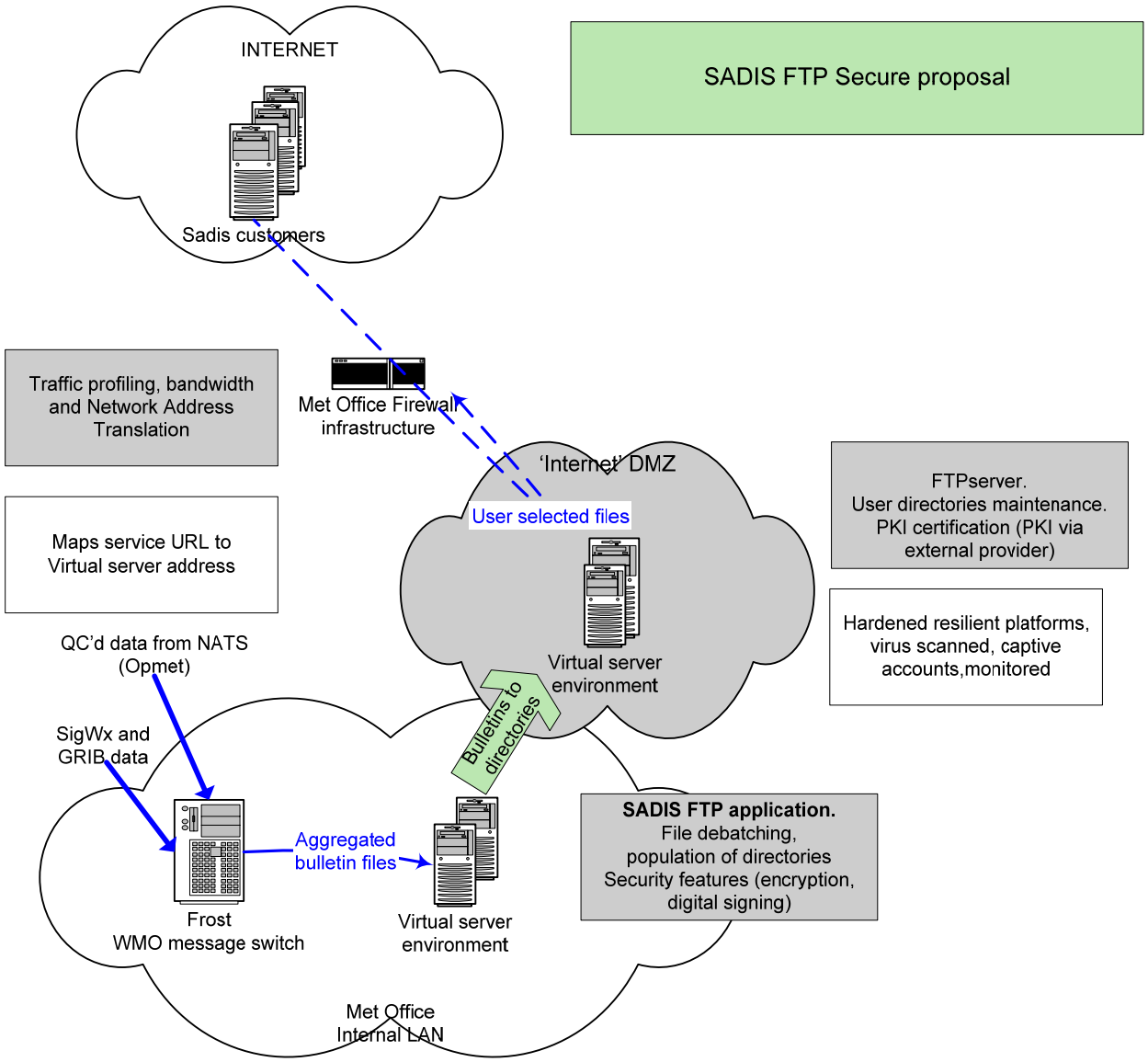
APPENDIX I

SADIS FTP SECURE - DESIGN PROPOSAL



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APPENDIX J

SADIS LONG-TERM PLAN FOR THE YEARS 2010-2014

SADIS MILESTONES *Note: Service(s) affected in { } brackets*	*SCOPE (Major versus Minor)*	*NATURE (Hardware and/or Software; P=SADIS provider U=SADIS user V=vendor)*	*SADISOPSG meeting schedule (WAFSOPSG meeting schedule)*	*ICAO Annex 3 amendment cycle*
January 2010 to November 2011: SADIS workstation vendors develop GRIB 2 decoders and software (including decompression algorithms) to enable the visualisation of higher-resolution WAFS upper-air gridded forecasts (including icing, turbulence and cumulonimbus cloud fields). {SADIS 2G (to be determined by SADIS/WAFSOPSG) and SADIS FTP}	Major	Software V, U		
By May 2010: Determine need to increase SADIS 2G data transfer rate in view of GRIB 2 trial results, subject to action by SADIS/WAFSOPSG, and downstream implications on end users. {SADIS 2G}	Major	Hardware P	**May 2010:** SADISOPSG/15	
November 2010: SADIS FTP Secure service launched (Phase 2), encompassing dual server capability and security features. Initially, this new service is expected to be provided in parallel with existing enhanced FTP service. {SADIS FTP}	Major	Software P		**November 2010:** Amendment 75
November 2010 to November 2011: SADIS user workstations upgraded to accept utilisation of SADIS FTP Secure service. {SADIS FTP}	Major	Software U		
February 2011: Confirm date for the cessation of WAFS upper-air forecasts in the GRIB 1 code form on the SADIS broadcast. {SADIS 2G and SADIS FTP}	Major	Software P	**February 2011:** WAFSOPSG/6	
May 2011: Determine cessation date of SADIS FTP Enhanced service (tentatively November 2011), given the implementation of the SADIS FTP Secure service. {SADIS FTP}	Major	Software P	**May 2011:** SADISOPSG/16	
