ICAO Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG)

World Area Forecast System (WAFS)

- Service Reference

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1 Introduction

1.1 Purpose

To provide a reference document on the World Area Forecast System (WAFS) for use by User States within the Asia and Pacific (ASIA/PAC) regions. This document provides an overview of WAFS, the role of the two World Area Forecast Centres (WAFCs), the available communication mechanisms, datasets and summarises the end-user equipment options available to User States.

1.2 Scope

This document is intended to collate general information on WAFS from many sources and provide a high-level overview of information. Rather than repeat details contained in other documents, this document will provide links to these documents.

1.3 References & Useful Links

APANPIRG WAFS/I TF: http://www.bangkok.icao.int/apanpirg_sg.html
ICAO : http://www2.icao.int/en/anb/met/
SADIS : http://www.metoffice.gov.uk/aviation/sadis
SADISOPSG : http://www2.icao.int/en/anb/met/sadisopsg/
Secure SADIS FTP Guide from:
http://www.icao.int/safety/meteorology/sadisopsg/SADIS%20User%20Guide/Forms/AllItems.aspx
SADIS User Guide from:
http://www.icao.int/safety/meteorology/sadisopsg/SADIS%20User%20Guide/Forms/AllItems.aspx
WAFSOPSG :
http://www2.icao.int/en/anb/met/wafsopsg/
WIFS: http://aviationweather.gov/wifs/
WIFS User Guide from: http://aviationweather.gov/wifs/page/open/id/5

1.4 Acronyms and Abbreviations

The following is a list of acronyms and abbreviations used within this document:

AFS	Aeronautical Fixed Service
AIREP	Air-report
ANSP	Air Navigation Service Provider
APANPIRG	Asia Pacific Air Navigation Planning and Implementation Regional Group
BUFR	Binary Universal Form for the Representation of meteorological data
CB	Cumulonimbus
CNS/MET SG	Communications, Navigation and Surveillance/Meteorology Sub-Group
EDTO	Extended Diversion Time Operations
FTP	File Transfer Protocol
GRIB	GRIdded Binary
GRIB1	GRIB Edition 1
GRIB2	GRIB Edition 2
HTTPS	Hypertext Transfer Protocol Secure
ICAO	International Civil Aviation Organization
ISCS	International Satellite Communications System
METAR	Meteorological Aviation Report / Aviation Routine Weather Report
MWO	Meteorological Watch Office
OPMET	Operational Meteorological Information
PC	Personal Computer
PNG	Portable Network Graphics
RANP	Regional Air Navigation Plan

SADIS	Satellite Distribution System for information relating to air navigation
SADISOPSG	Satellite Distribution System Operations Group
SIGMET	Significant Meteorological (Information)
SIGWX	Significant Weather
SPECI	Special Report / Aviation Selected Special Weather Report
SWH	High-level SIGWX
SWM	Medium-level SIGWX
TAF	(Terminal) Aerodrome Forecast
TCA	Tropical Cyclone Advisories
UK	United Kingdom
UKMO	UK Meteorological Office
USA	United States of America
US NWS	United States National Weather Service
VAA	Volcanic Ash Advisories
WAFC	World Area Forecast Centre
WAFS	World Area Forecast System
WAFS/I TF	WAFS Implementation Task Force
WAFSOPSG	World Area Forecast System Operations Group
WIFS	WAFS Internet File Service
WMO	World Meteorological Organization

2 WAFS Overview

The purpose of the World Area Forecast System (WAFS) is to provide the worldwide aviation community with operational meteorological forecasts and information about meteorological phenomena required for flight planning and safe, economic, and efficient air navigation. On behalf of the International Civil Aviation Organization (ICAO) and World Meteorological Organization, the WAFS comprises two Provider States, these being the United Kingdom Meteorological Office (UKMO) and the United States National Weather Service (US NWS). The WAFS Provider States each operate a World Area Forecast Centre (WAFC) known as WAFC London and WAFC Washington.

The WAFCs provide:

- global gridded forecasts of upper winds, upper-air temperatures and humidity, flight level and temperature of tropopause, and direction, speed and flight level of maximum wind; and
- global High-level SIGWX (SWH) products and Medium-level SIGWX (SWM) products for limited geographical areas.

