

International Civil Aviation Organization



**SEVENTEENTH MEETING OF THE METEOROLOGY
SUB-GROUP (MET SG/17) OF APANPIRG**

Bangkok, Thailand, 13 – 16 May 2013

Agenda Item 4: World Area Forecast System (WAFS)

4.2) Current Status of WAFS Implementation

**SURVEY ON OPERATIONAL USE OF SERVICES AND PRODUCTS FROM SERVICE
PROVIDERS OF WORLD AREA FORECAST SYSTEM (WAFS) IN ASIA/PACIFIC REGION
AND WAFS TRAINING NEEDS OF ASIA/PACIFIC STATES**

(Presented by Chairman, WAFS Task Force)

SUMMARY

This paper presents the results of a survey in the Asia/Pacific Region conducted from December 2012 to mid-January 2013 on the operational use of services and products from service providers of the World Area Forecast System (WAFS) in Asia/Pacific Region and the WAFS training needs of Asia/Pacific States.

1. Introduction

1.1 The Asia/Pacific World Area Forecast System Task Force (WAFS TF)¹ of the Meteorological Sub-group (MET SG)² of the Asia/Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG) conducted a survey from December 2012 to January 2013. This was the third annual survey to solicit information on:

- (a) the operational use of services and products from service providers of the World Area Forecast System (WAFS) in the Asia/Pacific Region; and
- (b) the training needs of Contracting States/Territories in the Asia / Pacific Region on WAFS.

2. The questionnaire

2.1 The questionnaire for the survey (Appendix A) covers the following areas:

¹ Formerly the World Area Forecast System Implementation Task Force (WAFS/I TF)

² Formerly part of the Communications, Navigation and Surveillance/Meteorological Sub-group (CNS/MET SG)

- (a) Access to WAFS services;
- (b) Transition of GRIB1 to GRIB2 WAFS data;
- (c) Utilization of trial gridded forecast of icing, turbulence and CB;
- (d) Training needs.

3. Discussion

3.1 The questionnaire was sent to 28 Contracting States/Territories in the Asia/Pacific Region by email on 30 November 2012. A total of 18 (64%) returns were received: Australia; Brunei Darussalam; China; Fiji Islands; Hong Kong, China; Macao, China; India; Japan; Republic of Korea; Malaysia; Republic of Maldives; New Caledonia; New Zealand; Pakistan; the Philippines; Singapore; Thailand; and Vietnam. The rate of return is the same as the last survey.

3.2 Key results include:

- (a) Half of responding States/Territories mainly use UK WAFS and the other half mainly use US WAFS (para. 3.5);
- (b) More States/Territories are using Secure SADIS FTP Service (para. 3.6);
- (c) All States/Territories using US WAFS products have access to WIFS (para. 3.7);
- (d) Of the 13 States/Territories having access to UK WAFS products, two States/Territories did not yet use Secured SADIS FTP Service by the time of this survey (para. 3.8);
- (e) More States/Territories are receiving GRIB2 WAFS data and among them, more are using the data operationally (para. 3.9);
- (f) 6 out of 18 States/Territories expressed difficulty in migration to GRIB2 data (para. 3.11).

3.3 A summary of results are given in the following paragraphs. More detailed analysis can be found in Appendix B.

3.4 Among the 18 responding States/Territories, 5 (28%) have access to UK WAFS products, 5 (28%) US WAFS products and 8 (44%) both. As compared with last survey, two more States/Territories have accessed to both UK and US WAFS products.

3.5 9 States/Territories adopt UK WAFS as the primary source for producing flight documentation, while the other 9 States/Territories use US WAFS.

3.6 Of the 13 States/Territories having access to UK WAFS products, 8 States/Territories (62%) use SADIS 2G, 11 States/Territories (85%) use Secure SADIS FTP Service, and 1 State/Territory (8%) via other channel (the Global Telecommunications System (GTS)). More States/Territories are uses Secure SADIS FTP Service as compared with the last survey.

3.7 Of the 13 States/Territories having access to US WAFS products, all of them (100%) use WIFS, while 2 of them (15%) also use other channel (GTS, NWS Aviation website).