November 2011: Cessation of SADIS FTP Enhanced service, given the implementation of the SADIS FTP Secure service.	Major	Software U		

SADIS MILESTONES *Note: Service(s) affected in { } brackets*	*SCOPE (Major versus Minor)*	*NATURE (Hardware and/or Software; P=SADIS provider U=SADIS user V=vendor)*	*SADISOPSG meeting schedule (WAFSOPSG meeting schedule)*	*ICAO Annex 3 amendment cycle*
{SADIS FTP}				
November 2011 to November 2013: SADIS user workstations upgraded to accept compressed GRIB 2 code form WAFS data (including processing and visualisation) {SADIS 2G (to be determined by WAFSOPSG/5) and SADIS FTP}	Major	Hardware and software U		
May 2012: Determine future SADIS bandwidth and/or data transfer rate requirements based on proposed cessation date of GRIB 1 code form WAFS data (and WAFS SIGWX in BUFR-code and PNG-chart form). {SADIS 2G}	Major	Hardware and software P	**May 2012:** SADISOPSG/17 **September 2012:** WAFSOPSG/7	
November 2013: Cessation of WAFS upper-air forecasts in the GRIB 1 code form and WAFS SIGWX forecasts in the BUFR-code and PNG-chart form on SADIS. {SADIS 2G and SADIS FTP}	Major	Software P,U	**May 2013:** SADISOPSG/18	**November 2013:** Amendment 76
2014 No changes expected.			**February 2014:** WAFSOPSG/8 **May 2014:** SADISOPSG/19	

BACKGROUND INFORMATION RELATED TO SADIS MILESTONES (2010-2014)

To assist workstation vendors and users alike to better understand the proposals outlined in this long-term plan, additional background information has been prepared by the SADIS Provider State:

1. Initially, the GRIB 2 code form WAFS upper air forecasts (including icing, turbulence and CB) will be disseminated on the SADIS FTP service only. However, subject to endorsement by the WAFSOPSG/5 meeting in September 2009, it may be agreed that the GRIB 2 products should be provided in parallel with GRIB 1 forecasts on the SADIS 2G satellite broadcast.

