Department of Commerce · National Oceanic & Atmospheric Administration · National Weather Service

NATIONAL WEATHER SERVICE INSTRUCTION 10-806
October 10, 2017

Operations and Services
Aviation Weather Services, NWSPD 10-8
WORLD AREA FORECAST SYSTEM

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OPR: W/AFS24 (M. Graf) **Certified by:** W/AFS24 (W. Bauman)
Type of Issuance: Routine

SUMMARY OF REVISIONS: This directive supersedes NWSI 10-806, "*World Area Forecast System,*" dated June 21, 2013. This revision was made to reflect the NWS Headquarters reorganization effective on April 1, 2015. No content changes have been made.

Signed 9/26/2017
Andrew Stern Date
Director
Analyze, Forecast and Support Office

World Area Forecast System

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1 Purpose

This instruction describes the World Area Forecast System (WAFS) and operational procedures and services provided by the Washington World Area Forecast Center (WAFC) in support of WAFS.

2 General

The WAFS was established in 1982 by the International Civil Aviation Organization (ICAO) Communications/Meteorology (COM/MET) Divisional Meeting held conjointly with the seventh session of the World Meteorological Organization (WMO) Commission for Aeronautical Meteorology (CAeM) in Montreal.

The Federal Aviation Administration (FAA) is the meteorological authority, as defined by ICAO, for the United States and has agreed to provide a WAFC within the WAFS framework. The FAA designated the National Weather Service (NWS) as the meteorological provider with responsibility for the WAFS broadcast. The Washington WAFC became operational in 1996.

3 World Area Forecast System and World Area Forecast Centers

The WAFS is defined in ICAO Annex 3, *Meteorological Service for International Air Navigation*, as "…a worldwide system by which world area forecast centers provide aeronautical meteorological enroute forecasts in uniform standardized formats." A WAFC is "…a meteorological center designated to prepare and issue significant weather forecasts and upper-air forecasts in digital form on a global basis." The two ICAO-sponsored WAFCs are provided by the United States and United Kingdom, and are referred to as the Washington WAFC and the London WAFC, respectively.

The Washington WAFC is comprised of three components of the National Weather Service: the Aviation Weather Center (AWC) in Kansas City, Missouri; the NCEP Central Operations (NCO) in College Park, Maryland; and the Telecommunications Operations Center (TOC) at NWS Headquarters in Silver Spring, Maryland.

4 World Area Forecast System Information

WAFS information is provided to users as specified in ICAO Annex 3 through WAFS broadcasts. WAFS information includes global grid point forecasts and significant weather forecast products.

4.1 Grid Point Data Forecasts

WAFCs will prepare global grid point forecasts four times a day. Forecasts will be valid for fixed valid times at 6h, 12h, 18h, 24h, 30h, and 36h after the time of the synoptic data on which the forecasts were based (0000, 0600, 1200 and 1800 UTC). The dissemination of each forecast should be in the above order and be completed as soon as technically feasible, but not later than six hours after standard observation time. Details about the forecast elements and file formats are available from ICAO's website at:

http://www.icao.int/airnavigation/METP/MOG/Pages/WAFS.aspx

4.2 Significant Weather (SIGWX) Forecasts

WAFCs will prepare significant weather (SIGWX) global forecasts four times a day. Forecasts will be valid for fixed valid times at 30 hours after the time of the synoptic data on which the forecasts were based (0000, 0600, 1200 and 1800 UTC). The dissemination of SIGWX forecasts will be completed as soon as technically feasible, but not later than 17 hours after the forecast valid time. SIGWX forecasts will be issued in the Binary Universal Form for the Representation of Meteorological Data (BUFR) code form as prescribed by the WMO. *Note: The BUFR code form is contained in WMO Publication No. 306, Manual on Codes, Volume I.2, Part B – Binary Codes.*

SIGWX forecasts will be issued as:

a. high-level SIGWX forecasts for flight levels between 250 and 630
b. medium-level SIGWX forecasts for flight levels between 100 and 450 for limited geographical areas, as determined by regional air navigation agreement.