3.8 SADIS FTP Service ceased on 3 December 2012. Secured SADIS FTP Service is then the sole Internet-based service provided by WAFS London. Of the 13 States/Territories having access to UK WAFS products, two States/Territories did not yet use Secured SADIS FTP Service by the time of this survey. Both of them indicated a plan to use Secured SADIS FTP Service in 2013.

3.9 15 States/Territories (61%) said they were receiving GRIB2 WAFS data already, an increase of 4 from last survey. The remaining 3 (39%) were not receiving GRIB2 WAFS data yet. Of the former 15 States/Territories, 9 States/Territories (36%) were using GRIB2 data operationally, an increase of 5 from last survey. 6 other States/Territories did not use GRIB2 data operationally yet.

3.10 Of the 9 States/Territories receiving GRIB2 WAFS data but not using operationally (6) or not yet receiving GRIB2 WAFS data (3), 8 States/Territories indicated that they have plan of using GRIB2 WAFS data operationally, the timing being 2013 for 5 States/Territories and 2014 for 3 States/Territories.

3.11 Concerning the planned cessation of GRIB1 data in November 2013, 6 States/Territories indicated difficulty in migration to GRIB2 data due to (a) not yet receiving WAFS Aviation GRIB2 data (1); (b) no technical expertise in processing WAFS Aviation GRIB2 data (3); (c) Not enough time to prepare for the migration (2); and (d) no access to finances to procure the necessary GRIB2 visualization software (3). It is worth to mention that other than these 6 States/Territories, who expressed difficulty in migration to GRIB2 data, there were 10 other States/Territories who did not respond to the questionnaire and their readiness in migration to GRIB2 data is questionable.

3.12 In view of the discussion above, and with consideration that:

- a) through the work of the WAFS Operations Group (WAFSOPSG) the GRIB2 products have been available in parallel with GRIB1 for the past several years to afford users sufficient time to migrate from GRIB1 to GRIB2 decoder software;
- b) GRIB1 products will not fulfil the requirements of ICAO Annex 3 – *Meteorological Service for International Air Navigation* – as of November 2013 (Amendment 76) whilst the GRIB2 datasets will – i.e. offering superior temporal and spatial resolution and product suite (e.g. icing/turbulence/cumulonimbus clouds);
- c) ICAO and the WAFS Provider States have worked considerably hard to ensure States/users are aware of the impending withdrawal of GRIB 1 data;
- d) guidance material relating to the GRIB2 datasets is available on the WAFSOPSG website and in the SADIS User Guide on the SADIS Operations Group (SADISOPSG) website; and
- e) State letters have already been issued at the global and regional level relating to the transition from GRIB1 to GRIB2 for WAFS gridded global forecasts,

the group may wish to consider formulating the following conclusion:

Draft Conclusion 17/xx – Migration to WAFS gridded global forecasts in WMO GRIB Edition 2 code form as soon as possible

That, States be invited to:

- a) urgently migrate to receiving, decoding and using the WAFS gridded global forecasts in WMO GRIB Edition 2 code form as soon as possible, if they have not already done so; and
- b) if required, urgently contact their workstation/software providers or consider contacting another State already using the GRIB2 datasets for assistance in migrating to GRIB2.

3.13 17 States/Territories responded to the question on utilization of trial gridded forecasts of icing, turbulence and CB. 2 States/Territories (12%) said that they have evaluated the performance of these products while the remaining 15 States/Territories (88%) have not done so.

3.14 The most-need topic for training remains ‘Interpretation of WAFS products’ followed by ‘Generation of products for flight documentation’, same as last survey. Suggested topics include:

- cover especially aviation products for briefing;
- cover performance of the gridded products;
- provide guidance on the establishment of the threshold for specific application given the performance of these gridded products;
- provide practical examples on the visualization of the products;
- provide guidance on the use of these gridded products in the flight planning system; and
- cover technical aspect of transmission and reception.

4. Action by the meeting

4.1 The meeting is invited to:

- a) provide comments on the results of the survey and discussions in this paper; and
- b) decide on the conclusion proposed for the group’s consideration.