The official distribution mechanism for WAFS data is via UK's SAtellite DIStribution (SADIS) system and the USA's WAFS Internet[1] File Service (WIFS) (which as of 1 July 2012 has replaced the prior service, the International Satellite Communication System (ISCS)), both of which form part of the ICAO Aeronautical Fixed Service (AFS). The UK also operates two Internet based distribution systems known as SADIS FTP and Secure SADIS FTP in parallel. The older SADIS FTP service will be ceased on 30 November 2012.

In addition to the WAFS data, the above distribution mechanisms also forward OPMET data (TAF, METAR, SIGMET etc.) for purposes of flight planning only (i.e. not for time critical purposes).

2.1 Charts

The two WAFCs provide global High-level SIGWX (SWH) products covering FL250-630. The WAFC's also provide Medium-level SIGWX (SWM) products, covering FL100-450[2], for limited geographic areas

[1] An enabling clause in Annex 3, Amendment 75, permits the use of the public internet for distribution of non-time critical data. WAFS data and OPMET data used for flight planning purposes only comes under this definition.
[2] This exceeds the Annex 3 requirement FL100-FL250

as defined in the regional air navigation agreements. At the time of writing these agreements specified that area's "ASIA SOUTH", "EUR" and "MID" will be provided by WAFC London and area "NAT" will be provided by WAFC Washington.

The WAFCs provide the SWH and SWM products as both coded data and charts, in BUFR[3] and PNG formats, respectively. The PNG format is provided for back-up purposes and is only available for the areas defined in ICAO Annex 3 Figures A8-1, A8-2 and A8-3.

2.2 Data Sets

The WAFCs provide global forecasts of upper wind and temperature data covering FL050-530, tropopause heights and temperature, maximum wind (height, speed, direction) and humidity data covering FL050-180 in gridded format. These gridded formats included the older GRIB[4] Edition 1 (GRIB1) and the newer Edition 2 (GRIB2). The WAFSs also provide gridded cumulonimbus (CB), icing, and turbulence datasets SADIS FTP/Secure SADIS FTP and WIFS in GRIB2 format only. The CB and turbulence parameters are only available on a trial and evaluation basis until endorsed by WAFSOPSG, however the icing forecast is considered operationally acceptable for use in Extended Diversion Time Operations (EDTO) flight planning. Unlike other gridded datasets, the parameter values for the gridded turbulence, CB and icing datasets issued by the two WAFCs are harmonised (i.e. identical).

The aforementioned gridded products are produced four times daily, for T+06 to T+36 at 6 hour time steps in the GRIB1 format and 3 hour time steps in GRIB2 format. This data can be used in flight planning systems to optimise flights routes or to generate a range of charts, such as wind and temperature charts, cross sections, etc. See 2.2.1.

As described in Section 2.1, the two WAFCs provide SWH and SWM data in BUFR code. The data is generated every 6 hours and is available 17 hours before validity, unless WAFC back-up procedures are invoked, in which case the data is available 15 hours before validity. This data allows users to generate SIGWX charts for standard ICAO areas or user defined domains.

As noted in Section 2, the AFS/internet based distribution mechanisms include a range of global OPMET data. These datasets include alphanumeric messages such as METAR, SPECI, TAF, SIGMET, VAA, TCA, and special AIREPs.

Administrative messages as defined in Section 4.2 are also broadcast as OPMET.

2.2.1 Differences between GRIB1 and GRIB2

Whilst there will obviously be differences at the technical 'encoding' level between GRIB1 and GRIB2; users may be interested to note the main differences between GRIB1 and GRIB2 are:

a. GRIB2 is a regular grid with 1.25 X 1.25 degree (~140 km X 140 km at the equator) resolution. GRIB1 has the longitudinal points on the grid 'thinned' as the polar regions are approached.

[3] BUFR stands for Binary Universal Form for the Representation of meteorological data. Technical details are contained in the WMO Manual 306 Part B specification, which can be obtained via the WMO ftp site - ftp://ftp.wmo.int/Documents/MediaPublic/Publications/CodesManual_WMO_no_306/WMO306_Vol_I.2_2011_en.pdf. BUFR provides efficient storage of meteorological features in a machine independent form, where all the information to describe the features are contained within the data.

