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ALASKA REGION UPPER AIR DATA COMMUNICATIONS

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 Signed   5/5/04
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Alaska Region Upper Air Data Communications

1.   Introduction. The National Weather Service (NWS) Alaska Region (AR) has 13 offices
responsible for taking upper air soundings twice daily at 00Z and 12Z.   These soundings
provide the mission critical observational data used in global, national, and local forecast,
warning and climate programs. This supplement describes the process and defines
responsibilities for the dissemination of upper air data under normal circumstances and details
the procedures to follow if there are communications or equipment disruptions.

2.	Communications Systems. This section contains a general description of the communications systems used for the dissemination of the upper air data.

2.1	Alaska Region Headquarters (ARH). ARH serves as the computer network hub. All communications systems involved in the transmission of upper air data connect at ARH.

2.2	WSONet. WSONet is a frame relay-based network that provides the primary connectivity between each upper air site and ARH. All upper air sites connect to ARH via WSONet. A commercial vendor provides the WSONet network circuits. WSONet has an automatic dial-backup capability that establishes a network connection to the ARH hub if there is a frame relay outage.

2.3	Digital Aviation Weather Network (DAWN). DAWN is a weather information system used by the Federal Aviation Administration (FAA) at its Flight Service Stations. DAWN is used as a backup data route between the upper air site and ARH. Each of the upper air sites, except Anchorage and Fairbanks, has a DAWN workstation connected to a server at the FAA Air Route Traffic Control Center in Anchorage. The DAWN system also connects to the ARH hub. The NWS upper air staff can connect the NWS upper air computers to the DAWN workstations via the upper air A-B switch box.

2.4	NWSNet. NWSNet is an NWS-wide Internet Protocol network. NWSNet is the primary network connection between the Alaska Region and the NWS Telecommunications Gateway (NWSTG). Data transmitted on NWSNet can be sent anywhere on the network, including the National Centers for Environmental Prediction (NCEP).

2.5	Advanced Weather Interactive Processing System (AWIPS). AWIPS is the primary system for dissemination, processing and display of meteorological information for forecasters in the NWS. The wide area network (WAN) connection back to the Network Control Facility at the NWSTG provides an alternate path for AR upper air data to reach the NWSTG and NCEP.

3.	Communications Software. The primary software used to transmit the upper air data is called GetUpperAir. GetUpperAir is a Windows based applications program developed by ARH. GetUpperAir provides a method to ingest the upper air message data from the upper air computer into the Forecast Preparation computer where the staff can then display, edit and transmit the data. The upper air staff can transmit the data in one of three ways: 1) direct to the NWSTG using the File Transfer Protocol (FTP) process; 2) direct to the ARH AWIPS using the FTP process; 3) from the upper air computer, to the ARH hub, via DAWN, except Anchorage and Fairbanks. The user should consult the on-line help available in the GetUpperAir program for details on how to operate the GetUpperAir software. See section 5 for additional details on the data flow.

4.	Upper Air Backup Hierarchy. This section defines the upper air backup hierarchy in the AR. The first level of backup to an upper air site will be provided by one of the other upper air sites, with the exception of Anchorage and Fairbanks, where the respective Weather Forecast Office (WFO) is the primary backup for their local upper air site. The second level of backup to

an upper air site will be provided by one of the WFOs. Specific backup site designations are listed in sections 4.1 and 4.2.

4.1   Upper Air Site Backup Assignments. The following table lists the assigned first level backup responsibilities for each upper air site. The backup station will transmit all the normal upper air messages before the established deadlines listed in section 5.5. The upper air site requiring backup will send their upper air data (including the appropriate WMO header information) via facsimile, or any other possible means, to their backup office. The backup office will use the GetUpperAir software to transmit the upper air messages. This software contains pre-formatted upper air messages. The user must insert the correct message data and World Meteorological Organization Headers before transmitting. The NWS Forecast Screen on DAWN may also be used if needed for manual entry and transmission of upper air data. At Anchorage and Fairbanks, upper air data may also be hand typed and transmitted by AWIPS.

