

SADISOPSG-Memo/97
12/11/14

MEMORANDUM

Ref: SWG 5/1.4.1

To: Members, Satellite Distribution System Operations Group (SADISOPSG)
From: SADISOPSG Secretary
Subject: **Future of the SADIS satellite broadcast**
Action: Members to provide responses to the Secretary by **5 December 2014**

The attached documents provide a detailed description of the issues relating to the continued use of the SADIS satellite broadcast beyond 2015 with specific reference to the use of the frequencies that are currently in operation.

Ultimately, a simple decision is required relating to whether the satellite broadcast should be continued beyond July 2016 or not. I would be grateful if you could study the attached documents and provide your views to me by 5 December 2014 so that an appropriate decision can be made with sufficient time to implement the way forward.

To enable members to be fully informed, the SADIS Provider State has offered to host a telephone conference call to those interested over the coming weeks, and you may expect to be contacted accordingly so that specific arrangements can be made.

Best regards,

(signed by)
Neil Halsey

Enclosures:

- A — Provision of satellite-based services beyond 2015
- B — Technical, financial and logistical information relating to provision of satellite-based services beyond 2015



Attachment A

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

PROVISION OF SATELLITE BASED SERVICES BEYOND 2015

SUMMARY

This paper provides an update on the status of extending the SADIS 2G service beyond 2015.

It highlights to the group that extension of the service beyond 31 July 2016 using the current downlink parameters will not be possible.

Action by the SADISOPSG is in paragraph 4.

1. INTRODUCTION

1.1 The group will be aware that the ICAO Meteorological Divisional Meeting in July 2014 (MET/14) recommended that the SADIS 2G service be extended beyond 2015, but not beyond November 2019.

1.2 It has become evident that the satellite currently used for SADIS 2G is due to be replaced in 2016 and will not be capable of providing the current downlink parameters (frequency) used by SADIS 2G beyond July 2016.

2. DISCUSSION

2.1 As noted in 1.1 above, the MET/14 meeting made the following recommendation:

MET/14 Recommendation 2/3 — Withdrawal of the SADIS 2G satellite broadcast and formal testing of the exchange of global OPMET information and WAFS forecasts on the AMHS

That ICAO, through an appropriate expert group, be tasked to:

- a) undertake steps necessary to ensure that the SADIS 2G satellite broadcast be extended beyond 2015, but not beyond November 2019;

- b) urge States/users concerned who have not already done so to migrate to operational use of the Secure SADIS FTP service in the intervening period described in a) above; and
- c) undertake, as a matter of urgency, formal testing of the exchange of global OPMET information and world area forecast system (WAFS) forecasts on the ATS message handling system (AMHS) with a view to determining the capability and minimum specifications required to distribute such data to States/users in the future.

2.2 When negotiating with the satellite lease provider with a view to extending the existing contract, it became evident that there was no possibility of any extension of the service using the current downlink parameters beyond 31 July 2016.

2.3 The two options that follow are:

- 1) Cease the SADIS 2G service on 31 July 2016 with all existing SADIS 2G users migrating to the Secure SADIS FTP service by that date; and
- 2) Migrate to new downlink frequencies that would be assigned for the SADIS “3G service” on the new satellite until November 2019.

2.4 These options and the consequent impacts, costs and risks are explored in more detail in the separate Information Paper provided to the meeting. To summarise:

2.5 Cessation of the satellite based services in July 2016 would result in:

- a) costs attributable to satellite based infrastructure of **GBP208,625** over a 5-year period 2015-2019 (resulting in a net saving of *at least* **GBP373,055** compared to extension of satellite based services, see 2.6a below);
- b) the replacement of essential ground hub SADIS 2G infrastructure that will not be supported beyond 31 March 2015. The cost of replacement hardware (CP7000 module) is estimated at GBP29,280;
- c) all SADIS 2G users could direct their efforts to migrating to Secure SADIS FTP by 31 July 2016;
- d) capital investment by current SADIS 2G users related to migration to new satellite frequencies would not be necessary; and
- e) although some capital investment and ongoing running costs would be required by those States setting up access to Secure SADIS FTP for the first time, these costs would be necessary anyway before 2019.