High- and Medium-Level SIGWX Forecasts

SIGWX forecasts for high and medium-levels will include the following elements:

a. Information from Tropical Cyclone Advisory Centers (TCACs) on significant tropical cyclones provided the maximum of the 10-minute mean surface wind speed is expected to reach or exceed 34 knots
b. Severe squall lines
c. Moderate or severe turbulence (in cloud or clear air)
d. Moderate or severe icing
e. Widespread sandstorm/duststorm
f. Cumulonimbus clouds associated with thunderstorms and with elements a) to e)
g. Flight level of tropopause
h. Jet streams
i. Information from Volcanic Ash Advisory Centers (VAACs) on the location of volcanic eruptions producing ash clouds of significance to aircraft operations comprising: volcanic eruption symbol at the location of the volcano and, at the side of the chart, the volcano eruption symbol, the name of the volcano, latitude/longitude, the date and time of first eruption, if known, and a reference to Significant Meteorological Information (SIGMET) and Notice to Airmen (NOTAM) issued for the area concerned; and
j. Information from WMO Regional Specialized Meteorological Centers (RSMCs) on the location of an accidental release of radioactive materials into the atmosphere, of significance to aircraft operations, comprising: the radioactivity symbol at the site of the accident and, at the side of the chart, the radioactivity symbol, latitude/longitude of the site of the accident, date and time of the accident and a reminder to users to check NOTAM for the area concerned.

Criteria for including items in SIGWX forecasts

The following criteria should be applied for high-level and medium-level SIGWX forecasts. Elements in a) through d), below, should only be included if expected to occur between the lower- and upper-level boundaries of the SIGWX forecast.

a. The abbreviation "CB" should only be included when it refers to the occurrence or expected occurrence of cumulonimbus clouds:
   1. Affecting an area with a maximum spatial coverage of 50 percent or more of the area concerned;
   2. Along a line with little or no space between individual clouds; or
   3. Embedded in cloud layers or concealed by haze.

b. The inclusion of "CB" should be understood to include all weather phenomena normally associated with cumulonimbus clouds, i.e. thunderstorm, moderate or severe icing, moderate or severe turbulence and hail;

c. Where a volcanic eruption or an accidental release of radioactive materials into the atmosphere warrants the inclusion of the volcanic activity symbol or the radioactivity symbol in SIGWX forecasts, the symbols should be included on high-level and medium-level SIGWX forecasts regardless of the height to which the ash column or radioactive material is reported or expected to reach; and

d. In the case of co-incident or the partial overlapping of elements a), i) and j) in 4.2.1, the highest priority should be given to element i), followed by element j) and a). The item with the highest priority should be placed at the location of the event, and an arrow should be used to link the location of the other element(s) to its associated symbol or text box.

Note: The explanations for the abbreviations can be found in the Procedures for Air Navigation Services – ICAO Abbreviations and Codes *(PANS-ABC, Doc 8400).*

4.2 SIGWX Corrections

In April 2016, the ICAO changed its SIGWX correction procedures to allow the reissuance of the SIGWX BUFR and PNG charts. A set of charts may be corrected until the next set of charts is issued. For example, the 00 UTC charts can be corrected until the 06 UTC charts are issued. When a correction is necessary, all PNG and BUFR files will be reissued for the set, including both the medium- and high-level charts. Two administrative messages will be issued to notify users that a correction has been issued.

SIGWX Text Correction Bulletin Information

FXUS65 KKCI – free text message describing what was corrected.
FXUS66 KKCI – standardized format message meant to trigger automated downloads of the corrected SIGWX charts.

Correction Message Templates

Examples of the SIGWX Text Correction Products can be found in Appendix B.

5 Backup

A WAFC will provide any or all of the WAFS services, as needed, when an interruption of the operation of the other WAFC occurs. WAFC London and WAFC Washington have studied a number of potential service interruption and outage scenarios, reviewed the current communication links between the two WAFCs, and agreed upon the appropriate responses to each interruption in service.

5.1 WAFC SIGWX Chart Production Interruptions

The two WAFCs can each produce the other WAFC's SIGWX PNG and BUFR charts when necessary. Should a WAFC experience difficulty producing their own charts, the other WAFC will issue the charts for the stricken WAFC. The charts will be issued with their usual WMO headers, as if they came from the stricken WAFC. Per ICAO agreement, an extra two hours of production time is allowed if one WAFC has to produce SIGWX charts for both WAFCs.

5.2 Failure of WAFC Grid Production

While the method is not as transparent to the user as SIGWX chart backup, the two WAFCs can provide backup service for their gridded forecasts. If a WAFC cannot update its gridded forecasts, the users can download and use the other WAFC's gridded forecasts. This requires that the users have established an account on both WAFCs' dissemination systems, and that their software be configured to use the grids from both WAFCs.