2. SADIS workstation vendors and flight planning systems will be afforded over 4 years of GRIB 2 data availability, in parallel with GRIB 1, to develop systems that are capable of accepting, processing and visualising GRIB 2 WAFS data. End-user systems would be expected to be upgraded to handle GRIB 2 before the GRIB 1 data is eventually withdrawn from all services.

3. Subject to endorsement by the SADISOPSG/14 Meeting, the SADIS Provider State will develop a SADIS FTP Secure service that will benefit from dual server capability and enhanced security features. This new service *will* necessitate a re-configuration or upgrade of end user workstations, since pre-existing login credentials are not expected to work on the new server. SADIS FTP Secure will be expected to be available as an operational service by November 2010. Users will be afforded a parallel running period of the pre-existing and secure SADIS FTP services, to allow them to update their systems. Subject to endorsement by the SADISOPSG/16 Meeting, the legacy service will be withdrawn in November 2011 in view of the operational implementation of the SADIS FTP Secure service, including migration of users.

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APPENDIX K

DELIVERABLES OF THE SADISOPSG

Task number	*Short-Name*	*Description*	*Source of task*
SADISOPSG-01	01-SADIS management report	issuance of satellite distribution system for information relating to air navigation (SADIS) management report, every 12 months, 10 weeks before each SADISOPSG meeting	SADISOPSG 2/3 b)
SADISOPSG-02	02-operational efficacy statement	issuance of an operational efficacy statement at every SADISOPSG meeting	SADISOPSG 1/4
SADISOPSG-03	03-updated SADIS inventory	update of the SADIS inventory at every SADISOPSG meeting	SADISOPSG 1/8
SADISOPSG-04	04-updated SADIS broadcast content, schedule and priorities	update of SADIS broadcast content, schedule and priorities, as necessary, contained in Annexes 1 and 4 to the *SADIS User Guide*	143-5; 149/18 (TOR)
SADISOPSG-05	05-impact of the introduction of OPMET data in table-driven codes	assessment of the potential impact of the introduction of METAR/SPECI and TAF in table-driven codes on the SADIS gateway operations	SADISOPSG 9/13
SADISOPSG-06	06-strategic assessment tables with a 5-year outlook	update of strategic assessment tables (including a 5-year outlook for OPMET and NOTAM data volumes to be broadcast on the SADIS) at every SADISOPSG meeting	SADISOPSG 2/9
SADISOPSG-07	07-technological developments having an impact on the SADIS	preparation of a report on technological developments having an impact on the SADIS to be presented at every SADISOPSG meeting	SADISOPSG 3/13
SADISOPSG-08	08-updated SADIS long-term plan	update to the SADIS 5-year long-term plan at every SADISOPSG meeting	APANPIRG 16/40; SADISOPSG 11/22

Task number	*Short-Name*	*Description*	*Source of task*
SADISOPSG-09	09-up-to-date SADIS User Guide	updates to the *SADIS User Guide* to ensure its compatibility with the evolving SADIS	EANPG 37/20

SADISOPSG EXECUTIVE SUMMARIES OF RECURRENT TASKS

SADISOPSG Task No. 1: Implementation and operation of SADIS

Task: Routine issuance of annual management report, operational clearance and update of SADIS inventory for submission to SCRAG.