Upper Air Site	Backup Site
Anchorage	Anchorage WFO
Annette	Yakutat
Barrow	Nome
Bethel	King Salmon
Cold Bay	St. Paul
Fairbanks	Fairbanks WFO
King Salmon	Bethel
Kodiak	McGrath
Kotzebue	Barrow
McGrath	Kodiak
Nome	Kotzebue
St. Paul	Cold Bay
Yakutat	Annette

4.2   WFO Backup Assignments.   The following table lists assigned second level upper air backup responsibilities for each WFO. The upper air site will send the upper air data via facsimile, or any other possible means, to their backup WFO. Every attempt will be made to transmit Parts A, B, and C from each upper air site before the transmission deadlines.

WFO Anchorage	WFO Fairbanks	WFO Juneau
Bethel	Barrow	Annette
Cold Bay	Kotzebue	Yakutat
Kodiak	Nome	
King Salmon	Fairbanks	
McGrath		
St. Paul		
Anchorage		

If all regional communications networks fail, the WFO will manually enter the upper air data into AWIPS.

5.   Communications Methods. This section contains a short description of each transmission method available for sending the upper air data to the NWSTG.

5.1   Primary Transmission. The primary method of upper air data transmission is to send the data directly to the NWSTG using the FTP process. Data transmission is accomplished using the GetUpperAir software application. When using this method, the data flows from the upper air site across WSONet to the ARH hub and then via the NWSNet to the NWSTG. Data transmission is no longer dependent on any processing at the ARH hub. This eliminates that single-point-of-failure.

5.2   Primary Backup. The primary backup transmission method is to transfer the data, using the FTP process, directly to the AWIPS Local Data Acquisition and Dissemination (LDAD) computer at ARH. This data transmission is accomplished using the GetUpperAir software application. When using this method, the data flows from the upper air site across WSONet to the ARH hub and into to the AWIPS LDAD system at ARH. ARH then transmits the upper air data to the NWSTG using the AWIPS communications system. This method provides a backup capability in the event the NWSNet network fails.

5.3   Secondary Backup. The secondary backup communications method is to use DAWN, except at Anchorage and Fairbanks. To use this method, the operator switches the upper air A-B switch and connects the upper air Micro-ART computer directly to the DAWN computer. This bypasses the forecast preparation computer and WSONet entirely. When using this method, the data flows from the upper air site via DAWN to the ARH hub. The ARH hub processes the data and sends it down the NWSNet to the NWSTG. This method provides a backup transmission path in the event there is either a forecast preparation computer or WSONet failure. Transmission is dependent on data processing at the ARH hub and the NWSNet.

5.4   Other Backup Methods. If the primary and secondary backup methods fail, the user has three other backup options.

5.4.1   Internet. The user can send data, upper air and other weather products, to the Internet web bulletin board hosted by the NWSTG: http://www.nws.noaa.gov/tg/bullguid.html .

During times of heavy usage, the NWSTG web input may not be reliable. Many transmissions may be required before they verify data receipt.

5.4.2   Facsimile. If there is a local station data communications outage, and telephone or facsimile service is still available, the user should contact their backup office and relay the data to them via fax or voice transmission.

5.4.3   Manual Entry. The WFO can transmit the upper air data by manually typing the data into their AWIPS system and transmitting the data. Every attempt will be made to transmit Parts A, B, and C from each upper air site before the transmission deadlines.

5.5   Message Transmission Deadlines. These are the data transmission windows for the AR upper air messages:

	00Z Cycle	12Z Cycle
Part A	0000Z to 0040Z	1200Z to 1240Z
Part B	0000Z to 0040Z	1200Z to 1240Z
Part C	0000Z to 0150Z	1200Z to 1350Z
RADAT	2305Z to 0100Z	1105Z to 1300Z

In case of late or multiple releases, the station must transmit the data as soon as it becomes available. For example: a station would transmit an incomplete Part A message with data to 400MB at 0040Z rather than wait until 0115Z to transmit the complete Part A message. In case of a total communications outage, the station should transmit all messages as soon as communications are restored, even up to 12 hours after the normal transmission time.

A coded message notification will be transmitted each time an upper air station has a missing observation. The coded notification will include the reason for the missing observation. Example: 10142 - ground equipment failure, 10144 - power failure, 10145 - bad weather conditions. The complete list of 101 groups, as well as coding instructions, can be found in Chapter 7 of National Weather Service Observing Handbook #10.

