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**SATELLITE DISTRIBUTION SYSTEM OPERATIONS GROUP (SADISOPSG)**

**EIGHTEENTH MEETING**

**Dakar, Senegal, 29 to 31 May 2013**

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| **Agenda Item** | **6:** | **Development of the SADIS** |
|  | **6.1:** | **Report of the SADISOPSG Technological Developments Team** |
|  | **6.2:** | **SADIS satellite broadcast** |
|  | **6.3:** | **SADIS Internet-based FTP Service** |
|  | **6.4:** | **SADIS workstation software evaluations** |

DRAFT REPORT

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| **Agenda Item** | **6:** | **Development of the SADIS** |
|  | **6.1:** | **Report of the SADISOPSG Technological Developments Team** |

Based on reports of the SADISOPSG Technological Developments Team and the SADIS Provider State, the group considered the following aspects related to the technological developments of SADIS:

1. recommendations concerning the provision of a satellite-based distribution system beyond 2015;
2. initiation of integrated services digital network (ISDN) backup tests on the SADIS 2G;
3. maintenance of the SADIS 2G ground segment infrastructure; an
4. implementation of a mid-life update to the SADIS Gateway Coremet system.

***Recommendations concerning the provision of a satellite-based distribution system beyond 2015***

Further to discussions at SADISOPSG/15 (2010) and SADISOPSG/16 (2011) on the continued need for the SADIS 2G satellite broadcast beyond 2015, the group recalled that it had formulated Conclusion 17/20 at the last meeting tasking the SADIS Provider State, in coordination with the SADISOPSG Technological Developments Team and other Members of the group, to develop recommendations concerning the requirements for future SADIS service provision and their relationship with alternative aeronautical fixed service (AFS) distribution systems, such as the air traffic services (ATS) message handling system (AMHS), and the aviation system block upgrades (ASBU) methodology being developed by ICAO to foster implementation of the global air traffic management system. Recommendations arising from this activity were expected to form the basis of proposals for consideration at the ICAO Meteorology Divisional Meeting proposed to be held in July 2014.

Recognizing that it was understood that “SADIS service provision” in this regard comprised the satellite broadcast and the Internet-based service (as stated in Conclusion 17/20), the group noted that the principle consideration of the ad-hoc group has been the provision of a satellite-based distribution system beyond 2015, especially given:

1. that the current SADIS 2G ground segment hardware located in the United Kingdom will become end-of-life in 2016;
2. the imminent introduction of the exchange of operational meteorological (OPMET) information (specifically METAR/SPECI, TAF and SIGMET) in a digital format; and
3. an understandable aim to reduce costs, where appropriate.

The group reviewed a detailed report prepared by the ad-hoc group as follow-up to Conclusion 17/20 which includes an assessment of the advantages and disadvantages of satellite-based distribution compared with other means of data dissemination/acquisition, and also gave due consideration to the fact that some States/users no longer have a requirement for the SADIS 2G satellite broadcast whilst other States/users do have a continued requirement, as had been clearly demonstrated during the consultation with States/users in 2010/11 as follow-up to Conclusion 15/21. The group commended the ad-hoc group for the work accomplished in preparing the detailed report, which was considered essential in view of enabling States and users to understand the implications of the future changes to service provision.

Appreciating that the significant number of SADIS 2G satellite receivers in operational use at present (approximately 170 receivers in 90 States) would preclude the withdrawal of SADIS 2G completely at the end of 2015, and recognizing the continued (global) expansion in the use of the Internet and roll-out of AMHS, the group noted that the ad-hoc group had recommended that the SADIS 2G satellite broadcast should be extended beyond 2015, but that it was not viable to invest in an enhancement to the system. Consequently, it was the view of the ad-hoc group, including the International Air Transport Association (IATA), that the existing SADIS 2G satellite broadcast should be retained *only until* November 2019.

Noting the remarks at 6.1.2 a) above, the group appreciated that a decision to extend SADIS 2G until November 2019 would necessitate a hardware refresh of the SADIS 2G uplink ground segment in the United Kingdom before the end of 2016. The group was reassured that the decision to extend SADIS 2G beyond 2015 until 2019 was not expected to result in any hardware changes at the point of the end-users.