Source: SCRAG

Coordination: SCRAG, WAFC London

Output:
Annual management report by the Provider State
Annual statement of SADIS operational efficacy by the SADISOPSG Operational Efficacy Assessment Team
Annual amendment to the SADIS Inventory by the SADIS Provider State
Annual amendment to the long-term plan

Progress:
1995/1996 operational clearance and inventory issued by SADISOPSG/1
1996/1997 operational clearance and updated inventory issued by SADISOPSG/2
1997/1998 operational clearance and inventory issued by SADISOPSG/3
1998/1999 operational clearance and inventory issued by SADISOPSG/4
1999/2000 operational clearance and inventory issued by SADISOPSG/5
2000/2001 operational clearance and inventory issued by SADISOPSG/6
2001/2002 operational clearance and inventory issued by SADISOPSG/7
2002/2003 operational clearance and inventory issued by SADISOPSG/8
2003/2004 operational clearance and inventory issued by SADISOPSG/9
2004/2005 operational clearance and inventory issued by SADISOPSG/10
2005/2006 operational clearance and inventory issued by SADISOPSG/11
2006/2007 operational clearance and inventory issued by SADISOPSG/12
2007/2008 operational clearance and inventory issued by SADISOPSG/13
2008/2009 operational clearance and inventory issued by SADISOPSG/14

References:
SADISOPSG/1 Conclusions 1/6 and 1/8
SADISOPSG/2 Conclusions 2/2, 2/3 and 2/5
SADISOPSG/3 Conclusion 3/7
SADISOPSG/4 Conclusions 4/5 and 4/6
SADISOPSG/5 Conclusions 5/5 and 5/7
SADISOPSG/6 Conclusions 6/5 and 6/6
SADISOPSG/7 Conclusions 7/4 and 7/5
SADISOPSG/8 Conclusions 8/4 and 8/5
SADISOPSG/9 Conclusions 9/6 and 9/7
SADISOPSG/10 Conclusions 10/6 and 10/7
SADISOPSG/11 Conclusions 11/5 and 11/6
SADISOPSG/12 Conclusions 12/4 and 12/5
SADISOPSG/13 Conclusions 13/4, 13/5 and Decision 13/21
SADISOPSG/14 Conclusions 14/4, 14/5, 14/7, 14/8 and Decisions 14/6, 14/20

Group responsible:
SADISOPSG Operational Efficacy Assessment Team
Rapporteur: Chris Tyson

SADISOPSG Task No. 2: Development, maintenance and monitoring of the SADIS broadcast content, schedule and priorities

Task: The content of the SADIS broadcast has to be developed, maintained and monitored, in line with operational requirements developed by the ICAO planning and implementation regional groups. The broadcast has to be backed-up, as necessary, by the SADIS Provider State.

Source: SADISOPSG terms of reference; SADIS Gateway High-Level Technical Requirements (paragraph 3.4)

Coordination: MET and CNS/MET sub-groups of APANPIRG, APIRG, EANPG and MIDANPIRG; EUR BMG; WAFCs London and Washington; WAFSOPSG and IAVWOPSG, as necessary

Output: Up-to-date annexes to the *SADIS User Guide* placed on the ICAO SADISOPSG website.

Progress: OPMET information and WAFS forecasts to be included on the SADIS broadcast incorporated in Annexes 1 and 4 of the *SADIS User Guide*, respectively. The actual content of broadcast is indicated in Annexes 2 and 3. SADISOPSG/4 agreed that Annexes 2 and 3 should be based on the EUR BMG OPMET tables.

References: SADISOPSG/1 paragraphs 9.1 to 9.14
SADISOPSG/3 paragraph 5.4, Conclusion 3/15
SADISOPSG/4 paragraphs 3.1 to 3.6, Conclusion 4/8
SADISOPSG/5 paragraphs 3.7 to 3.9, Conclusion 5/9
SADISOPSG/6 paragraphs 3.2 to 3.13, Conclusions 6/8 and 6/9
SADISOPSG/7 paragraphs 3.1 to 3.11, Conclusions 7/6, 7/8 and 7/9
SADISOPSG/8 Conclusions 8/6, 8/7, 8/8 and 8/9.
SADISOPSG/9 Conclusions 9/8, 9/9, 9/10 and Decision 9/11
SADISOPSG/10 Conclusions 10/8, 10/9, 10/10 and Decision 10/11
SADISOPSG/11 Conclusions 11/8, 11/9, 11/10, 11/12 and Decision 11/11
SADISOPSG/12 Conclusions 12/7, 12/8 and Decisions 12/6, 12/9 and 12/10
SADISOPSG/13 Conclusions 13/6, 13/7, 13/9, 13/10 and Decisions 13/8 and 13/11
SADISOPSG/14 Conclusions 14/10, 14/11, 14/12 and Decision 14/13

