



International Civil Aviation Organization

**Seventh Meeting of CNS/MET Sub-Group of APANPIRG and
Tenth Meeting of CNS/ATM IC Sub-Group of APANPIRG**

Bangkok, Thailand, 15 – 21 July 2003

Agenda Item 8 (2): Review Transition to the final phase of WAFS

RESULTS OF THE WAFS GRIB/BUFR SURVEY

(Presented by Chairman, WAFS Transition Task Force)

SUMMARY

This paper presents the results of the WAFS GRIB/BUFR Survey conducted by the WAFS Transition Task Force for consideration by the CNS/MET SG.

1. Introduction

1.1 Under Draft Conclusion 6/13 of CNS/MET SG6 in its meeting during 15-19 July 2002, the WAFS Transition Task Force (WAFS/T TF) was asked to “carry out a regional survey to assess the plans of the SADIS and ISCS user States in the ASIA/PAC Regions to upgrade/replace their workstations and software used for handling WAFS data, and the dates the new equipment and the software capability to decode and display GRIB and BUFR data are expected to be operational”. With the endorsement of the Draft Conclusion by APANPIRG/13 (as Conclusion 13/25), the WAFS/T TF conducted the survey during January–May 2003 in coordination with the ICAO Asia and Pacific Office.

2. The Questionnaire

2.1 The questionnaire for the survey (Appendix 1) was drawn up in October 2002 with inputs from Australia, New Zealand, United Kingdom and Hong Kong, China. ICAO made a suggestion to include questions on the current status of the workstations, software and communication means in use. This was incorporated in the questionnaire.

3. Survey Results

3.1 The ICAO Asia and Pacific Office sent the questionnaire to the 35 Contracting States to which the Office was accredited and to the States/Territories listed in the FASID Table MET 7 on 24 January 2003. By the end of May 2003, 26 responses were received, accounting for 62% of the total of 42 expected. Of the 16 States/Territories which did not provide any responses, 13 are known to be non-WAFS users from the current information in FASID Table MET 7.

3.2 The survey results are presented in three tables in Appendix 2 with those responses still outstanding highlighted: -

- (a) Table 1 provides the current status of the workstations, software and communication means in use by States/Territories. Information on the current software GRIB and BUFR capability and the usage of the SADIS FTP backup

service is also provided. It is noted that only 4 States/Territories currently utilize the SADIS FTP backup service;

- (b) Table 2 provides the survey results on the States' plan for transition to GRIB and BUFR coded WAFS products. In short, 22 States/Territories are currently capable or have plans to have the capability to operationally convert GRIB and BUFR into Wind/Temp and SIGWX charts. **Only 13** are currently capable to operationally convert GRIB into Wind/Temp charts, and the number in respect of BUFR is even lower – **only 7**. In other words, **83%** of States/Territories have yet to be capable to operationally convert BUFR coded WAFS products into SIGWX charts and **69%** of States/Territories have yet to be capable to operationally convert GRIB coded WAFS products into Wind/Temp charts. In respect of training, 14 returns indicate requirements for training in GRIB and/or BUFR. In respect of procurement plans, 15 States/Territories have plans to purchase BUFR visualization software and 4 have plans to upgrade their ISCS STAR 4 workstations. A number of States express difficulties in having operational GRIB and/or BUFR capability before the July 2005 time frame (Lao PDR and Vanuatu) or indicate that more time may be required for the transition (Fiji, Maldives, and Nepal);
- (c) Table 3 provides a summary of the relevant statistics derived from the survey responses.

4. Discussions

4.1 Based on the survey results obtained, the following points are highlighted for discussion by the CNS/MET SG: -

- (a) As the anticipated date of removal of T4 facsimile products from the WAFS satellite broadcast is only two years from now, it is imperative that: -
 - (i) all States should be urged to start the necessary preparation for the migration to GRIB and BUFR **as soon as possible**, if they have not already done so; and
 - (ii) considerable assistance in terms of the provision of equipment, software and training is **urgently** required for States having difficulties in the migration to GRIB and BUFR;
 so that the Asia and Pacific Regions will be ready for the migration to GRIB and BUFR by mid-2005;
- (b) Although the SADIS FTP backup service is available through the Internet free of charge both for SADIS and ISCS authorized users, the current utilization of this service is on the low side. While the full operational use of the Internet for the provision of aeronautical meteorological information is awaiting the establishment of guidance and criteria for the accreditation/qualification of Internet providers of such information, States having difficulties with ISCS workstation upgrade may wish to note the SADIS FTP backup service as an option for authorized ISCS users, and actively consider its applicability to their own circumstances; and
- (c) Comments in respect of BUFR decoding and visualization were also received in the survey returns. The supply of BUFR standards and specifications to States and the availability of software to automatically convert BUFR coded WAFS products into SIGWX charts are pointed out as areas that require prompt attention.