Appendix A The Questionnaire

**Questionnaire on
Operational Use of Services and Products from Service Providers of
World Area Forecast System (WAFS) in Asia / Pacific Regions and
WAFS Training Needs of Asia / Pacific States**

INTRODUCTORY NOTE

This questionnaire is developed by the WAFS Implementation Task Force (WAFS/TF)³ of the Communications, Navigation, Surveillance and Meteorology Sub-group (CNS/MET SG)⁴ of the Asia / Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG). It is distributed to Contracting States / Territories in the Asia / Pacific Regions to solicit information on:

- (a) Operational use of services and products from the service providers of the World Area Forecast System (WAFS) in the Asia / Pacific Regions; and
- (b) training needs of Contracting States / Territories in the Asia / Pacific Regions on WAFS.

The results will be presented to the CNS/MET SG and will be reported to the World Area Forecast System Operations Group (WAFSOPSG) as necessary.

The questionnaire is divided into 6 sections covering the following subjects:

- Section 1 General
- Section 2 Access to WAFS services
- Section 3 Transition from GRIB1 to GRIB2 WAFS data
- Section 4 Utilization of gridded forecasts of icing, turbulence and CB
- Section 5 Training needs
- Section 6 Additional information

All questions should be answered if applicable. It is particularly important that you provide your answers as detail as possible. You can provide such details and any other comments in Section 6.

Please return the completed questionnaire by email to cmcheng@hko.gov.hk on or before 15 January 2013. Your valuable inputs are very important to help promoting

³ Following a review of the working group and task forces under CNS/MET SG, CNS/MET SG/16 decided that the WAFS Implementation Task Force (WAFS/I TF) will be reformed as WAFS Task Force (WAFS TF) from 2013 (Decision 16/34).

⁴ APANPIRG/22 decided that a separate MET Sub-Group (MET/SG) will be formed under the new APANPIRG structure effective from the 2013 meeting (Decision 22/52).

the use of WAFS services and utilization of WAFS products in the Asia / Pacific Regions.

Abbreviation

APANPIRG	Asia Pacific Air Navigation Planning and Implementation Regional Group
CB	Cumulonimbus
CNS/MET SG	Communications, Navigation and Surveillance/Meteorology Sub-Group
FTP	File Transfer Protocol
GRIB	GRIdded Binary
GRIB1	GRIB Edition 1
GRIB2	GRIB Edition 2
ISCS	International Satellite Communications System
SADIS	Satellite Distribution System for information relating to air navigation
WAFS	World Area Forecast System
WAFS/I TF	WAFS Implementation Task Force
WIFS	WAFS Internet File Service

SECTION 1 – GENERAL

1. Name of State/Territory:
2. Name of Your Organization⁵:
3. Details of Focal Point for SADIS, if applicable:
 - (a) Name (surname in capital letters):
 - (b) Title/Post:
 - (c) Affiliation:
 - (d) Tel. No.: ()-
 - (e) Fax.No.: ()-
 - (f) Email:
4. Details of Focal Point for WIFS, if applicable:
 - (g) Name (surname in capital letters):
 - (h) Title/Post:
 - (i) Affiliation:
 - (j) Tel. No.: ()-
 - (k) Fax.No.: ()-
 - (l) Email:

Note: If you are receiving from both SADIS and WIFS, please fill in details of focal point for both SADIS and WIFS.

⁵ The word “Organization” is used in the questionnaire to mean the entity in your State / Territory, who responds to this questionnaire. If there are more than one entity in your State / Territory that receive WAFS products, please consolidate the inputs from these entities into one single reply for your State / Territory.

SECTION 2 – ACCESS TO WAFS SERVICES

5. Does your State/Territory currently have access to WAFS products?

(a) Yes (b) No (go to Q.12)

[Answer:](#) Click and select ...

6. Which sets of WAFS products does your State/Territory have access to?

(a) UK WAFS (go to Q.8)

(b) US WAFS (go to Q.9)

(c) Both US and UK WAFS (go to Q.7)

[Answer:](#) Click and select ...