SADISOPSG Task No. 3: Organization of flow of OPMET messages and NOTAM traffic through SADIS gateway to SADIS node

Task: The flow of OPMET traffic must be organized to ensure smooth and reliable transit through the SADIS gateway at the London switch to the SADIS node for uplink on the broadcast. Pattern of flow based on the various OPMET exchange systems in existence in the AFI, ASIA, EUR and MID Regions (AMBEX, ROBEX), and the inclusion of ISCS data, as necessary.

Source: SADISOPSG terms of reference; MOTNEG/1 (paragraph 2.18) and METG/5, Appendix A to Agenda Item 5

Coordination: MET and CNS/MET sub-groups of APANPIRG, APIRG, EANPG and MIDANPIRG

Output: SADIS Gateway High-Level Technical Requirements and *SADIS Gateway Operations Handbook*

Progress: Technical requirements kept up-to-date in the *SADIS Gateway Operations Handbook.*

References: SADISOPSG/2 Appendices H and I
SADISOPSG/6 paragraph 4.12
SADISOPSG/7 paragraphs 4.11 to 4.13
SADISOPSG/8 paragraphs 4.12.1 to 4.12.4
SADISOPSG/9 paragraphs 5.2.1 to 5.2.3
SADISOPSG/10 paragraphs 5.1.1 to 5.1.3
SADISOPSG/11 paragraphs 6.1.1 to 6.1.7
SADISOPSG/12 paragraphs 6.1.1 to 6.1.8
SADISOPSG/13, paragraphs 6.1.1 to 6.1.9
SADISOPSG/14, paragraphs 6.1.1 to 6.1.7

Group responsible: SADISOPSG Gateway Development Team
Rapporteur: Mike Williamson

SADISOPSG Task No. 4: Preparation of a 5-year outlook for OPMET and NOTAM data volumes to be broadcast on the SADIS

Task: Forward the SADIS strategic assessment tables containing the 5-year outlook for OPMET and NOTAM data volumes to be broadcast on the SADIS for update by the MET and CNS/MET sub-groups of the APANPIRG, APIRG, EANPG and MIDANPIRG.

Source: SADISOPSG Decision 2/9, SADISOPSG/3 Draft decision endorsed by APANPIRG, APIRG, EANPG and MIDANPIRG

Coordination: MET and CNS/MET sub-groups of APANPIRG, APIRG, EANPG and MIDANPIRG

Output: Strategic Assessment Tables updated annually to correspond to the outlook for the next five years.

Progress:
2001/2005 strategic assessment tables issued by SADISOPSG/6
2002/2006 strategic assessment tables issued by SADISOPSG/7
2003/2007 strategic assessment tables issued by SADISOPSG/8
2004/2008 strategic assessment tables issued by SADISOPSG/9
2005/2009 strategic assessment tables issued by SADISOPSG/10
2006/2010 strategic assessment tables issued by SADISOPSG/11
2007/2011 strategic assessment tables issued by SADISOPSG/12
2008/2012 strategic assessment tables issued by SADISOPSG/13
2009/2013 strategic assessment tables issued by SADISOPSG/14

References:
SADISOPSG/6 Conclusion 6/12
SADISOPSG/7 Conclusion 7/12
SADISOPSG/8 Conclusion 8/17
SADISOPSG/9 Conclusion 9/14
SADISOPSG/10 Conclusion 10/14
SADISOPSG/11 Conclusion 11/17
SADISOPSG/12 Conclusion 12/16
SADISOPSG/13 Conclusion 13/15
SADISOPSG/14 Conclusion 14/15

Group responsible:
SADISOPSG Strategic Assessment Team
Rapporteur: Chris Tyson

SADISOPSG Task No. 5: Technological Developments

Task: Monitor, report on and propose action on technological developments having an impact on the SADIS.