5. Action

5.1 The meeting is invited to note the results of the WAFS GRIB/BUFR survey presented above and to consider urgent follow-up actions to ensure that all States receive the assistance and training that may be required, and start the necessary preparation as soon as possible to achieve the capability to operationally convert GRIB and BUFR coded WAFS products into Wind/Temp and

SIGWX charts before the anticipated date of 1 July 2005. The meeting may also like to address the concerns expressed by some States in respect of the supply of BUFR standards and specifications and the availability of software to automatically convert BUFR coded WAFS products into SIGWX charts in good time.



To:

**Asia/Pacific Regional Survey on State Plans for
Transition to GRIB and BUFR Coded WAFS Products**

As a follow-up to action arising from the 13th Meeting of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/13) held in September 2002, the Asia/Pacific WAFS Transition Task Force is undertaking a survey to assess plans of SADIS and ISCS user States in the Asia and Pacific Regions for upgrading or replacement of workstations and/or software for processing WAFS data. The objective of the survey is to identify when States in the Asia Pacific Regions will be operationally capable of decoding and displaying GRIB and BUFR data in graphical format. The results of the survey will be used to assist in planning the implementation of the final phase of WAFS in the Asia and Pacific Regions.

Software required to convert GRIB data into Wind / Temp charts (e.g. PCGRIDDS and GrADS) is freely available, and can be downloaded over the internet from <http://www.nws.noaa.gov/software/pcgridds/index.html> and from <http://grads.iges.org/grads/grads.html> respectively.

Two types of software are required to convert BUFR messages into significant weather charts (SIGWX) - decoding software for decoding the BUFR messages into latitude and longitude values of the coded elements, and visualization software for producing images from the decoded values. BUFR decoding software is freely available from WAFC London. BUFR visualization software packages with different levels of sophistication are being developed by the companies listed on the SADIS website. The vendors who will provide the new ISCS workstations to replace the STAR4 workstations will also provide BUFR decoding and visualization software.

An indicative timetable for achieving the final phase of WAFS in the Asia Pacific Regions is shown on the following page.

Task/Stage of Implementation of WAFS	Anticipated Date
Training in the operational conversion of GRIB data to Wind / Temp charts	late 2002 (SADIS) early 2004 (ISCS)
All states able to convert GRIB data to Wind / Temp charts	mid 2004
The satellite distribution by the two WAFCs of global high-level SIGWX (SWH) and medium-level SIGWX (SWM) for limited geographical areas in BUFR format	2003 (SADIS) early 2004 (ISCS)
Training in the operational conversion of BUFR to SIGWX charts.	late 2002 (SADIS) early 2004 (ISCS)
All States able to convert BUFR data into SIGWX charts	mid 2004
Removal of T4 facsimile products from the satellite broadcast	1 July 2005

To help us in this task, I would be grateful if you could complete the attached questionnaire and return it to the ICAO Asia and Pacific Office by 14 March 2003. The information will be used to ensure the requirements of all States in the Asia and Pacific Regions are considered when implementing the migration from T4 facsimile format to GRIB and BUFR as part of the final phase of WAFS.

Your feedback will be greatly appreciated.