7. Which sets of WAFS products does your State/Territory use as the primary source for producing flight documentation?

(a) UK WAFS

(b) US WAFS

[Answer:](#) Click and select ...

8. If your State/Territory is gaining access to UK WAFS products (either as primary or backup source), what is/are the channels through which your State/Territory gains access to UK WAFS products? (*Can select more than one item. Click on checkbox to select. Same for the remaining questions*)

SADIS 2G satellite communications

Secure SADIS FTP Service

Others (please specify below, e.g. GTS or dedicated link):

9. If your State/Territory is gaining access to US WAFS products (either as primary or backup source), what is/are the channels through which your State/Territory gains access to US WAFS products?

WAFS Internet File Service (WIFS)

Others (please specify below, e.g. GTS or dedicated link):

10. (Answer this question only if your answer to Question 8 is NOT 'SADIS 2G satellite communications')

If your State/Territory is under the footprint of SADIS 2G satellite and your State/Territory has not yet access to UK WAFS products via SADIS 2G satellite, does your State/Territory have any plan to receive UK WAFS products via SADIS 2G satellite?

(a) Yes

(b) No

[Answer:](#) Click and select ...

If 'yes', then when to start reception:

(i) 2013

(ii) 2014

(iii) 2015

(iv) beyond 2015

[Answer:](#) Click and select ...

If 'no', then why:

- Already receiving US WAFS products
- Already receiving UK WAFS products via Secure SADIS FTP Service
- Already receiving UK WAFS products via other channel(s) (please specify below):

Have no technical expertise in implementation

High implementation cost

High operating cost

Other reason(s) (please specify below):

11. (Answer this question only if you answered Question 8 and did NOT select 'Secure SADIS FTP Service' in Question 8)

If your State/Territory has not yet gained access to UK WAFS products via Secure SADIS FTP Service, does your State/Territory have any plan to do so?

(a) Yes

(b) No

[Answer:](#) Click and select ...

If **'yes'**, then when do you plan to access Secure SADIS FTP Service:

- (i) 2013
- (ii) 2014
- (iii) 2015
- (iv) beyond 2015

[Answer:](#) Click and select ...

If **'no'**, then why:

- Already receiving US WAFS products
- Already receiving UK WAFS products via SADIS 2G satellite
- Already receiving UK WAFS products via other channel(s) (please specify below):

- Have no technical expertise to gain access to the service
- High implementation cost
- High operating cost
- Other reason(s) (please specify below):

12. If the answer to Q.5 is 'no', does your State/Territory have any plan to gain access to either UK WAFS products or US WAFS products or both?

(a) Yes (b) No

[Answer:](#) Click and select ...

If **'yes'**, then when:

- (i) 2013
- (ii) 2014
- (iii) 2015
- (iv) beyond 2015

[Answer:](#) Click and select ...

and via which channel(s):

- SADIS 2G satellite communications
- Secure SADIS FTP Service
- WAFS Internet File Service (WIFS)
- Others (please specify below):

If **'no'**, then why:

- Have no technical expertise on implementation
- High implementation cost
- High operating cost
- Other reason(s) (please specify below):

SECTION 3 – TRANSITION FROM GRIB1 TO GRIB2 WAFS DATA

13. Both WAFS London and WAFS Washington are now providing both WAFS Aviation GRIB1 data and WAFS Aviation GRIB2 data. Re-prioritization of GRIB2 data over GRIB1 data was made on 5 July 2012. Is your State/Territory currently receiving/retrieving WAFS Aviation GRIB2 data?

(a) Yes (go to Q.14) (b) No (go to Q.15)

[Answer:](#) Click and select ...

14. If your answer to Q.13 is '**yes**', is your State/Territory utilizing WAFS Aviation GRIB2 data operationally for preparing flight documentation?

(a) Yes (b) No

[Answer:](#) Click and select ...

15. If your answer to Q.13 is '**no**' and/or your answer to Q.14 is '**no**', does your State/Territory have any plan to utilize WAFS Aviation GRIB2 data operationally for preparing flight documentation?