[4] GRIB stands for GRIdded Binary. GRIB is a mathematically concise data format commonly used in meteorology to store gridded data. It is standardized by the WMO Commission for Basic Systems, known under number GRIB FM 92-IX. The details of GRIB1 and GRIB2 can be found at the following links, respectively: http://www.wmo.int/pages/prog/www/WDM/Guides/Guide-binary-2.html and http://www.wmo.ch/pages/prog/www/DPS/FM92-GRIB2-11-2003.pdf

b. GRIB2 bulletins contain data covering the entire globe for each level and each parameter in each bulletin. GRIB1 has separate bulletins for each 'octant' of every level/parameter combination.

c. GRIB2 data is compressed using the JPEG2000 standard. Appropriate JPEG2000 decompression libraries will be necessary.

d. GRIB2 has a temporal resolution of 3 hours, from T+06 to T+36 inclusive. GRIB1 has a temporal resolution of 6 hours (T+06 to T+36 inclusive).

e. GRIB2 has additional levels (FL270, FL320 and FL360) close to the normal cruise of level of Airliners. FL410 will be added to the GRIB2 dataset in November 2013 with applicability of Amendment 76 to Annex 3.

f. The tropopause height in GRIB2 is capped at FL600, but in GRIB1 the cap is at FL530. As such, there may be differences between GRIB2 and GRIB1 tropopause heights and temperatures in the tropical regions. GRIB2 will be the more accurate representation.

As of 5th July 2012, WAFS forecasts in GRIB2 format was prioritized above those in GRIB1 format. For practical purposes this means that WAFS GRIB2 will be generated and made available before WAFS GRIB1. This is in anticipation of the cessation of WAFS forecasts in GRIB1 format (planned November 2013).

Due to a combination of higher horizontal resolution in the polar regions in GRIB2, its 3 hour time step (twice that of GRIB1) and extra vertical levels, the GRIB2 data volume is nearly four times as much as the GRIB1 products. However the JPEG2000 data compression allows for a compression factor of approximately 2. Thus, the complete wind/temperature/tropopause dataset in GRIB2 format is approximately twice that of GRIB1. These figures exclude the CB, icing and turbulence parameters which are yet to be endorsed by WAFSOPSG.

2.3 Satellite Based Reception of WAFS Data – SADIS 2G

The UK provides point to multi-point data distribution service via satellite in real-time. This service is provided by the UKMO's SADIS 2G satellite positioned at 00N 060E. The coverage provided by the satellite service is shown in Figure 1.

Figure 1: Schematic of SADIS 2G satellite footprint. Reception signal strengths, particularly at the edges of the footprints, are not so simply or sharply defined. Consult SADIS guidance document for detailed information.

2.4 Obtaining WAFS Data Via The Public Internet

The UKMO currently provides access via SADIS FTP and Secure SADIS FTP service as an alternative to the SADIS satellite service or as a backup to the satellite service. The older SADIS FTP service will remain in service in parallel with the Secure SADIS FTP until 30 November 2012, when it (SADIS FTP) will be withdrawn.

The US NWS provides a service known as WAFS Internet File Service (WIFS) which allows users to retrieve data via HTTPS[5] protocol. WIFS replaced the ISCS-G2 service and ISCS FTP service on 1 July 2012.

The following Gantt chart shows the indicative availability of WAFS distribution services provided by UK and USA.

