SADIS COST RECOVERY ADMINISTRATIVE GROUP (SCRAG)

FIFTEENTH MEETING

(Frankfurt, 4 November 2014)

Agenda Item 2: Consideration of issues relevant to the SCRAG's work addressed by the SADIS Operations Group (SADISOPSG)

REPORTS ON CONCLUSIONS OF THE SADISOPSG/19 MEETING

(Presented by the Chairperson of the SADIS Operations Group)

1. Introduction

1.1 This paper includes the following Attachments received from the Chairperson of the SADISOPSG:

- **Attachment 1**: Executive Summary of the nineteenth meeting of the SADIS Operations Group (SADISOPSG/19, London, 27-29 May 2014);
- **Attachment 2**: Annual statement of operational efficacy of SADIS 2013/2014;
- **Attachment 3**: Provision of a dedicated standalone server for the monitoring of WAFC London data availability on SADIS 2G and Secure SADIS FTP
- **Attachment 4**: Actual project costs associated with a mid-life upgrade to the SADIS Gateway Coremet system.
- **Attachment 5**: SADIS inventory 2014/2015.

2. Action by the Group

2.1 The Group is invited to review the information presented in this paper.

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ATTACHMENT 1

NINETEENTH MEETING

SADIS OPERATIONS GROUP
(London, United Kingdom, 27 to 29 May 2014)

EXECUTIVE SUMMARY[1]

1. INTRODUCTION

1.1 The nineteenth meeting of the SADIS Operations Group (SADISOPSG/19) was held, on an exceptional basis, at the Civil Aviation Authority (CAA), London, United Kingdom, 27 to 29 May 2014. Twenty-one (21) participants from ten (10) States, including the focal point representative of the European OPMET Data Management Group (EUR OPMET DMG), and three (3) international organizations (the Agency for Aerial Navigation Safety in Africa and Madagascar (ASECNA), the International Air Transport Association (IATA) and the World Meteorological Organization (WMO)) attended the meeting.

1.2 As Chair, Ms. Gaborekwe Khambule (South Africa) presided over the meeting throughout its duration, assisted by Ms. Juan Zou (China) as Vice-Chair.

2. FOLLOW-UP OF SADISOPSG/17 CONCLUSIONS

2.1 With regard to the follow-up of the SADISOPSG/18 conclusions, the group agreed that action had been completed on all of the conclusions (Decision 19/1).

3. OPERATION OF THE SADIS

3.1 Concerning the annual SADIS management report, which provides a point of reference for the reporting of important SADIS-related events during the period under review (previous 12-months) and a repository for information relating to the provision and availability of the service, the group reviewed the latest management report prepared by the SADIS Provider State and endorsed targets to be applied to the monitoring of timeliness and availability of WAFC London upper-air gridded data and significant weather forecasts on SADIS 2G and Secure SADIS FTP (Decision 19/2).

3.2 With regards to the list of SADIS operational focal points, the group concurred that it provided useful contacts for the SADIS Provider State and the ICAO Regional Offices concerned to resolve operational issues, and agreed that ICAO should consult with States in order to update the list in time for the dispatch of the SADIS efficacy questionnaire in December 2014 (Conclusion 19/3).

3.3 The group reviewed the operation of SADIS during 2013/2014 based on the annual SADIS management report referenced above and on the responses of sixty (60) user States to the annual questionnaire on the operational efficacy of the SADIS. Concerning the annual questionnaire, the group was pleased to note the consistently high percentage of users reporting good availability of OPMET information and WAFS forecasts on both the SADIS 2G satellite broadcast and the Secure SADIS FTP service. The group developed a revision to the annual questionnaire to be used for the dispatch of the 2014/2015 SADIS operational efficacy questionnaire in December 2014 (Decision 19/4).

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[1]The full report is available at the following website: www.icao.int/safety/meteorology/sadisopsg/

3.4 The group, including IATA, agreed that the SADIS 2G satellite broadcast and the Secure SADIS FTP service had continued to meet the operational requirements during the period under review (namely 2013/2014) and that the SADIS Cost Recovery Administrative Group (SCRAG) be informed accordingly (Conclusion 19/5).

3.5 The group reviewed the SADIS inventory for 2014/2015 and, in order to ensure that SADIS continued to meet the approved operational requirements, developed an amendment to the inventory that would be forwarded to the SCRAG accordingly (Conclusion 19/6).