6 WAFS Dissemination Systems (WIFS and SADIS)

The United States' WAFS Internet File Service (WIFS) and the United Kingdom's Secure Aviation Data Information Service (SADIS) provide access to WAFS forecasts and Operational Meteorological (OPMET) data from everywhere in the world. Users should see Appendix C to determine which service is the primary service for their area. After registering with the primary service, all users can register with the other service for backup use only. Both services monitor usage to ensure that the users are only downloading data from the appropriate primary service.

Note that WIFS and SADIS are additive components to the Aeronautical Fixed Telecommunication Network (AFTN). The systems do not replace data acquisition and distribution functions of the ICAO/AFTN.

WIFS - http://www.aviationweather.gov/wifs/
SADIS - http://www.metoffice.gov.uk/aviation/sadis

7 Retention of Weather Documentation Materials

In accordance with NWSI 10-2003, Records Retention, NWS forecast products will be electronically transferred to the National Centers for Environmental Information (NCEI) to meet retention requirements (five years). A limited short-term records retention responsibility resides at the originating AWC. Each originating office will be able to electronically retrieve and print hard copies of their forecast products issued within the first 14 days of issuance. Offices should use caution in distributing copies of these records. However, if copies are distributed, a disclaimer indicating the records are not certified should be provided, along with contact information on how to obtain certified copies from NCEI.

APPENDIX A - Fixed Areas of Coverage of WAFS Forecasts in Chart Form

1. Mercator Projection

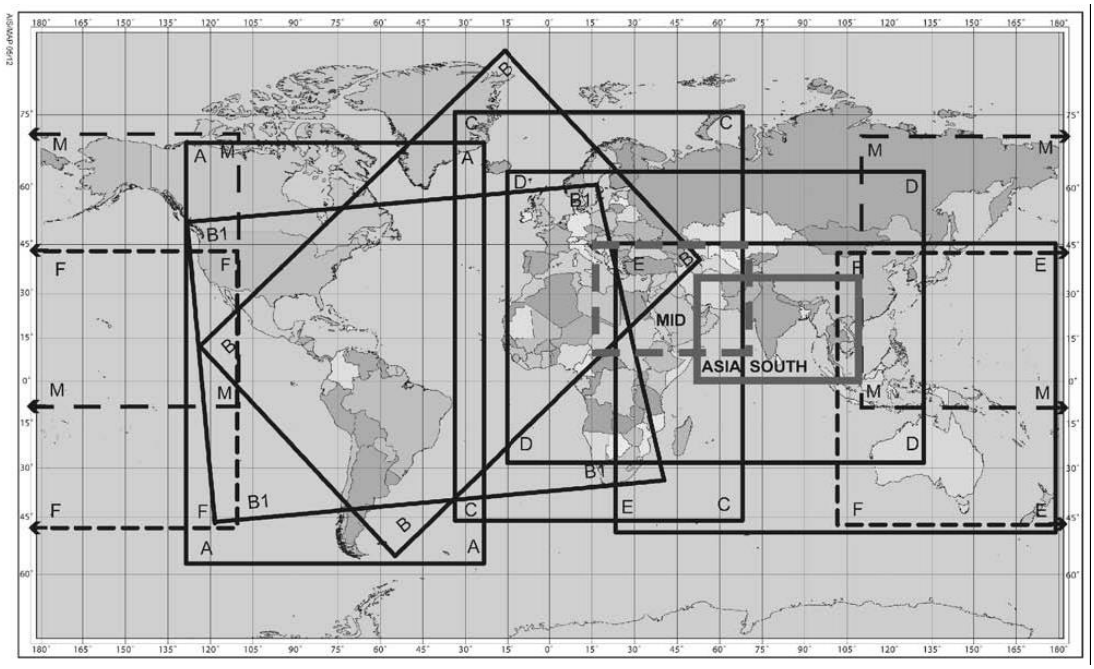

CHART	LATITUDE	LONGITUDE	CHART	LATITUDE	LONGITUDE
A	N7000	W12500	D	N6500	W01500
A	N7000	W02500	D	N6500	E13200
A	S5500	W02500	D	S2800	E13200
A	S5500	W12500	D	S2800	W01500
ASIA	N3600	E05300	E	N4500	E02500
ASIA	N3600	E10800	E	N4500	E18000
ASIA	0000	E10800	E	S4700	E18000
ASIA	0000	E05300	E	S4700	E02500
B	N8500	W01500	F	N4230	W11000
B	N4330	E05300	F	S4730	W11000
B	S5200	W05000	F	S4730	E10000
B	N1500	W12500	F	N4230	E10000
B1	N5000	W12800	M	S1000	E11000
B1	N6000	E01500	M	N7200	E11000
B1	S3500	E04000	M	N7200	W11000
B1	S4600	W10800	M	S1000	W11000
C	N7600	W03230	MID	N4400	E01700
C	N7600	E07000	MID	N4400	E07000
C	S4500	E07000	MID	N1000	E07000
C	S4500	W03230	MID	N1000	E01700