2.6 Extension of the satellite based services on new downlink frequencies beyond 31 July 2016 would result in:

- a) costs attributable to satellite based infrastructure of *at least* **GBP581,680** over a 5 year period 2015-2019;

- b) capital investment by current SADIS 2G users related to migration to new satellite frequencies of between **GBP500** and **GBP10,000** per site, not including shipping, consultancy (if required), travel, or subsistence;
- c) the risk that the new satellite frequencies do not pass proof of concept, or that there are unforeseen technical issues making it impossible to meet the 31 July 2016 deadline; and
- d) the risk that resources/logistics are insufficient to enable all users to migrate by 31 July 2016.

3. CONCLUSION

3.1 Given that the existing satellite provider is planning to replace the current satellite with another platform, the SADIS Provider State has been given notice, under the terms of its contractual arrangements with the satellite lease provider, that the current downlink parameters (frequency) used by the SADIS 2G broadcast will not be available beyond 31 July 2016 and that there is no possibility of an extension of the service beyond this date. Therefore, there are two options for the SADIS service beyond 31 July 2016:

- 1) Cease the SADIS 2G service on 31 July 2016 with all existing SADIS 2G users migrating to the Secure SADIS FTP Service by that date
- 2) Migrate to new downlink frequencies that would be assigned for the SADIS “3G service” on the new satellite until November 2019

3.2 In consideration of the above, and bearing in mind the costs, risks, and limited timescale remaining, it is suggested that the most appropriate course of action would be for the satellite based service (SADIS 2G) to be ceased at 1200 UTC on 31st July 2016. Accordingly, the SADISOPSG is invited to formulate the following draft Decision;

Decision xx/xx: — Cessation of the satellite based service, SADIS 2G, effective 1200 UTC 31 July 2016.

That, the SADIS Provider be invited to cease the satellite based service, SADIS 2G, with effect from 1200 UTC, 31 July 2016.

Note 1: — Secure SADIS FTP will continue in its current form.

Note 2: — In order to replace essential ground hub SADIS 2G infrastructure that will not be supported beyond 31 March 2015, additional costs of GBP29,280 will be incurred.

4. ACTION BY THE SADISOPSG

4.1 The SADISOPSG is invited to:

- a) note the information contained in this paper; and
- b) decide on the draft decision proposed for the group’s consideration.

— END —



INFORMATION PAPER

Attachment B

SATELLITE DISTRIBUTION SYSTEM OPERATIONS GROUP (SADISOPSG)

**TECHNICAL, FINANCIAL AND LOGISTICAL INFORMATION RELATING TO PROVISION
OF SATELLITE BASED SERVICES BEYOND 2015**

SUMMARY

This paper provides technical information regarding the extension of the SADIS 2G service beyond 2015.

It highlights to the group that extension of the service beyond 31 July 2016 using the current downlink parameters will not be possible.

As such, this paper sets out the main options, considers the likely impacts, and – where possible – provides some cost estimates.

Action by the SADISOPSG is in paragraph 3.1.

1. INTRODUCTION

1.1 The group will be aware that, subsequent to the SADISOPSG recommendations presented to the ICAO Meteorological Divisional Meeting in July 2014 (MET/14), the MET/14 meeting recommended that the SADIS 2G service be extended beyond 2015, but not beyond November 2019.

1.2 On the basis of this recommendation, the SADIS Provider sought to extend the service accordingly. However, it has become evident that the satellite currently used for SADIS 2G is due to be replaced in 2016 and will not be capable of providing the current downlink parameters (frequency) used by SADIS 2G beyond July 2016.