(a) Yes (b) No

[Answer:](#) Click and select ...

If '**yes**', then when:

- (i) 2013
- (ii) 2014
- (iii) 2015
- (iv) beyond 2015

[Answer:](#) Click and select ...

If '**no**', then why:

- Not yet able to decode WAFS Aviation GRIB2 data
- Not yet using WAFS Aviation GRIB2 data operational but currently evaluating the data
- Limited computing facilities and processing software to process WAFS Aviation GRIB2 data to generate products for flight documentation
- Other reason(s) (please specify below):

16. It is planned that broadcast of WAFS forecasts in GRIB1 would cease in November 2013. Does your State/Territory envisage any difficulty in preparing for the migration from GRIB1 to GRIB2 WAFS data?

(a) Yes

(b) No

[Answer:](#) Click and select ...

If **'yes'**, then why:

- Not yet receiving WAFS Aviation GRIB2 data
- No technical expertise in processing WAFS Aviation GRIB2 data
- Not enough time to prepare for the migration
- No access to finances to procure the necessary GRIB2 visualization software
- Other reason(s) (please specify below):

SECTION 4 – UTILIZATION OF GRIDDED FORECASTS OF ICING, TURBULENCE AND CB

17. WAFC London and WAFC Washington are currently providing harmonised gridded forecasts of icing, turbulence and CB in GRIB2 format via their respective server based systems. Have your State/Territory evaluated the performance of the gridded forecasts of icing, turbulence and CB?

(a) Yes

(b) No

[Answer:](#) Click and select ...

18. If your answer to Q.17 is '**yes**', please provide your comments on the performance of the gridded forecasts of icing, turbulence and CB.

Source of gridded forecasts:

- US WAFS
- UK WAFS
- Both US and UK WAFS

Comments:

SECTION 5 – TRAINING NEEDS

19. Have your State/Territory gained access to training via the following resources?

- Seminar(s)/Workshop(s) organized by ICAO
- Seminar(s)/Workshop(s) organized by other organization(s) (please specify organization(s)):

- On-line training (please specify source(s)):

- Self-study of training materials on Internet (please specify source(s), if available):

- Others (please specify):

20. What is/are the area(s) of training on WAFS that your State/Territory consider most needed? Please specify the priority of your selected item(s) by inserting '1', '2', '3', etc. to the respective text box in the last column (*Can select more than one area. Please prioritize using '1', '2', '3', etc. instead of inserting multiple '1's, etc.*).

Area(s) of training need	Priority (<i>'1' most needed</i>)
(a) Channels for reception of WAFS products (please provide details of topics of interest:)	<input type="text"/>
(b) WAFS processing software (please provide details of topics of interest:)	<input type="text"/>
(c) Decoding of WAFS data (please provide details of topics of interest:)	<input type="text"/>
(d) Generation of products for flight documentation (please provide details of topics of interest:)	<input type="text"/>

- (e) Interpretation of WAFS products
(please provide details of topics of interest:
)
- (f) Other (please specify):
- (g) Other (please specify):
- (h) Other (please specify):
- (i) Other (please specify):
- (j) Other (please specify):
- (k) Other (please specify):
- (l) Other (please specify):
- (m) Other (please specify):
- (n) Other (please specify):
- (o) Other (please specify):
- (p) Other (please specify):

Section 6 – ADDITIONAL INFORMATION

Please use this section to describe any further details in your answers in the previous sections and to provide any further comments that you may have. Please specify the section and question numbers when you supplement further details in your previous answers.

===== END OF QUESTIONNAIRE =====

Thank you very much for your valuable inputs !!!

Appendix B
**Results of Survey on Operational Use of Services and Products from Service Providers
of WAFS in Asia/Pacific Region and WAFS Training Needs of Asia/Pacific States
(December 2012 – mid-January 2013)**

Access to WAFS services

1. *Does your State/Territory currently have access to WAFS products?*

All States/Territories (18; 100%) said that they have access to WAFS products.

2. *Which sets of WAFS products does your State/Territory have access to?*

5 States/Territories (28%) said that they have access to UK WAFS products, 5 (28%) US WAFS products and 8 (44%) both (Figure 1).

