SADISOPSG-Memo/76
30/9/11

MEMORANDUM

Ref.: SWG 5/1.4.1

To:	Members, Satellite Distribution System Operations Group (SADISOPSG)
From:	SADISOPSG Secretary
Subject:	**Progress reports related to the implementation of an ISDN backup capability for SADIS 2G**
Action:	To note.

At the Sixteenth Meeting of the SADIS Operations Group (SADISOPSG/16 held 23 to 25 May 2011), the group noted that there was an outstanding action to complete the implementation of an integrated services digital network (ISDN) backup capability for the SADIS 2G satellite broadcast. The group was informed that there had been progress and that individual elements of the capability had been tested, but that further actions were necessary to fully test the end-to-end process. The SADIS Provider State agreed to provide an update to the group, through the Secretariat, regarding the status and timeline of implementation.

An initial progress report was provided by the SADIS Provider State on 22 July 2011 and communicated by the Secretariat to Members under cover of an email on 9 August 2011. This first progress report is presented at Attachment A for completeness.

I am pleased to now provide at Attachment B a second progress report provided by the SADIS Provider State on 30 September 2011. As outlined in the second progress report, a further update will be provided by the SADIS Provider State at our next meeting in May 2012.

…/…

I would like to take this opportunity to thank the SADIS Provider State for their continued attention and effort to implement this important backup arrangement for the SADIS 2G satellite broadcast.

Best regards,

(signed by)
Greg Brock

Enclosures:

Attachments A and B – SADIS Provider State progress reports dated 22 July 2011 and 30 September 2011 respectively.

ATTACHMENT A

Update on Status of the ISDN Backup capability for delivery of data to SADIS 2G in the event of significant disruption to services at Exeter.

Introduction/Background:
In order to provide an alternative, resilient path for transmitting WAFS data to the SADIS 2G satellite, an ISDN[1] link has been established between the National Weather Service Telecommunications Gateway (NWSTG) and the SADIS Gateway (overseen by NATS). There is also an ISDN[2] link between the SADIS Gateway and the satellite uplink facility at Whitehill. *(Note, the SADIS FTP and Secure SADIS FTP services are not considered here, since their backup is WIFS[3]).*

Modes of operation:
In the event of a catastrophic failure of the SADIS hardware and/or other computing/message switching facilities at the Exeter HQ of UK Met Office, it is intended that WAFS Data from WAFC Washington be routed via NWSTG direct to the SADIS Gateway and thence to the satellite uplink facility at Whitehill. The original intention was for such a capability to be invoked in the event of a true catastrophe. However, it is evident that certain, less serious failure modes at Exeter can be remedied by implementation of elements of the ISDN backup plan. These are currently being explored in more detail[4].

Testing the operation of the ISDN Backup:
Testing of the entire, end to end, ISDN backup process is not straightforward. This is because of: a) the limited bandwidth available over the satellite link; and b) the necessity in the event of a truly catastrophic event at Exeter to send WAFC Washington GRIB1 and GRIB2 (`CCCC =-KWBC`) direct to users. Whilst SADIS Workstation evaluations demonstrate that known workstations can now deal with both WAFC London and WAFC Washington GRIB data, not all users use data from both centres routinely and reception of both datasets and/or duplicated data during testing may cause confusion. Clearly, in the event of catastrophe at Exeter, then the WAFC Washington GRIB data will become the only available data and must be used. However, the potential for disrupting normal day to day operations by transmitting such data over the satellite for 'testing' purposes is currently considered to be too high. In addition, there are issues relating to bandwidth.

Work has been done to test various elements of the process, but not - as yet - the true end to end process. One option is to send a simple administration message from NWSTG - SADIS Gateway - Whitehill - satellite. This would 'prove' the end to end process for a single message, but would not stress test the communications links.

'Stress' tests of the individual circuits have been performed. In some cases these have been by pre-arrangement with NWSTG, but also during recent real data-transmission issues at the Exeter site.

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[1] 64kbps
[2] 64kpbs
[3] WAFS Internet File Service
[4] For example, feeding WAFC London GRIB1/GRIB2 to the satellite if SADIS ground segment hardware at Exeter fails.

Table 1 below indicates when elements of the backup process have been tested.