1.3 This Information Paper, and its **Appendix**, apprises the group of the likely impacts based on these two options. Where possible it provides cost estimates for those options with a view to permitting the SADISOPSG to determine the most appropriate future actions.

2. DISCUSSION

2.1 When negotiating with the satellite lease provider with a view to extending the existing contract, it became evident that there was no possibility of any extension of the service using the current downlink parameters beyond 31 July 2016.

2.2 The two options that follow are:

- 1) Cease the SADIS 2G service on 31 July 2016 with all existing SADIS 2G users migrating to the Secure SADIS FTP service by that date.
- 2) Migrate to new downlink frequencies that would be assigned for the SADIS “3G service” on the new satellite until November 2019.

2.3 Impacts

2.3.1 Up to 80 existing SADIS 2G users **could be adversely** affected by a change to downlink frequencies, made up of:

- a) a minimum of 35 existing SADIS 2G users will either have to transition to a new downlink frequency, or migrate to the Secure SADIS FTP service;
- b) up to an additional 45 SADIS 2G users, who have access to both SADIS 2G and Secure SADIS FTP will need to decide if they wish to transition to a new downlink frequency, or use their Secure SADIS FTP service in a primary role;

Up to 109 existing SADIS users **would not be adversely affected** by cessation of satellite based services, made up of

- c) 53 SADIS users only have access to Secure SADIS FTP, so they would not be impacted by the change; and
- d) 56 SADIS users have access to both SADIS 2G and Secure SADIS FTP and use Secure SADIS FTP regularly. It may be assumed that cessation of satellite based services would not have a significant impact on these users.

Table 1 to the **Appendix** provides a breakdown by region, but the most significantly affected region (by A and B above) is Africa.

2.3.2 The timescale provides very limited scope for detailed planning and implementation of appropriate works. In addition, user budgetary constraints over the next 18 months will no doubt apply in some cases.

2.4 It should also be considered that item c) of MET/14 Recommendation 2/3 makes reference to the possible use of AMHS for distribution of SIGWX BUFR, PNG and WAFS Upper Air Forecasts in GRIB2 format.

2.5 In theory, it should be feasible for AMHS systems of certain specification to receive/distribute SIGWX BUFR, PNG and WAFS Upper Air Forecasts in GRIB2 format. However, there does not appear to have been any official, formal testing of the capability or minimum specification required. It is also unknown as to whether it is easier to install AMHS or obtain access to Secure SADIS FTP in lieu of reception of SIGWX BUFR, PNG and WAFS Upper Air Forecasts in GRIB2 format via SADIS 2G. In addition, there is no known mandate from ICAO for SIGWX BUFR, PNG and WAFS Upper Air Forecasts in GRIB2 format data to be distributed by AMHS.

2.6 Costs

2.6.1 It is impossible to provide precise cost analysis at this stage, but best estimates for the most obvious remedial actions are given in the **Table 2** to the **Appendix**. Regrettably, the satellite platform provider is unable to provide cost estimates for replacement downlink parameters at time of writing. As such, the estimates for the replacement service are based largely on existing rates and should be treated with caution.

To summarise, and bearing in mind the complexities of depreciation, when considered over a 5 year period (matching the period covered by **Table 2** to **Appendix A**):

Cessation of SADIS 2G in July 2016 would result in estimated satellite based costs from 2015 to 2019 inclusive of **GBP208,625** (this includes replacement of an essential item of ground hardware which will become unsupported from 31 March 2015).

Provision of a replacement satellite service (SADIS 3G) to 2019 would result in estimated satellite based costs of *at least* **GBP581,680**.