3. *Which sets of WAFS products does your State/Territory use as the primary source for producing flight documentation?*

9 States/Territories (50%) said they use UK WAFS as primary source while the other 9 States/Territories (50%) said they use US WAFS as primary source (Figure 2).

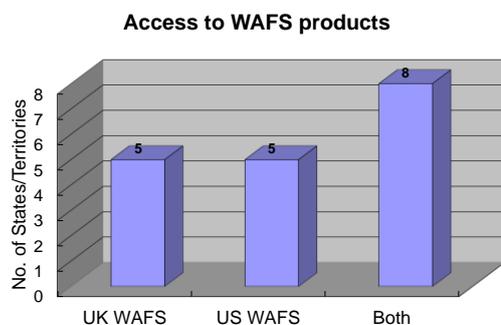


Figure 1

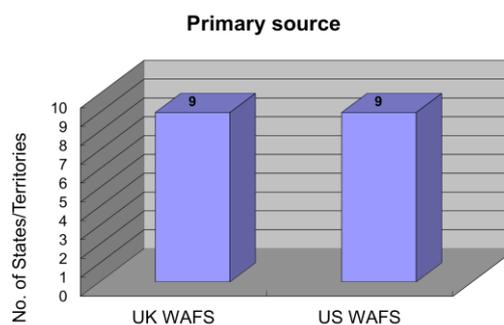


Figure 2

4. *What is/are the channels through which your State/Territory gains access to UK WAFS products?*

There are 13 States/Territories responding to this question. 8 States/Territories (62%) said they gain access to UK WAFS products via SADIS 2G, 11 States/Territories (85%) via Secure FTP Service, and 1 State/Territory (8%) via other channel (the Global Telecommunications System (GTS)) (Figure 3).

5. *What is/are the channels through which your State/Territory gains access to US WAFS products?*

There are 13 States/Territories responding to this question. All of them (13 States/Territories; 100%) have gain access to WAFS Internet File Service (WIFS) while 2 (15%) of them also gain access to US WAFS products via other channel (GTS and NWS Aviation Website) (Figure 4).

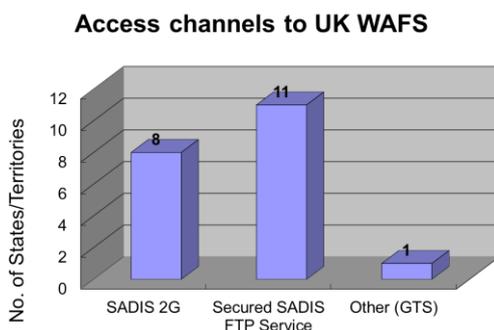


Figure 3

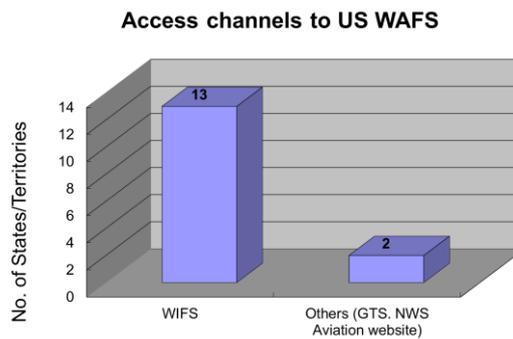


Figure 4

6. *If your State/Territory is under the footprint of SADIS 2G satellite and your State/Territory has not yet access to UK WAFS products via SADIS 2G satellite, does your State/Territory have any plan to receive UK WAFS products via SADIS 2G satellite?*

5 States/Territories responded to this question and said that they have no plan to use SADIS 2G for the following reasons:

- (a) already receiving US WAFS products (5; 80%);
- (b) already receiving UK WAFS products via Secure SADIS FTP Service (2; 40%);
- (c) high operating cost (1; 20%).

7. *If your State/Territory has not yet gained access to UK WAFS products via Secure SADIS FTP Service, does your State/Territory have any plan to do so?*

4 States/Territories responded to this question. Among them, 2 States/Territories said that they planned to gain access to UK WAFS products via Secure SADIS FTP Service in 2013. The other 2 States/Territories said that they have no plan to do so, one of the reason being they were already receiving US WAFS products.

