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Weather

WEATHER STATION OPERATIONS

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This manual implements AFPD 15-1, *Atmospheric and Space Environmental Support*. It applies to all Air Force personnel who provide meteorological support to the agencies their unit services. Consult cited policy directives, instructions, manuals, and their supplements for specific policies, procedures, and requirements, and as these directives are continuously being updated. Check the appropriate Air Force Index to determine currency of cited publications. Send comments or suggested changes or improvements through channels to HQ AWS/XOOS, 102 W. Losey St, Room 105, Scott AFB IL 62225-5206. Major commands (MAJCOM), field operating agencies, and direct reporting units send one copy of their supplement to HQ AWS/XOOS and HQ USAF/XOWP; other commands send one copy of each supplement to the next higher headquarters.

SUMMARY OF REVISIONS

This revision incorporates interim change (IC) 98-1 and mandates a 2 hour lead time for severe weather warnings and a 4 hour lead time for severe weather watches (unless waived by the base or post commander); updates verification procedures for these warnings by allowing units to objectively verify warnings based on reported occurrences within a 10 nautical mile radius; and implements mandatory Severe Weather Action Team (SWAT) recall procedures. **Attachment 14** contains complete text of IC 98-1. Changed material from previous edition is indicated by a |.

Chapter 1

INTRODUCTION

1.1. Purpose . This manual prescribes mandatory procedures, and provides basic guidance to Air Force Weather (AFW) units about technical issues related to weather station operations. This version does not specifically address the redistribution of responsibilities in the BWS which will result from implementation of "Back to Basic" initiative. Future supplement/revision of this manual will more thoroughly address this issue as details are worked out and "Back to Basics" is implemented. Implementation of the guidance provided in this manual by weather station managers will enhance the ability of an AFW unit to provide quality weather information products and service.

1.2. Mission.

1.2.1. The United States Air Force (USAF) mission is to prepare its forces to preserve the security and freedom of the people of the United States of America (AFM 1-1). The mission of USAF weather units is to provide or arrange for staff and operational weather products and services that support active duty and reserve components of USAF and Army units, unified commands, and other agencies as directed by the Chief of Staff, HQ USAF (AFDD 45 and AFPD 15-1).

1.2.2. Although missions of base weather stations appear similar, significant differences do exist. The types of agencies supported, their wartime and peacetime taskings, the weather unit's mobility/ deployment commitments, locations and many other factors give each weather unit's mission a unique character.

1.3. Key Programs. Success in the areas listed below is crucial to a well managed weather station. Refer to the applicable chapter for more detailed information on each area. However, all programs required to effectively manage a weather station are not mentioned in this guide. Other areas to consider include: wartime mission support, specific local and follow-on training requirements, mobility and tactical equipment training etc. Metrics and process improvement are also of key importance in providing quality products and services to the weather information consumers. Refer to AFPD 15-1, Atmospheric and Space Environmental Support, and AFI 15-114 Weather Support Evaluation, these publications and your MAJCOM or higher headquarters support services for further guidance on establishing an effective quality improvement program. Units may use AF Form 3811, ***Quality Control Register***, or an automated format to help manage a local quality assurance program.

1.3.1. Support Assistance Request (SAR). Use when requesting specialized weather, space environmental, or climatological support from the Air Force Global Weather Central (AFGWC), 50 WS (AFSPC) (formerly Air Force Space Forecast Center (AFSFC)), or AF Combat Climatology Center (AFCCC). See AFI 15-118 for more details.

1.3.2. Weather Observations. Observations are required to support aviation and ground operations, protect resources, and contribute to a global network of information that improves weather analysis and forecast products. Accurate observations also build a historical data base for analysis that support operational planning, weapons systems design, resource conservation, and engineering. The Federal Meteorological Handbook No. 1 (FMH-1) establishes standard surface weather observation requirements for United States federal meteorological agencies. AFMAN 15-111 establishes surface weather observation standards for the USAF and includes all AF - unique practices. All observing task - qualified personnel must be able to take, encode, and disseminate an observation in accordance with the

appropriate MAJCOM and AFMAN 15-111 criteria. Backup procedures to generate critical local weather observation data elements must be established. Base Weather Station (BWS) and Representative Observation Site (if applicable) evacuation procedures must also be established.

1.3.2.1. Alternate Observing Site (AOS) Program. If an alternate observation site is required, written procedures must be developed, in conjunction with other local operational and functional managers, and all weather station personnel trained and capable of performing duties at the alternate location. Development of procedures and visibility charts for the alternate locations is advisable while ordering duplicate communications circuits, equipment, etc. should only be considered for needs. Tactical meteorological equipment is not authorized for the sole purpose of satisfying alternate observing requirements.

1.3.2.2. Observation Process. The observation is the backbone of the weather information process and communication between the observer and forecaster is critical. For example, an observer relays subtle changes in local conditions that aren't captured in the encoded observation (e.g., dew is forming on the grass, the stratus layer is starting to thicken, etc.). This qualitative information alerts the forecaster to meteorological changes and may be critical to the forecast quality. When an apprentice is taking observations, the forecaster must share the impact the observation has on the forecast process, or how it affects their meteorological reasoning. This teamwork helps train the apprentice for future forecasting duties and fosters continuous improvement of weather products and services.

1.3.2.2.1. Orientation. Newly assigned personnel must be given a thorough orientation to include visits to the meteorological equipment on the airfield complex, air traffic control facilities, flying squadrons, supervisor of flying duty sections, the command post and other key operational locations. This orientation gives a solid foundation of how local weather products and services fit into the overall mission. Orientation should also cover equipment limitations and local weather effects plus a feel for how something as simple as a wind shift/runway change can impact operations.

1.3.2.2.2. Observing Weather Watch. While most units operate under a basic weather watch concept, units should strive to increase watch capability when weather affecting operations are occurring or forecast. This means a frequent reanalysis of conditions and, when conditions warrant, dissemination of observations that, even though they may not meet special or local criteria, help keep operational managers apprised of the changes.

1.3.2.2.2.1. Altimeter Setting Local. The AFMAN 15-111 requirement for local altimeter setting updates is "at a frequency not to exceed 35 minutes when there has been a change of .01 inch". During periods of rapidly or steadily changing altimeter settings, more frequent updates are encouraged to ensure users have timely information.

1.3.2.2.3. Cooperative Weather Watch. Ensure air traffic control, security police, range control, etc know what conditions, changes, reportable values are important and should be reported to the BWS. Ensure the local weather support document outlines these conditions/ criteria and addresses any corresponding training requirements.

1.3.2.3. Seminars. Seminars should be conducted on a periodic basis to refresh personnel on observing and forecasting procedures. At a minimum they should be conducted for seasonal unique challenges and as a training tool for skill improvement.

1.3.2.4. Publications. Units will maintain the following publications and have access to DoD FLIPs (FLIPs will be reviewed semi-annually and compared to special/local observation criteria for currency):

- •AFMAN 15-111
- •Federal Aviation Administration (FAA) Handbook 7340.1 - Contractions Manual
- •Technical Orders (TOs) for tactical observing equipment (as applicable)
- •World Meteorological Organization (WMO) International Cloud Atlas VII, Cloud Types for Observers (Recommended)

1.3.3. Terminal Aerodrome Forecast (TAF). The TAF is the summation of the forecaster's weather prediction. Pertinent data and meteorological reasoning are combined into a concise text depiction of what the atmosphere is expected to do for a 24 hour period. The TAF is used primarily to support aircraft operations and general base/post activities. AFMAN 15-124 establishes TAF standards.

1.3.3.1. Product Consistency. TAFs must be consistent with all other products, including current observation, weather warnings and watches, etc. Elements within each TAF must also be consistent. For example, if heavy snowshowers are forecast, the visibility will be restricted. Strong gusty winds or hail would generally be expected if severe thunderstorms are forecast. Product consistency prevents customers from receiving conflicting information.

1.3.4. Alternate Forecast Site (AFS). Requirements for alternate forecast sites and procedures must be coordinated with other local operational and functional managers. If an alternate forecast site is required, written procedures must be developed and all forecasters must be trained and capable of performing duties at the alternate location.

1.3.5. Severe Weather Action Team (SWAT). AFW units tasked with resource protection responsibilities will develop procedures to ensure weather station management responds to both potential and actual severe weather events within the unit's area of responsibility. As a minimum, the unit will:

1.3.5.1. Develop a severe weather management plan.

1.3.5.2. Exercise the severe weather management plan periodically (actual events can count as exercises).

1.3.5.3. Outline specific duty positions which need to be filled during severe weather events.

1.3.5.4. Specify position responsibilities within the team.

1.3.5.5. Specify which position is the leader of the team.

1.3.5.6. Outline standby/recall procedures.

1.3.5.6.1. Unless waived by wing or post commanders, establish procedures to activate their SWAT whenever their installation is placed in a tornado or severe thunderstorm area by the Air Force Weather Agency (AFWA) Military Weather Advisory (MWA) or their supporting Operational Weather Squadron's (OWS) MWA or like product. The SWAT will respond 4 hours before the expected occurrence of a severe weather event to analyze and assess the weather threat. If the SWAT determines that their installation is at risk for severe weather, then a contingent of the SWAT will remain on duty until the threat is passed. However, if the SWAT determines that their installation is not at risk for severe weather, the weather unit will return to normal operations

1.3.6. Training. An effective training program is probably the most critical element required to ensure the BWS is capable of accomplishing it's mission. The Career Field Education and Training Program (CFETP) provides information necessary for planning, developing, and conducting your program. The current CFETP is listed in AFIND 8, Section E, and can be ordered by your Publications Monitor.

1.3.6.1. Upgrade Training: The CFETP identifies mandatory requirements, sources for training, and documentation requirements for upgrade to the next skill level..

1.3.6.2. Qualification Training (QT): QT is task specific knowledge and performance training designed to qualify an individual for a specific duty position. The CFETP identifies the career field requirements for position qualification and may list a Qualification training Package (QTP) specifically designed to guide QT for a specific position. Unit unique qualification requirements must also be identified and addressed by training.

1.3.6.3. Formal Training: Formal training is normally conducted in-residence in a formal classroom setting. Some Qualification and Upgrade requirements can only met by attendance at the appropriate formal course. The CFETP identifies available formal training courses and denotes courses required for qualification.

1.3.6.4. On-the-Job Training (OJT): OJT has traditionally been considered only that which occurs in the duty section and conducted through hands-on and over the shoulder guidance of a person qualified in the tasks and duty position. A large portion of the training a person gets to meet the skill and knowledge requirements to do the job must be accomplished through OJT. Realistically it includes a number of different training options, including:

1.3.6.4.1. Hands-on instruction / demonstration by a qualified individual

1.3.6.4.2. Unit seminars

1.3.6.4.3. Meteorology discussions during shift change, or at critical forecast times

1.3.6.4.4. Review of technical materials (FYI, T-TWOS, etc. . .)

1.3.6.4.5. Completion of Computer Based Training modules (a list can be found in the CFETP)

1.3.6.4.6. Review of video tapes (a list can be found in the CFETP)

1.3.6.5. Documentation: All training must be documented in the AF Form 623, ***On-The-Job Training, Record*** IAW AFI 36-2201. Identify duty position requirements in the Specialty Training Standard (STS) which is Part 2 of the CFEPT. Unit and position unique requirements should be documented on AF Form 623a, ***On-The-Job Training Record Continuation Sheet,*** and kept with the STS as necessary.

1.3.7. Back to Basics. The Back to Basics program is an initiative to improve AFW performance by infusing the science of meteorology into weather operations at the wing/base level. A specific objective is to design duty positions in the weather station to better align roles and responsibilities based on education, training, and experience.

1.3.7.1. Air Force Doctrine Document 45 identifies seven primary weather functions that enhance military operations: collection, analysis, forecasting, tailored applications, dissemination, evaluation, and integration. Duty positions in Back to Basics are designed to support the accomplish-

ment of these functions through exploiting the skills and abilities of officer and enlisted and by making the most of limited resources.

1.3.7.2. The responsibilities listed and their assignment to a duty position represents the Back to Basics ideal. Many units should be able to adhere to this list. Some, however, will have to modify the assignment of tasks to account for specific situations. The goal is to follow the list as closely as possible with available resources.

Table 1.1. Officer Duty Position Responsibilities.

Officer Duty Positions	Abbreviation	General Responsibility
Meteorologist	(M)	Learns operational military meteorology.
Operational Meteorologist	(OM)	Performs operational military meteorology.
Instructor Meteorologist	(IM)	Scientific leader: exploits knowledge of weather science and weather operations to enhance combat-force effectiveness.
Command Meteorologist	(CM)	Commander and lead meteorologist: exploits knowledge of military meteorology and wing/base operations to make weather a force multiplier.

Table 1.2. Enlisted Duty Position Responsibilities.

Enlisted Duty Positions	Abbreviation	General Responsibility
Weather Apprentice (3-level)	(AP)	Learns observing, analysis, and metwatch.
Weather Analyst (5 level)	(AN)	Performs observing, analysis, and metwatch.
Able Forecaster (A suffix)	(AF)	Performs general forecasting, briefing, and analysis, and exploits on-shift training opportunities for AP and AN.
Weather Manager (7-level)	(WM)	Performs specific forecasting, briefing, and analysis; exploits on-shift training opportunities for AF; and manages weather systems.
Weather NCOIC (7/9-level)	(WN)	Technical leader: adapts resources to mission requirements; manages observing and metwatch function; and manages weather communications and equipment.

1.3.7.3. As weather personnel advance in skill level, each individual's breadth and depth of knowledge will increase. However, unless the individual periodically performs those functions more commonly carried out in junior positions, skill in the basics tenets of weather observing and forecasting will be lost. To foster continuance of these skills, weather unit leadership must ensure individuals can function effectively in the core competencies. All base weather station officers, Weather NCOICs, Weather Managers, and Able Forecasters will obtain and maintain qualification in surface observing, TAF preparation, and mission briefing preparation and presentation, where these duties are performed at the base weather station. All Weather Analyst and Weather apprentices will obtain and maintain qualification in observing duties. Specific initial and recur-

ring qualification requirements are contained in AFI 15-180, *Air Force Weather Standardization and Evaluation Program.*

1.4. Conclusion . Every weather unit needs a structured, well organized process to meet the many demands placed on today's weather station. Whether it's routine in-station support or an unexpected call to deploy, you and your team will benefit by following the basic guidance presented in this document.

Chapter 2

METEOROLOGICAL WATCH PROGRAM

2.1. General . Certain weather conditions endanger property or life, pose a safety hazard, or adversely impact operations. Weather units should monitor these phenomena and provide products and services to supported agencies when these conditions are observed or forecast to occur. These items include: observations, forecasts, PIREPs, weather advisories, watches, and warnings.