In view of the foregoing, the group formulated the conclusion accordingly:

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|  | **Conclusion 18/xx —** | **Recommendations concerning the provision of the SADIS 2G satellite distribution system beyond 2015 and other associated developments** |
| That, the Secretary be invited to forward the following recommendations, as developed by the SADISOPSG, concerning the provision of the SADIS second-generation satellite distribution system (SADIS 2G) for OPMET information and WAFS forecasts beyond 2015, and other associated developments, to the ICAO Meteorology Divisional Meeting to be held in July 2014.That, 1. SADIS 2G should be extended to November 2019 with a view to withdrawing the service from that date;

 *Note 2. ― The Secure SADIS FTP service is expected to continue to be made available up to and beyond November 2019.*1. formal testing of the distribution of WAFS upper-air gridded global forecasts in WMO GRIB Edition 2 (GRIB2) code form, WMO BUFR code form and PNG format be undertaken on the aeronautical message handling system (AMHS) to determine the capability and minimum specification required to distribute such data;
2. subject to successful outcomes of b) above, the use of appropriately capable AMHS be actively promoted as the primary means of distribution of traditional alphanumeric codes (TAC) OPMET information, digitally coded (XML/GML) OPMET information, and WAFS forecasts in WMO GRIB, WMO BUFR and PNG format; and
3. more information concerning AMHS should be made available such that end-users and workstation software providers can develop systems to access and process the data referred to in c) above, as appropriate.
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The group further recalled discussions at the last meeting concerning whether a refresh or limited enhancement of the existing SADIS 2G broadcast infrastructure would be preferable as a short- to mid-term solution prior to 2015, such as increasing the SADIS 2G allocated data transfer rate to 256 Kbps or more. The group had agreed to wait until the follow-up to Conclusion 17/20 had been completed before deciding on possible refresh/enhancement options (SADISOPSG/17 Report, 6.2.6 refers). Given the foregoing discussion and the associated recommendation that SADIS 2G be extended only until November 2019, with no accompanying enhancement to the system, the group now agreed that no further action was required on this matter at this time.

***Initiation of ISDN backup tests on SADIS 2G***

As follow-up to Conclusion 17/17, the group was pleased to learn that the SADIS Provider State had initiated tests of the integrated services digital network (ISDN) backup capability for SADIS 2G. The SADIS Provider State reported to the group that the tests had proven to be a success and had even been used operationally several times to prevent interruption of SADIS 2G during periods of essential work.

***Maintenance of the SADIS 2G ground segment infrastructure***

As follow-up to Conclusion 17/7, the group was pleased to learn that the SADIS Provider State had procured a replacement SMS-301 modem protection switch within the SADIS 2G satellite uplink infrastructure. The group was pleased to note that the procurement costs associated with this replacement unit had come in under budget and that the faulty unit was in the process of being appropriately disposed of.

***Implementation of a mid-life upgrade to the SADIS Gateway Coremet system***

The group recalled that the SADIS Gateway provides 24/7 functionality to ingest, collate, quality control and distribute OPMET information to States/users around the world via the SADIS infrastructure. As per the SADIS Inventory, the group appreciated that an integral component of the SADIS infrastructure was the NATS Message switch (Coremet system) operated by the SADIS Gateway. The group was informed that original Coremet system had been implemented by NATS during 2003, with a share of the cost of capital attributable to SADIS recovered through the SADIS Cost Allocation and Recovery (SCAR) arrangement over a period of five years ending in June 2008.

The group recalled being informed at the last meeting that the SADIS Gateway Provider had initiated a project to undertake a mid-life upgrade to the Coremet system (SADISOPSG/17 Report, 4.4.4 refers). Similar notification had also been given to the twelfth and thirteenth meetings of the SADIS Cost Recovery Administrative Group (SCRAG/12 and SCRAG/13) in November 2011 and November 2012 respectively. To this end, the group was apprised of the latest technological developments in this regard, prepared by the SADIS Provider State, including the latest implementation timescale and latest estimated costs.

In reviewing the report, the group appreciated that the mid-life upgrade to the Coremet system was necessary to ensure that the SADIS infrastructure could continue to support a high‑quality service for users into the future. The main expected benefits of the mid-life upgrade to the Coremet system were summarized as follows:

1. extendible ATS message handling system (AMHS) capability;
2. capability to ingest, convert and deliver OPMET information in XML/GML digital data formats;
3. capability to ingest and re-distribute WAFS upper-air gridded global forecasts in the World Meteorological Organization (WMO) GRIB Edition 2 (GRIB2) code form;
4. various capacity improvements; and
5. enhanced monitoring and data comparison capability.