Yours faithfully,

C.M. Shun
Chairman of the Asia/Pacific WAFS Transition Task Force

**Questionnaire for Asia and Pacific Regional Survey on the
States' Plans for Transition to GRIB and BUFR Coded WAFS Products**

(place X in box where applicable)

1. **State:** _____
- 1.1 SADIS/ISCS workstation(s) currently used:

- 1.2 SADIS/ISCS software currently used:

- 1.3 Does the SADIS/ISCS software currently used have the capability to
decode and visualize GRIB and BUFR data?
YES ☐ NO ☐
- 1.4 Communication means to obtain SADIS/ISCS products:

- 1.5 Has the SADIS FTP backup service been utilized?
YES ☐ NO ☐
2. When does your State plan to have the capability to operationally convert WAFS GRIB data
into Wind / Temp charts?
2.1 Currently capable ☐
2.2 Plan to be operationally capable by: Month _____ Year 200 _____
2.3 State does **NOT** have plans for converting GRIB data into Wind/Temp charts ☐
If you have marked 2.3 with an X, please explain the reason:

3. Will your staff require training to operate software that converts
GRIB data into Wind / Temp charts? YES ☐ NO ☐
4. When does your State plan to have the capability to operationally convert WAFS BUFR
data into SIGWX charts?
4.1 Currently capable ☐
4.2 Plan to be operationally capable by: Month _____ Year 200 _____
4.3 State does **NOT** have plans for converting BUFR data into SIGWX charts ☐
If you have marked 4.3 with an X, please explain the reason:

*(provide
separate
inputs for
SADIS and
ISCS where
appropriate.)*

5. Will your staff require training to operate BUFR decoding software? YES ☐ NO ☐

6. Does your State have plans to purchase BUFR visualization software? YES ☐ NO ☐

If NO, please explain reason:

7. Will your staff require training to operate BUFR visualization software? YES ☐ NO ☐

8. Does your State operate a STAR4 workstation for reception of WAFS products via the ISCS system? YES ☐ NO ☐

(Note: this question is not applicable to SADIS users)

9. If yes to 8:
9.1 Do you plan to replace the STAR4 workstation? YES ☐ NO ☐

9.2 If YES to 9.1 above, when do you plan to replace the workstation? Month _____ Year 200 _____

9.3 If NO to 9.1 above please explain the reason:

10. Comments for the WAFS Transition Task Force:

Name:

Organization:

Position:

Date:

Telephone:

Facsimile:

Email:

AFTN address:

Please return completed questionnaire to ICAO Asia and Pacific Office by 14 March 2003

(email: icao_apac@bangkok.icao.int / facsimile: + 662 537 8199)

**Asia/Pacific Regional Survey on the
States' Plan for Transition to GRIB and BUFR Coded WAFS Products**

Table 1. Survey Results on States' Current Setup

	Workstations		Software		Software GRIB & BUFR Capability	Communication	SADIS FTP
State/Territory	SADIS	ISCS	SADIS	ISCS			
Australia	-	Use existing gear	-	Use existing software	Yes (GRIB) No (BUFR)	Satellite	No
Bangladesh	Note – a SADIS user.						
Bhutan	Note – not yet a WAFS user.						
Brunei Darussalam	UKW technik	-	WEDIS from Sofreavia/ UKW technik	-	Yes (GRIB) No (BUFR)	Internet (Note)	No
	Note – We used to receive the SADIS products from the SADIS direct broadcast but this practice has been abandoned since the SADIS operator started the cost recovery process some time ago. We now receive the ISCS products on a regular basis for part of our aviation needs via the Internet.						
Cambodia	Note – not yet a WAFS user. May purchase a SADIS system according to latest information from ICAO.						
China	Both SADIS and ISCS workstations are used currently		WSI	Alden	Yes	Satellite	No
Hong Kong, China	IES ULTIMA	Aviation Weather Workstation	IES ULTIMA	Aviation Weather Workstation	SADIS: Yes ISCS: Yes (GRIB); No (BUFR)	Satellite	Yes
Macao, China	One workstation	-	NETSYS VHAN 5.0	-	No	Satellite	No
Cook Islands	Note – not yet a WAFS user.						
D.P.R. of Korea	SADIS VSAT	-	VISIONMAN JR	-	No	Satellite	No