2.1.1. Definitions:

2.1.1.1. Metwatch. A meteorological watch (metwatch) is the process of monitoring the weather and informing designated agencies when certain weather conditions could impact operations or pose a hazard to property or life.

2.1.1.2. Weather Watch. A weather watch is a special notice provided to supported customers that alerts them of a potential for weather conditions of such intensity as to pose a hazard to life or property for which the customer must take protective action (e.g., tornadoes, thunderstorms with winds greater than 50 knots and/or hail greater than or equal to 3/4 inches, lightning within 5 nautical miles, winter storms, blizzard conditions).

2.1.1.3. Weather Warning (WW). A weather warning is a special notice provided to supported customers that alerts them to weather conditions of such intensity as to pose a hazard to life or property.

2.1.1.4. Weather Advisory (WA). A weather advisory is a special notice provided to supported customer that alerts them to weather conditions that could affect their operations.

2.1.1.4.1. Observed Weather Advisory (OWA). A weather advisory issued when the customer does not require advanced notification of a particular weather phenomenon.

2.1.1.4.2. Forecast Weather Advisory (FWA). A weather advisory issued when the customer requires advance notification of an impending condition with sufficient time to allow protective actions to be taken.

2.1.1.5. Issue Time. The issue time is the time when an agency is notified of a watch, warning, or advisory. When more than one agency is notified, the issue time is the time the last agency is notified. Follow-up notifications are not considered when determining issue time.

2.1.1.6. Actual Lead Time (ALT). The actual lead time is elapsed time between the issue time of an advisory or warning and the first occurrence of the event.

2.1.1.7. Minimum Desired Lead Time. The minimum desired lead time is the minimum amount of advance notice an agency requires prior to the onset of a particular weather phenomenon (minimum desired lead-time for weather warnings for lightning and all observed weather advisories is always assumed to be zero). An actual value in minutes and/or hours must be specified as opposed to vague terms such as “ASAP.”

2.1.1.8. Timing Error. The timing error is the algebraic difference between the forecast time of occurrence and the actual time of occurrence. The timing error is positive (plus) if the event occurred later than the forecast time and negative (minus) if it occurred earlier than forecast.

2.2. Meteorological Watch

2.2.1. Requirements. Weather units with forecast and observing functions will coordinate with their supported agencies to identify metwatch requirements for Weather Advisories (WAs), Weather Warnings (WWs), and Watches. Weather support plans or similar documents (base annexes) provide an excellent source for written documentation of these requirements.

2.2.2. Backup Support. If support during non-duty hours is required and cannot be met with local resources, limited duty stations will arrange for assistance from another unit or weather agency such as a BWS, forecast unit (FU), or a National Weather Service forecast office. Weather units must work this issue through their Weather Squadron (WS)/Operations Support Squadron (OSS)/Air Support Operations Squadron (ASOS) and Operations Group/Air Support Operations Group (ASOG), especially when the unit providing assistance is not in the same MAJCOM.

2.2.3. Dissemination. Weather units will enter WAs, WWs, and watches into the Automated Weather Distribution System (AWDS) or other dissemination system approved by MAJCOM. Supported agencies are responsible for further dissemination.

2.2.4. Local Weather Units will:

2.2.4.1. Develop a metwatch program in coordination with each supported agency by identifying specific weather phenomena that impact operations. In addition, unit must coordinate the minimum desired lead times and the notification method for each phenomenon.

2.2.4.2. Document and annually review the metwatch program in a weather support plan or similar document. This plan describes the phenomena and geographic coverage of required advisories, watches, warnings, and minimum desired lead times; agencies requiring notification; dissemination (routine and back-up) procedures; and alternate procedures in the event of BWS evacuation.

2.2.4.3. Ensure timely local dissemination. Ideally, weather units will enter products only once into a local dissemination device (e.g., AWDS). Units without AWDS will verify and document receipt of WAs, WWs, and watches by key customers.

2.2.4.4. Develop backup dissemination procedures to ensure customers will receive timely notification if an outage occurs to the primary system.

2.2.4.5. Ensure backup support. If required by supported agencies, limited duty stations will arrange for backup support from another unit or weather agency to ensure 24-hour metwatch support. Weather units will:

2.2.4.5.1. Coordinate with their local customer and base safety office for the requirements for lightning watches and warnings to be issued during hours the weather station is closed or manned solely by an observer. If lightning watch/warning support is required by the base during hours support is normally unavailable, then the remainder of the requirements in para 2.2.4.5. apply to lightning as well.

2.2.4.5.2. Establish a written agreement with the weather agency providing the support to notify supported agencies when, at a minimum, severe weather may affect the agency's operation. If centralized warnings (e.g., AFGWC Point Warning) meet customer requirements, document their use in a weather support plan or similar document. AF Form 3809, Centralized Point Warning Log, may be used by any agency that issues or relays warnings for customers not collocated with the issuing/relaying agency. The form's instructions are self-explanatory.

2.2.4.5.3. Designate a standby, fully task certified forecaster when the weather station is closed and establish recall notification procedures.

2.2.4.5.4. Establish procedures to manage a severe weather threat if the unit has a forecast metwatch responsibility. As a minimum these procedures will:

2.2.4.5.4.1. Provide appropriate actions for shift personnel to take when initial indications of severe weather are first detected.

2.2.4.5.4.2. Detail actions for activating the Severe Weather Action Team (SWAT). See paragraph **1.3.5.**

2.2.4.5.4.3. List or provide for the assignment of specific responsibilities for each SWAT member responding to the alert of severe weather.

2.2.4.5.5. Establish a unit tracking system and document issuance of WAs, WWs, and watches, on AF Form 3806, *Weather Advisory Log*, or the AWDS format; AF Form 3807, *Watch/Warning Notification and Verification*, or the AWDS format; and AF Form 3808, *Hurricane/Typhoon Military Advisory*, as appropriate.

2.2.4.5.6. Subjectively verify all forecast WAs and WWs. Exceptions are: downgrades that have already been verified and extensions. ALT will always be computed from local observational data.

2.2.4.5.7. Establish BWS evacuation procedures.

2.2.4.5.7.1. CONUS units evacuating a BWS will notify AFGWC (DSN 271-2586), when an alternate location is active, if unable to successfully continue resource protection efforts from the alternate location, and provide a single contact point for centralized warning support. These units will also notify AFGWC when normal operations resume.

2.2.4.5.7.2. Overseas units will develop similar procedures with supporting centralized warning facilities if unable to successfully continue resource protection efforts from the alternate location.

2.3. Weather Advisory (WA).

2.3.1. Weather units provide weather advisory support to US Air Force and US Army installations, activities, and personnel; Air National Guard and Air Force Reserve units; and plant sites. Weather units use a mix of centrally produced and locally produced services to provide this support. Personnel should evaluate the validity of the products prior to issuing local advisories.

2.3.1.1. Coordinate WA criteria with each customer.

2.3.1.2. Limit phenomena to conditions that affect the agency's operation. For example, 25-knot winds parallel to the runway might not affect operations; but a 25-knot crosswind might.

2.3.1.3. When several customers have similar phenomena, consolidate phenomena to the extent possible without compromising individual requirements.

2.3.2. WA minimum desired lead time. Coordinate a minimum desired lead time with the customer for each WA phenomenon. If a customer requires no lead time, the WA is an observed WA. Coordinate the minimum desired lead time based upon the customers requirement and the unit's best estimate of its capability to provide such a lead time. There is a correlation between minimum desired

lead time and false alarms - the greater the minimum desired lead time, the greater the percentage of false alarms. A minimum desired lead time is not required for weather advisory downgrades and extensions. Units will develop their own historical profile of capabilities to aid in establishing minimum desired lead times.

2.3.3. WA Format.

2.3.3.1. Non-AWDS user. Coordinate the WA dissemination format with supported agencies. At a minimum, the format should clearly define the location for which the WA is issued, the forecast time of occurrence and duration (occurrence time for observed advisories), and the phenomenon.

2.3.3.2. AWDS user. Use the AWDS format for WAs entered into AWDS from the base weather station terminal, the staff weather officer terminal, or the aircrew briefing terminal. Use unformatted text for WAs entered into the observer terminal (i.e., locations with a representative observation site).

2.3.3.3. A WA may contain more than one phenomenon, but each phenomenon requiring its own DLT should be individually verified.

2.3.3.4. For any location, more than one WA may be in effect at the same time, but only one WA will be in effect for a particular phenomenon.

2.3.4. WA Amendments.

2.3.4.1. When a WA no longer adequately describes a phenomenon or its onset, amend the WA by issuing a completely new WA under a new number.

2.3.4.2. An amended WA will clearly state its effect on the previous WA; for example, “DOWNGRADES ADVISORY NO. 5-5” or “UPGRADES ADVISORY NO. 7-11.”

2.3.4.3. Compute lead times for amendments that “upgrade” advisories that cross any locally established threshold consistent with the minimum desired lead time.

2.3.4.4. Extend WAs only if the duration changes, and the extension is issued prior to the expiration of the original advisory. WA upgrades that do not cross locally established thresholds, downgrades, and extensions are not required to meet DLT.

2.3.5. WA Records.

2.3.5.1. Record all weather advisories (both forecast and observed) and extensions on the AF Form 3806***, Weather Watch Advisory Log***, or the AWDS format (see **Attachment 2**).

2.3.5.2. For observed advisories, the record copy provided by the local dissemination device will suffice; however, when such a record is not provided, observed advisories will be recorded in the same manner as forecast advisories.

2.4. Local Weather Watches and Warnings.

2.4.1. General. Weather units provide weather warning support to US Air Force and US Army installations, activities, and personnel; Air National Guard and Air Force Reserve units; and plant sites. Weather units use a mix of centrally produced and locally produced warning services to provide this support. Personnel should evaluate the validity of the products prior to issuing local advisories.

2.4.2. Area covered by warnings. Weather units issue warnings for installations (base or post) and/or areas (training areas, missile complex, drop zone, etc.). BWSs and other weather agencies will work

with their customers to identify requirements and define locations covered by the warnings. Warnings cover separate and distinct areas normally not larger than 5 nautical miles in radius (except for lightning warnings which have a minimum radius of 5 nautical miles).

2.4.2.1. Area covered by lightning warnings. The requirement to issue watches and warnings for lightning within 5 nautical miles applies only to AF weather units located on an AF installation providing support to on-base customers. AF weather units located on an Army post, or supporting off-base customers, will work with their supported customer to establish lightning support requirements.

2.4.3. Warning Criteria. Limit warning criteria to intense weather phenomena which create a hazard to property or life, cause the customer to take protective action, and fall within the weather unit's forecast capabilities. The following are recommended criteria. Weather units will coordinate with their customer which of these, or similar, are valid requirements. Units are encouraged to adhere to the minimum thresholds suggested below. Consider issuing advisories to meet notification requirement for criteria of lower intensities.

2.4.3.1. Tornadoes.

2.4.3.2. Winds 35 knots or greater. Several thresholds may be established (e.g., 35 knots but less than 50 knots, and 50 knots or greater).

2.4.3.3. Hail. Several thresholds may be established (e.g., less than 3/4 inch and 3/4 inch or greater).

2.4.3.4. Heavy rain (e.g., 2 inches or more within 12 hours).

2.4.3.5. Heavy snow (e.g., 2 inches or more within 12 hours).

2.4.3.6. Freezing precipitation.

2.4.3.7. Blizzard conditions (winds of 30 knots or greater and considerable falling and/or blowing snow causing prevailing visibilities of 1/2 mile or less).

NOTE: Items 2.4.3.2 and 2.4.3.3 (above) reflect the recommended minimum thresholds for warnings. The actual threshold for a heavy precipitation warning will be established according to supported agency requirements. For example, an agency may require a warning for a 4-inch precipitation accumulation in 12 hours rather than 2 inches; or 2 inches in 6 hours; or a wind warning for 40 knots or greater rather than 35 knots.

2.4.3.8. Lightning within 5mm (required to implement AFOSH Standards 91-66 and 91-100).

2.4.4. Warning Minimum Desired Lead Time. Minimum desired lead times must be within the unit's forecast capability and within the reactive capability of the supported agency.

2.4.4.1. Minimum desired lead-time for wind gusts of 50 knots or greater; hail 3/4 inch or greater in diameter (or substitute your local severe weather thresholds where different) will be at least 2 hours. This lead-time requirement can be shortened by wing or post commanders through issuance of a local written waiver, if this amount of lead-time is not needed to properly react to severe weather.

2.4.4.2. Lightning warnings are for lightning observed within 5 nautical miles thus do not require a lead-time.

2.4.5. Watch-Warning System. Some weather units may, in conjunction with their supported agencies, use a watch-warning system as part of their metwatch program. This system allows the weather unit to advise agencies of the potential for severe weather before actually issuing a warning. Consequently, the customer has more time to prepare for extremely hazardous weather phenomena which disrupt operations and pose a significant threat to safety. The following information provides a framework for establishing a watch-warning system:

2.4.5.1. Watches may be issued for any warning criteria but should be reserved for the potential for severe weather.

2.4.5.1.1. Lightning watches will be issued at least 30 minutes prior to thunderstorms being forecast within areas where watch/warning support is required. Lightning watches will be canceled only when the potential for lightning within the next 30 minutes is no longer forecast. (Required to implement AFOSH Standards 91-66 and 91-100).

2.4.5.1.2. Minimum desired lead time for wind gusts of 50 knots or greater; hail 3/4 inch or greater in diameter (or substitute your local severe weather thresholds where different) will be at least 4 hours. This lead-time requirement can be shortened by wing or post commanders through issuance of a local written waiver, if this amount of lead-time is not needed to properly react to severe weather

2.4.5.2. A watch never takes the place of a warning. Weather units will issue warnings, as required, regardless of whether or not a watch had previously been issued.

2.4.5.3. Weather units will include the details of the watch-warning system in a weather support plan, base/wing regulation, or other similar document. To avoid possible confusion, thoroughly educate base/post agencies on the purpose, applicability, and operating procedures of the watch-warning system.

2.4.5.4. The aerial coverage of a watch and subsequent warning may be different; however, the coverage for both will be documented.

2.4.5.5. Weather units will disseminate the watch as required by the local weather support plan or similar document.

2.4.5.6. Weather units will amend and cancel watches using procedures established for warnings in paragraphs **2.4.7.** and **2.4.8.**

2.4.5.7. The following examples of weather watches and warnings serve as a guide:

- •WATCH #4-8. The potential exists for tornado development at Moody AFB during the period 20/1700Z to 20/2100Z. A warning will be issued later if required.
- •WEATHER WARNING #4-2. Tornado sighted 10 NM SW of Moody AFB moving NE. Expect tornado activity in Moody area current-20/2000Z. Weather Watch #4-8 remains in effect.
- •WATCH #6-9. The potential exists for severe thunderstorm development at Moody AFB during the period 21/1600Z to 21/2300Z. Winds of 50 knots or greater and/or hail of 3/4 inch or greater accompanying severe thunderstorms. A warning will be issued later, if required.