	Data path NWSTG to SADIS Gateway over ISDN	**Data path SADIS Gateway to Whitehill over ISDN**
OPMET	Not necessary. SADIS Gateway obtains OPMET data independently of Exeter site. Non-QCd OPMET data can be provided by Exeter in the event of a failure of the SADIS Gateway	Demonstrated on 18/19th July 2011
WAFS GRIB1	Demonstrated by receipt and subsequent blackhole 13/07/11	Demonstrated on 18/19th July 2011
WAFS GRIB2	Demonstrated by receipt and subsequent blackhole 13/07/11	Demonstrated on 18/19th July 2011
SIGWX BUFR	To be tested	Demonstrated on 18/19th July 2011
SIGWX PNG	To be tested	Demonstrated on 18/19th July 2011
Volanic Ash Graphics	To be tested	Demonstrated on 18/19th July 2011
Admin Message	To be tested	To be tested

Table 1: Status of testing at 21/07/2011

Current status:
Recent tests (or genuine use) of the ISDN links between NWSTG and SADIS Gateway, and between SADIS Gateway and Whitehill have demonstrated that both ISDN links function and have the capacity to deal with the necessary volumes of data. Staff processes and procedures to connect/disconnect calls have also been practiced and demonstrated.

As such, there is high confidence (though not absolute proof) that in the event of catastrophe, data delivery direct from NWSTG to the SADIS 2G satellite could be established quickly and maintained.

Future steps:
It is necessary to continue testing. As such, the following is proposed to be completed over a timescale of 6 weeks (to 2nd September 2011):

1) 48 hour stress test of ISDN link between NWSTG and SADIS Gateway:
Objective: to confirm all scheduled GRIB1, GRIB2, SIGWX BUFR and SIGWX PNG files are received, as well as the receipt of any volcanic ash graphic products transmitted during the test.

2) To arrange occasional tests of OPMET direct over ISDN between SADIS Gateway and Whitehill

3) To arrange, as a minimum, end to end transmission of admin messages from NWSTG-SADIS Gateway-Whitehill.

4) To consider additional methods of testing whereby the entire end to end process is 'stressed'. Such testing must not disrupt the normal operations of the service.

With regard to point 4, it may be that it will not be possible to safely test the entire end to end process with realistic data volumes without disrupting the normal service. If so, then an assessment of the confidence of the end to end process being able to cope with the data volumes will need to be given.

There will be further consideration of how the backup system as originally intended can be used to remedy data delivery problems of less severity than 'catastrophic' magnitude. These options, and the testing of those options, will in addition more regularly practice/prove the individual sections of the overall backup process.

A further update will be provided to the Secretariat of the SADISOPSG by 30 September 2011.

Chris Tyson
SADIS Manager
22/07/2011

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ATTACHMENT B

Second Update on Status of the ISDN Backup capability for delivery of data to SADIS 2G in the event of significant disruption to services at Exeter.

In order that this update report may be read as a self contained Progress Report without having to frequently refer to previous documentation, there is some repetition of background and operational information as provided in the first Progress Report.

Introduction/Background:
In order to provide an alternative, resilient path for transmitting WAFS data to the SADIS 2G satellite, an ISDN[1] link has been established between the National Weather Service Telecommunications Gateway (NWSTG) and the SADIS Gateway (overseen by NATS). There is also an ISDN[2] link between the SADIS Gateway and the satellite uplink facility at Whitehill. *(Note, the SADIS FTP and Secure SADIS FTP services are not considered here, since their backup is WIFS[3]).*

Modes of operation:
In the event of a catastrophic failure of the SADIS hardware and/or other computing/message switching facilities at the Exeter HQ of UK Met Office, it is intended that WAFS Data from WAFC Washington be routed via NWSTG direct to the SADIS Gateway and thence to the satellite uplink facility at Whitehill. The original intention was for such a capability to be invoked in the event of a true catastrophe. However, it is evident that certain, less serious failure modes at Exeter can be remedied by implementation of elements of the ISDN backup plan. These are currently being explored in more detail[4].

Testing the operation of the ISDN Backup:
Testing of the entire, end to end, ISDN backup process is not straightforward. This is because of: a) the limited bandwidth available over the satellite link; and b) the necessity in the event of a truly catastrophic event at Exeter to send WAFC Washington GRIB1 and GRIB2 (`CCCC =-KWBC`) direct to users. Whilst SADIS Workstation evaluations demonstrate that known workstations can now deal with both WAFC London and WAFC Washington GRIB data, not all users use data from both centres routinely and reception of both datasets and/or duplicated data during testing may cause confusion. Clearly, in the event of catastrophe at Exeter, then the WAFC Washington GRIB data will become the only available data and must be used. However, the potential for disrupting normal day to day operations by transmitting such data over the satellite for 'testing' purposes is currently considered to be too high. In addition, there are issues relating to bandwidth.