A net difference of *at least* **GBP373,055**

2.6.2 Risks

2.6.2.1 If testing of new frequencies is carried out, the following risks are identified:

- 1) One outcome of the testing may be that new frequencies are unsuitable. With the limited time available and no possibility of extending the use of the existing frequencies, further testing may not be possible. This will result in no option but to cease the SADIS 2G service on 31 July 2016. To mitigate this risk a decision will need to be taken as soon as possible as to whether or not to embark upon, and agree to fund, a testing project.
- 2) Even if testing proves the concept, SADIS 2G users may simply decide there is no point in migrating to a new frequency. Whilst there will undoubtedly be some difficulties for some users to migrate to Secure SADIS FTP, many may well be able to do so and therefore choose not to update their SADIS 2G equipment. A consequence could be that very few users may take the SADIS 3G service, questioning the efficacy of expenditure of large sums for a small number of users.

- 3) If testing is successful, the limited timescales may mean that not all users can update their SADIS 2G systems in sufficient time. To mitigate this risk, any actions must be undertaken with the minimum delay. The logistics of providing on-site support to up to 80 users in limited timescale could prove challenging.
- 4) The “replacement” satellite is not yet launched, and “testing” will be on a different satellite to the satellite that will be used operationally. There must be a risk that, there are operational difficulties during any switchover.
- 5) There are still some uncertainties relating to precise costs.

A risk matrix is provided in Table 3 to the **Appendix** to this paper.

3. CONCLUSION

3.1 The foregoing information and Appendix are intended to provide the group with information relating to the options, impacts, costs and risks associated with cessation of SADIS satellite based services effective 31 July 2016, or alternatively migrating to new satellite downlink frequencies by the same date. Note, regardless of whether or not satellite based services are withdrawn on 31 July 2016, the Secure SADIS FTP based service is expected to continue in its current form.

APPENDIX

Provision of satellite based services beyond 31 July 2016.

Background

The SADIS Provider has been informed that the current SADIS 2G downlink 'parameters'¹ would no longer be available after 31 July 2016.

This is due to the replacement of Intelsat's current 904 satellite with a new satellite that no longer has the capability to provide the existing downlink parameters.

The current SADIS 2G satellite lease contract ends on 31 December 2015. In the short term, the SADIS Provider is seeking an extension of the current contract to 31 July 2016 to secure the current frequencies for as long as possible.

Assessment of number of users currently reliant upon SADIS 2G.

To assess the current status, Table 1 illustrates the number of users per region with access to SADIS 2G only, Secure SADIS FTP only, or to both. It should be noted that even where a user has access to both services, it is evident from download records that not all use the Secure SADIS FTP service regularly.

If the SADIS 2G were to be withdrawn 31 July 2016, then between 35 and 80 users who would need to migrate to Secure SADIS FTP. For some users who already have access to Secure SADIS FTP, the transition may be straightforward.

If it was decided to use new downlink frequencies, then between 35 and 80 users would need to decide if they would embark on a migration to SADIS 3G; or instead transition to Secure SADIS FTP. The decision would no doubt be driven by a) costs of migration to SADIS 3G, b) availability/reliability of internet connectivity in their State, and c) the fact that any migration to a new downlink frequency would have a limited lifetime, i.e. only until November 2019.

Region	SADIS 2G only	Sec SADIS FTP only	Registered as having both SADIS 2G and Secure SADIS FTP			Total users
			Accessing Secure SADIS FTP regularly	Not accessing Secure SADIS FTP regularly	Total	
AFI	12	11	17	27	44	67
ASIA	3	5	4	8	12	20
EUR	9	37	27	10	37	83
MID	11	1	8	0	8	20
NAT	0	1	0	0	0	1
Total	35	53	56	45	101	191

Table 1: Number of users with SADIS 2G only, Secure SADIS FTP only, or both. Where users have access to both services, it is evident that many do not use the Secure SADIS FTP service routinely. This may be for a number of reasons. Therefore, the number of users accessing Secure SADIS FTP regularly and those not accessing Secure SADIS FTP regularly are listed.