Source: SADISOPSG terms of reference

Coordination: SCRAG

Output: Annual reports to SADISOPSG

Progress: SADISOPSG/4: Study of possible TPC/IP output part on SADIS VSATs. TCP/IP conversion unit developed by MMS in 2000.
SADISOPSG/7: Assessment of the SADIS second-generation broadcast (SADIS 2G) using a combination of a new-type modulation and new receiving equipment.
SADISOPSG/8: Development of the operational concept for the second-generation SADIS two-way system based on approved VSAT technology studied; however, implementation not pursued due to the lack of a clear operational requirement.

References: SADISOPSG/3 Decision 3/14 and Appendix I
SADISOPSG/4 Decision 4/12 and Appendix J; Conclusion 4/13
SADISOPSG/5 paragraph 4.3
SADISOPSG/6 paragraph 4.18
SADISOPSG/7 paragraphs 4.23 and 4.24, Conclusion 7/14
SADISOPSG/8 paragraphs 4.11.5 to 4.11.11, Decision 8/14
SADISOPSG/9 paragraphs 5.4.1 to 5.4.5, Conclusion 9/15
SADISOPSG/10 paragraph 5.3.1
SADISOPSG/11 paragraphs 6.3.1 to 6.3.3
SADISOPSG/12 paragraphs 6.3.1 to 6.3.3
SADISOPSG/13 paragraphs 6.3.1 to 6.3.7; Conclusions 13/16 and 13/17
SADISOPSG/14 paragraphs 6.3.1 to 6.3.9; Conclusions 14/16 and 14/17

Group responsible: SADISOPSG Technological Developments Team
Rapporteur: Bernd Richter

SADISOPSG Task No. 6: SADIS User Guide

Task: Maintain, update and extend, as necessary, *SADIS User Guide*.

Source: EANPG Conclusion 37/20; METG/5 paragraph 5.27

Coordination: NIL

Output: *SADIS User Guide* and amendments thereto

Progress: *SADIS User Guide* was issued in 1997. Guide available from the SADISOPSG website only since 2008. The second, third and fourth editions issued in 2001, 2004 and 2008, respectively.

References:
SADISOPSG/1 Decision 1/11
SADISOPSG/2 Decision 2/15.
SADISOPSG/3 Decision 3/15
SADISOPSG/4 Decision 4/1, Conclusions 4/2 and 4/17 and Appendix E
SADISOPSG/5 paragraphs 5.1 to 5.3
SADISOPSG/6 paragraphs 5.1 to 5.5
SADISOPSG/7 paragraphs 5.1 to 5.5
SADISOPSG/8 Conclusions 8/6, 8/9 and 8/18
SADISOPSG/9 Conclusion 9/22
SADISOPSG/10 Conclusion 10/20
SADISOPSG/11 paragraphs 7.1.1 to 7.1.3
SADISOPSG/12 Conclusion 12/23
SADISOPSG/13 Decision 13/22
SADISOPSG/14 Decision 14/21

SADISOPSG TASK TEAMS

SADISOPSG GATEWAY DEVELOPMENT TEAM

1. **COMPOSITION**

China, Germany, Netherlands, United Kingdom, United States, ASECNA, EUR BMG and IATA.

2. **TASKS**

a) Maintain the Technical Requirement Document for the SADIS gateway. This will include a continuous review of requirements;

b) maintain the *SADIS Gateway Operations Handbook*. This will include a continuous review of validation, monitoring and procedures; and

c) report on its activities to the SADISOPSG on an annual basis.