•WEATHER WARNING #6-4. Thunderstorms with wind gusts to 55 knots and 1-inch hail at Moody AFB during the period 21/1900Z to 21/2300Z. Weather Watch #6-9 remains in effect.

•WATCH #1-2. The potential exists for blizzard conditions developing at Grand Forks AFB during the period 25/0000Z to 25/1400Z. Winds 30 to 40 knots with heavy snow accumulation of 4 inches or more within 12 hours are possible. A warning will be issued later, if required.

•WEATHER WARNING #1-2. Blizzard conditions; winds 40 knots with snow and blowing snow causing visibility of 1/4 mile or less and accumulation of 2-4 inches within 12 hours at Grand Forks AFB for the period 25/0200Z to 25/1000Z.

•WATCH #7-5. The potential exists for lightning at Langley AFB during the period 15/1900z to 15/2100z. A warning will be issued later if required."

•Weather Warning #7-10. Lightning within 5 nm of Langley observed at 15/1945z with estimated duration until 15/2015z. Weather Watch #7-5 remains in effect." (if another warning has been issued for forecast severe weather parameters, the effect on that warning would also be referenced; i.e., "weather watch #7-5 and weather warning #7-9 remain in effect)

2.4.6. Warning format. A warning for observed lightning will be issued separately from, and can be issued concurrent with, a warning issued for any or all other criteria. The warning for observed lightning is the only criterion that will be issued separately from other warning criteria. All criteria will be verified separately.

2.4.6.1. The following additional requirements apply to warnings issued for criteria other than observed lightning:

2.4.6.1.1. Only one warning will be in effect at one time for any given location (airfield, range, etc.).

2.4.6.1.2. If a warning is issued for one criterion and it later becomes necessary to issue a warning for another criterion, then a new warning will be issued to include both criteria forecast to affect that location.

2.4.6.1.3. Each warning issued for a particular location is an entity and supersedes any previously issued warning for that location.

2.4.6.1.4. A separate valid time may be specified for each criterion.

2.4.6.1.5. Issue warnings to cover all occurrences of weather phenomena that meet a supported agency's established weather warning criteria. However, a warning need not be issued if there is an unforecast single occurrence that has stopped and is not forecast to recur.

2.4.6.2. Word the text of each warning to clearly describe the weather conditions in terms non-weather personnel can understand. Each warning must clearly identify:

2.4.6.2.1. The location (installation or area) for which it is valid.

2.4.6.2.2. The specific conditions forecast.

2.4.6.2.3. The specific valid period. For an observed lightning warning, the ending time will reflect estimated duration.

2.4.6.2.4. The warning number (i.e., Moody AFB Weather Warning #6-2).

2.4.6.2.5. The effect the warning has on any previously issued warning in the text. For example, downgrades Weather Warning #7-10; upgrades Weather Warning #4-8; or in the case of lightning warnings, Weather Warning #8-3 remains in effect.

2.4.7. Amending Warnings. Weather units will use the following procedures to amend warnings.

2.4.7.1. When a warning no longer adequately describes the phenomenon or its onset, amend the warning by issuing a completely new warning (with a new number). When a new warning is issued, clearly state its effect on any previously issued warning in the text; for example, "DOWNGRADES WARNING 3-1" or "UPGRADES WARNING 11-14."

2.4.7.2. Compute lead times for upgraded warnings consistent with established minimum desired lead times.

2.4.7.3. Locally issued weather warnings may be extended provided the extension is issued prior to the expiration of the original warning and nothing changes except the duration. Minimum desired lead time is not applicable for extensions.

2.4.8. Canceling Warnings. Weather units should cancel warnings when previously forecast/observed conditions abate or are no longer expected to recur. Lightning warnings will be canceled when thunderstorms have passed beyond the area covered by the warning. For lightning warning cancellations, include a statement indicating impact on any previously issued warnings such as "weather warning #6-3 remains in effect". Disseminate cancellations following locally established formats."

2.4.9. Reporting Procedures.

2.4.9.1. AF Form 3807, ***Watch/Warning Notification and Verification***. Record WWs and watches on AF Form 3807 or the AWDS format (see **Attachment 3**).

2.4.9.2. AF Form 3810, ***Weather Warning and Advisory Data***. Record and transmit a completed AF Form 3810 by the 15th of each month to the appropriate MAJCOM. MAJCOMs will collect and forward unit inputs (recommended format is Excel spreadsheet) to HQ AWS/XOX by the 25th of the month. See AFI 15-114 for complete reporting procedures.

2.4.10. Relationship Between WAs and WWs.

2.4.10.1. It is possible to have a WW and one or more WAs in effect at the same time (i.e., a WW for non-convective winds gusting to 55 knots and WAs for a crosswind component of 36 knots and an equivalent wind chill temperature less than -20 degrees Fahrenheit). Such a situation should not cause confusion. However, having a WW and a WA in effect at the same time for two different thresholds of the same phenomenon (i.e., a WW for convective winds gusting to 40 knots and a WA for convective winds gusting to 25 knots) would be horizontally inconsistent and will not be done. At most locations, a strong wind is the only phenomenon that will pose such a problem.

2.4.10.2. In all cases, WAs and WWs must maintain product consistency with other forecast products which have been issued, or will be issued from that agency. For example, if a warning is issued for winds equal to or in excess of 35 knots, then the TAF, flight weather briefings valid for that time, etc., will also reflect winds in the warning. Products will be amended, corrected, or revised to ensure categorical and horizontal consistency.

2.5. Centrally Produced Weather Warnings.

2.5.1. General. Units requiring centrally produced warnings are to request such support following procedures in AFI 15-118. Units that require centrally produced warnings will revalidate them in response to queries from the centralized unit. MAJCOM Directorates of Weather will also validate all requests for non-standard warning criteria and lead times.

2.5.2. Warning Criteria.

2.5.2.1. AFGWC issues weather warnings for the following standard weather phenomena:

2.5.2.1.1. Tornadoes.

2.5.2.1.2. Severe Thunderstorms (those with wind gusts of 50 knots or greater, or hail 3/4 inch or greater in diameter, or both).

2.5.2.1.3. Moderate thunderstorms (those with wind gusts of 35 knots or greater but less than 50 knots, or hail 1/2 inch or greater but less than 3/4 inch in diameter, or both).

2.5.2.1.4. Heavy rain (2 inches or more within 12 hours).

2.5.2.1.5. Heavy snow (2 inches or more within 12 hours).

2.5.2.1.6. Surface winds 35 knots or greater (non-convective).

2.5.2.1.7. Freezing precipitation.

2.5.2.2. Other centrally produced warnings. Units requiring other centrally produced warnings (from sources other than AFGWC) should standardize warning elements along the following categories. However, these categories are not intended to dictate the requirements of supported activities.

2.5.2.2.1. Tornadoes.

2.5.2.2.2. Surface winds 50 knots or greater.

2.5.2.2.3. Surface winds 35 knots or greater but less than 50 knots.

2.5.2.2.4. Hail 1/2 inch or greater.

2.5.2.2.5. Heavy rain and/or snow accumulation 2 inches or more within 12 hours.

2.5.2.2.6. Freezing precipitation.

2.5.3. Warning Minimum Desired Lead Time. Lead times are established based on supported agency requirements (see **Attachment 2** for instructions on completing AF Form 3806). Units that prepare centrally produced weather warnings will establish standard lead times. In line with this, AFWA, or the supporting Operational Weather Squadron (OWS), will establish a 30 minute lead time for tornadoes, a 2 hour lead time for severe thunderstorms, and 90 minutes for all other criteria. As centrally produced WWs must be relayed through another unit, delaying receipt by the customers, centralized units will issue these WWs as soon as reasonable threat exists, regardless of established lead times. Measure lead time from the time the centralized unit enters the warning into the communication system.

2.5.4. Warning Format. Each warning will be issued as a separate entity for a particular installation, area, or location; include specific criteria and a specific valid time. Word the text of the warnings such that expected weather conditions can be clearly understood by non-weather personnel.

2.5.5. Amending and Canceling Warnings. Units that prepare centrally produced warnings will establish procedures to amend and cancel warnings. These procedures will follow the intent of paragraphs **2.4.7.** and **2.4.8.**

2.5.6. Dissemination and Relay of Warnings. Units that issue centrally produced warnings will enter them into a customer-accessible communications system. Units that require and receive centrally-produced warnings will pass those warnings meeting local warning criteria to that location 24 hours a day or as specified by the customer.

2.5.7. Backup Procedures. In case centrally produced warning service is interrupted:

2.5.7.1. Units that prepare centrally produced warnings will establish procedures to notify WW addressees of the following:

2.5.7.1.1. Whenever warning service has been curtailed.

2.5.7.1.2. What warning services are still available, if any.

2.5.7.1.3. The estimated time warning services will be restored.

2.5.7.2. During outages at weather centrals, such as AFGWC, which provide point weather warnings (PWWs), the base/post weather station with the responsibility of relaying centrally produced PWWs will assume metwatch and warning responsibility for stations they normally relay warnings to, until the responsible central's outage ends.

2.5.8. Warning Records. Units that issue centrally produced warnings will maintain dissemination records. Use AF Form 3807 for this purpose (overprinting is authorized in accordance with AFI 37-160, Vol 8).

2.6. Hurricanes and Typhoons

2.6.1. The Tropical Prediction Center (Miami FL), the Central Pacific Hurricane Center (Honolulu HI), and the Joint Typhoon Warning Center (Nimitz Hill GU) issue official tropical cyclone forecasts and related information for tropical cyclones of depression, storm, or hurricane/typhoon intensity. These forecasts are issued in the form of marine and public advisories. Tropical cyclone forecasts include information describing initial and forecast locations, movement, intensity, and horizontal dimensions of significant winds and waves about the tropical cyclones.

2.6.2. Hurricane/Typhoon Procedures. The National Hurricane Operations Plan clarifies terms and establishes policies, procedures, and responsibilities in the Atlantic and the Eastern and Central Pacific westward to 180 degrees west. PACAFI 15-102 provides information for the Pacific Ocean westward from 180 degrees west and the Indian Ocean. Weather units assist supported commands not included in the above or similar command publications (e.g., US Forces Korea) in developing appropriate policies, responsibilities, and procedures.

2.6.3. Evacuation and Disaster Support. Although official tropical cyclone forecasts must be relayed verbatim to the customer, weather units need to interpret these forecasts for their supported agencies. In the Western Pacific, these interpretations will rely upon the forecast error probability statements included in discussion bulletins. Since supported agencies may require a 48-hour and 72-hour outlook for planning purposes, weather units need to ensure their supported agencies understand the uncertainty of these outlooks. Release of forecasts to the public will only be done in accordance with the

procedures specified by the Wing Commander for release of information to non-military organizations.

2.6.4. Records. The AF Form 3808, ***Hurricane/Typhoon Military Advisory***, (**Attachment 4**) may be used to distribute tropical weather advisories to supported agencies. NOTE: When using the AF Form 3808 to pass hurricane center advisories, weather units must ensure the recipient realizes the information is verbatim, not an interpretation, and the 48-hour and 72-hour outlooks are for planning purposes only and subject to change.

Chapter 3

STANDING OPERATING PROCEDURES (SOPS)

3.1. General. An SOP is a clear, effective, and locally devised aid containing step-by-step procedures for completing a specific task or operation performed by one or more individuals within a unit or workcenter. It ensures the task or operation is accomplished in a standardized manner in accordance with applicable directives. SOPs are not standard publications, they are not directive in nature and do not prescribe forms. SOPs can contain material extracted from standard publications; which is directive in nature. For ready reference purposes, this information may be extracted from the source documents and included as part of a quick-reference card/sheet in the form of an SOP.

3.2. Administrative Control. SOPs will be maintained in their appropriate workcenter(s). Workcenters may prepare a master SOP list for administrative control. If several workcenters have one or more SOPs in common, the unit will maintain a master list and establish unit distribution of those SOPs. SOPs will be reviewed (at least annually) and updated as often as necessary to ensure currency.

3.3. SOP Topics. Each unit has a unique mission and/or organization structure; therefore, the topics and contents of SOPs are generally left to the individual unit's or workcenter's discretion. Tailor SOPs to meet local needs. The following is a list of topics that may require an SOP. This list is not all-inclusive, nor will all units require SOPs for all topics listed.

OBSERVING

1. Shift Duties
2. Special/Local Criteria
3. Runway Change Procedures
4. Weather Equipment Outage Procedures
5. Weather Dissemination Procedures
6. Communications Outage Procedures
7. Quality Control Program
8. Alternate Observing Site Procedures
9. Power Failure Procedures
10. Standby Forecaster Recall Procedures
11. Aircraft Mishap
12. Duty Priorities

FORECASTING

1. Shift Duties
2. Local Analysis and Forecast Program
3. PIREP Handling
4. Weather Warnings/Watches
5. Forecaster Standby
6. Quality Control Program
7. TAF and TAF Amendments
8. DV/VIP Flights
9. Severe Weather Management Team
10. PMSV
11. Flight Weather Briefings
12. Weather Radar
13. Duty Priorities

Chapter 4

LOCAL ANALYSIS AND FORECAST PROGRAM (LAFP)

4.1. General. A strong LAFP is vital to your metwatch program. Centralized products reduce the amount of analysis and forecast work required at weather stations. Computers digest, analyze, and generate considerably more information in an hour than most forecasting sections could in a month. However, most computer-generated products require reanalysis for local effects and specific missions or operations. Use the centralized product as an initial analysis or forecast tool, then refine and improve it. Coupling reanalyzed products with locally produced charts and diagrams will provide sufficient information to develop accurate environmental products. Weather units that provide weather forecasts must develop an LAFP to ensure a systematic and organized approach to forecasting.

4.2. Responsibilities. The Command Meteorologist is primarily responsible for technical leadership in the unit. The process of implementing technical leadership must effectively utilize the expertise of the Instructor Meteorologist and the Station Chief if, it is to be effective. Technical leadership is displayed by participating in regular forecast discussions, implementing an effective training program which includes frequent use of the technical library, and developing a comprehensive LAFP. An effective, well-developed LAFP helps to improve forecast support and product consistency. The LAFP provides guidance on how to produce weather products provided to weather station customers. This guidance is routinely used in the process of creating and disseminating these products. The LAFP may be documented in operating procedures and will address all elements of weather forecast support. These instructions will also include references for techniques described, frequency of forecast discussions, forecast reviews, and case study criteria.