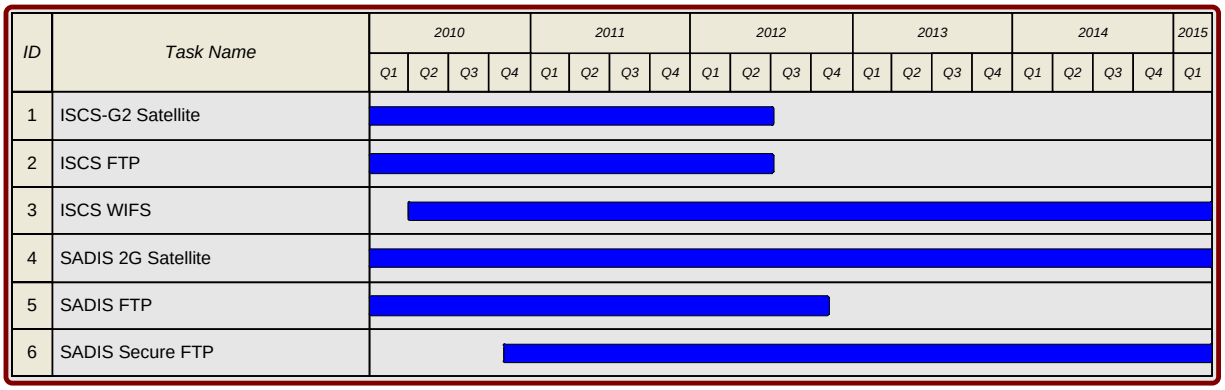

Figure 2. Timeline showing the indicative availability of WAFS services up to the year 2015

2.5 WAFS End-User system components

User States wishing to utilize WAFS data require the following components:

1. Visualisation software
2. PC/server on which to run the visualisation software
3. Communications with the:
    - Satellite based SADIS 2G; and/or
    - Internet based Secure SADIS FTP or WIFS).

2.5.1 Visualisation Software

There are a number of companies which offer commercial-off-the-shelf software capable of visualising the WAFS/OPMET datasets and generating graphical charts. Software is available for both Windows and Linux operating systems. The UK Met Office (as SADIS Provider) maintains a list of the companies offering WAFS capable visualisation software compatible with its systems. The details can be found at:

http://www.metoffice.gov.uk/aviation/sadis/manufacturers

The SADIS Provider State has performed an evaluation of these software systems, the results of which can be found at:

http://www.metoffice.gov.uk/aviation/sadis/software

[5] The primary open source product for access using the HTTPS protocol is the "GNU Wget package" (GNU is a recursive acronym for "GNU's Not Unix" and is pronounced "guh-NEW").

Some WAFS users have elected to implement there own bespoke software. Alternatively many flight planning systems support the visualisation of WAFS data and flight plan optimisation based on WAFS data, however these systems are outside the scope of this document.

2.5.2 PC/Server

All systems require a PC or server on which to run the visualisation software. For redundancy, User States may elect to install the visualisation software on multiple PCs/servers or under platform virtualisation such as VMware.

2.5.3 Data From The SADIS or WIFS Services

User States need to determine from which of the SADIS or WIFS Providers they should obtain their data., and the Regional Air Navigation Plan will give guidance on which of the two providers should be used.

The SADIS Provider can provide access to satellite based communications and to internet based communications.

The satellite based service will require dedicated hardware, thus:

- satellite antenna (normally 1.8 or 2.4 metre diameter)
- low noise block
- digital receiver
- router
- cabling including coaxial, power, communications (RS-232/Ethernet/USB)

Information regarding the cost of the above equipment, installation and support and maintenance can be obtained directly from the suppliers via the link below. For redundancy purposes, some User States elect to install multiple satellite reception systems or alternatively use internet based communication systems as a backup.

Further details on suppliers of this satellite data reception system can be found at:
http://www.metoffice.gov.uk/aviation/sadis/manufacturers

User States wishing to implement SADIS 2G can find procurement guidelines at:
http://www.metoffice.gov.uk/aviation/sadis/procure.

SADIS FTP/Secure SADIS FTP and WIFS are internet based services. They will require suitable hardware and software to download data via the internet, and to visualise the data. Contracts with Internet Service Providers will be necessary.

The SADIS Provider provides information regarding suppliers of such equipment at:
http://www.metoffice.gov.uk/aviation/sadis/manufacturers

Important note: *SADIS FTP/Secure SADIS FTP and WIFS use different log on credentials, protocols, folder structures, and filename conventions. Users should contact their hardware/software providers to ensure their systems are compatible with the service they wish to use.*

3 System Operation

The WAFS is used by a variety of users groups around the world including airlines, Air Navigation Service Providers (ANSPs) and Meteorological Watch Offices (MWOs). This section is intended to provide an overview of the WAFS from the generation of datasets by the WAFC to typical end-users.

The two WAFCs run global meteorological models which run four times daily. The WAFCs gridded (GRIB1/GRIB2) parameters are direct outputs from these models, whereas as the SIGWX products are

manually generated by forecasters. The forecasters generate these SIGWX datasets by drawing each feature based on an analysis of satellite imagery, meteorological models and a range of other forms of guidance. The generated SIGWX products are in accordance with the Standards and Recommended Practices of ICAO Annex 3.