Additional details in this regard were provided in the report prepared by the SADIS Provider State.

In view of the foregoing, in particular taking into account the expected benefits, implementation timescale (2013 to 2014) and latest estimated costs (GBP 120,000 to GBP 180,000 attributable to SADIS plus a cost of capital, expected to be depreciated over the next 5 years), the group recommended that the SADIS Provider State proceed with the implementation of a mid-life upgrade to the SADIS Gateway Coremet system. The group was pleased to note that the SADIS Provider State intended to provide a more detailed assessment of the project costs associated with the mid-life upgrade to the SADIS Cost Recovery Administrative Group (SCRAG) in time for its next meeting.

In view of the foregoing, the group formulated the following conclusion accordingly:

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|  | **Conclusion 18/xx —** | **Implementation of a mid-life upgrade to the SADIS Gateway Coremet system** |
| That, in view of assuring the ingestion, collation, quality-control, distribution, monitoring and comparison of aeronautical meteorological information on SADIS into the future:1. the SADIS Provider State be invited to:
	1. proceed with the implementation of the SADIS requirements and capability within the mid-life upgrade (MLU) to the Coremet message switch system at the SADIS Gateway (United Kingdom National Air Traffic Services) in the timeframe 2013 to 2014;

 *Note. ― Project costs attributable to SADIS are estimated at GBP 120,000 to 180,000 plus cost of capital.** 1. provide a more detailed assessment of the project costs associated with 1) that are attributable to SADIS to the SCRAG/14 Meeting; and
	2. provide a progress report on the status of implementation to the SADISOPSG/19 Meeting.

and,1. the Chair of the SADISOPSG be invited to inform the Chair of the SCRAG of the estimated project cost associated with a) above.
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| **Agenda Item** | **6:** | **Development of the SADIS** |
|  | **6.2:** | **SADIS satellite broadcast** |

***Implementation of alternative SADIS 2G uplink/downlink monitoring***

Further to discussions at SADISOPSG/16 (2010) concerning the restoration of the SADIS 2G comparator functionality, the group recalled that it had formulated Conclusion 17/28 at the last meeting regarding the implementation of alternative SADIS 2G uplink/downlink monitoring at the SADIS Provider (United Kingdom Met Office) and SADIS Gateway (United Kingdom National Air Traffic Services).

As follow-up to Conclusion 17/28 a), the SADIS Provider had prepared a report on the implementation of comparison monitoring of two of the three data channels serving the SADIS 2G satellite broadcast – namely GRIB and T4 (BUFR/PNG). In addition, as follow-up to Conclusion 17/28 b), the SADIS Gateway has prepared a report on the implementation of comparison monitoring on the third of the three channels – namely OPMET. The group expressed its appreciation to the SADISOPSG Members form South Africa and Switzerland for the assistance provided to the SADIS Gateway in respect of the implementation, as an interim solution, of comparison of the OPMET data channel.

In respect of the actions undertaken by the SADIS Provider to implement comparison monitoring of the GRIB and T4 (BUFR/PNG) channels serving SADIS 2G, the group noted that whilst the infrastructure presented to the last meeting has been implemented and demonstrated to function, a weaker-than-expected satellite signal means that there are too many “false alarms” of missing data at the SADIS Provider’s Exeter-based SADIS 2G very small aperture terminal (VSAT) satellite reception site. Investigations had determined that the overall transmission to/from the satellite was reported to be very reliable; nevertheless the SADIS Provider remained committed to improving the uplink/downlink monitoring of SADIS 2G. The group expressed its appreciation to the SADISOPSG Members from the Netherlands and Switzerland, as well as a SADIS workstation software provider (namely IBL Software Engineering), for the assistance provided to the SADIS Provider in respect of these transmission/reception investigations. The group considered and agreed that further work was necessary to ensure adequate SADIS 2G monitoring, in particular in the context of furthering the investigations into the weaker-than-expected signal at the SADIS Provider’s Exeter-based SADIS 2G VSAT satellite reception site. In this regard, the group formulated the following conclusion:

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|  | **Conclusion 18/xx —** | **SADIS 2G VSAT satellite reception signal investigations at the SADIS Provider**  |
| That, 1. the SADIS Provider (United Kingdom Met Office), be invited to continue to investigate:
	1. the reasons for a weaker-than-expected signal at the Exeter-based SADIS 2G VSAT satellite reception system;
	2. options in relation to making the weaker-than-expected SADIS 2G satellite reception signal (downlink) from the modem useable in terms of comparison with SADIS 2G transmitted data (uplink); and
	3. report on progress in respect of 1) and 2) to the SADISOPSG/19 meeting;