4.3. Developing the LAFP. When developing the LAFP, determine the impact of weather on each supported operation or weapon system; then, the environmental support requirements in relation to operational decision making. Units must concentrate on customer requirements that are not satisfied using centralized products. As supported missions change or new products and techniques become available, review and change appropriate portions of the LAFP.

4.3.1. Forecast guidance.

4.3.1.1. Evaluate and identify those centralized products that will be part of your LAFP. Review the appropriate Air Force, MAJCOM, and AFGWC instructions, manuals, guides, and pamphlets for specific product information. Additional information can also be obtained by reviewing National Weather Service , US Navy publications, and other indigenous sources (particularly useful at overseas locations).

4.3.1.2. The forecast guidance will be structured to help the forecaster choose useful tools and products for the current forecast regime. This can be accomplished by including checklists, rules-of-thumb, and other local guidance for each applicable forecast regime. This guidance ensures all useful data is incorporated into the process, such as climatology data, and forecast soundings (if applicable). If forecast soundings are used, procedures will outline how to verify and adjust these soundings using the WSR-88D Vertical Wind Profile (VWP), PIREPs, etc.

4.3.1.3. Model Initialization. The LAFP will outline procedures for model initialization and verification. Time management is vital to successfully completing all the required tasks associated with analysis and forecast production in the limited time available. As a result, the LAFP proce-

dures will ensure model initialization and verification is performed as soon as possible after the data receipt. Forecasters do not have to receive the complete model run before initializing the products received at the beginning of the run. Initialize and verify specific parameters such as relative humidity, circulation centers, and vorticity using METSAT imagery. Other items like thickness values, wind direction/speed, heights/pressures, and temperatures can be initialized/verified by overlaying Formatted Binary Data (FBD). In addition, include in the procedures a requirement to initialize the 12 HR forecast from the previous model run with the current run's 00 HR forecast to assess trends in the model forecast. Procedures must ensure forecasters analyze model output for significant features such as fronts, trough, etc. and adjust the model guidance when deemed appropriate. For details on model initialization, refer to the following references:

- AFH 105-56, Chapter 7.9, Meteorological Techniques
- 5WW/FM-81/005 The damming Effect of the Southern Appalachians
- FOT 52421-DF, Back to Basics II, Block II, Part C
- AFGWC/FM-81/001 Meteorological Analysis and the LFM; They Work Together
- 3WW/FM-83/003 Initializing the LFM, A Case of Good Agreement
- AWS/TN-88/001, Forecaster Handbook #6, Satellite Interpretation for Forecasters

4.3.2. Metwatch. The LAFP will outline unit metwatch procedures. These procedures will be tailored to the significant forecast regimes of the area. Using the Terminal Forecast Reference Notebook (TFRN), forecasters are better able to identify current forecast regimes and, using the LAFP, determine the best approach and products to use to accomplish the metwatch in the shortest possible time. These procedures will incorporate the use of technology available in the weather station. Some examples are lightning detection data, MESONET wind data, NWS radio reports, indigenous products, etc. Some details on three of the major systems currently in use follow:

4.3.2.1. RADAR. The LAFP procedures will ensure station personnel are aware of all current alert areas and thresholds, whether through a list, shift change briefing, or other means. In units using the WSR-88D, the LAFP will include a listing, by forecast regime, of radar products appropriate for use in that regime. Also, the LAFP will include a listing of all alert paired products currently available. WSR-88D unit procedures should include a requirement to monitor the VWP for use in forecast soundings, hodographs, and other products. The procedures in WSR-88D units will also require forecasters to periodically check the environmental winds tables for errors to ensure the accuracy of wind data used to make metwatch decisions. Units need to refer to FMH-11 for details on accomplishing these tasks.

4.3.2.2. Meteorological Satellite (METSAT). LAFP procedures will include explanations of what types of METSAT imagery (IR, VIS, WV) are appropriate for the forecast regimes affecting that station, and how to incorporate them into the forecast process. For example, imagery will be used to initialize graphics products, fog/stratus placement, jet stream winds, etc. These procedures will also detail which image sectors and resolutions are most appropriate for a particular regime. In addition, the procedures outline which enhancement curves are most useful for the significant cloud types and phenomena in the area.

4.3.2.3. AWDS. LAFP procedures will include instructions for producing Local Area Work Charts (LAWCs) on AWDS tailored to each forecast regime for the area. For example, a unit might produce an AWDS LAWC with one set of isopleth/isotherm parameters for winter, and a different set for the spring/summer severe weather season. These LAWC procedures ensure all

relevant data are incorporated. System managers must make sure the tables are set so all data types are available at the highest zoom level possible. Procedures will outline the use of the AWDS metwatch feature to monitor changes in upstream conditions, and command sequences to facilitate data manipulation. In addition, alphanumeric products to monitor upstream conditions not available on the LAWC such as peak wind remarks, pressure falling rapidly, PIREPs, and SIGMETs. Units need to refer to the AWDS Positional Handbooks for details on implementing these procedures. Procedures for incorporation of seasonal differences and various weather regimes affecting the forecast location should also be developed for use during AWDS outages and/or for data obtained via sources other than AWDS.

4.3.3. Analysis development.

4.3.3.1. Centrally produced products. Use centralized products to assess macroscale and synoptic scale systems. Forecasters need to develop an awareness of the content, strengths, and limitations of centralized products through routine use and evaluation. Centralized products are commonly used for forecast periods from 6 hours through 10 days. Short-range forecasts (0 to 6 hours) are benefited by continuity analysis and locally prepared products.

4.3.3.2. Locally prepared products. Use locally prepared products to assess mesoscale systems. Forecasters produce these products to acquire unique information not available from centralized products (analysis of non-standard levels, Local Area Work Chart (LAWC), Skew-T, vertical cross sections, or continuity charts) or when comparing products similar to those of centralized analyses (locally generated grids (LGG), uniform gridded data fields (UGDF), etc.).

4.3.3.3. Determine local analyses and prognoses requirements to support the mission.

4.3.3.3.1. Identify specific meteorological elements that require special analysis or prognosis; e.g. ceiling, visibility, wind, temperature, thunderstorms, and/or precipitation. Consider using your special criteria and your TAF amendment and specification criteria as a first look at what you need to analyze for. These have a direct impact on your customers' operations.

4.3.3.3.2. Select the analyses or prognoses technique/guidance applicable to each forecast product or element. Consider:

4.3.3.3.2.1. Data availability. Review the availability of both raw and processed data to determine the scope and extent of local analyses which can be accomplished.

4.3.3.3.2.2. Climatology. Climatological studies of seasonal weather system tracks help determine appropriate geographic analysis areas. The average speed of systems helps determine prognostic time steps of major features and the need for locally generated prognoses. A comprehensive array of climatological products and services are available from Air Force Combat Climatology Center (AFCCC) as described in USAFETAC/TN--94/001, Capabilities, Products, and Services of AFCCC. Many of AFCCC's products (e.g., standard climatic packages) are routinely published and distributed; all are available from the AWS Technical Library. Requests for new or updated climatic packages or for special climatic support are to be submitted to AFCCC/DO, as described in USAFETAC/TN--94/001. Ensure you have a current copy of your station's Surface Observation Climatic Summary (SOCS). Keep your local climatology records up to date. You need to maintain a copy of your climatic summary and update it each month when you have new extreme values of wind speed, precipitation and snowfall (24-hour amounts and monthly totals, in inches), and maximum and minimum temperatures.

4.3.3.4. Analysis Procedures. The LAFP will include procedures outlining an effective approach to data analysis. Procedures need to ensure that continuity is maintained on locally analyzed features. LAFP procedures must also ensure that the analysis area is large enough to track weather producing features in the forecast regime, and that analyzed parameters are important to the forecast process. Units may decide what is appropriate based on case studies, rules-of-thumb, cross-feed items, or forecast reviews. Procedures will specify key items to be analyzed from the list of available data and will list additional items that should be analyzed and incorporated as time allows. The LAFP will include procedures outlining which products are best for the forecast regime (i.e. which Skew-Ts are most representative for each forecast regime, geostrophic wind chart is unreliable with NW flow, etc.).

4.3.3.5. Contents of the TFRN. The TFRN familiarizes you with the local area climatology, forecast techniques, and forecast regimes. Units will have a TFRN for each location they have forecast responsibility for. The location of the information is not important, but the TFRN will, as a minimum, contain the station's location, area topography, local effects, meteorological sensor location, climatology, forecast regimes, forecast techniques/rules-of-thumb, supported aircraft sensitivities, and weather impact on supported units. The station chief, flight commander, and command meteorologist will review TFRNs annually for currency and update as necessary. They will also ensure a review by all assigned forecasters is accomplished semi-annually.

4.3.3.6. Forecast Worksheets. Information on forecast worksheet preparation is contained in AWS TR 218, Preparation of Terminal Forecast Worksheets, available from the AWS Technical Library. Forecast worksheets are still a valuable tool, even in today's automated weather station. They can help you organize your thought processes and guide you through an examination of the atmosphere as you prepare your forecast. Forecast worksheets are completed in accordance with the LAFP as dictated by the appropriate forecast regime identified in the TFRN.

4.3.3.6.1. Evaluate each element pertinent to the operational forecast requirement. Use questions and statements to lead the forecaster to assess meteorological information valid to the forecasting problem. An answer to a particular problem may be "yes" or "no", it may be a specific value of some element, or it may be a descriptive discussion.

4.3.3.6.2. Information such as conditional climatology, data to apply studies or objective aids, the coded forecast, forecast problems, and forecast reviews could be indicated. Ultimately, the worksheet helps the forecaster arrive at the best possible forecast.

4.3.3.6.3. Meteorological situations which give rise to major forecast problems are often seasonal; therefore, two or more worksheets may be developed.

4.3.3.7. Forecast discussions and shift change briefings. Units conduct routine forecast discussions and shift change briefings to provide consistency in all forecast products, provide input from other experienced individuals which serves as a check-and-balance on subjective reasoning, and to provide a disciplined systematic approach to forecasting.

4.3.3.7.1. A forecast discussion needs to focus on the dynamics of the atmosphere explaining why the changes occurred, or are going to occur, and the causal factors that produced the weather phenomena. Shift change briefings will plainly explain the forecast regime and the meteorological reasoning behind the TAF for consistency in disseminated products. The briefer needs to base the discussion on sound meteorological reasoning, explaining past changes, current conditions, and expected changes in terms of their meteorological basis and

impact on operations. The discussion will act as an exchange of information among as many station personnel as possible.

4.3.3.7.2. Shift change briefings as a general rule are comprised of the on-coming and off-going personnel. Forecast discussions are to be attended by all available personnel. **Attachment 6** shows an example of a forecast discussion/shift change briefing format.

4.3.3.7.3. Discussions with other forecasters at neighboring weather units are encouraged. This is beneficial to all parties and serves as another check and balance on forecast reasoning. Someone may key on an important feature others miss. It's also a way to compare tools others use to forecast weather regimes AFW stations have in common.

4.3.3.8. Forecast seminars. Forecast seminars help your people improve their forecasts based on sound meteorological reasoning and enhances their technical skills. The seminars must concentrate on forecast techniques, forecast reviews (of good and bad forecasts), and climatology. Forecast memos, technical notes, and technical reports can be the basis for the seminars. Forecast seminars will, at a minimum, be conducted in preparation for each change in season. These seminars would incorporate any rules of thumb, forecast reviews, or case studies, applicable to the upcoming regime.

4.3.3.9. Forecast reviews. Establish procedures to review forecasts that handled challenging weather well and non-representative forecasts of operationally significant weather. Forecast reviews in particular provide an excellent learning opportunity for all station personnel. Focus on what can be learned from the review, rather than view it as punishment for a bad forecast. The station chief, flight commander, and command meteorologist need to participate in the review process by providing input and guiding forecasters toward the correct analyses and conclusions. The completed product will be incorporated into the unit training program and considered for cross-feed through the MAJCOM to HQ AWS. To maintain a manageable number of reviews, purge reviews that are no longer of value on a routine basis. AWS/TN-79/002, Forecast Reviews and Case Studies, and 2WW/FM-86/003, Forecast Reviews, provide good reference material describing how to put together high-quality forecast reviews.

4.3.4. Electro-Optics Tactical Decision Aid (EOTDA) Support. For those units which support EO weapons systems, the LAFP will include information necessary to ensure personnel can produce the mission tailored decision aids their customers require. A key part of any successful EO program is having the necessary reference material on hand. All applicable EO publications will be kept readily accessible and updated. Another significant source of reference material is the documentation for the EOTDA software package. Units must ensure they have the complete documentation for the current version of the EOTDA in use. Also, as a precaution, units must always maintain backup copies of all EOTDA software packages they use. EOTDA procedures need to also address how the unit will produce the necessary tailored decision aids in cases where the primary EOTDA system (PC with EOTDA software) fails. This may involve using a backup computer system, manual computation, or other means. Regardless of which backup system is used, the procedures must clearly explain how to produce an effective EOTDA in cases of primary system failure. The following is a list of EO publications units might include in their EOTDA reference library:

•AWS/FM-82/008, Estimating Thermal Contrast for IR EO Systems, Jun 82

•AWS//TR-79-002, Weather Support for PGMs, May 79

•AWS/TN-87/003, Weather Sensitivities of EO Weapon Systems, Dec 87

- •AWS/FM-100/013, Environmental Sensitivities of EO Weapon Systems, Mar 80
- •AWS/FM-82/008, Estimating Thermal Contrast, Mar 82
- •NAVEDTRA 40520, Introduction to EO, Sep 83
- •ATC EO Service Test Workbook, Jan 87
- •ATC EO Service Test Study Guide/Problem Solving, Apr 86 and Feb 87
- •AFGL-TR-85-0144, OTDA for IR Systems MARK III Calculator Version Jun 85-
- •AFGL-TR-83-0334, OTDA Manual Version, Sep 83
- •AFGL-TR-84-0108 (I) OTDA for Laser Weapon Systems Calculator Version MARK I, Mar 84
- •AFGL-TR-85-0274 OTDA for TV Systems Calculator Version MARK II, Oct 85
- •AFGL-TR-85-0276 (I) OTDA for Low-Light-Level TV Systems Calculator Version MARK II, Oct 85
- •AWS/FM-100/013 EO Weapon Systems, Mar 80
- •AWS/TN-87/001 What's Hot & What's not-Practical Guide to TDA, Jul 87
- •AFGL-TR-87-0330 OTDA Final Report, Nov 87
- •TR-0173 Global EO System Environmental Matrix (GEOSEM) Climatology for Central America, Jun 85
- •Ford Aerospace PAVE TACK EO Target Designator System
- •HUGHES IR Maverick Operations Supplement, Oct 85
- •MAV-M-1000-2 HUGHES Operations Sup TV Maverick, Jan 85

4.4. Standard Plotting Procedures and Representations. When necessary (due to long term AWDS or other equipment outages), weather organizations will use Weather Plotting Charts (WPCs) to manually plot and analyze weather data. WPCs may be ordered from the Defense Mapping Agency (DMA) using instructions contained in the DMA Catalog , Ordering, Stocking, and Requirements for Cartographic/ Geodetic Products and Services, and the Department of Defense (DoD) Catalog of Maps, Charts, and Related Documents. Information concerning DMA can be obtained by calling the DMA Customer Support Center, 1-800-826-0342, or DSN 287-2495. The following procedures for plotting and displaying meteorological charts and diagrams are used when creating work charts, diagrams, locally generated composites, and facsimile charts. Building a unit program that utilizes hand plotting and analysis can give you a backup capability if your AWDS or other communication device fails. Tailor these procedures to best support your mission and document deviations in unit directives.