The SIGWX products are available in both BUFR and PNG format. It is anticipated that Users will generate charts for their region from the BUFR data and that the PNG charts are made available as a backup. The SIGWX products are produced every 6 hours, valid for 00Z, 06Z, 12Z or 18Z and are available 17 hours before validity under normal conditions, 15 hours under backup conditions. The SIGWX charts are valid for use within a period starting 3 hours before, until 3 hours after validity time.

Unlike the SIGWX products which are generated for a single validity time, the WAFCs global gridded datasets are generated for a range of time steps between T+06 and T+36 hours. Within this time range, the GRIB1 data is available at 6 hourly steps whereas the GRIB2 data is available in 3 hourly steps, i.e.

GRIB1 data available for time steps +6, +12, +18… to +36
GRIB2 data available for time steps +6, +9, +12, +15, +18… to +36

It is intended that for anything other than basic situational awareness (e.g. Wind and Temperature charts), the GRIB data should be interpolated between time steps. This is particularly so with regard to use of winds in flight planning software.

OPMET messages are made available as soon as the messages are received by the WIFS and SADIS Provider States.

Once the data sets are available:

- SADIS satellite service pushes the data to SADIS users; and/or
- Users pull the data via Internet/FTP service.

User States wanting to utilise the WAFS data are required to either install or operate a satellite data reception system or have a permanent and reliable internet connection as defined in Section 2.5.3. In addition, User States will also need to operate visualisation software as defined in Section 2.5.1.

Under normal operating conditions a User State ingests data from their primary WAFC (Section 4.1). A User State may also contact the alternative WAFC provider in order to obtain an account for backup/contingency purposes (Section 3.2). The visualisation software ingests the WAFS data and generates products:

- At predefined times;
- Upon the arrival of new datasets; and/or
- As required by the operator.

Most WAFS visualisation software can be configured to generate a range of different products. Commonly generated products include:

- High-level SIGWX charts for any region of the globe from the BUFR data;
- Mid-level products for limited geographical regions from the BUFR data; and
- Wind and Temperature charts from GRIB data.

In addition, some visualisation software is also capable of providing a range of other products. These products can also be grouped together to form a flight packages for user defined routes and may contain:

- OPMET data (METAR/SPECI, TAF, SIGMET, AIRMET, TCA, VCA, etc);
- SIGWX charts;
- Wind and Temperature charts;
- Cross sections charts; and
- Route/Flight forecasts in text format

Following the selection of the primary WAFC, the visualisation software needs to be configured to generate products from that WAFC. WAFC London transmits all its products with a source address of

"EGRR". WAFC Washington however transmits its data from 2 source addresses ("KWBC" GRIB; "KKCI" BUFR/PNG).

The visualisation software can typically be configured to disseminate the aforementioned charts and data sets to Users via a range of mechanisms including email, FTP and TCP communication protocols. End users of these charts include pilots, flight planners, air traffic controllers, meteorologists, etc. Airlines and ANSPs also often load the WAFS GRIB data into flight planning systems to optimise routes for efficiency and safety.

3.1 Errors or Omissions in WAFS products

Should a user detect any errors or omissions in the WAFC products they are encouraged to contact the WAFC directly using the following 24-hour contact details:

WAFC London service desk contact details:
email: servicedesk@metoffice.gov.uk
telephone: +44 (0) 1392-88 66 66

WAFC Washington service desk contact details:
Email: toc.nwstg@noaa.gov
telephone: +1 301 713 0902

Should the error or omission relate to a SIGWX product the WAFCs will typically issue a correction message as described in Section 4.2.1.

3.2 Backup Communications

The two WAFCs provide global forecasts of SWH charts and a range of gridded fields as defined in Section 2. Having global forecasts available from the two WAFCs provides a backup should an outage occur. The WAFS architecture supports the following:

- Loss of satellite based communication mechanism, SADIS:
  - The WAFCs each provide internet based services and these can be used as a backup source of data to that delivered over their satellite based services. It is incumbent on users to request access details from the primary WAFC.
- Complete loss of data from SADIS or WIFS provider.
  - In the extremely unlikely event that either the SADIS or the WIFS provider were to be completely unavailable, those users who have pre-arranged alternative accounts can make use of the alternate provider's internet based service to obtain data. It is incumbent on users to request and obtain access details for the alternate provider. Moreover, the WAFCs do not arrange backup/contingency accounts on behalf of users. Users also need to note that the data and data structures available from the two WAFCs are not identical mirrors of each other and Users are responsible for ensuring that their systems are able to decode both EGRR and KWBC/KKCI GRIB and BUFR data.