4. CONTENT OF THE SADIS BROADCAST

4.1 OPMET information

4.1.1 The group considered the level of alignment of the *scheduled* and *non-scheduled* OPMET information content of the SADIS and the WAFS Internet File Service (WIFS). Appreciating the recent efforts of the OPMET gateway providers in this regard, the group nevertheless agreed that the SADIS and WIFS Provider States, in coordination with the European OPMET Data Management Group, should continue efforts to align the scheduled OPMET information (with Annex 1 of the SADIS User Guide (SUG)) and, to the extent practicable, the non-scheduled OPMET information (Conclusion 19/7).

4.1.2 The group considered matters related to the non-implementation of the requirements for OPMET information on SADIS – more specifically, the lack of availability of METAR/SPECI and TAF form certain aerodromes. In this regard, recognizing the importance of the OPMET information for users, and that States are required to provide or have agreed to provide the OPMET information from the AOP aerodromes or non-AOP aerodromes respectively listed in Annex 1 of the SUG, the group agreed that States whose OPMET information had been identified as "not available" on SADIS during routine monitoring conducted by the SADIS Gateway should be encouraged to ensure that the OPMET information be produced and disseminated through the regional OPMET bulletin exchange schemes as a matter of urgency. In addition, the group agreed that regional OPMET bulletin exchange schemes should be consistent with the OPMET information requirements contained in Annex 1 of the SUG, including up-to-date processes and procedures to support implementation (Conclusion 19/8).

4.1.3 Concerning the requirements for OPMET information (specifically METAR/SPECI and TAF) from non-AOP aerodromes on SADIS, the group reviewed a revision of the requirements based on a proposal made by IATA. In this regard, the group agreed that States should be consulted accordingly on the amended or additional user requirements, as well as those where there was no longer a user requirement. In addition, the group agreed that the Secretariat should undertake a review of the process used to revise Annex 1 of the SUG concerning OPMET information from non-AOP aerodromes (Conclusion 19/9).

4.1.4 With respect to the provision of *non-scheduled* OPMET information (e.g. SIGMET and AIRMET information, volcanic ash and tropical cyclone advisories) on SADIS, the group discussed the maintenance of information containing WMO abbreviated header lines used by States to exchange the information. In this regard, the group tasked to the Secretariat to undertake a review of the Regional SIGMET Guide template with a view to determining whether tables containing such information could be included therein, and to conduct an assessment of the feasibility of making such information available in an electronic form on an appropriate ICAO website (Conclusion 19/10).

4.1.5 The group agreed that a review of the *SADIS Gateways Operations Handbook* should be conducted by the SADIS Gateway Provider, in coordination with the SADISOPSG Technological Developments Team, including with respect to the OPMET monitoring requirements for aerodromes

listed in Appendix C of the handbook, in order to validate or to propose modification thereto (Conclusion 19/11).

4.2 WAFS forecasts

4.2.1 Insofar as WAFS forecasts on SADIS was concerned, the group was informed that WAFSOPSG/8 (2013) had proposed that upper-air wind and temperature data and geopotential altitude data at flight levels 80 (750 hPa), 210 (450 hPa) and 480 (125 hPa) be added to the complement of WAFS data. The group noted that this proposal had been included in draft Amendment 77 to Annex 3 which would next be considered by the Meteorology Divisional Meeting in July 2014. At a future stage, and subject to the adoption by the Council of the said amendment to Annex 3, the group noted there would be a need to consider the inclusion of this additional WAFS data on SADIS. For now however, the group agreed that no specific action was required other than to monitor developments.

5. DEVELOPMENT OF THE SADIS

5.1 Report of the SADISOPSG Technological Developments Team

5.1.1 The group recalled that the SADISOPSG Technological Developments Team (TDT) was expected to monitor, report and propose action on technological developments having an impact on SADIS. The group noted that the issues dealt with by the SADISOPSG TDT since the last meeting were related to:

a) recent enhancements/changes to the SADIS;

b) monitoring of WAFS data availability on SADIS 2G and Secure SADIS FTP;

c) implementation of a mid-life upgrade to the SADIS Gateway Coremet system; and

d) investigations into SADIS 2G satellite reception signal problems on the premises of the SADIS Provider

5.1.2 Insofar as recent enhancements/changes to SADIS was concerned, with specific reference to the withdrawal of WAFS upper-air gridded global forecasts in WMO GRIB 1 code form and noting that WAFS forecasts (in WMO GRIB 2 code form) for CB clouds, icing and turbulence were now available for operational use instead of trial use, the group agreed that there was a need to undertake the associated removal of redundant (trial nature) folders on the Secure SADIS FTP service (Conclusion 19/12).