4.4.1. Standard plotting procedures:

4.4.1.1. Sounding data. AWS/TR-79/006, Use of the Skew-T, Log P Diagram in Analysis and Forecasting, provides standard plotting and analysis guidance. The AWDS will automatically generate an analysis of upper air data.

4.4.1.2. Plotted data. Plot each element, except wind information on surface and upper air charts, parallel to adjacent latitude lines. Document deviations from the plotting models in Air Force Visual Aids (AFVAs). When data are garbled, plot the letter "X" in the appropriate space; e.g., if sea level pressure is reported as 9L2, the plot will be 9X2. Where the entire element is missing,

plot the letter “M” in the appropriate space; when both wind direction and speed are missing, plots for wind data are not made.

4.4.1.3. Supplemental data. Plot gradient level winds, off-time data, Pilot reports (PIREPs), and Radar Reports (RAREPs) in red, unless another color is determined to be more appropriate. Enter the time of data (Z) immediately below the station plot, or in the legend, if more practical.

4.4.1.4. Wind data. The following instructions and AFVA 105-2, Wind Plotting Guide, supplement the guides for plotting wind data on surface and upper air charts.

4.4.1.4.1. Plot wind direction using the first two digits of the reported value (e.g., 275 = 28) by drawing the shaft of an arrow from the station circle in the direction from which the wind is blowing. Identify maximum wind, and when appropriate, enter the height or pressure (as reported) in parentheses near the axis of the shaft.

4.4.1.4.2. Wind speed is represented by barbs and solid pennants; a full barb represents 10 knots (5 m/s), a half barb represents 5 knots (2.5 m/s), and a pennant represents 50 knots (25 m/s). Barbs and pennants lie back from the shaft at an angle of about 120 degrees and are oriented to the left of the wind shaft (in relation to a person with his back to the wind) in the Northern Hemisphere and to the right in the Southern Hemisphere.

4.4.1.5. Legends. Place a legend on each chart or diagram denoting the type of chart or diagram, valid time, date and time the product was created (if locally produced), and the names/initials of personnel who plotted, analyzed, or generated the product.

4.4.2. Standard representations.

4.4.2.1. Fronts and associated phenomena. These symbols are used to indicate the positions of fronts and associated phenomena. Provision is made for monochromatic representation. The symbol line is placed on the product along the line of the phenomena (**Attachment 10**).

4.4.2.2. Weather features. These symbols are used to indicate the relative position of weather phenomena. In all cases, the extent of the area effected by the phenomena may be delineated by a thin boundary line of the same color. Any shading, cross-hatching, or superimposing of weather symbols must not obliterate plotted data (**Attachment 9**).

4.4.2.3. Air masses. Use the standard abbreviations listed below when identifying air mass origin, history, and temperature on graphic products.

4.4.2.3.1. Origin. Show airmass origin using capital letters; “A” - arctic air, “P” - polar air, “T” - tropical air, “E” - equatorial air as appropriate.

4.4.2.3.2. History (optional). Indicate the history of the air mass by placing a small letter before the capital letter showing the origin of the air mass; “m” - maritime characteristics, “c” - continental characteristics.

4.4.2.3.3. Temperature. Add a small letter after the capital letter to indicate whether the temperature of the air mass is warmer or colder than the temperature of the surface it is moving over; “w” - the air is warmer than the surface it is moving over, “k” - the air is colder than the surface that it is moving over.

4.4.2.3.4. Indicate one air mass changing into another with an arrow joining the symbols for the two air masses; e.g., the transitional state between an air mass of maritime polar air (mP) and an air mass of maritime tropical air (mT) would be shown as mP→EmT.

4.4.2.3.5. Show the mixing of two air masses by inserting a plus sign between the symbols for the air masses; e.g., mP+mT. To indicate one air mass lying above another, place the letter symbols for the two air masses one above the other and separate them with a horizontal line, e.g.,

$$\frac{mP}{cP}$$

4.4.2.4. Surface charts. Use the symbols shown in **Attachment 9** and **Attachment 10** when depicting fronts, weather features, or allied phenomena on surface charts.

4.4.2.4.1. Draw isobars in intervals of four millibars (mb). Multiples or submultiples of these basic intervals may be used depending on the scale and purpose of the chart; but, whatever the intervals, include the 1000mb isobar in all series.

4.4.2.4.2. Locate the position of pressure centers by using the symbol ⊗. The capital letters L (red) or H (blue) are used to indicate the nature of the center. An identifying letter can be used to assist in tracking pressure centers from product to product. This letter can be written as a suffix to the letter or symbol defining the pressure center.

4.4.2.4.3. The value of the pressure center will be labeled in whole millibars immediately below the symbol marking the center, the number being parallel to the adjacent line of latitude. Identify previous positions of pressure centers by using the symbol O. Above each symbol will be the corresponding time in hours (two figures) and below it, the pressure of the center at that time in millibars. To clarify continuity, a color coding scheme may enhance visualization of past positions.

4.4.2.4.4. Indicate the forecast position of a pressure center in the same manner - enter the time and the forecast pressure above and below the symbol respectively. Join the present position and the forecast position by a solid arrow drawn along the track the center is forecast to take.

4.4.2.4.5. Tropical cyclones may have a name or number assigned to them. Label in red block letters/numbers near the center of the cyclone. Use the following labels:

Depression	< 34 knots	T.D. (number)
Tropical Storm	≥ 34 but < 64 knots	T.S. (name)
Hurricane or Typhoon	≥ 64 knots	Hurricane or Typhoon (name)

4.4.2.4.6. Draw pressure change lines, or isallobars, of 3-hour pressure change for 1 mb intervals. When the scale of the product is small or if the period is longer than three hours, use larger intervals. Number the no change line with a zero and precede the numbers on the other labeled lines with a plus (+) sign if the pressure has risen and a minus (-) sign if it has fallen.

4.4.2.5. Isobaric surfaces. Use the symbols shown in **Attachment 9** and **Attachment 10** when depicting fronts, weather features, or allied phenomena on isobaric surfaces.

4.4.2.5.1. Contour lines. Depict contour lines at intervals of 60 geopotential meters (200 geopotential feet). Other intervals (120, 80, 30, 20 meters) are acceptable if applicable. Lines are numbered in geodecameters when metric units are used, e.g., 5,280 geopotential meters would be labeled as "528." When English units are used, the lines are numbered in units of 100 geopotential feet; e.g., 17,600 geopotential feet would be labeled "176."

4.4.2.5.2. Streamlines. When used in lieu of contours, streamlines will be shown with arrowheads to depict the flow direction. Streamline density will be such that wind direction at any point can be easily determined.

4.4.2.5.3. Height centers. The present, past, and forecast positions of high and low centers in the contour patterns are indicated in the same way as pressure centers on a surface chart. Show the value of the height at the center to the nearest 10 meters or to the nearest 100 feet depending on the units used immediately below the symbol marking the center, e.g., 528 (5,280) if in meters and 176 (17,600) if in feet. The number will be parallel to the adjacent line of latitude. The time of past position is to be depicted as date of month/time Z. Color coding may be used to clarify visualization.

4.4.2.5.4. Isotachs, jet streams, isohypses, isotherms, and isodrosotherms. Draw isotachs at intervals of 10, 20, or 40 knots. Mark centers of regions of minimum speed with an "S" and centers of regions of maximum speed with a "J" (optional) followed by the estimated maximum speed; e.g., J120. Signify a jet stream by a solid heavy red line with arrowheads placed at intervals pointing in the direction of the flow. When thickness lines (isohypses) are shown, make them red; intervals of 30, 60, or 90 geopotential meters are recommended. Isotherms (lines of equal temperature) will not be combined with thickness lines on the same chart. Isotherms will be drawn in red. Isodrosotherms (lines of equal dew point) will be drawn in green.

4.4.2.6. Tropopause charts. Intervals for isopleths when altitudes of the tropopause are used is 1,000 meters or 3,000 feet with additional isopleths at intervals of 500 meters or 1,500 feet when the spacing is wide or irregular.

4.4.2.6.1. When pressure values of the tropopause are used - 50mb with additional isopleths at intervals of 25mb when the spacing is wide or irregular.

4.4.2.6.2. When a tropopause of two or more levels exists over the same area of the chart, two or more sets of intersecting lines may then have to be drawn to give a complete representation of the tropopause field.

4.4.2.7. Height-change charts. Draw isallohypses (lines of equal height change) of 12 or 24-hour height changes. Use intervals which best locate the position of height rise/fall center at each level.

4.4.2.7.1. When a single color is used, show the zero change line thicker than other lines or by using a different line style (dashed versus solid). For a polychromatic system, use a dark color (e.g., black, purple, etc.) for the zero line and blue for rises and red for falls.

4.4.2.7.2. In both systems (polychromatic and monochromatic) depict the values of the change lines clearly, preceded by the appropriate positive or negative sign. Connect earlier positions of centers by using an arrow. Place the arrowhead pointing to the current position of the center.

4.4.2.8. Vertical cross-sections. Cross-sectional diagrams can be analyzed in a number of ways. They can include frontal surfaces, tropopauses, or areas of cloud, as well as isentropes or isotachs. AWDS vertical cross-section parameters include plots, temperature (to include potential and equivalent potential temperature), dew point depression, wind speed, vertical wind shear, D-values, relative humidity, and mixing ratio. Every vertical cross section will include a complete explanation of all parameters used and of all items used in the analysis.

4.4.3. Standard outlining of weather areas:

4.4.3.1. The symbols and colors shown in **Attachment 9** through **Attachment 11** will be used to indicate the relative position of weather phenomena indicated on both AWDS and on hand plotted charts.

4.4.3.2. These representations are intended to avoid confusion and provide a common analysis scheme. Units must try to use these standard colors whenever possible. When standard colors are not used, units will document the local representations to provide a reference for unit personnel.

4.5. Rules of Thumb. Any locally developed forecasting procedures which, in the opinion of the unit, improves the ability of the unit to recognize and forecast of operationally significant meteorological events.

4.5.1. Development. Accumulate and analyze subjective and/or objective meteorological data which supports development of a local forecasting process.

4.5.2. Verification. Compile statistics to validate the rule of thumb and use this information to continuously improve the process.

4.5.3. Documentation. Document the rule of thumb in the TFRN. Consider crossfeeding through the MAJCOM any rule of thumb which may be of use to other AFW units.

Chapter 5

WEATHER SUPPORT INSTRUCTIONS AND PLANS

5.1. General. Every weather unit provides weather support to or receives support from numerous base/post agencies. Each weather unit will have a concise, yet detailed document which states support responsibilities.

5.1.1. Purpose. This chapter helps you prepare a weather support document, namely the weather support instruction (WSI) and the weather support plan (WSP). It provides detailed guidance in preparing a new document or updating an existing one. Keep in mind it doesn't restrict WSI/WSP writers to only what is included, nor does it include all that may be appropriate to local operations. Each WSI/WSP is unique and is tailored to customer needs/weather support capabilities.

5.1.2. Role of the Command Meteorologist (CM) or weather unit leader. The CM/weather unit leader provides or arranges for weather support to the various base/post customers and documents this support. To effectively accomplish this task, he/she must establish a good rapport with the base or post key customers. Ensure your squadron commander is involved in this process. You are the weather expert on your base and you should be arranging a level of support that meets all your customers requirements.

5.2. Before Writing the Document:

5.2.1. General. Before you begin writing the document, identify your customers.

5.2.2. The Primary Customer (Wing/Corps). You must be thoroughly familiar with your customer's mission and support requirements. The following areas need be investigated:

5.2.2.1. Learn about local customer weapon systems (aircraft, missiles, combat vehicles etc) you provide weather support for, and establish a means to receive information on changes in weather sensitivities. Tailor local weather warnings and advisories to provide needed support.

5.2.2.2. Know weather minimums for flight operations.

5.2.2.3. Determine concept of operations: for example, local flights only, night and weekend flying, average number of sorties, duration, and so forth.

5.2.2.4. Determine the type and scope of weather services required: for example, mass weather briefings twice a day, over-the-counter briefings, special or routine support from AFGWC, etc.

5.2.3. Secondary Customers. You must also be familiar with your secondary customers (civil engineering, maintenance, etc.) requirements. Consider:

5.2.3.1. Is there a need for information on wind chill, heat stress, lightning, surface winds, roads and ground conditions, heavy rain or snow, and freezing precipitation, Air Traffic Control training, etc.?

5.2.3.2. Is climatic data routinely required?

5.2.4. Service Required by the Weather Unit. What support is required from other agencies for you to perform your role? For example:

5.2.4.1. Maintenance for weather equipment.

5.2.4.2. Air traffic control personnel monitor weather conditions, relay PIREPs, and provide back-up radar support.

5.2.4.3. Civil engineering organization provides back-up power support.

5.2.4.4. Base operations puts weather information in Flight Information Publications (FLIPs), furnishes runway condition readings, notifies the unit of aircraft emergencies/incidents and, relays warnings and advisories, etc.

5.2.5. Consultation. After you fully understand your customer's mission and their requirements, plus the services required by the unit, you can begin the consultation phase of writing or updating the WSI/WSP. This phase includes the following:

5.2.5.1. Obtain agreement on what procedures you will use.

5.2.5.2. Identify the need for new equipment or facilities, to include AOS/AFS if required.

5.2.5.3. Determine adequacy of provided weather services.

5.2.5.4. Explain capabilities and limitations of your weather unit.

5.2.5.5. Determine if other support agreements can be incorporated into the WSI/WSP.

5.2.5.6. Work with your squadron IM to obtain administrative details and assistance with the preparation of the WSI/WSP. If you are not on an Air Force base, visit the post's plans office or the publications branch to obtain administrative details on preparation of the WSI/WSP.

5.3. Documenting Support to the Weather Station:

5.3.1. General. The weather support document must be clearly written. Ensure it agrees with other prescribing directives and is written in a nontechnical format, and where technical terms are necessary, clearly define them. Normally, information included in another document is not totally repeated; a reference will do. However, if the customer doesn't have easy access to the referenced material (i.e., AFMAN 15-111), then include the information in the support document. Attachments and appendices are good ways to document information such as special and local observation criteria, forecast specification and amendment criteria, dissemination formats, etc. The document should have a table of contents. See **Attachment 7**.