Figure A-1. Fixed areas of coverage of WAFS forecasts in chart form – Mercator projection

2. Polar Stereographic – Northern Hemisphere

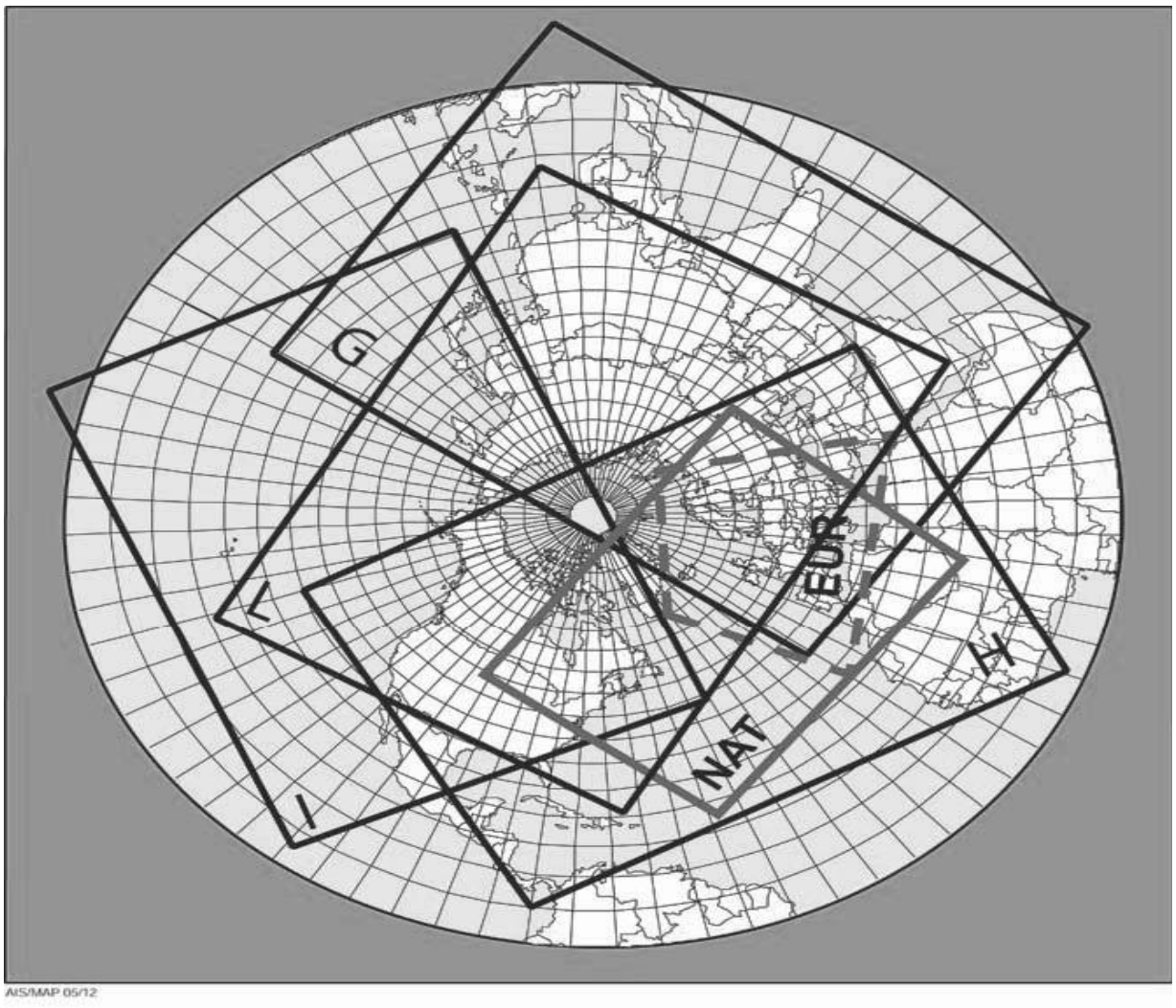

CHART	LATITUDE	LONGITUDE	CHART	LATITUDE	LONGITUDE
EUR	N5830	E06800	I	N0200	W11000
EUR	N2600	E03145	I	N4000	W03953
EUR	N2100	W02130	I	N2000	E13000
EUR	N4700	W05800	I	S0500	E18000
G	S1000	E11000	L	N1205	E11449
G	S0530	E04515	L	N1518	E4500
G	N3500	W02000	L	N2020	E6900
G	N2000	E16500	L	N1413	E14338
H	N0230	W00500	NAT	N4454	W10130
H	N2500	E05600	NAT	N1953	E00945
H	N3000	W14500	NAT	N1721	W05354
H	N0500	W08000	NAT	N5047	E06004

Figure A-2. Fixed areas of coverage of WAFS forecasts in chart form – Polar stereographic projection (northern hemisphere)