**Note: The above table does not take into account users that may have multiple SADIS 2G units or multiple Secure SADIS FTP workstations.*

¹ 'Parameters' is used to cover the combination of frequency/polarization etc that defines the data carrying signal.

Cost impacts on the SADIS Provider (to be Cost Recovered as per SADIS Agreement).

Table 2 sets out the possible costs (dependent on decision) that would fall to the SADIS community under the cost recovery arrangements.

The same table also identifies, as far as possible, the separate costs that would need to be borne by users. This could be highly variable and would be a function of a) existing hardware, b) local expertise, c) consultancy costs if required, d) travel/subsistence/shipping costs if and where required.

Estimated costs for migrating to a new SADIS '3G' downlink frequency:

Note, at time of writing there are still some outstanding cost estimates from potential suppliers.

Description	2015	2016	2017	2018	2019	Total over 5 year period
All cost estimates are in GBP, at 2014 prices.						
1 Cessation of satellite based services, 31 July 2016:						
1.1 Costs falling under normal cost recovery						
1.1.1 Annual costs						
1.1.1.1 SADIS 2G Satellite Lease	54,600	27,300				81,900
1.1.1.2 Support and Maintenance costs	36,500	9,125				45,625
1.1.1.4 Facilities Management	6,300	1,575				7,875
1.1.1.5 Comms links	9,156	2,289				11,445
1.1.1.6 Additional costs for increase (suggest doubling) Secure SADIS FTP bandwidth to cover increased downloads.	6,500	6,500	6,500	6,500	6,500	32,500
Total	113,056	46,789	6,500	6,500	6,500	179,345
1.1.2 Capital costs (depreciation periods to be agreed).						
1.1.1.3 Essential Hardware refresh	29,280 ²	Depreciation period would need to be agreed if the hardware were refreshed.				29,280
					Grand Total over 5 years	208,625
1.2 Potential costs on users who decide to migrate to Secure SADIS FTP.						

² Replacement of CP6000 modules with CP7000 module. Ultra AEP will not support this unit beyond 31/3/2015. If a replacement is not procured by that time any and all risk of failure of unit between 1/4/2015 and 31/3/2016 will rest with SADISOPSG.

Description	2015	2016	2017	2018	2019	Total over 5 year period
1.2.1 Annual costs						
1.2.1.1 Ongoing provision of connection	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.
1.2.2 Capital costs						
1.2.2.1 Procurement and funding of internet connection	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.	Unknown. Local rates.
2 Provision of new downlink parameters for satellite based services (SADIS 3G) from 31 July 2016						
2.1. Potential costs to be cost recovered:						
2.1.1 Annual costs						
2.1.1 SADIS 2G Satellite Lease	54,600	27,300	0	0	0	81,900
2.1.1 SADIS 3G Satellite Lease	0	30000	60,000	60,000	60,000	210,000
2.1.2 Support and Maintenance costs	36,500	36,500	36,500	36,500	36,500	182,500
2.1.3 Facilities Management	6,300	6,300	6,300	6,300	6,300	31,500
2.1.4 Comms links	9,156	9,156	9,156	9,156	9,156	45,780
2.1.5 Dual illumination (parallel signal) for transition	15,000	15,000	0	0	0	30,000
2.1.6 Integrator on-going support (if/where further telephone guidance is required)	0	Currently awaiting quote.	0	0	0	Unknown
Total	121,556	125,956+ Unkown	111,956	111,956	111,956	581,680+Unknown