5.3.2. Selecting the Format. You select if an instruction or plan best suits your needs. Each has advantages and disadvantages:

5.3.2.1. The WSI requires fewer pages, is easier to write and use, and permits handling and maintenance ease for other agencies. However, it takes longer to publish changes because it must also be coordinated and printed through base administration.

5.3.2.2. The WSP is easier to coordinate and publish changes and can include off-base support agreements. However, it is more difficult to write and use, usually requires more pages, and can be more difficult to maintain for other base agencies.

5.3.3. Areas Considered. Cover these areas in the support document:

5.3.3.1. Introductory information. The introductory chapter of the WSI and the basic plan section of a WSP contain: (See examples in **Attachment 7**)

5.3.3.1.1. General statement.

5.3.3.1.2. Terms explained.

5.3.3.1.3. Composite duty priorities.

5.3.3.1.4. Capabilities and limitations.

5.3.3.1.5. Tasks and responsibilities.

5.3.3.1.6. Release of weather information to non-DoD agencies and individuals.

5.3.3.2. Forecasting services. This section includes information on operating hours, back-up support (if applicable), TAF procedures, TAF specification and amendment criteria, weather briefings, pilot-to-metro service (PMSV) procedures, electro-optical support, radar procedures, closed circuit television, automatic telephone answering devices, support to auxiliary airfields, and the AWDS. Some examples are shown in **Attachment 9**.

5.3.3.3. Observing services. Describe the observing services provided. For example, observer duty hours, observation procedures, site limitations, cooperative weather watch procedures, basic weather watch procedures, dissemination procedures, and observation criteria. Describe observing criteria in an attachment or tab. See **Attachment 7**.

5.4. Documenting Reciprocal Base/Post Support:

5.4.1. General. At most AFW locations, Wing Plans (Wg/XP) is responsible for documenting reciprocal support needs and agreements between the weather unit and off-base customers.. Do not duplicate their efforts since conflicts in stated needs can lead to problems. At locations where there is no Wg/XP, Army posts for example, the weather unit may need to document reciprocal support. Incorporating the agencies serviced and responsibilities eliminates the need for separate letters of agreement. The following agencies and the related services and responsibilities may be included. See Attachment 7.

5.4.1.1. Agencies and reciprocal support.

5.4.1.1.1. Air traffic control facility:

5.4.1.1.1.1. Relay of pilot reports.

5.4.1.1.1.2. Notification of runway change.

5.4.1.1.1.3. Back-up radar support.

5.4.1.1.1.4. Cooperative weather watch.

5.4.1.1.2. Operations center:

5.4.1.1.2.1. Notification of accidents or mishaps where weather may have been a factor.

5.4.1.1.2.2. Relay of warnings and advisories.

5.4.1.1.3. Base/post Operations:

5.4.1.1.3.1. Relay of warnings and advisories.

5.4.1.1.3.2. Relay of runway surface conditions.

5.4.1.1.3.3. Notification of aircraft mishaps/emergencies.

5.4.2. Off-base support. In addition to base/post reciprocal support, it is appropriate to incorporate support provided by an off-base unit. For example, another weather unit provides telephone weather briefings to base/post and transient aircrews. Back-up radar support and meteorological satellite support will be incorporated.

5.5. Publication and Implementation:

5.5.1. General. This section describes the actions you take to publish and keep current the support document. An outdated document is ineffective.

5.5.2. Coordination. You coordinate the document, or changes to it, with all the tasked agencies, and agencies that have an interest in it. For example, if an agency's name appears in the draft, then that agency needs to review it before publishing. Provide draft copies to primary agencies, for example, operations group commanders for operations, resources, maintenance, etc. To expedite coordination, visit each agency and discuss the document or change rather than calling or using a "buckslip" attached to the draft. The primary agencies must have their staff and subordinate units review the draft. It's a good idea to also visit some of these. For example, operations center, tower, base operations, etc, since they are key participants in the WSI/WSP. During coordination, be prepared to explain and justify documented support procedures and requirements. Use source documents when appropriate.

5.5.3. Publication. Plan the publication date far enough ahead to give ample time for implementation. Talk with the publications or plans shop personnel in selecting the date, they'll assist in publishing the document.

5.5.4. Periodic reviews. Review at least annually, the WSI/WSP using the attached checklist and sample weather support documents (**Attachment 7**). One of these reviews should coincide with the mandatory annual review to ensure any new customer requirements can be incorporated into the document. Include all the original coordinating agencies in the annual review. In addition to any other suggested changes, recommend each supported agency provide the following:

5.5.4.1. WW and WA criteria and required lead times.

5.5.4.2. Frequency and times for warning and advisory notification, for example, "Duty hour only", "24 hours per day", and so forth.

5.5.4.3. Source and method of notification, including back-up.

5.5.4.4. Justification for required support.

5.5.4.5. Actions taken by customer.

5.5.4.6. Description of resources protected.

5.5.4.7. Office of primary responsibility.

Chapter 6

COMMUNICATIONS

6.1. Mission. The DoD/DCS Global Weather Communications System (GWCS) provides communications services for the Air Force weather support system in support of its global mission and for other DoD agencies as required. Weather data require special communications networks and handling procedures because of their unique composition and the need to widely disseminate large volumes of information in a timely manner. The GWCS is composed of:

6.1.1. Automated Weather Network (AWN). The AWN is a global communications network used for collecting and distributing alphanumeric environmental/weather data and Notices to Airmen (NOTAMs). It consists of: two overseas Automatic Digital Weather Switches (ADWSs) which are linked to AFGWC via high-speed communications circuits through a hub ADWS at Tinker AFB OK and the Communications Front End Processor (CFEP) at Offutt AFB NE; three overseas Weather Intercept Concentrator Units, and their supporting circuits; and the circuitry and interfaces interconnecting the ADWSs with other DoD, federal, and foreign meteorological and aviation facilities. The AWN is the data source for AFMEDS, alphanumeric AWDS, and USAF NOTAM systems. Weather data collected and received via the AWN are automatically edited and distributed in accordance with customer requirements. ADWSs exist at Tinker AFB OK, Hickam AFB HI, and RAF Croughton UK. The Tinker ADWS is the AWN's hub and serves the CONUS, Alaska, the North Atlantic, and the Caribbean. The Hickam ADWS serves all of the Pacific/Asian area, while the Croughton ADWS serves Europe, the Mediterranean, Africa, the Middle East, and the Azores. HQ AFGWC is responsible for the day-to-day management of AWS AWN matters.

6.1.2. AWDS. AWDS is designed to provide an integrated, automated system to support weather station, weather support unit, air traffic control agencies, and command post operations at selected locations worldwide.

6.1.3. Air Force Meteorological Dissemination System (AFMEDS). AFMEDS is the primary dissemination system for distributing weather alphanumeric data and NOTAM information to DoD units worldwide not equipped with AWDS.

6.1.4. Air Force Digital Graphics System (AFDIGS). AFDIGS is the primary means of distributing weather facsimile products to DoD units worldwide not equipped with AWDS.

6.1.5. AFGWC/DOOK: Air Force Global Weather Center, Graphic Data Requirements is the primary source for graphics, FBD, and UGDF data on AWDS.

6.1.6. Communications Front End Processor (CFEP): CFEP controls the data flow from AFGWC to the field units.

6.1.7. Other supporting networks. Supporting meteorological data acquisition and dissemination networks consist of computer and manually controlled circuits and equipment connecting USAF and US Navy units to the AWN, connections to foreign meteorological dissemination circuits, and high frequency radio broadcasts which are intercepted by USAF and USN radio intercept sites under the Global Weather Intercept Program (GWIP).

6.2. Communication Publications. Maintaining an accurate weather communications publication file is essential to providing quality weather support. The following publications pertain to weather communications:

6.2.1. AFCAT 15-152, Vol I (Facsimile and Graphics Products Catalog) contains brief descriptions of facsimile and graphics products available on the AFDIGS and the AWDS.

6.2.2. AFCAT 15-152, Vol II (Weather Station Index) contains a worldwide index of weather station identifiers and related information.

6.2.3. AFCAT 15-152, Vol III (Weather Message Catalog) provides a description of all non-decodable weather bulletins.

6.3. Management and Assignment of Location Identifiers.

6.3.1. Location Identifiers. Each unit originating decodable weather messages requires a unique location identifier. Decodable weather data are relayed to customers worldwide.. Units transmitting decodable weather data request an authorized location identifier through channels from the host nation.

6.3.2. Temporary Location Identifiers. If an official identifier is not provided in time for a station to begin transmitting reports, a KQXX identifier may be temporarily assigned by Det 7, AFGWC, Tinker AFB OK, to the unit until a permanent identifier is assigned. Some instances for assigning KQXX identifiers are:

6.3.2.1. Deployed units providing tactical support during exercises or contingencies.

6.3.2.2. Units supporting weather systems testing programs requiring temporary station identifiers.

6.3.2.3. Units which have requested authorized FAA or International Civil Aviation Organization (ICAO) identifiers and are awaiting notification of the assigned station call letters.

6.3.3. Management of KQ Identifiers. Det 7, AFGWC is responsible for managing and assigning KQXX identifiers for all weather units. Sets of KQ identifiers are assigned to each MAJCOM. The MAJCOM then has operational control of specific KQXX identifiers. MAJCOMs requiring additional KQXX identifiers may forward their requests directly to Det 7, AFGWC. A list of available KQXX identifiers and the controlling MAJCOM is published in AFCAT 15-152, Vol II (To Be Published), Weather Station Index.

6.4. Station Index Numbers. Station index numbers are used by stations transmitting synoptic or upper air observations. Official station index numbers are assigned by the WMO. Weather units requiring the assignment of official WMO station index numbers need to forward their requests through channels to the Federal Aviation Administration (FAA). See FAA Handbook 7350.6, Location Identifiers.

6.5. Weather Message and Bulletin Transmission Procedures. Transmitted data needs to be correctly coded, formatted, and identified in order for them to be accurately recognized and processed. Lack of attention in transmitting weather messages and bulletins causes delays and, in some cases, complete loss of data. A weather message is an hourly observation, terminal forecast, or other individual decodable report transmitted without a bulletin heading. A weather bulletin is a complete data transmission which includes a unique bulletin heading, date-time group (DTG) and content. The content of a bulletin may

consist of a plain language discussion or forecast, a separately formatted bulletin or a compilation of individual decodable reports such as a computer bulletin built to satisfy a particular data requirement. Weather units may find their file times of obligated data transmissions in AFCAT 15-152, Vol III, or MAJCOM publication.

6.5.1. Standard Weather Bulletin Format. The following weather bulletin format is standard to the AWN:

6.5.1.1. Symbolic Weather Bulletin Format (MANOP Heading):

TTAA(ii) CCCC YYGGgg (MOD)

(TT) - Data content designator.

(AA) - Geographical designator.

(ii) - Number(s) used to differentiate between bulletins in a series which have the same MANOP Heading.

(CCCC) - The location identifier of the station originating the bulletin.

(YYGGgg) - Date-time group (DTG) always expressed in Universal Coordinated Time (UTC).

(YY) - Day of the month.

(GGgg) - Time of the day (hours and minutes).

(MOD) - Modifier. Indicates the original bulletin is corrected (COR), is transmitted late (RTD), or is being amended (AMD). If more than one modifier is used (a correction to an amendment) the modifiers need not be in any particular order (AMD COR or COR AMD).

6.6. Weather Message Preparation Procedures (Decodable Reports). Formats for individual decodable reports differ from bulletin formats in that there are several variations of message formats. Since the station identifier, data type, time and modifier are considered textual elements of each code, units should follow instructions provided in the applicable code regulation for encoding these groups.

6.6.1. Standard AFMEDS and AWDS Weather Message Format:

(C)(C)CCC DATYP GGgg MOD TEXT

CCC - FAA location identifier (i.e., BLV).

CCCC - International ICAO location identifier (i.e., KBLV).

CCCCC - AWDS ICAO identifier (i.e., KBLVM (sends data to printer)).

DATYP - The appropriate data type entry, i.e., AB = Weather Summary.

GGgg - Date-time group (hours and minutes)

- METAR (time group in whole hour) (i.e., 1200)

- TAF (time group is the valid period of the TAF) (i.e., 1212).

MOD - Modifier (COR, RTD, AMD).

6.6.1.1. Message preparation procedures: Enter the report using the standard message format. Use the new line (NL) function at the end of each line except the last. Use the end-of-text (ETX) function at the end of the last line of the message. the second and succeeding lines of a multiline decodable report (except upper air reports) will be included four spaces from the left.

6.6.1.1.1. Message preparation examples:

6.6.1.1.1.1. Single-line message for one station:

(C)(C)CCC DATYP GGgg (MOD) TEXT;(ETX)

Example: KBLV 1200 COR TEST MESSAGE;

6.6.1.1.1.2. Multiple-line message for one station:

(C)(C)CCC DATYP GGgg (MOD) TEXT (NL)

(4sp)TEXT (NL)

(4sp)TEXT;(ETX)

EXAMPLE: KBLV 1212 COR TEST MESSAGE

TEST MESSAGE;

6.6.1.1.1.3. Single-line message for more than one station

(C)(C)CCC DATYP GGgg (MOD) TEXT;(NL)

NNNN (NL)

(C)CCC DATYP GGgg (MOD) TEXT;(ETX)

EXAMPLE: KBLV 1212 AMD TEST MESSAGE;

NNNN

KBLV 1414 TEST MESSAGE;

6.6.2. Ensure data transmissions do not exceed a total of 69 printed characters per line, including space functions and data automatically added by terminal equipment or servicing computers (station identifier and spaces). The maximum length of a TAF must not exceed 17 lines due to file size limitations of the AWN.

6.7. Service Message Preparation Procedures. The normal method of addressing communications matters is by use of AUTODIN messages or correspondence. There are times when these methods are not applicable due to operational support considerations. The use of the Defense Switched Network (DSN) is usually the quickest, though not always the most reliable, means of communication. In many instances, the most efficient means is by the use of service messages.

6.7.1. Transmission of service messages on the AWN is normally used for the following purposes:

6.7.1.1. Requesting immediate operational data support not routinely available by Automated Response to Query (ARQ).

6.7.1.2. Requesting activation/deactivation of special data package, or Operation Plan (OPLAN), or Weather Data Requirements Contingency Package (WDRCP).

6.7.1.3. Short-notice support assistance requests (SARs).

6.7.1.4. Requesting AFDIGS (graphics), AWN (Alphanumerics), and AFGWC (Graphics for AWDS) reruns.

6.7.1.5. Requesting NOTAM reruns.

6.7.1.6. To contact the servicing ADWS Data Acquisition Unit (DAU) to resolve data receipt or other communications problems affecting current support operations and requiring immediate attention.