 *Note.― The SADIS Provider is expected to require up to GBP 6,000.00 of capital expenditure for additional equipment in pursuit of solutions to a) above. The SADIS Provider will consult with the Secretary and the SADISOPSG Technical Developments Team before committing to any such expenditure.*and, 1. the Chair of the SADISOPSG be invited to inform the Chair of the SCRAG of the additional costs that may be expected to be incurred associated with a) above.
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| **Agenda Item** | **6:** | **Development of the SADIS** |
|  | **6.3:** | **SADIS Internet-based FTP Service** |

***Feasibility study into increasing the allocated bandwidth of the Secure SADIS FTP service***

The group recalled that it had formulated Conclusion 17/23 at the last meeting regarding a feasibility study into increasing the allocated bandwidth of the Secure SADIS FTP service. The feasibility study had been considered desirable given the findings of a survey of users of world area forecast system (WAFS) products and services in the Asia-Pacific Region conducted by the WAFS Implementation Task Force (WAFS/I TF) of the Asia-Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) in 2011/12 (as follow-up to APANPIRG Conclusion 22/40).

The group reviewed a detailed report as follow-up to Conclusion 17/23, where it was recalled that the Secure SADIS FTP service bandwidth under consideration was the bandwidth between the SADIS Provider (United Kingdom Met Office) and the SADIS Provider’s Internet Service Provider (ISP) only, since that the SADIS Provider has no control or responsibility for any subsequent factors influencing an end-user’s download rate or ISP.

Having reviewed the detailed report, the group was pleased to learn that, in view of an impending upgrade to the SADIS Provider’s ISP links in mid-2013, the SADIS Provider would be in a position to upgrade the existing Secure SADIS FTP service bandwidth allocation from ‘4Mbit/s bursting to 8Mbit/s’ to ‘16Mbit/s bursting to 24Mbit/s’ by August 2013 with a net *reduction* in costs compared to existing ISP costs. Taking these positive developments into account, and acknowledging that the number of Secure SADIS FTP service users continues to increase year-on-year, commensurate with an increasing amount of data (WAFS forecasts and OPMET information) being downloaded via the Internet-based service, the group agreed that an increase to the Secure SADIS FTP bandwidth allocation was both feasible and necessary.

Furthermore, taking into account the day-to-day utilization of Secure SADIS FTP, including identifiable “peaks” in utilization around the time of the availability of the WAFS upper-air gridded global forecasts in the WMO GRIB code form (four times per day), the group noted that, simultaneous with the increased bandwidth allocation proposal outlined above, the SADIS Provider would be in a position to implement “Dynamic Partitioning” on the Secure SADIS FTP service which would more rigorously enforce fair allocation of available bandwidth, regardless of multiple concurrent sessions. In this regard, the group agreed that the implementation of an upper limit of 512Kbit/s would provide a sufficiently robust approach to bandwidth utilization.

In view of the foregoing, the group formulated the following conclusion accordingly:

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|  | **Conclusion 18/xx —** | **Increase to the bandwidth allocated to Secure SADIS FTP between the SADIS Provider and the SADIS Provider’s Internet Service Provider**  |
| That,1. the SADIS Provider State, be invited to:
	1. increase the bandwidth allocated to the Secure SADIS FTP service (between the SADIS Provider and the SADIS Provider’s Internet Service Provider) from ‘4 Mbit/s bursting to 8 Mbit/s’ to ’16 Mbit/s bursting to 24 Mbit/s’; and

 *Note 1. ― At an estimated cost of GBP 3,720.00 per annum at 2013 prices.** 1. implement ‘Dynamic Partitioning’ to the Secure SADIS FTP service to limit user connections to a maximum of 512Kbit/s as a means of enforcing fairer allocation of available bandwidth between users.