5.1.3 Insofar as the monitoring of WAFS data availability on SADIS 2G and Secure SADIS FTP was concerned, the group agreed that, in view of ensuring continuity of timeliness and availability monitoring, the SADIS Provider should undertake the migration of the monitoring system used from an existing development system to a dedicated, operational standalone server (Conclusion 19/13).

5.1.4 Insofar as the implementation of a mid-life upgrade to the SADIS Gateway Coremet system was concerned, the group was pleased to learn that a contract for the upgrade had recently been let, which was expected to result in the upgrade entering operational service in January 2015. Noting that estimated project costs attributable to SADIS had been provided to the SCRAG in 2013, the group agreed that actual project costs, as reported by the SADIS Provider State, should now also be provided to the SCRAG accordingly (Conclusion 19/14).

5.1.5 Insofar investigations into SADIS 2G satellite reception signal problems on the premises of the SADIS Provider was concerned, the group reviewed a report that outlined alternative methods of monitoring that were considered or trialled, the current status of the monitoring system, and recommendations for further work. The group endorsed that no additional significant expense should be incurred by the SADIS Provider for the purposes of monitoring of WAFS data integrity/availability via SADIS 2G and that an existing arrangement that makes use of both the SADIS Provider's own SADIS 2G VSAT and a data feed supplied by a third party provided acceptable levels of monitoring (Decision 19/15).

5.2 SADIS satellite broadcast

5.2.1 Concerning the distribution of corrections to WAFS gridded global forecasts (in WMO GRIB 2 code form) and significant weather forecasts (in WMO BUFR code form and PNG chart form) on SADIS, as a consequence of WAFSOPSG/7 Conclusion 7/5, the group noted that the distribution of corrections to these WAFS forecasts would require no reconfiguration of SADIS 2G, but would require some reconfiguration of Secure SADIS FTP (see 5.3.3 below).

5.3 SADIS Internet-based FTP Service

5.3.1 Acknowledging recent (2013) enhancements/changes to the Secure SADIS FTP service (specifically increases to the allocated bandwidth and implementation of dynamic partitioning) and taking into account subsequent user feedback that indicated that further improvement may be beneficial, the group considered whether a further increase the bandwidth allocation for Secure SADIS FTP between the SADIS Provider and its Internet Service Provider should be implemented. In this regard, notwithstanding that a small number of users/States had expressed a need for an increase of the referred allocated bandwidth, the group was of the opinion that for the vast majority of users the recent enhancements were sufficient for the next 12 months at least.

5.3.2 In respect of the use of concatenated data files on Secure SADIS FTP, and noting that a small number of users had reported difficulties handling the data files, the group agreed that the SADIS Provider, in coordination with the SADISOPSG TDT, should consider alternative means of providing and updating concatenated data files containing WAFS GRIB2 bulletins on Secure SADIS FTP (Conclusion 19/16).

5.3.3 Further to 5.2.1 above, the group endorsed the distribution of corrected WAFS gridded global forecasts and significant weather forecasts on SADIS 2G and Secure SADIS FTP (Decision 19/17) and agreed to a related modification to the processes to be used to handle such forecasts on Secure SADIS FTP (Conclusion 19/18).

5.3.4 As a follow-up to WAFSOPSG/8 Conclusion 8/7, concerning a user requirement for the provision of one-minute updates to the data available on Secure SADIS FTP, the group reviewed a feasibility study prepared by the SADIS Provider State which proposed three options to progress this issue. Appreciating development, testing and cost implications associated with two of the three options, the group agreed that the simplest and most cost effective means with which to satisfy the user requirement was to provide an additional file (and folder) that provides one-minute updates for traditional alphanumeric coded OPMET information on Secure SADIS FTP (Conclusion 19/19).

5.4 SADIS workstation software evaluations

5.4.1 The group reviewed and endorsed an update to the fourth-round SADIS workstation software evaluation criteria (Decision 19/20).