6.7.1.7. Providing notification of changes in operating hours.

6.7.1.8. Transmission of mission-tailored weather products direct to a single customer or, at most, a few customers.

6.7.1.9. Requesting graphic product retransmissions after an AWDS outage.

6.7.2. Service messages should be sent making maximum use of contractions and abbreviations to allow for clarity and brevity. When all else fails, use plain language.

6.7.3. AWN Service Message Format Information.

6.7.3.1. AWN service messages will be transmitted using the abbreviated plain address format. An example of a service message is provided below. This format meets most requirements for service message transmissions.

Line #	CONTENT
1	PP WXDO (NL)
2	DE KBLV 121200 (NL)
3	(TEXT OF MESSAGE) (ETX)

Line 1. Message Precedence and Routing Line. May consist of not more than nine ICAO identifiers (addressees). Message precedence may be (OO) - Immediate, (PP) - Priority, or (RR) - Routine.

Line 2. Message Originator Line: ICAO location identifier of the originating station and the date-time group of the message.

Line 3. The Actual Text of the Message. Be brief. Use contraction when possible.

EXAMPLE:

RR WXDO KBLV KLFI KLFC

DE KBLV 121200

TEST MESSAGE;

6.7.3.1.1. Transmission of service messages requires the same level of accuracy as that of meteorological data. Each service message is forwarded, automatically, according to the mes-

sage addressee line. If any addressee is incorrect, the message will fail and a response will be delayed.

6.8. Automatic Response to Query (ARQ). The AWN provides environmental data on a routine and demand basis to satisfy the user's mission requirements. ARQ provides the capability to request nonroutine, operationally essential data from the ADWS data base.

6.8.1. Data required on a routine basis are identified on a station's data requirements listing and will not be requested by ARQ unless necessary to meet special support requirements. It is important to reduce nonessential use so that valid requirements may be accomplished more efficiently. Each unit with an ARQ capability must exercise judicious use of the ARQ capability to ensure that the system is not abused and that ARQs are used for valid, non-recurring mission-essential uses only.

6.8.2. The ARQ program processes four types of demand requests. These are:

6.8.2.1. Requests for decodable data (requests for individual reports of coded data)

6.8.2.2. Requests for combinations of decodable data from an individual station.

6.8.2.3. Requests for nondecodable data transmitted and identified by a bulletin heading

6.8.2.4. TYPNO/TYPOK requests for data missed during a circuit/equipment outage.

6.8.3. ARQ request messages are assigned a precedence of OO, PP, or RR according to the urgency of need. The AWDS will automatically set up an ARQ for data requested that is not available in the AWDS system. Ensure the ARQ is for the data you want prior to transmitting. The ADWS response is transmitted at that precedence on a first-in-first-out (FIFO) basis. Numerous ARQs for the same data only extend computer response time and tax the system to do more work. Units that don't receive a timely response to their ARQ or don't receive a response at all will contact their servicing ADWS/WNDO immediately for assistance.

6.8.4. Precedence for use with ARQs are:

6.8.4.1. Immediate (OO) - To satisfy urgent requirements for data which aren't available in-station (in response to an extreme emergency or an exceptionally urgent operational requirement, i.e., Wartime operations).

6.8.4.2. Priority (PP) - To satisfy requirements for data not available in-station to provide timely operational support (i.e., Pilot-to-Metro Service (PMSV) support).

6.8.4.3. Routine: (RR) - To satisfy requirements for data not available in-station to provide support to non-recurring operational requirements (special briefing requirements or forecast data).

6.9. Air Force Meteorological Data System (AFMEDS) Data Types and For mats:

6.9.1. Data Types:

6.9.1.1. SA - Hourly surface observations (Surface Aviation Observation and METAR). Requested by ICAO or FAA location identifier.

6.9.1.2. SI/SM/SN - Synoptic surface observations for land stations and ships. Requested by WMO Block/Station number for land reports and by ship block identifier for ship reports.

6.9.1.3. SD - Radar reports in RAREP or RADOP code. Requested by ICAO or FAA location identifier.

6.9.1.4. FT - Terminal forecasts from individual stations in TAF code. Requested by ICAO or FAA location identifier.

6.9.1.5. TW - Total weather for an individual station. Provides the latest hourly observation, subsequent special observations, and latest terminal forecast. Requested by ICAO or FAA location identifier.

6.9.1.6. TWR - Provides same data response as TW including latest RADAR report.

6.9.1.7. TWP - Provides same data response as TWR with a separate response for an outstanding point warnings for that location. NOTE: TWP data responses are only available for CONUS stations. Limited to three station per ARQ.

6.9.1.8. ST - Surface trend data. Provides all surface observation received from an individual station during the preceding 6 hours. The number of stations in the ST data base is limited. Forward requests for additions to the data base through MAJCOM channels to AFGWC/DOOK.

6.9.1.9. Upper air data types:

DATA Required	FM Type
PIBAL PART A (PPAA)	UP
PIBAL PART B (PPBB)	UG
PIBAL PART C (PPCC)	UH
PIBAL PART D (PPDD)	UQ
PIBAL PARTS A&B (PPAA & PPBB)	UI
PIBAL PARTS C&D (PPCC & PPDD)	UY
RAOB/PIBAL PART A (TTAA & PPAA)	US
RAOB PART B (TTBB)	UK
RAOB PART C (TTCC)	UL
RAOB PART D (TTDD)	UE
RAOB PARTS A&B (TTAA & TTBB)	UM
RAOB PARTS C&D (TTCC & TTDD)	UF
RAOB/PIBAL PARTS A&B (TTAA/PPAA & TTBB/PPBB)	UJ
RAOB/PIBAL PART B (TTBB&PPBB)	UJ1
RAOB /PIBAL PART C&D (TTCC/PPCC & TTDD/PPDD)	UJ2
SELECTED LEVELS (SLAM)	UX

NOTE: Ship PIBALS parts begin with QQ (QQAA, QQBB, etc.) and ship RAOBS parts begin with UU (UUAA, UUBB, etc.)

6.9.2. ARQ Message Formats

6.9.2.1. An ARQ message requesting individual station decodable reports (maximum 9 stations per line) would have the following format:

RR KAWN ARQ(NL) (Note 1)

DE (C)CCCC 121200(NL) (Note 2)

SA STL BLV(ETX) (Note 3)

Note 1: Assign message precedence according to urgency of need. Address the ARQ to KAWN.

Note 2: The ICAO on the DE line identifies the device (unit) to which the ARQ response is to be routed. The date-time group is optional but recommended when transmitting multiple line ARQs.

Note 3. Identify the correct data types you need.

6.9.2.2. An ARQ for a nondecodable bulletin would be formatted as follows:

RR KAWN ARQ(NL)

DE (C)CCCC 121200(NL)

WTCA31 KMIA(ETX)

6.9.2.3. Multiple line ARQs (maximum of five request lines per message) requesting a combination of decodable and nondecodable bulletins would have the following format:

RR KAWN ARQ(NL)

DE (C)CCCC 121200(NL)

SA STL BLV(NL)

WTCA31 KMIA(NL)

TW VPS HST(NL)

SD MSY(ETX)

6.9.2.4. Data missing during a circuit outage can also be ARQd. The response will provide the computer precedence 2 data missed during the period of the outage. The ARQ would be formatted as follows:

RR KAWN ARQ(NL)

DE (C)CCCC 121200(NL)

TYPNO/TYPOK 111700 111820 CCSD(ETX) (Note 1 & 2)

6.9.2.4.1. Include date and time outage began and ended (requests for outages exceeding 6 hours cannot be processed). If the outage occurs from one day to another (162300-170100), two separate ARQs must be sent, one for each day. The Command Communications Service Designator (CCSD) must be added for circuit identification.

6.9.2.4.2. Do not include TYPNO/TYPOK requests in multiple line ARQs.

6.9.2.5. AFMEDS ARQ Formats and procedures:

6.9.2.5.1. The simplified AFMEDS ARQ format eliminates the need to include a “TO” and “FROM” line. An AFMEDS ARQ begins with the word ARQ. All AFMEDS ARQs are considered as routine (RR) precedence. If a higher precedence is required the precedence must be inserted prior to the word “ARQ” (OO ARQ or PP ARQ).

6.9.2.5.2. AFMEDS terminals may receive ARQ responses either on their screen or printer. Normally all responses are sent to the screen, if the letter "P" is added to the word ARQ (ARQP), the response will be sent to the printer.

6.9.2.5.3. AWDS will automatically ARQ data requested that is not available in the AWDS database. Ensure the data is what you require before transmitting the ARQ.

6.10. Operations Security (OPSEC):

6.10.1. The principles of the OPSEC program are intended to deny disclosure of intelligence information to our adversaries. Operational information, although it may not be classified, could be combined with other similar information to produce details of a classified or sensitive operation. Nonroutine requests for data needed to support an operational requirement are good examples of this type of information. Units must ensure data used to support operations of this type don't compromise the security or sensitivity of the operation.

6.10.2. Extreme caution must be exercised when using ARQ in any situation in which classified information may be involved or may be deduced from transmitted unclassified information. Requests for data in support of classified operations, missions, or exercises will be handled as follows:

6.10.2.1. Use area bulletins available from AFGWC or theater forecast units to the maximum extent.

6.10.2.2. Use a classified data transmission system.

6.10.2.3. Send an Immediate secure AUTODIN message in accordance with AFI 15-118. AFGWC can provide you with secure AUTODIN messages containing selected surface observations and/or terminal forecasts, plus any bulletins otherwise available within the AWN. Bulletins are relayed in real-time and collectives of observations/forecasts can be in increments of 4 minutes to a maximum of 60 minutes.

6.10.2.4. If you have the capability, use the AFGWC Dial-In Subsystem (AFDIS) to access products from AFGWC. Remember, this is not a secure system and should not be used for classified information.

6.10.3. Don't attempt to mask requests for specific data by adding other nonessential data to an ARQ.

6.11. Facsimile and Graphics Products. Weather graphics products on AWDS and AFDIGS provide an important part of the overall data support package. To make maximum use of this service, units must know what graphics products are available, when they are available, what alphanumeric products, if any, are available for the graphics product, and what procedures to follow when requesting the creation of new graphics products. See AFCAT 15-152 Vols I and III for a complete listing of available graphic products and alphanumeric backups.

6.11.1. AFDIGS Operations.

6.11.1.1. The AFDIGS transmits a combination of AFGWC, NWS/NMC, Fleet Numerical Meteorology and Oceanography Center (FLENUMMETOCCEN) and indigenous source facsimile products over four circuits; CONDIGS (CONUS), EURDIGS (Europe), PACDIGS (Pacific), and HALDIGS (Howard AFB Panama, and Lajes AB, Azores). Each AFDIGS product is assigned a MANOP heading or chart title, a Mode and Message Selection System (MOMSS) number, and a precedence.

6.11.1.2. AFDIGS product receipt is determined at each unit by reviewing the list of available products, determining unit facsimile data requirements, and making product selections by use of the MOMSS.

6.11.1.3. Each AFDIGS circuit has scheduled a unique combination of products from the list of facsimile products in AFCAT 15-152, Vol I. AFDIGS product schedules are designed to provide users with a large data base from which products may be selected to meet individual unit support requirements. Products available on one AFDIGS circuit may be made available on another AFDIGS circuit by submitting a request in accordance with AFI 15-118.

6.11.1.4. The AFGWC duty officer may preempt or reschedule facsimile products or reruns during periods of degraded operations.

6.11.1.5. AFDIGS products which are manually retransmitted facsimile products will be marked "SUBORIGINAL" prior to transmission.

6.11.2. AWDS Operations:

6.11.2.1. The AWDS provides combination of AFGWC, NWS/NMC, Fleet Numerical Meteorology and Oceanography Center (FLENUMMETOCCEN) and indigenous source facsimile.

6.11.3. AFDIGS/AWDS Product Precedence. All AFDIGS products are assigned a precedence for initial transmission, as well as a rerun precedence. The rerun precedence for scheduled AFDIGS products will be included on the published AFDIGS transmission schedules. The following guide is normally used to determine facsimile product precedence. (Customer timeliness requirements and product perishability are also considered).

6.11.3.1. IMMEDIATE (O). Used for emergency support products required to avert or lessen the possibility of loss of human life or property and for direct operational support products to support emergency war orders, alert forces, combat operations, contingency tasking, or other similar activities identified by Air Force or DoD agencies.

6.11.3.2. PRIORITY (P). Used for direct operational support products which do not require a higher precedence.

6.11.3.3. ROUTINE (R). Used for all other products approved for transmission over AFDIGS.

6.11.4. AFDIGS Rerun Procedures.

6.11.4.1. Retransmission of AFDIGS products is based on product rerun precedence. Examples of facsimile products:

6.11.4.1.1. Availability of alphanumeric backup bulletin for the product.

6.11.4.1.2. Product data base update time.

6.11.4.1.3. Products that have been superseded.

6.11.4.1.4. Products containing data that may be obtained or inferred from other available facsimile or alphanumeric products.

6.11.4.2. All AFDIGS reruns will normally be transmitted using MOMSS 299.

Exceptions will be identified in the NOXX1 KGWK message.

6.11.4.3. AFDIGS Rerun Request Format. Rerun request will be transmitted by service message using the following format:

RR KGWK KGWC (Note 1)

DE KBLV 211200 (Note 2)

CONDIGS RERUN REQUEST. INT ZDK AUEU51 KGWC, MOMSS 378,

NLTZ 0040. INT ZDK RADAR SUMMARY, MOMSS 009, NLTZ 0045.

MACHINE PROBLEM. PLS CONSIDER RERUN BY 0200. (Note 3).

Note 1: Address rerun messages to the appropriate AFDIGS Network Control Station and AFGWC.

Note 2: Requesting station's identifier and message date-time group.

Note 3: Text will always include:

Circuit (CONDIGS, EURDIGS, HALDIGS, PACDIGS).

Chart Identification (Title or MANOP Heading, MOMSS and NLTZ time).

Reason for rerun request (brief and to the point).

6.11.5. Rerun Status Message. The Weather Communication Center (WCC), a part of CFEP, will transmit a rerun status message (NOXX1 KGWK) via longline communication circuits approximately 15 minutes prior to scheduling a product rerun. The rerun will then be entered into the transmission queue at its assigned rerun precedence.

6.11.5.1. Rerun request received at the WCC prior to the published not-later-than (NLT) time will not be honored. (Exception: Rerun requests due to receipt of incomplete or illegible charts).