 *Note 2. ― The SADIS Provider is expected to have the new infrastructure associated with 1) and 2) in place by 31 August 2013.*and, 1. the Chair of the SADISOPSG be invited to inform the Chair of the SCRAG of the estimated cost and installation timescale as presented in a) above, accordingly.
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Recalling that the group had endorsed the withdrawal of the Classic SADIS FTP service in November 2012 (through SADISOPSG Conclusion 16/15), the group welcomed news that, overall, the migration of users to the Secure SADIS FTP service had been successful and that the withdrawal of Classic SADIS FTP had passed smoothly. The group expressed its appreciation to States/users that had undertaken the necessary migration and to the SADIS Provider State and SADIS workstation software providers for the technical assistance provided to States/users during the migration.

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| **Agenda Item** | **6:** | **Development of the SADIS** |
|  | **6.4:** | **SADIS workstation software evaluations** |

The group recalled that it last undertook a review of the SADIS workstation software evaluation criteria in 2011 (SADISOPSG/16), where it had been agreed that revised criteria be used by the SADIS Provider State to conduct a fourth round of evaluations on behalf of the group in 2011 and 2012 (Conclusion 16/21 and associated Decision 16/22 refer). The group also recalled that, despite some expressions of interest, none of the SADIS workstation software providers had requested their software packages to be evaluated against the fourth-round criteria by the time of the last meeting (SADISOPSG/17 Report, 6.4 refers).

Taking the foregoing into account, the group reviewed a necessary update on the SADIS workstation software evaluations conducted since the last meeting where, it was noted that, again no SADIS workstation software providers had requested their software to be evaluated against the fourth-round criteria. Therefore, no SADIS workstation software provider had yet been evaluated against the fourth-round criteria endorsed by the group in 2011.

The group noted with some disappointment that this situation meant that no SADIS workstation software provider had yet demonstrated that their software has the capability to, *inter alia*, process and display WAFS upper-air gridded global forecasts in the WMO GRIB Edition 2 (GRIB2) code form, and source WAFS forecasts and OPMET information from the Secure SADIS FTP service (with its integral use of digital certificates and digital signatures).

Nonetheless, the group reviewed a necessary update to the fourth-round SADIS workstation software evaluation criteria to accommodate recent and forthcoming changes to SADIS service provision. The proposed changes were intended to address, in particular, the recent withdrawal of the Classic SADIS FTP service and the impending withdrawal of WAFS upper-air gridded global forecasts in the WMO GRIB Edition 1 (GRIB1) code form.

The group concurred that the evaluation of software that suitably processes and displays WAFS forecasts and OPMET information was an important aspect of providing reassurance to the SADIS user community that there was SADIS workstation software commercially available that could assist States in their obligations to meet Annex 3 – *Meteorological Service for International Air Navigation*, Chapter 9 and Appendix 8.

The group reaffirmed that the evaluation process does not certify or endorse any single software application nor does it recommend one application over another. The software evaluations are simply the results of software reviews that the SADIS Provider conducts on behalf of the SADISOPSG. The purpose of these reviews was therefore to verify whether the workstation software could deliver certain minimum functions which the group has considered are essential for the correct application of the WAFS forecasts and OPMET information available on SADIS. In the longer term, given the expected transition from traditional meteorological products and services to meteorological information in a digital exchange environment, the group noted that there might be a need to consider the continued utility of conducting the SADIS workstation software evaluations at a future stage.

In view of the foregoing, the group reviewed and endorsed an update to the fourth-round SADIS workstation software evaluation criteria and agreed to further encourage the SADIS workstation software providers to have their software packages evaluated against the (updated) fourth round criteria. The group formulated the following decision and conclusion accordingly.

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|  | **Decision 18/xx —** | **Endorsement of updated fourth round criteria for SADIS workstation software evaluations** |
| That, the updated fourth round criteria for SADIS workstation software evaluations, as presented at **Appendix K** to this report, be endorsed and used as the basis of evaluations conducted by the SADIS Provider State on behalf of the SADISOPSG henceforth.*Note. ― The updated criteria removes reference to the ‘classic’ SADIS FTP service and to WAFS upper-air gridded global forecasts in WMO GRIB1 code form.* |

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|  | **Conclusion 18/xx —** | **SADIS workstation software evaluations** |
| That, the SADIS Provider State be invited to:1. further encourage SADIS workstation software providers to have their software packages evaluated against the updated fourth round evaluation criteria as contained at **Appendix K** to this report; and
2. report back to the SADISOPSG/19 Meeting the results of evaluations conducted by that time.

*Note 1. ― The updated evaluation criteria were endorsed under SADISOPSG Decision 18/xx.**Note 2. ― The conducting of evaluations is in accordance with SADISOPSG Decision 16/22.* |

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