Following on from the previous update (22 July 2011), further consideration has been given to finally signing off and regularly testing these circuits. As noted in the previous update, it is relatively simple to test various elements of the process, but not - as yet - the true end to end process. One option is to send a simple administration message from NWSTG - SADIS Gateway - Whitehill -

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[1] 64kbps
[2] 64kpbs
[3] WAFS Internet File Service
[4] For example, feeding WAFC London GRIB1/GRIB2 to the satellite if SADIS ground segment hardware at Exeter fails.

satellite. This would 'prove' the end to end process for a single message, but would not 'stress test' the communications links.

'Stress' tests of the individual circuits have been performed. In some cases these have been by pre-arrangement with NWSTG, but also during recent real data-transmission issues at the Exeter site.

Table 1 below indicates when elements of the backup process have been tested. The tests indicated in blue font are those carried out since the last Progress Report. The GRIB1 and GRIB2 was successful, but the non-receipt of PNG/BUFR data needs to be investigated.

	Data path NWSTG to SADIS Gateway over ISDN	**Data path SADIS Gateway to Whitehill over ISDN**
OPMET	Not necessary. SADIS Gateway obtains OPMET data independently of Exeter site. Non-QCd OPMET data can be provided by Exeter in the event of a failure of the SADIS Gateway	Demonstrated on 18/19th July 2011
WAFS GRIB1	Demonstrated by receipt and subsequent blackhole 13/07/11 21 hour stress test, 26-27 July 2011 - GRIB1 successfully received	Demonstrated on 18/19th July 2011
WAFS GRIB2	Demonstrated by receipt and subsequent blackhole 13/07/11 21 hour stress test, 26-27 July 2011 - GRIB2 successfully received	Demonstrated on 18/19th July 2011
SIGWX BUFR	To be tested 21 hour stress test, 26-27 July 2011 SIGWX BUFR not received - to be investigated	Demonstrated on 18/19th July 2011
SIGWX PNG	To be tested 21 hour stress test, 26-27 July 2011 SIGWX BUFR not received - to be investigated	Demonstrated on 18/19th July 2011
Volanic Ash Graphics	To be tested	Demonstrated on 18/19th July 2011
Admin Message	To be tested	To be tested

Table 1: Status of testing at 29/09/2011

Report on actions from previous update:
To summarise and report on the previously scheduled actions, the following information is provided. Blue font identifies the status of each action.

1) 48 hour stress test of ISDN link between NWSTG and SADIS Gateway:
Objective: to confirm all scheduled GRIB1, GRIB2, SIGWX BUFR and SIGWX PNG files are received, as well as the receipt of any volcanic ash graphic products transmitted during the test.

A 21 hour stress test was arranged (see table 1) for 26/27 October 2011. GRIB1 and GRIB2 transmission/receipt was successful, but SIGWX BUFR and SIGWX PNG files were not received.

2) To arrange occasional tests of OPMET direct over ISDN between SADIS Gateway and Whitehill

These are in the process of being established as a regular, monthly test. Expected to commence in November 2011.

3) To arrange, as a minimum, end to end transmission of admin messages from NWSTG-SADIS Gateway-Whitehill.

This has still to be tested

4) To consider additional methods of testing whereby the entire end to end process is 'stressed'. Such testing must not disrupt the normal operations of the service.

No simple, safe method of stressing the entire end to end service has yet been identified.

Current status:

As noted in the previous update, tests (or genuine use) of the ISDN links between NWSTG and SADIS Gateway, and between SADIS Gateway and Whitehill have demonstrated that both ISDN links function and have the capacity to deal with the necessary volumes of data. Staff processes and procedures to connect/disconnect calls have also been practiced and demonstrated.

It remains necessary to continue to test and to practice this backup process. In the near future it is necessary to identify why SIGWX BUFR and SIGWX PNGs were not received on the last test.

Future steps:

The plans for future tests, are indicated below:

1. Monthly tests of the SADIS Gateway - Whitehill ISDN Link:

   These are expected to commence in November 2011.

2. Further tests of the NWSTG - SADIS Gateway ISDN Link in order to confirm that all necessary bulletins are sent and received

   A decision will also need to be made as to how regularly these tests should be repeated

3. A method to be established whereby a full end to end message can be transmitted without disrupting the normal SADIS Service

A further update will be provided as a Working Paper to the SADISOPSG/17.

Chris Tyson
SADIS Manager
30/09/2011

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