3. Polar Stereographic – Southern Hemisphere

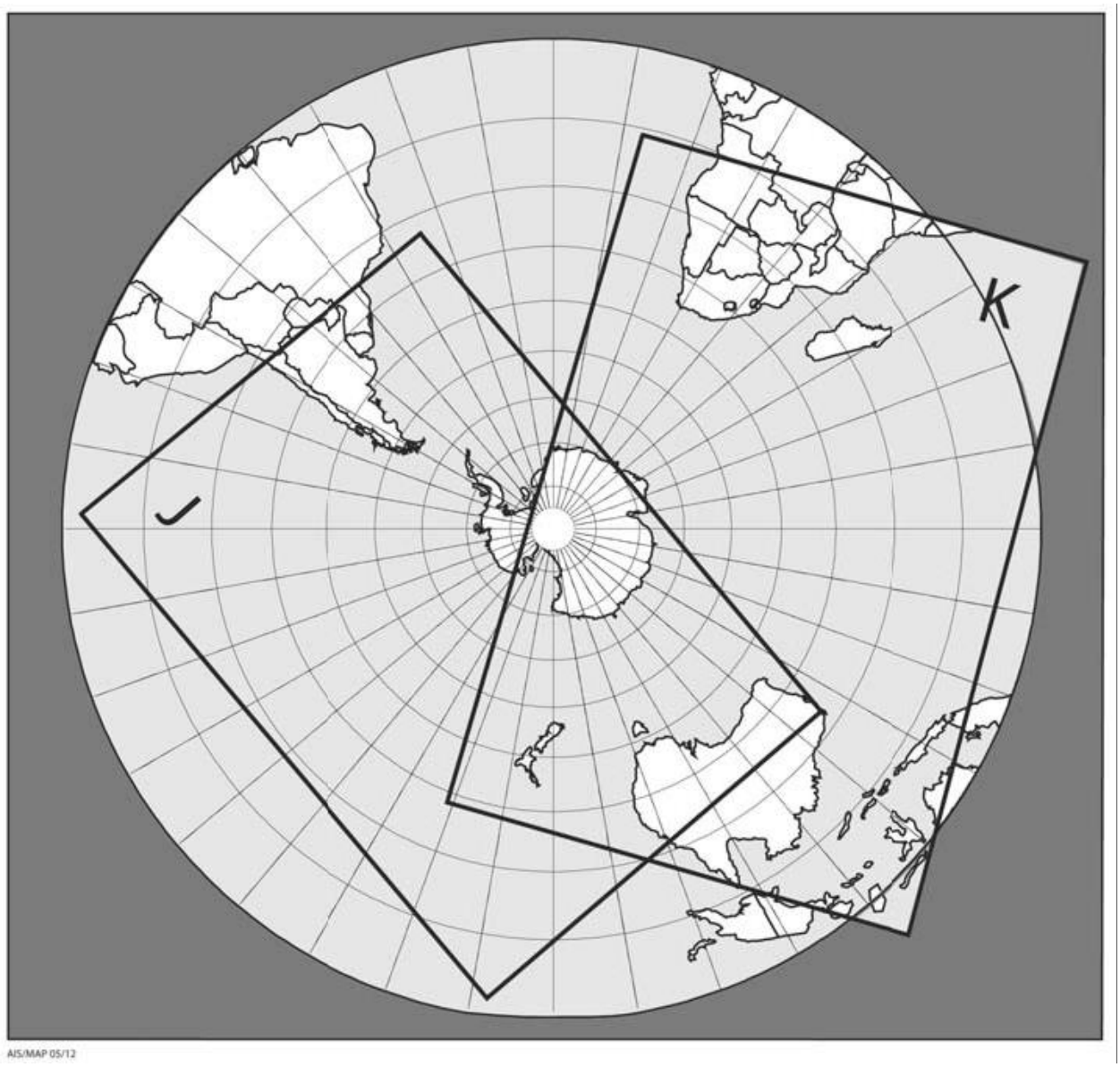

CHART	LATITUDE	LONGITUDE
J	S2305	W03700
J	S2245	E11322
J	S0616	E17245
J	S0722	W09347
K	S1000	E00500
K	S2845	W16730
K	N0500	E12800
K	N1200	E05500

Figure A-3. Fixed areas of coverage of WAFS forecasts in chart form – Polar stereographic projection (southern hemisphere)

APPENDIX B - SIGWX Text Correction Samples

Free text ADMIN message that provides description of the error.

FXUS65 KKCI 241630

WAFC WASHINGTON HAS IDENTIFIED AN ERROR WITH THE FOLLOWING WAFS SIGWX BULLETIN VALID AT 251200 UTC

BUFR FILE: JUCE00 KKCI
PNG CHARTS:
ICAO AREA M: PGDE29 KKCI
ICAO AREA F: PGGE05 KKCI
ICAO AREA I: PGBE05 KKCI

A MISSING CAT LABEL WAS DISCOVERED ON BUFR FILE: JUCE00 KKCI; AND PNG CHARTS:
ICAO AREA M: PGDE29 KKCI
ICAO AREA F: PGGE05 KKCI
ICAO AREA I: PGBE05 KKCI

THE CAT LABEL SHOULD BE LOCATED NEAR 3500N14500E.
CAT INTENSITY: MODERATE.
CAT LEVELS: 380/300.

WAFC WASHINGTON WILL RE-TRANSMIT ALL BUFR AND PNG SIGWX PRODUCTS.

ISSUED BY WAFC WASHINGTON=

Automated Fixed Format Administrative Message