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Fiji	-	Alden STAR4	-	X-Weather, AWGS, XAn STAR4	No (not all)	Satellite	No
France (French Polynesia, New Caledonia and Wallis Islands)	-	COROBOR MESSIR	-	COROBOR MESSIR	Yes (GRIB) No (BUFR)	Satellite	No
India	Pentium II workstation	-	PC METIS	-	Yes	Satellite	No
Indonesia	✓	✓	ALMOS	STAR4	No	Satellite	No
Japan	-	Use existing system	-	Use existing system	No	Satellite	No
Kiribati	Note – not yet a WAFS user.						
Lao P.D.R.	Compaq DESKPRO & HP Netserver E800 for alternative	-	COROBOR MESSIR & WEDIS	-	Yes	Satellite	No
Malaysia	HP 9000 K210 servers & HP C110 workstations	Workstation being acquired	Sonalyts wXstation software	MESSIR- AERO being acquired	Yes (GRIB) No (BUFR)	Satellite	No
Maldives	One workstation	-	Aviation Weather Workstation	-	No	Satellite & Internet	No
Marshall Islands	Note – not yet a WAFS user.						
Micronesia, Federated States of	Note – not yet a WAFS user.						
Mongolia	✓	-	FLIGHT MAN LITE	-	Yes	Satellite	No
Myanmar	Note – not yet a WAFS user.						
Nauru	Note – not yet a WAFS user.						
Nepal	✓	-	MESSIR	-	Yes (only GRIB)	Satellite	No

New Zealand	-	Metservice Forecaster Workstations	-	Metservice developed In-house	Yes	Satellite, GTS & Internet	Yes
Niue	Note – not yet a WAFS user.						
Pakistan	SADIS workstation is in use	-	WEDIS	-	No (BUFR)	SADIS workstation installed (Satellite)	No
Palau	Note – not yet a WAFS user.						
Papua New Guinea	Note – an ISCS user.						
Philippines	-	STAR 4	-	STAR 4	Never been operational	-	-
Republic of Korea	Compaq PC workstations		PC METIS		Yes	Satellite	No
Samoa	-	Nil	-	Nil	No	No	No
Singapore	-	✓	-	COROBOR MESSIR – AERO & VISION	Yes	Satellite & SADIS FTP Backup	Yes
Solomon Islands	Note – not yet a WAFS user.						
Sri Lanka	One workstation	-	Sofreavia software	-	Yes (only GRIB)	Satellite	No
Thailand	Windows/2000 Server		COROBOR software		Yes	Satellite	Yes
Tonga	Note – not yet a WAFS user.						
Tuvalu	Note – not yet a WAFS user.						
United States	Note – ISCS Provider State.						
Vanuatu	-	-	-	-	-	Non reception of WAFS products	-
Viet Nam	STAR 4	-	ALDEN	-	No	Satellite	No

Appendix 2

Table 2. Survey Results on States' Plan

	Operational Capability		Training Needs			BUFR Visualization Software	ISCS STAR4 Workstation	
State/Territory	GRIB	BUFR	GRIB	BUFR Decoding	BUFR Visualization	Plan to Purchase	Operate	Plan to Upgrade (Date)
Australia	Yes	7/2005 (Note 1)	No	No	No	No (Note 2)	No	-
	Note 1 – Decoder can be built once BUFR specifications have been supplied. Note 2 – We do not want to use standalone systems if avoidable. Comment – The earlier BUFR standards and specifications can be supplied, the better. This will help us in establishing the appropriate capabilities into our integrated communications systems.							
Bangladesh	Note – a SADIS user.							
Bhutan	Note – not yet a WAFS user.							
Brunei Darussalam	Yes	mid-2004	Yes	Yes	Yes	Yes	-	-
Cambodia	Note – not yet a WAFS user. May purchase a SADIS system according to latest information from ICAO.							
China	Yes	Yes (5/2004)	No	Yes	Yes	Yes	Yes	Yes
	Comment – Training forecaster for application of WAFS products and training computer technician for BUFR decoding.							
Hong Kong, China	Yes	Yes (Notes 1 and 2)	No	No	No	Yes	No	-
	Note 1 – On the assumption that SADIS and ISCS are the same in respect of BUFR operation. Note 2 – Under interactive mode only. New software is being sourced to provide automatic conversion operations. There is at present no software which could convert WAFS BUFR data into SIGWX chart for user selected area under automatic mode.							
Macao, China	6/2004	6/2004	Yes	Yes	Yes	Yes	No	-
Cook Islands	Note – not yet a WAFS user.							
D.P.R. of Korea	12/2003	12/2003	Yes	Yes	Yes	Yes	-	-
Fiji	12/2003	12/2003	Yes	Yes	Yes	Yes	Yes	Yes (12/2003)

[illegible]