6. LONG-TERM PLANNING OF SADIS

6.1 Based on an update by the SADIS Provider State, the group endorsed a concise long-term plan for SADIS for the years 2015 to 2019 inclusive (Decision 19/21).

7. THE SADIS USER GUIDE

7.1 The group reviewed and endorsed Amendment No. 2 to the fifth edition of the SADIS User Guide, available on the SADISOPSG website, which addressed, *inter alia*, the deletion of references to the (now decommissioned) WAFS gridded global forecasts in WMO GRIB 1 code form, improved specificity with respect to the availability on SADIS of WAFS forecasts (in GRIB and BUFR code forms and PNG chart form) and volcanic ash and tropical cyclone advisories (in PNG chart form), and improved specificity with respect to WAFC backup contingency and the associated availability of WAFS forecasts on SADIS (Decision 19/22).

8. FUTURE WORK PROGRAMME

8.1 With respect to Deliverable SADISOPSG-05 that addressed an assessment of the potential impact of the introduction of METAR/SPECI and TAF in table-driven codes (specifically in WMO BUFR code form) on the SADIS Gateway operations, and noting the recent commencement of a transition to using contemporary, non-proprietary code forms such as XML/GML for the dissemination of OPMET information in digital form, the group agreed that Deliverable SADISOPSG-05 had been overtaken by events and should be updated accordingly (Decision 19/23). The group reviewed and updated the deliverables, executive summaries and tasks teams in its work programme (Decision 19/24).

9. ANY OTHER BUSINESS

9.1 Area forecasts for low-level flights on SADIS

9.1.1 When considering the potential inclusion of area forecasts for low-level flights issued in a graphical form on SADIS, and noting a lack of standardization in the format, file size and issuance time, as well as unknown impacts on the SADIS 2G satellite broadcast and on SADIS workstations/users, the group concurred that such forecasts should *not* be disseminated on SADIS 2G. The group however did concede that such products could be included on Secure SADIS FTP, either in a standardized format (such as digital form using GML from, say, 2019) or in a non-standardized format subject to further review by the SADIS Provider State in coordination with the SADISOPSG Technological Developments Team (Decision 19/25 and Conclusion 19/26).

9.2 Structure of Annexes 2 and 3 of the SADIS User Guide

9.2.1 The group noted that Annex 2 of the SADIS User Guide (SUG) presented the WMO abbreviated header lines used for METAR/SPECI and TAF collective bulletins according to ICAO Region, ICAO State and ICAO location indicator of the aerodrome concerned, whereas Annex 3 of the SUG presented the same information according to "WMO Area". In view of downstream difficulties that the existing structure of Annex 3 of the SUG could pose for users (e.g. certain States and/or certain aerodromes were not immediately identifiable within the annex), the group agreed that a feasibility study should be undertaken by the EUR OPMET Data Management Group with a view to structuring Annex 3 of the SUG based on ICAO Regions/States (Conclusion 19/27).

— END —

ATTACHMENT 2

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Ref.: SWG 5/1.4.1

10 June 2014

To: Chair, SCRAG

From: Chair, SADISOPSG

Subject: **Annual statement of operational efficacy of SADIS 2013/2014**

I wish to inform you that the nineteenth meeting of the Satellite Distribution System Operations Group (SADISOPSG/19 held 27 to 29 May 2014 in London), in Conclusion 19/5, invited me to inform you that the operational efficacy of the SADIS had continued to be satisfactory, meeting all operational requirements since the SADISOPSG/18 Meeting (29 to 31 May 2013 in Dakar).

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ATTACHMENT 3

International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Ref.: SWG 5/1.4.1

10 June 2014

To: Chair, SCRAG

From: Chair, SADISOPSG

Subject: **Provision of a dedicated standalone server for the monitoring of WAFC London data availability on SADIS 2G and Secure SADIS FTP**

I wish to inform you that the nineteenth meeting of the Satellite Distribution System Operations Group (SADISOPSG/19 held 27 to 29 May 2014 in London), in Conclusion 19/13, invited me to inform you of the costs, attributable to SADIS, associated with migration of a timeliness and availability monitoring system used for WAFC London significant weather (SIGWX) forecasts and GRIB2 data on SADIS 2G and Secure SADIS FTP from an existing development WMO message switching server to a dedicated standalone server. It is to be therefore noted that the running cost attributable to SADIS for this dedicated standalone server is approximately GBP 4,000 per annum (at 2014 prices).