```
FXUS66 KKCI 200343

RETRANSMITTED WAFC WASHINGTON DATA:

DATA TYPE: WAFC WASHINGTON SIGWX BUFR AND PNG

ORIGINAL WMO AHL: PG//// KKCI 191800

                  JU//// KKCI 191800

RETRANSMITTED WMO AHL: PG//// KKCI 191800 CCA

                       JU//// KKCI 191800 CCA

WHERE PG//// REPRESENTS ALL WAFC WASHINGTON SIGWX PNG FILES

AND JU//// REPRESENTS ALL WAFC WASHINGTON SIGWX BUFR FILES

ALL WAFC WASHINGTON SIGWX BUFR AND PNG FILES INDICATED ABOVE ARE

NOW BEING RE-TRANSMITTED.

ISSUED BY WAFC WASHINGTON=
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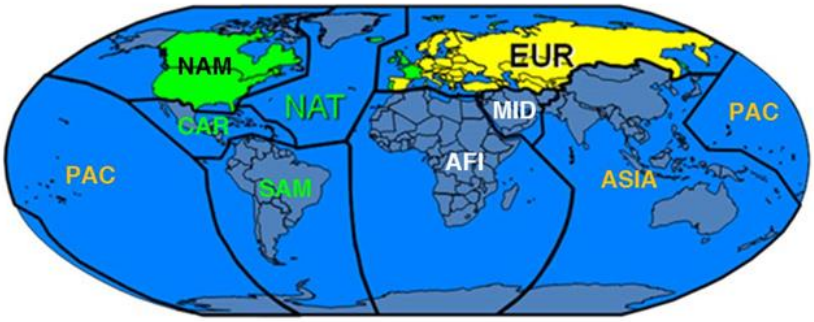
APPENDIX C - WIFS and SADIS Coverage Areas

WIFS and SADIS Coverage Areas



US	UK
NAM	EUR
CAR	AFI
SAM	MID
NAT	
US/UK Share	
ASIA-PAC	

- The US and the UK share responsibility for distribution among the ICAO Regions to include backup for each other
  - The US provides internet distribution through WIFS
  - The UK provides internet distribution through the Secure Aviation Data Information Service (SADIS); formerly the **SA**tellite **DI**stribution **S**ystem