Rapporteur: Mike Williamson behalf of the *ex-officio* Member from the BMG

SADISOPSG STRATEGIC ASSESSMENT TEAM

1. **COMPOSITION**

Germany, Saudi Arabia, United Kingdom, ASECNA, IATA and WMO

2. **TASKS**

a) Analyse the tables of assessed future regional requirements provided by the MET and CNS/MET sub-groups of the PIRGs concerned;

b) assist the SADIS Provider State in updating the long-term plan; and

c) develop a report, for endorsement by the SADISOPSG, on a annual basis.

Rapporteur: Chris Tyson

SADISOPSG TECHNICAL DEVELOPMENTS TEAM

1. **COMPOSITION**

Germany, Netherlands, Switzerland, United Kingdom, United States, ASECNA and IATA.

2. **TASKS**

a) Evaluate options for technological development in respect of the technical and financial impacts;

b) coordinate any funded study/evaluation, if approved by SCRAG; and

c) report on its activities to the SADISOPSG on an annual basis.

Rapporteur: Bernd Richter

SADISOPSG OPERATIONAL EFFICACY ASSESSMENT TEAM

1. **COMPOSITION**

Chairman of the SADISOPSG, *ex-officio* Member from the BMG and United Kingdom.

2. **TASKS**

a) Analyse the completed questionnaires returned by States related to the operational efficacy of the SADIS broadcast; and

b) report back to the SADISOPSG on an annual basis

Rapporteur: Chris Tyson

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APPENDIX L

OPTION 2 - SADIS 2G HARDWARE REFRESH PROPOSALS

FIGURE C1: OPTION 2 Simplified topology with single MegaPAC V-IX configuration at Whitehill