Shown below is an example of how the three coded messages would look if McGrath, Alaska, had no upper air observation due to a ground equipment failure on the 26th day of the month at 12Z.

> USAK18 PAMC 261220
> 70231 TTAA 7612/ 70231 51515 10142=
>
> UMAK18 PAMC 261221
> 70231 TTBB 7612/ 70231 51515 10142=
>
> UFAK48 PAMC 261222
> 70231 TTDD 7612/ 70231 51515 10142=

All upper air stations must do one of the following before the transmission deadlines:

1. Transmit a complete upper air message.
2. Transmit an incomplete upper air message (10141 Group).
3. Transmit a notification of a delayed message (10143 Group).
4. Transmit a message explaining why the observation is missing (10142, 10158, etc.).

5.6   Receipt Confirmation. The following are four methods which can assist in determining if the AR upper air data has been properly transmitted and received.

1. AR Upper Air Status Page: http://www.oa.nwsar.gov/data/uas/UAS.html
2. NCEP THANKS Report: http://www.ncep.noaa.gov/NCO/DMQAB/QAP/thanks/
3. Monitor the DAWN collectives US1, UM1, UF4
4. Receipt of return copies of upper air data.

6.   Roles and Responsibilities in the Event of Transmission Failures. The following describes the primary roles and responsibilities for reporting and resolving upper air data transmission failures within the AR.   It is important that the Computer Management Unit (CMU) staff receive notification as soon as possible after it is determined that the primary transmission method is unsuccessful. The CMU staff can often make repairs in time to allow sites to meet all transmission deadlines.

6.1   Upper Air Site. If a failure occurs during the normal work hours of 8:00 a.m. to 4:30 p.m., Monday through Friday, the affected upper air site will contact the CMU using the AR hotline number at 907-271-1752 for assistance. The upper air staff will then notify the lead forecaster, or their designee, at their area WFO of a failure during normal business hours to ensure the WFO is aware of possible changes in service level. If a failure occurs outside the normal work hours, the upper air staff will contact the lead forecaster, or their designee, at their area WFO to coordinate the need for a possible after hours repair, as defined in Section 6.2.

6.2   WFO. If a failure occurs outside normal business hours, the affected site will contact the lead forecaster, or their designee, at their area WFO to help determine if the CMU staff should be called in to repair the problem. The lead forecaster, or their designee, is responsible for ensuring the CMU staff receives an initial call to begin any required after hours repair action. The lead forecaster can direct the upper air staff to call the CMU staff directly if the decision is to make an after hours repair.

6.3   CMU. The CMU staff has the primary responsibility for the day-to-day maintenance and operation of the data servers and regional network. The CMU staff will provide remote telephone support to help in fault isolation when there are upper air data transmission failures. The CMU will staff the regional network help desk during the normal work hours of 8:00 a.m. to 4:30 p.m., Monday through Friday.

6.3.1   Help Desk. The ARH operates a network help desk with a centralized telephone "hotline" for reporting network outages. The "hotline" number is (907) 271-1752. The CMU staffs the network help desk during the normal work hours of 8:00 a.m. to 4:30 p.m., Monday through Friday. The help desk will be used according to the failure reporting process described in Section 6.1.

6.3.2   Computer Program Manager. The computer program manager will ensure that the help desk voice mail is checked at least three times daily, at 8:00 a.m., 1:00 p.m., and 4:30 p.m. each business day. The computer program manager will provide an after hours contact telephone number to the meteorologist in charge at each WFO for inclusion in the station duty manual. The after hours contact number is for use when a failure requires an after hours repair call back.

6.3.3   Telecommunications Manager. The telecommunications manager is responsible for initiating and coordinating work orders with the commercial vendor for any changes required in the commercial WSONet network data connections. The telecommunications manager will track all network outages caused by commercial circuit failures and do any follow up actions needed with the vendor to ensure prompt restoration of the commercial network circuits.   The telecommunications manager will provide current WSONet network circuit numbers and Network Operations Center telephone contact numbers to the computer program manager.

6.3.4   Network Monitoring. The AR uses an automated monitoring system called "Big Brother" to provide a visual indication of network status. The Big Brother web site is often helpful in determining what type of problem is occurring. Big Brother monitoring is available at: http://www.oa.nwsar.gov/bb/index.html