Reprint 511

# Results of the WAFS BUFR/GRIB survey

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7th Meeting of the Communications/Navigation/Surveillance and Meteorology Sub-Group of APANPIRG (CNS/MET SG7) &
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*International Civil Aviation Organization*

**Seventh Meeting of CNS/MET Sub-Group of APANPIRG**

Bangkok, Thailand, 15 – 21 July 2003

**Agenda Item 8(2): 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)<br>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)<br>early 2004 (ISCS) |
| Training in the operational conversion of BUFR to SIGWX charts. | late 2002 (SADIS)<br>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:

   _____

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

   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:

   _____

   _____

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)<br>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)<br>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<br>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 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **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)<br>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 | Sonalysts wXstation software | MESSIR-AERO being acquired | Yes (GRIB)<br>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 |

**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.<br>Note 2 – We do not want to use standalone systems if avoidable.<br>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.<br>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) |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Comment – Fiji Meteorological Service (FMS) has only recently been formally informed of the deadline for change to new ISCS system. FMS will require external financial support to upgrade its system within so short time frame. Otherwise more time will be needed to determine exact nature of upgrade to existing system, obtain costs, secure financial aid and implement the change. It is hoped that the overlap period can be extended to mid-2004. | | | | | | | |
| **France (French Polynesia, New Caledonia and Wallis Islands)** | 3/2004 | 3/2004 | No | No | No | Yes | No | - |
| | Comment – We operate 2 ISCS receiving sites: in Tontouta (New Caledonia) and Wallis. For the first one, reception is handled by a message switching system (TRANSMET) and visualization with COROBOR MESSIR. For Wallis reception and visualization with MESSIR. | | | | | | | |
| **India** | Yes | Yes | No | No | No | No | - | - |
| **Indonesia** | 2005 | 2005 | Yes | Yes | Yes | Yes (Note) | Yes | Yes (2005) |
| | Note – We intend to replace the old systems with the new in 2005.<br>Comments –<br>(i) Please take a note that SADIS has been switched off by UK, caused by our shortage to pay its cost share, no SADIS services since 31 July 2002.<br>(ii) Alden has no longer support their STAR4 software.<br>(iii) We have no ability to access WAFS product, yet. | | | | | | | |
| **Japan** | 3/2005 | 3/2005 | No | No | No | No | No | - |
| **Kiribati** | Note – not yet a WAFS user. | | | | | | | |
| **Lao P.D.R.** | No (Note) | No (Note) | Yes | Yes | Yes | Yes | - | - |
| | Note – while the response was indicated as 'Yes', the current status appears to be 'No' considering the comment below.<br>Comment – Department of Meteorology and Hydrology (DMH) Lao P.D.R. has encountered problems in both communication means to receive SADIS products and lack of capability/staff to decode and visualize GRIB and BUFR data. | | | | | | | |
| **Malaysia** | Yes | 12/2003 | No | No | No | Yes | No | No |
| | Comment – We are in the process of acquiring an ISCS Receiving System with MESSIR-AERO software. The ISCS Receiving System is expected to be operational by the end of 2003. The MESSIR-AERO has the capability to convert BUFR data into SIGWX charts. | | | | | | | |
| **Maldives** | 2/2004 | 2/2004 | Yes | Yes | Yes | Yes | - | - |
| | Comment – Time must be permitted till all the user states are ready and capable. | | | | | | | |
| **Marshall Islands** | Note – not yet a WAFS user. | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **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.<br>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 –<br>(i) The Philippine WAFS Products Receiving System was a grant from NOAA, NSA under the VCP Program, making the Philippines an ISCS user.<br>(ii) The Workstation used is STAR4.<br>(iii) The Workstation is to be replaced with one capable of communicating the IP protocol by December 15, 2003.<br>(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.<br>(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.<br>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.<br>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 | - | - |

**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 |