Description	2015	2016	2017	2018	2019	Total over 5 year period
2.1.2 Capital costs (depreciation periods to be agreed).						
2.1.1 Hardware refresh	70,000	Consideration would need to be given as to whether such costs would be recovered in year or depreciated over several years.				70,000
2.1.2 Proof of concept Project development	Currently awaiting quote.		No guarantee of success.			Unknown
2.1.3 Testing	Currently awaiting quote.		No guarantee of success.			Unknown
2.1.4 Integrator development of instructional material for system re-tune across a range of combinations ³	20,000	Consideration would need to be given as to whether such costs would be recovered in year or depreciated over several years.				20,000
Total	90,000+Unknown		-	-		90,000+Unknown
				Grand Total over 5 years		559,724 +Unknown
2.2 Potential costs to be borne by users						
2.2.1 Capital costs (some of these options are mutually exclusive)						
2.2.1.1 Lowest estimate for cost on user to implement re-tune ⁴	500		Should not need to be repeated			Mutually exclusive – 500 to 9,000
2.2.1.2 Mid estimate for cost on user to implement re-tune ⁵	1,500		Should not need to be repeated			
2.2.1.3 Full replacement system ⁶	9,000		Should not need to be repeated			

³ It is assumed that this cost would be distributed across all user States in accordance with normal Cost Recovery processes.

⁴ It is assumed that under this scenario users would have local technical expertise to re-tune equipment without additional/new hardware. A nominal cost of GBP500 is assumed.

⁵ It is assumed under this scenario that users would effectively purchase new de-modulator/de-multiplexor pre-tuned to new frequencies.

Description	2015	2016	2017	2018	2019	Total over 5 year period
2.2.1.4 Local engineer costs	Dependent on local economy. User to obtain estimates		Should not need to be repeated			Not known
2.2.1.5 Consultancy (Integrator assistance)	Estimated at 1,000 per staff member per day		Should not need to be repeated			Assume one contracted staff member, 1,000. Higher if more staff required on site.
2.2.1.6 Travel/subsistence of consultant	Dependent on location.		Should not need to be repeated			
				Grand Total over 5 years	500 to approximately 10,000, dependent on local skills.	

Table 2: Tabulated costs considering main options relating to transitioning to new SADIS downlink parameters.
Note, in many cases the costs are best estimates. They should be treated with some caution.

⁶ It is assumed under this scenario that users purchase a fully compatible, pre-tested system. Given expectation that SADIS 2G will be ceased completely effective November 2019, this is considered to be an unlikely choice due to expense and limited useful life.

Risk Matrix

The following matrix considers the main, high level risks in relation to migrating, or not, to new satellite downlink parameters. .

Option	Initial Risk	Mitigation action	Revised Risk	Further Mitigation action	Final Risk	Comment
Cessation of SADIS satellite based services.	1) Minimum of 35 and up to 80 SADIS 2G users potentially losing access to essential data	1) Users migrate to Secure SADIS FTP	1) Internet connectivity potentially unreliable	1) None	1) Some users may not be able to migrate to Secure SADIS FTP.	This is the cheapest option. At the present time, number of users that will not be able to migrate to Secure SADIS FTP by 31 July 2016 is unknown.
Transition to new SADIS satellite downlink parameters (SADIS 3G).	1) Minimum of 35 and up to 80 SADIS 2G users potentially requiring transition to SADIS 3G 2) Uncertain costs	1) Users transition to new downlink frequencies (SADIS 3G) 2) Make best estimate where possible	1.1) New frequencies may not work 1.2) Limited timescale 1.3) Lack of funds 1.4) Suppliers of equipment/expertise overwhelmed. 2) At time of writing some cost estimates are still awaited. There is a risk of actual costs being in excess of expected costs.	1.1) Limited time to test on additional frequencies 1.2) Implement any testing/transition as soon as possible 1.3) Obtain funds from other sources (WMO VCP?, emergency government funds?) 1.4) Implement any testing/transition as soon as possible 2) Update cost estimates when available.	1) Some users may not be able to transition to SADIS 3G at all, or in sufficient time. 2) Actual costs may be higher than anticipated.	1) This is the most expensive option. At the present time, number of users that will not be able to migrate to a SADIS 3G service by 31 July 2016 is unknown. 2) This is a risk that will always need to be carried to some degree.

Table 3: Risk Matrix. To identify the top level risks.