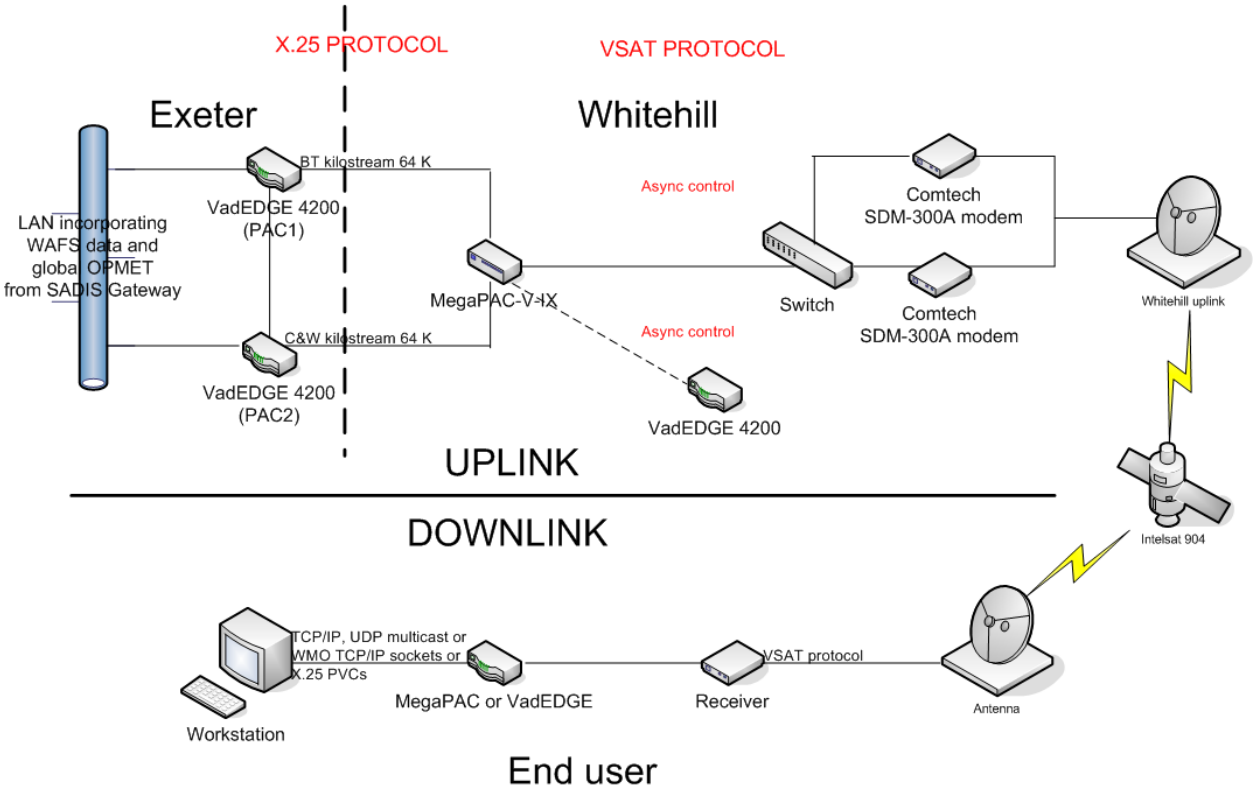

FIGURE C2: VADOS equipment in OPTION 2 SADIS 2G network

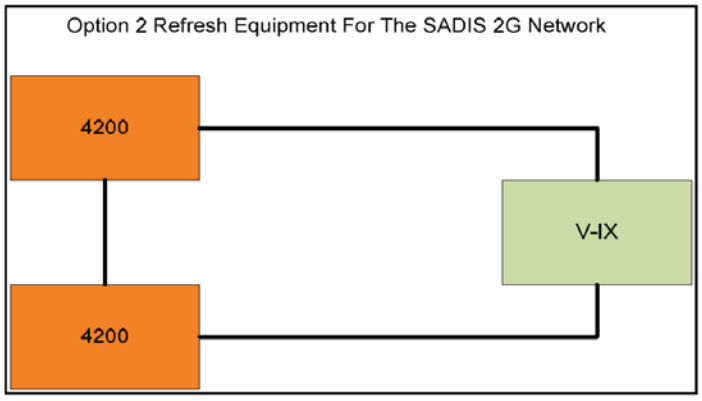

FIGURE C3: VADOS component and system availability in OPTION 1 SADIS 2G network

KEY: MTBF = Mean Time Between Failure
MTTR = Mean Time To Repair

Component Availability

Equipment	MTBF (Hours)	MTTR (Hours)	Availability (Single Unit) A1s=MTBF/MTBF + MTTR	Availability (Redundant Units) $A2r=[1-(1-A_1)]*[1-(1-A_2)]$	Availability (Chassis - Single Modules) A=A1s*A2s*A3s*A4s	Availability (Chassis - Redundant Modules) A=A1s*A2r*A3r*A4r	Availability (Parallel Units) $A=[1-(1-4200)^2]*[1-(1-4200)^2]$
4200	60,000	4	99.9933337777%				99.9999991112%
4200 (Hot Spare)	60,000	0.5	99.9991666736%				
V-IX					99.9884497310%	99.9991995877%	
Chassis (Backplane)	500,000	4	99.9992000064%				
CPU	81,284	4	99.9950792245%	99.9999997579%			
PSU	171,000	4	99.9976608734%	99.9999999453%			
I/O Cards (SIO/XIO/UIF)	114,582	4	99.9965091722%	99.9999998781%			
V-IX (Hot Spare)					99.9985561202%	99.9998999936%	
Chassis (Backplane)	500,000	0.5	99.9999000001%				
CPU	81,284	0.5	99.9993848766%	99.9999999962%			
PSU	171,000	0.5	99.9997076032%	99.9999999991%			
I/O Cards (SIO/XIO/UIF)	114,582	0.5	99.9995636332%	99.9999999981%			

Support	Configuration	**System Availability**[1] (VE4200 parallel Availability * MPVIX with redundant modules)	Approximate downtime per year
4 hour MTTR	2*parallel VE4200, 1*MPVIX with redundant modules	**99.999199%**	5 minutes
0.5 hour MTTR hot swap	2*parallel VE4200, 1*MPVIX with redundant modules, hot spare MPVIX	**99.999899%**	1 minute

— END —

[1] System Availability figures relate solely to VADOS equipment.