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ATTACHMENT 4

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Ref.: SWG 5/1.4.1

10 June 2014

To: Chair, SCRAG

From: Chair, SADISOPSG

Subject: **Actual project costs associated with a mid-life upgrade to the SADIS Gateway Coremet system**

I wish to inform you that the nineteenth meeting of the Satellite Distribution System Operations Group (SADISOPSG/19 held 27 to 29 May 2014 in London), in Conclusion 19/14, invited me to inform you of the actual project costs, attributable to SADIS, associated with a mid-life upgrade to the SADIS Gateway Coremet system (NATS Message Switch). Such an upgrade has been deemed necessary in view of assuring the ingestion, collation, quality-control, distribution, monitoring and comparison of aeronautical meteorological information on SADIS into the future. It is to be therefore noted that the actual project costs attributable to the SADIS programme are GBP 187,110.27, comprising manufacturing, hardware and NATS project costs. It is understood that the SCRAG has determined that these costs will be depreciated over a 5 year period.

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ATTACHMENT 5

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Ref.: SWG 5/1.4.1

10 June 2014

To: Chair, SCRAG

From: Chair, SADISOPSG

Subject: **SADIS inventory 2014/2015**

I wish to inform you that the nineteenth meeting of the Satellite Distribution System Operations Group (SADISOPSG/19 held 27 to 29 May 2014 in London), in Conclusion 19/6, invited me to forward to you the attached updated SADIS inventory for the period 2014/2015.

Gaborekwe Khambule (Mrs.)

Enclosure:
Updated SADIS inventory

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ATTACHMENT

SADIS INVENTORY

Editorial note. — Changes proposed by SADISOPSG/19 are highlighted in tracked-change mode as ~~deletions~~ or additions

(~~2013-2014~~2014-2015)

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 implementation of Secure SADIS FTP) and communications circuits, ISDN 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

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

2. The Secure SADIS FTP hub infrastructure connection to the Met Office message switch (MetSwitch) 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").

Dell Poweredge R900 servers to provide the Secure SADIS FTP service (see Section 1 C).

ii) **Principally procured for SADIS**

a) At the Met Office;

See Section 1 C for itemized components

b) Communications between Met Office Exeter and Whitehill uplink facility;

2 Fibre Optic 64 ~~Kbps~~Kbit/sec circuits in support of SADIS 2G service

c) At the uplink site (Whitehill);

1) Units and services leased from Cable and Wireless Communications Ltd. to support SADIS 2G services:

- 1 (70 to 140 MHz) converter;
- Use of 1 (140 to C band) converter;
- Use of satellite hub (lease represents only a very small part of this large aperture) for SADIS 2G services; and

2) Units forming part of a totally integrated rack structure to provide SADIS 2G service, with back-up (see the list under Section 1 C).

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) Met Office Message switch (MetSwitch): Total investment £738K[1] of which 1.00 per cent is attributable to the Secure SADIS FTP service usage: switching data to operational FTP service;

b) Met Office Message switch (MetSwitch): Total investment £738K[2] of which 0.74 per cent is attributable to SADIS 2G usage: switching data to operational (2G) broadcast service and to 2G monitoring system (Corobor Comparator/MetSwitch Dev);

c) Allocated bandwidth ~~4 Mbps~~16 Mbit/sec bursting to ~~8 Mbps~~24 Mbit/sec between server and Internet Service Provider (ISP) in support of the Secure SADIS FTP service. Individual client connections have a maximum throughput of 512Kbit/sec;

d) NATS Message switch (CoreMet System);

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

e) Secure SADIS FTP equipment running costs;

Note. — This comprises support and maintenance of the servers underpinning the Secure SADIS FTP services, a share of the cost for the underlying storage capacity on which the Secure SADIS FTP services are reliant, and operational monitoring of the Secure SADIS FTP services by Tivoli ensuring problems can be identified and resolved in a timely manner.

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 per cent of total share of Met Office Serial Communications. Includes cost of switching serial data from MetSwitch 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

The SADIS Gateway (UK NATS) has procured a dedicated SADIS data backup arrangement with the WIFS Provider State. The backup infrastructure includes an ISDN connection between the National Weather Service Telecommunications Gateway (NWSTG) and the SADIS Gateway, and an ISDN connection between the SADIS Gateway and Whitehill uplink facility, to provide SADIS data backup.