Transition from GRIB1 to GRIB2 WAFS data

8. *Both WAFS London and WAFS Washington are now providing both WAFS Aviation GRIB1 data and WAFS Aviation GRIB2 data. Re-prioritization of GRIB2 data over GRIB1 data was made on 5 July 2012. Is your State/Territory currently receiving/retrieving WAFS Aviation GRIB2 data?*

15 States/Territories (83%) said that they are receiving WAFS Aviation GRIB2 data and 3 States/Territories (17%) said no (Figure 5).

9. *If your State/Territory is currently receiving/retrieving WAFS Aviation GRIB2 data, is your State/Territory utilizing them operationally for preparing flight documentation?*

Among the 15 States/Territories receiving WAFS Aviation GRIB2 data, 9 of them (60%) are using GRIB2 data operationally for preparing flight documentation while the remaining 6 (40%) are not (Figure 6).

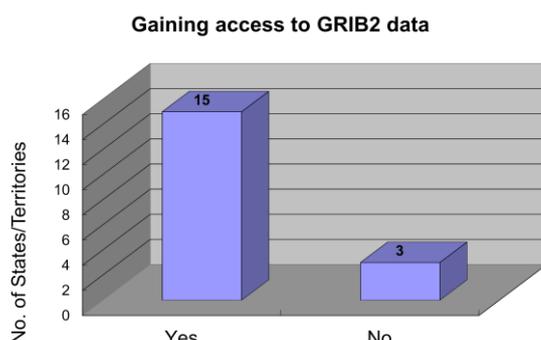


Figure 5

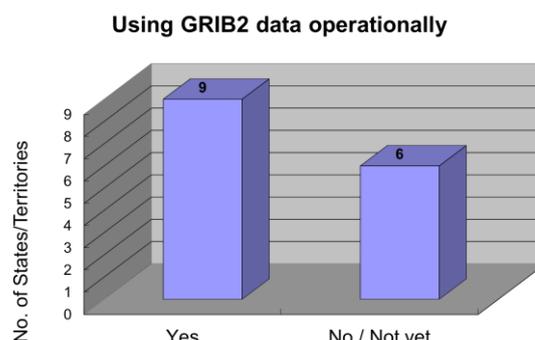


Figure 6

10. *If your State/Territory is not currently receiving/retrieving WAFS Aviation GRIB2 data and/or is not yet utilizing GRIB2 data operation, does your State/Territory have any plan to utilize WAFS Aviation GRIB2 data operationally for preparing flight documentation?*

8 States/Territories responded to this question. All of them (100%) said that they planned to use GRIB2 data operationally (Figure 7): in 2013 (5 out of 8; 62.5%) and in 2014 (3 out of 8; 37.5%).

11. *It is planned that broadcast of WAFS forecasts in GRIB1 would cease in November 2013. Does your State/Territory envisage any difficulty in preparing for the migration from GRIB1 to GRIB2 WAFS data?*

18 States/Territories responded to this question. 6 (33%) States/Territories said that they have difficulty in migrating from GRIB1 to GRIB2 data while the remaining 12 States/Territories (67%) said no (Figure 8). The areas of difficulty are:

- (a) not yet receiving WAFS Aviation GRIB2 data (1 quote)
- (b) no technical expertise in processing WAFS Aviation GRIB2 data (3 quotes)
- (c) not enough time to prepare for the migration (2 quotes)
- (d) no access to finances to procure the necessary GRIB2 visualization software (3 quotes).