4 Implementation Factors

4.1 Policy For Obtaining Access To SADIS/WIFS

WAFS service should be obtained as per direction from the Regional Air Navigation Plans (RANPs). The policy describing how a State should arrange to obtain data from the appropriate service is stated in Appendix E of the 5th Edition of the SADIS User Guide (June 2012) http://www.icao.int/safety/meteorology/sadisopsg/SADIS%20User%20Guide/SADIS%20User%20Guide%20-%20Fifth%20Edition/1.SUG_5th%20Edition.alltext.pdf. For reference, an uncontrolled copy is provided below.

PROCESS FOR DETERMINING FROM WHICH SERVICE (SADIS OR WIFS) A USER SHOULD OBTAIN OPMET INFORMATION AND WAFS FORECASTS

GENERAL

1. In order for the SADIS and WIFS Provider States to appropriately manage and maintain viable, mutually existing services delivering OPMET information and WAFS forecasts, the following process should be followed in order to determine from which service (SADIS or WIFS) a user within a particular State should arrange to obtain their data.

STATES REQUIRED IN ICAO REGIONAL AIR NAVIGATION PLANS TO OBTAIN WAFS FORECASTS FROM SADIS FOR PRIMARY OPERATIONAL USE

2. For those States required by the ICAO Regional Air Navigation Plans to use SADIS as their primary source from which to obtain WAFS forecasts, the following procedure applies:

a) SADIS accounts will be provided (following normal authorization processes) on request to the SADIS Provider State; and,

b) participation in the SADIS cost recovery scheme will be required (except for LDCs as defined by United Nations).

c) WIFS accounts will be provided to authorized SADIS users by the WIFS Provider State for backup purposes on condition that:
   — a SADIS account has been authorized and provided;
   — there are no outstanding balances in respect of the SADIS cost recovery scheme; and
   — use is restricted to backup purposes and periodic testing.

STATES REQUIRED IN ICAO REGIONAL AIR NAVIGATION PLANS TO OBTAIN WAFS FORECASTS FROM WIFS FOR PRIMARY OPERATIONAL USE

3. For those States required by the ICAO Regional Air Navigation Plans to use WIFS as their primary source from which to obtain WAFS forecasts, the following procedure applies:

a) WIFS accounts will be provided (following normal authorization processes) on request to the WIFS Provider State; and

b) SADIS accounts will be provided to authorized WIFS users by the SADIS Provider State for backup purposes on condition that:
   — a WIFS account has been authorized and provided; and
   — use is restricted to backup purposes and periodic testing.

STATES IDENTIFIED IN THE ICAO REGIONAL AIR NAVIGATION PLANS AS BEING ABLE TO OBTAIN WAFS FORECASTS FROM EITHER SADIS OR WIFS FOR PRIMARY OPERATIONAL USE

4. The State, having determined which of the two services (SADIS or WIFS) to obtain their primary operational supply of WAFS forecasts, the procedures in 2 and 3 will apply.

5. In exceptional circumstances, States that have an operational requirement to obtain data from both WIFS and SADIS FTP on a continuous basis will have their requests considered on a case-by-case basis. Under such circumstances, a State taking both services will be required to contribute fully to the SADIS cost recovery scheme (unless recognized as United Nations LDC).

6. The definition of the threshold for operational versus backup purposes to be used on the SADIS and WIFS Internet-based services will be that as defined and endorsed by the SADISOPSG.

4.2 Administration Messages

The SADIS Provider and WIFS Provider notify User States of changes to services and documentation via Administration Messages. These Administration Messages are structured text messages which are provided to User States via each of the communication mechanisms (i.e. satellite, FTP, WIFS).