C. Hub equipment and services located at Exeter and Whitehill

Item	*Description*	*Quantity*
1.	**Whitehill services (leased from Cable & Wireless)**	
1.1	70 MHz to 140 MHz converter	1

[1] budgeted cost for providing MetSwitch service during the fiscal year ~~2013/2014~~2014/2015.
[2] budgeted cost for providing MetSwitch service during the fiscal year ~~2013/2014~~2014/2015.

1.2	140 MHz to C band converter	1
1.3	Satellite Hub leased bandwidth	1 slot

2. ISDN back-up service to Washington (NWSTG)

2.1	VadEDGE 4200	3*
2.2	ISDN 2e circuit	1
2.3	Interface cables	2

Note. — Hardware listed under Section 2 is located at Whitehill.

3. Secure SADIS FTP service

3.1	Dell Poweredge R900 servers with 1 Gb RAM	2
3.2	Dell Poweredge R900 (4 core) servers with 32 Gb RAM *	2
3.3	Shared Storage Arrays (analogous to hard disk storage, but with dynamic upper limit)	2
3.4	VMWave Virtual Platform with Red Hat Linux 5.3 OS	2
3.5	Intel Xeon X7350, 2.93 GHz Processors	2
3.6	Licenses, misc. support and maintenance costs	1

Note 1. — Item 3.2 relates to Digital Signing servers.
Note 2. – Items listed under Section 3 are located at Exeter.

4. SADIS 2G Infrastructure

4.1	MetSwitch port	1
4.2	MegaPAC V-IX Base System Dual PSU including Chassis, 1 CP6000, and 1 switch	2*
4.3	CP6000 for use with MegaPAC V-IX	1*
4.4	VadEDGE 4200	4*
4.5	Uplink modem (Comtech EF Data SDM-300a)	3*
4.6	Communications cabinet and lease	1
4.7	MegaWatch including Enterprise Reports, and PC	1
4.8	Comtech SDM300L demodulator (NER5 downlink)	1
4.9	Corobor comparator software and PC	1
4.10	Communications rack floor space at Exeter in IT Hall 1 and IT Hall 2, and at Whitehill	3
4.11	Space in stores at Exeter to locate spare hardware	1
4.12	WAN Module	2
4.13	Comtech EF Data SMS 301 – redundancy switch	2*
4.14	BRI Module for VadEDGE 4200	2
4.15	Interface cabling	8

** Includes one unit/module stored as a cold spare and one unit as part of downlink that may also be used as a spare for the uplink circuit if necessary.*

Note. — Hardware listed under Section 4 is located at Exeter and Whitehill.

2. PROCURED SERVICES

A. Space segment annual lease: Allocated frequency band to SADIS 2G, providing a 64 ~~Kbps~~Kbit/sec data rate (less communications overhead);

B. Annual maintenance of Met Office Exeter and Whitehill uplink site equipment (SADIS 2G and Secure 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.

24-hour Weather Desk support	*Skill*
1. Service desk (first point of contact)	Incident Management
2. Additional Service Desk operator	Customer Enquiries

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. Technical Team Leader (TTL)	Technical Supervisor
2. Networks and Systems Supervisor (NSS)	Service Continuity

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)	Process Specialist

ii) Additional support

Day support	*Resource*
1. Systems integration team	14 staff-days of network computer engineer
2. Message Switching Manager	15 staff-days of MSS manager
3. Administrator	160 staff-days of executive officer
4. International aviation management	30 staff-days of manager
5. Data traffic	5 staff-days of communications engineer
6. Contract procurement and management	4 staff-days of senior procurement officer
7. Message switching Team	15 staff-days of technical officer
8. Invoice Administration	20 staff-days of invoicing officer and 15 staff-days of business accountant

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

Note 1. — The CACC provides the OPMET Gateway function, which is provided from a single operational site, but with a full capability at an alternative site. Staff are available either on a 24-hour basis, or as a daytime support with on-call capability.

Note 2. — 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	*Resource*
1. Operational staff support	523 staff-days per annum
2. Engineering staff support	22 staff-days per annum

Day Support	*Resource*
3. SADIS administration support	50 staff-days per annum
4. Engineering (including on-call)	15 staff-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 2G service.

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