Micronesia, Federated States of	Note – not yet a WAFS user.							
Mongolia	5/2003	5/2003	Yes	Yes	Yes	Yes	-	-
Myanmar	Note – not yet a WAFS user.							
Nauru	Note – not yet a WAFS user.							
Nepal	Yes	No (Note)	-	-	-	No (Note)	-	-
	Note – Yet to be planned. Comment – The anticipated date to convert BUFR data into SIGWX may not be quite practical for all the States. It might take longer time than anticipated.							
New Zealand	Yes	Yes	No	No	No	No	No	-
Niue	Note – not yet a WAFS user.							
Pakistan	Yes	1/2004 (tentative)	No	Yes	Yes	Yes	-	-
Palau	Note – not yet a WAFS user.							
Papua New Guinea	Note – an ISCS user.							
Philippines	12/2003 (Notes)	12/2003 (Notes)	-	-	-	-	Yes (Notes)	12/2003 (Notes)
	Notes – (i) The Philippine WAFS Products Receiving System was a grant from NOAA, NSA under the VCP Program, making the Philippines an ISCS user. (ii) The Workstation used is STAR4. (iii) The Workstation is to be replaced with one capable of communicating the IP protocol by December 15, 2003. (iv) The Philippines through the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), will send to WMO within March application for assistance through VCP for the acquisition of the replacement workstation. (v) The National Weather Service of NOAA, USA through the Permanent Representative of the USA with WMO is coordinating for the replacement of workstation by ISCS users.							
Republic of Korea	Yes	Yes	No	No	No	No	No	-
	Comment – We would like to know ftp-address for the SADIS products.							
Samoa	No (Note 1)	No (Note 1)	No	No	No	No (Note 2)	No	-
	Note 1 – New Zealand weather office is responsible for the airspace over us. Note 2 – at the airport we have no plans of purchasing BUFR (software).							

Singapore	Yes	Yes	Yes	Yes	No	No (Note)	No	-
	Note – Already has a system. Comment – While we have the capability to convert BUFR/GRIB to SIGWX & WIND/TEMP charts, we would like our staff to be trained to operate WAFS BUFR/GRIB decoding software.							
Solomon Islands	Note – not yet a WAFS user.							
Sri Lanka	1/2004	1/2004	Yes	Yes	Yes	Yes	-	-
	Comment – Training component is essential in Sri Lanka scenario where we have a limited number of personnel. Also appreciate software at a concessionary rate. These are important, as no charge is levied on aviation products issued by the Met Dept.							
Thailand	Yes	Yes	Yes	Yes	Yes	No (Note)	No	-
	Note – Currently capable.							
Tonga	Note – not yet a WAFS user.							
Tuvalu	Note – not yet a WAFS user.							
United States	Note – ISCS Provider State.							
Vanuatu	No	No	-	-	-	-	-	-
	Comment – I regret to inform you that the implementation of WAFS system under the Vanuatu National Meteorological Services is not completed, hence no reception and non availability of WAFS products and information. Equipment unsatisfactorily installed, inadequate equipment, hardware, software, documentation, consumables, insufficient training, lack of spare parts etc. The station has been installed but not operating due to reasons not made known to Vanuatu. We have voiced our concern to WMO to look into the matter and if possible to assist and to determine the requirements of equipment and training in order to complete the implementation of the project.							
Viet Nam	Yes	7/2004	No	Yes	Yes	Yes	-	-

Appendix 2

Table 3. Summary

	No. of responses	Percentage
Expected Responses	42	
Received Responses	26	62
Capabilities		
State/Territory currently capable or plans to have the capability to operationally convert GRIB and BUFR into Wind/Temp and SIGWX charts	22	52
State/Territory currently capable to operationally convert GRIB into Wind/Temp charts	13	31
State/Territory currently capable to operationally convert BUFR into SIGWX charts	7	17
Training Needs		
State/Territory requires training in GRIB and/or BUFR	14	33
State/Territory requires training to operate GRIB software	11	26
State/Territory requires training to operate BUFR decoding software	14	33
State/Territory requires training to operate BUFR visualization software	13	31
Procurement/Upgrade Plans		
State/Territory has plan to purchase BUFR visualization software	15	36
State/Territory has plan to upgrade ISCS STAR 4 workstation	4	10
State/Territory operates ISCS STAR 4 workstation	4	10
SADIS FTP Backup Service		
State/Territory utilizes the SADIS FTP backup service	4	10