The SADIS administration messages include:

Header[6]	Description
NOUK10 EGRR	Generally used to advise on model or product difficulties, engineering outages, and product changes. This is the preferred bulletin header for general messages
NOUK11 EGRR	Other advice messages.
NOUK12 EGRR	Provides a text message directing users how to decode GRIB values. It is mainly used by Workstation Suppliers.
NOUK13 EGRR	SADIS User Guide Updates (ICAO can only authorise these messages).
NOUK31 EGGY	NATS advisory messages
NOBX99 EBBR	BMG METNOs describing changes to bulletins promulgated in the EUR Region
PLUK30 EGRR PLUK31 EGRR PLUK32 EGRR PLUK33 EGRR PLUK34 EGRR	The PL series have been reserved for any graphical ADMIN messages but users would be alerted and directed from a NOUK10 EGRR message

For further details refer to section 4.2 of SADIS Gateway Operations Handbook, from

http://www.icao.int/safety/meteorology/sadisopsg/SADIS%20User%20Guide/Forms/AllItems.aspx

The WIFS administration messages include:

Header	Description
NOXX10 KKCI	WIFS administration messages

4.2.1 Correction Messages

The two WAFCs have also implemented Correction Messages to advise users of errors or omissions in SIGWX forecasts (PNG or BUFR). It is intended that the content of such messages shall be brought to the attention of users of the WAFS SIGWX forecast at the pre-flight planning stage. Guidance regarding these bulletins is available on the WAFSOPSG website at URL:

http://www.icao.int/safety/meteorology/WAFSOPSG/Pages/GuidanceMaterial.aspx.

These messages are transmitted with the following headers:

WAFC London	FXUK65 EGRR
WAFC Washington	FXUS65 KKCI

[6] The message header takes the form TTAAii CCCC. For further details, see: http://www.wmo.int/pages/prog/www/ois/Operational_Information/Publications/WMO_386/AHLsymbols/TableDefinitions.html

5 Further Information

5.1 WAFC General Contact Details

User States wanting to access the system should contact the relevant WAFC.

5.1.1 WAFC Washington

NWS/Aviation Weather Center
Attention: Mr Matt Strahan
Chief, International Operations Branch
7220 NW 101st Terrace
Kansas City, Missouri
USA 64153-2371
E-mail addressed to: matt.strahan@noaa.gov
Fax number: +1 816-880-0650

5.1.2 WAFC London

The Met. Office
Attention: Mr. Nigel Gait
International Aviation Manager
Fitzroy Road
Exeter
Devon EX1 3PB
United Kingdom
E-mail addressed to: nigel.gait@metoffice.gov.uk
Fax number: +44 1392-885-681

5.2 Technical Groups

There are a number of technical groups involved with the development and implementation of WAFS. These include:

APANPIRG WAFS/I TF:
http://www.bangkok.icao.int/apanpirg_sg.html

SADISOPSG:
http://www2.icao.int/en/anb/met/sadisopsg/Pages/default.aspx

WAFSOPSG:
http://www2.icao.int/en/anb/met/wafsopsg/Pages/default.aspx

6 Significant Changes to WAFS

Date Effective	Description
1 Mar 2010	GRIB 2 data available via SADIS FTP, including trial forecasts of CB, icing & turbulence parameters
May 2010	WIFS operational
18 Nov 2010	Secure SADIS FTP service commenced operation
18 Nov 2010	GRIB2 over SADIS 2G and ISCS commences
June 2011	Maximum icing parameter endorsed for use in planning EDTO operations only
29 Nov 2011	Harmonised CB, icing and turbulence operational

31 Mar 2012	Current ISCS users should have completed transition to WIFS
1 Jul 2012	Cessation of the ISCS satellite service
1 Jul 2012	Cessation of the ISCS FTP service
5 Jul 2012	Re-prioritisation of GRIB2 over GRIB1
30 Nov 2012	SADIS FTP will be ceased. Secure SADIS FTP will be the sole Internet based service provided by the UK.
Nov 2013	Planned cessation of WAFS Upper Air Forecasts in GRIB1 form. GRIB2 will be the sole format provided.
Nov 2013	It is expected that the GRIB2 forecasts for CB, icing and turbulence parameters will be endorsed for operational use with Amendment 76 to ICAO Annex 3.

Note: There is no planned cessation date for the current SIGWX forecasts.