Figure 7

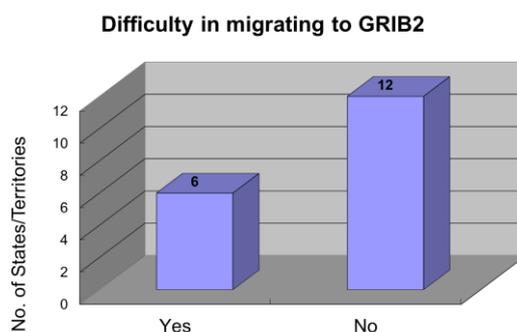


Figure 8

Utilization of trial gridded forecasts of icing, turbulence and CB

12. *WAFS London and WAFS Washington are currently providing harmonised gridded forecasts of icing, turbulence and CB in GRIB2 format via their respective server based systems. Have your State/Territory evaluated the performance of the gridded forecasts of icing, turbulence and CB?*

17 States/Territories responded to this question. 2 of them (12%) said that they have evaluated

trial gridded forecasts of icing, turbulence and CB, while the remaining 15 States/Territories (88%) said that they have not done so. Comments on evaluation of trial gridded forecasts by the 2 States/Territories are as follows:

- (a) *“Currently our meteorologists have access to these products in the forecast preparation process however these grids are rarely used due to their relatively low grid resolution, lack of guidance material and thresholds, a lack of verification information and given the grids provide potential and forecasts contain severity*

Due to the lack of user need for these grids and the lack of verification statistics, neither the Met Authority or Civil Aviation Safety Authority is currently putting effort into approving the use of these gridded products for flight planning purposes within our FIR.”

- (b) *“Our earlier study on the verification of the trial harmonized WAFS gridded forecast of clear air turbulence potential using special air-reports received in the Hong Kong Flight Information region (presented in WP/56 of CNS/MET SG/16 held in Bangkok, Thailand, 23-27 July 2012) concluded that, in 40 pilot reports of turbulence of moderate or above intensity, about one third of the cases the WAFS forecast for mean and maximum CAT potential were both zero. The harmonized gridded CAT potential forecast products from WAFS Provider States fails to provide any hint for one third of the cases which include a special air-report of moderate to severe intensity”*

Training needs

- 13. *Have your State/Territory gained access to training via the following resources?*

15 States/Territories responded to this question and indicated that they have gained access to training in WAFS via the following sources:

- (a) seminar(s)/Workshop(s) organized by ICAO (8 responses)
- (b) seminar(s)/Workshop(s) organized by other organization(s) (4 responses; 1 said from WMO)
- (c) self-study of training materials on Internet (5 responses)
- (d) Others: (3 responses; 1 said from Under project upgrading of Brunei Darussalam MMSS-GTS and one said from MeteoFrance)

- 14. *What is/are the area(s) of training on WAFS that your State/Territory consider most needed?*

The table below summarizes the priority of areas of training on WAFS as indicated by the Sates/Territories:

Areas	No. of States/Territories quoting this area as priority ‘1’	No. of States/Territories quoting this area as priority ‘2’	No. of States/Territories quoting this area as priority ‘3’	No. of States/Territories quoting this area as priority ‘4’	No. of States/Territories quoting this area as priority ‘5’ or lower
Interpretation of WAFS products (see Note (1))	7	2	2	2	0

Generation of products for flight documentation (see Note (2))	2	7	2	0	0
WAFS processing software	2	1	4	2	0
Decoding of WAFS data	1	3	4	2	0
Channels for reception of WAFS products (see Note (3))	1	1	0	1	4
Other (see Note (4))	2	0	0	0	0

Note :

- (1) States/Territories remarked that the topic on ‘Interpretation of WAFS products’ should:
 - cover especially aviation products for briefing
 - cover performance of the gridded products
 - provide guidance on the establishment of the threshold for specific application given the performance of these gridded products
 - provide practical examples on the visualization of the products
 - provide guidance on the use of these gridded products in the flight planning system
 - cover technical aspect of transmission and reception
- (2) States/Territories remarked that the topic on ‘Generation of products for flight documentation’ should:
 - Cover more training for better understanding of different products available
- (3) States/Territories remarked that the topic on ‘Channel for reception of WAFS products’ should:
 - enable better understanding on which products are available, when they will be available, and which flight levels are available for the Pacific Region
- (4) Other topics include:
 - processing of aviation GRIB2 data
 - integration of local (WMO Block 98) Synoptic and Temp Observations for eventual use in the WAFS Plotting and Analysis