6.11.6. Product Backup Procedures. Various methods have been established to meet AFDIGS backup requirements including: rerun requests, AFDIS, backup alphanumeric bulletins, insertion of indigenous products to substitute for missing scheduled products, direct Digital Facsimile (DIFAX) feed, or the exchange of products between units by use of telefax equipment.

6.11.6.1. The use of AFDIS and/or backup alphanumeric bulletins will be a frequently used method of providing mission support when AFDIGS products are unavailable or during an AFDIGS circuit outage.

6.11.6.2. Rerun requests of AFDIGS products should be made after careful consideration of the need for the product, the availability of alphanumeric backup support for the product, and the availability of an updated product which will replace the missing one.

6.11.6.3. Substitute products are identified by AFGWC for some scheduled AFDIGS products. The NOXX1 KGWK status message will inform AFDIGS users of a transmission substitute when applicable. Suboriginal products received from other facsimile circuits may also be transmitted on AFDIGS as substitutes to scheduled products.

6.11.6.4. Direct DIFAX feed will be employed during periods when the WCC experiences a total outage. DIFAX backup service is available to all CONUS and Alaskan AFDIGS customers through the contractor's satellite uplink station.

6.11.6.5. Telefax devices are frequently used to transmit weather information between weather units and are a method of providing products during AFDIGS/AWDS outages. Many units have,

or have access to, these devices. If a critical need exists, AFGWC can disseminate certain products using their telefax device. The AFGWC duty officer is the point of contact for requesting this service.

6.11.6.6. AFDIS provides some back-up capability to AFDIGS.

6.11.7. AWDS Rerun Procedures:

6.11.7.1. Rerun requests for AWDS products should be made after careful consideration of the need for the product, the availability of alphanumeric backup support for the product, and the availability of an updated product which will replace the missing one.

6.11.7.2. Request rerun of Alphanumeric products from Det 7, Tinker AFB OK by service message or by telephone.

6.11.7.3. Request rerun of graphic products from AFGWC/DOOK, by service message (TYPNO/TYPOK) or telephone.

6.12. Weather Message Deficiency Bulletins. Weather message deficiency bulletins provide an important link in the quality control process between stations originating weather messages, the servicing ADWSs and AFGWC. As such, each station will include the monitoring of these products in its individual quality control programs. There are two basic types of weather message deficiency bulletins used within the AWN.

6.12.1. AXXX bulletins: A computer-derived product managed by AWN software that monitors the receipt of scheduled observations and forecasts at an ADWS and reports the receipt of those products. When a scheduled observation or forecast isn't received at the ADWS or is received garbled, the station's call sign will appear in the AXXX bulletin indicating nonreceipt. Stations whose call signs are listed in an AXXX will transmit the missing data as soon as possible and prior to issuing the next hourly observation or forecast.

6.12.2. AFGWC computer-generated bulletins.

6.12.2.1. AXUS1 KGWC: Identifies those CONUS and Alaskan stations whose hourly observation was received at AFGWC with one or more errors or was received garbled. Only the first error encountered is specified, so affected units will review the entire observation to ensure the retransmission is correct.

6.12.2.2. AXPA1 KGWC is the same as AXUS1 KGWC, above, except for PACAF stations (except Alaska).

6.12.2.3. The receipt of an AXXX or AXUS/AXPA bulletin may not necessarily mean that a station made an error or failed to transmit. The bulletins are notices that the data were either not received or were received in error. When this occurs it indicates that a circuit or equipment problem may exist at the unit or at some other point on the circuit. The AXXX and AXUS bulletins are useful tools for use at the unit level to assist in identifying possible problems.

6.12.3. Notice to Airman Bulletins (NOXX): If there is a problem getting graphic products to the field, normally a NOXX bulletin is sent to advise the field of all events (i.e., delays, back logs, etc.).

6.13. Alphanumeric and Graphic Weather Data Requirements. Weather data requirements are the mission-essential data or products that a unit needs to successfully accomplish its mission support responsibilities. Data are grouped into the following categories:

6.13.1. Routine data requirements: These are the data required for normal mission support. These requirements are listed on the individual data requirements listings and updated when required or reviewed at least annually. Routine data requirements are normally required frequently in the day-to-day station operation.

6.13.2. Special event data requirements: These are the data required on demand to meet special support requirements, but not normally required for routine mission support. The data are requested by ARQ or AFI 15-118 request. Units will continuously review the use of ARQ to determine if these data will be included in their routine data requirements listing.

6.13.3. Contingency and exercise requirements: These are the special data packages needed to support specific exercises or contingency operations plans. They are compiled by reviewing the exercise support plans and determining the data required for weather support.

6.13.3.1. Alphanumeric contingency packages are constructed in advance by the servicing DAU's Data Requirements Section and provided upon receipt of a request for activation of the contingency package.

6.13.3.2. AFGWC does not have the capability to provide prepositioned contingency packages for graphic products. Contingency requirements will be incorporated with routine data requirements whenever possible. Requirements for scheduled exercises, including support of deployed TAWDS/TFS, and IMETS, will be requested in advance in accordance with AFI 15-118.

6.13.4. Command and control requirements: Alphanumeric data required by command and control systems are supplied directly by AFGWC over non-AWN circuits.

6.13.5. Notice to Airman Bulletins (NOXX): If there is a problem getting an alphanumeric products to the field, normally a NOXX bulletin is sent to advise the field of all events (i.e., delays, back logs, etc.).

6.14. Security. Data requirements are designed to support a variety of operational requirements. Since the transmission of weather information is normally accomplished on unsecure circuits, an indication of a change in data support, a sudden request for data from a particular area, or the use of ARQ to support a classified mission could result in a compromise of the security of the mission. Weather units must continuously evaluate their actions when requesting operational data requirements to determine if a compromise is possible. Unit supervisors must ensure that all personnel are aware of their responsibilities to the security of the mission. Methods used for establishing classified or otherwise sensitive operational support include:

6.14.1. Incorporating support for special missions with the routine data requirements.

6.14.2. Incorporating special support requirements into a weather data requirements contingency package (WDRCP).

6.14.3. Using secure communications (classified AUTODIN message or secure voice telephone to coordinate, request, or provide weather support).

6.15. Data Requirements. The unit's command meteorologist, station chief, AWDS System Manager (ASM), and experienced 5 and 7 level personnel will decide which alphanumeric and graphics data products best support both your meteorological needs, and your local customer's mission requirements. The size of your data requirements not only affects your system, but may also affect all others on your AWDS loop. Therefore, units will request only those products used routinely or for contingency support. A periodic review will be accomplished to eliminate products no longer needed. Work with the ASM to set data requirements.

6.15.1. Graphic Data. AFGWC/DOOK, Offutt AFB NE (DSN 271-7396) is the AFW focal point for all AWDS graphics products. Units will maintain a copy of their data requirements. You can obtain a copy of your latest data requirements from AFGWC/DOOK. To update your requirements, send a memorandum to them with the data you want to add or delete. For emergency requests, send a message, service message on AWDS, or call them direct, with a follow-up letter.

6.15.2. Alphanumeric Data Product. Detachment 7, AFGWC, Tinker AFB OK, is the AFW focal point for all alphanumeric data requests. Units will maintain a copy of their data requirements. Det 7 maintains an up-to-date copy of your data requirements. You can obtain a copy, on diskette, by calling the Det 7, AFGWC Data Requirements Section, DSN 339-7617/7627/7628. The diskette can be read on your PC (they are in ASCII form). Directions for making changes to your data requirements are supplied with the diskette. If problems occur, contact the Det 7 data requirements section for assistance. Send them a diskette copy of your request. For emergency requests, you can send a message, AWDS service message, or call them direct, with a follow up letter. A list of all available alphanumeric products can be found in AFCAT 15-152, Vol II (to be published

6.16. Data Transmission.

6.16.1. Graphics Products. These products are transmitted as they are received by the AWDS Product Driver Subsystem computer at AFGWC. AWDS product precedence is a first-in, first-out (FIFO) system based on product type. FBD specials have the highest priority, followed by the routine FBD and vector graphics, then UGDF, and finally raster scan.

6.16.1.1. Retransmission. AWDS products can be retransmitted by sending a service message requesting a block of time, up to 6 hours, for which data was missed .

6.16.2. Data Retrieval. AWDS Positional Handbooks list the specific steps required to retrieve AWDS alphanumeric and graphics products. Retrieving alphanumeric data is a two step process. AWDS first checks to see if the product is stored in the database. If the product is not available, an ARQ is automatically formatted to be sent to the AWN. AWDS uses a series of filters to retrieve graphics products. These filters help speed up the process by identifying the level, product sub-type, and parameters. If necessary, these filters can be by-passed. A rerun of graphics products can be requested from CFEP using the following AWDS Rerun Request format:

RR KGWK KGWC KQBO(NL) (Note 1)

DE KOFF 161630(NL) (Note 2)

AWDS RERUN REQUEST FOR CG01D(NL) (Note 3)

PLEASE RETRANSMIT BLOCK TIME 1300-1500Z.(NL) (Note 4)

SSGT SMITH SENDS, DSN555-1111(ETX) (Note 5)

Note 1: Who the request is routed to. If you put your four letter ICAO at the end of this line you will receive a copy.

Note 2: Station sending the request and the date-time group of preparation.

Note 3: Tells CFEP what loop and drop to send request to. European stations replace with EGXX (ex. EG02B). Pacific sites replace with PGXX (ex. PG01C).

Note 4: Time block of data you want.

Note 5: POC with DSN number for the request.

6.17. Establishing Data Requirements. Weather units establish their weather data requirements with AFGWC/DOOK (DSN 271-7483) and review the entire data requirements package as mission support dictates.

6.17.1. Routine. Normally data requirement changes in conjunction with mission support changes will be submitted with ample lead time to enable AFGWC to make the required changes.

6.17.1.1. Units will submit their routine data requirements requests via AUTODIN message when the data are needed within 30 days. Where data requirements changes are extensive, the unit will make all necessary changes to a copy of their data requirements listing. If in doubt about the necessary lead time required to process a data requirements change, contact AFGWC for advice. Requests for data requirements changes will contain the following information:

6.17.1.1.1. AWDS and AFDIS Graphics: Send requirements to AFGWC/DOOK, Offutt AFB NE(DSN 271-7483)

6.17.1.1.2. Alphanumeric: Send requirements to Det 7, AFGWC, Tinker AFB OK. (DSN 271-7617)

6.17.1.2. Data types required. (See AFCAT 15-152, Vol II, Weather Station Index to ensure data type is available from the station before requesting it.) Units can fax their requirements to AFGWC if support is within 3-8 days. Units should always call to confirm receipt of any fax/ AUTODIN message.

6.17.1.3. For alphanumeric requirements include WMO block/station number or station call sign exactly as it appears in AFCAT 15-152, Vol II. If ship data are needed, request by indicating the ship editing block (see AFCAT 15-152, Vol III, Weather Message Catalog).

6.17.1.4. Bulletin heading, if the request is for a nondecodable bulletin (see AFP 15-152, Vol III).

6.17.1.5. Graphics products coverage: Include Projection Indicator (PI) set for AWDS vector graphics, UGDFs, and raster scan. Use WMO block number or AFGWC region for FBD.

6.17.1.6. Start date and time of service. Routine data requirements updates are accomplished every three weeks on a Thursday on or about 1020Z. A minimum of 15 days lead time, from time of receipt at AFGWC, is required to process routine data requirements changes. Graphics data requirements updates are done at least weekly.

6.17.1.7. Duration of the requirement. If temporary, indicate inclusive start and stop dates and times.

6.17.1.8. Terminal(s) and circuit(s) to which data will be sent.

6.17.1.9. AWDS units will provide alphanumeric product identifiers.

6.17.2. Special event requirements. These include requests to meet requirements generated by a "no-notice exercise," real-time operational requirements, or emergencies where insufficient lead times are available to submit the change request by routine means. Units will request AWN support by service message. Graphics support can be initiated by phone or telefax message. If the request contains classified information or requesting the specific data poses a possible OPSEC violation, it will be sent by classified Immediate precedence (OO) AUTODIN message or secure telephone communications. Data will be provided until notified by the requesting unit to terminate the requirement.

6.17.3. Establishing a weather data requirements contingency package (WDRCP).

6.17.3.1. WDRCPs are constructed to support specific contingency requirements of alphanumeric data for individual units using the same data as routine request described above. WDRCPs are not available for graphics products. The data requested in the WDRCP will not duplicate data identified as a routine data requirement as this will result in deleting the data completely.

6.17.3.2. Upon receipt of a request for a WDRCP, the servicing DAU will develop the package and assign an identifying reference name or number to it. The WDRCP listing is then forwarded to the requesting unit. The requesting unit will verify the accuracy of the WDRCP and submit changes to the servicing DAU if necessary.

6.17.3.3. Send package to Det 7, AFGWC, Tinker AFB OK.

6.18. Requesting Weather Communications Services.

6.18.1. For the purpose of this section, weather communications services are defined as telecommunications facilities, systems, devices, and services dedicated to the transmission, reception, and display of weather or astrogeophysical data, products, and information. Exceptions are:

6.18.1.1. Terminal transmitting, receiving, recording, and product displaying equipment, and services which are an integral part of a computer or automatic data processing (ADP) device not performing communications functions.

6.18.1.2. Facilities and systems established to meet unique command requirements which function as an integral part of a command or tactical system. These are the responsibility of the command requiring and establishing them.

6.18.2. Basic guidance on weather communications support responsibilities is found in Air Force level Instructions and Regulations, and MAJCOM supplements. Refer to the appropriate Air Force Index for the latest listing of applicable communication references.

6.18.3. Weather Communication Equipment. Weather communications are provided by the Defense Information System Agency (DISA) in the CONUS. These facilities include USAF weather alphanumeric and facsimile, telecopiers, NWS facsimile, and National Environmental Satellite Service (GOES/WSFO) taps. Procedures for obtaining and using these facilities are contained in AFI 33-103. Leased or Government-Furnished Equipment (GFE) facilities which satisfy weather communications requirements are an AFC4A responsibility. Weather units must contact their local communications unit for assistance in requesting services.

6.18.3.1. Weather Communication Equipment (Local/On-Base). Equipment such as an intercom system, pony teletype, telephone, telewriter or closed-circuit television system are normally the responsibility of the base or installation establishing the requirement for such services. The base or installation commander usually establishes requirements for and installation of local on-base systems and services. Weather units operate these systems for the purpose of disseminating weather information. Weather units need to maintain close liaison with base or installation commanders to ensure that efficient and effective on-base systems are in use.

6.18.4. Acquiring GFE (CONUS). When requesting GFE that require Air Force assets, such as maintenance and allied support, a Communication-Computer Systems Requirement Document (CSRD) needs to be submitted to the supporting communications agency for a manpower determination. Specific guidance is contained in AFI 33-103.

6.18.5. Acquiring GFE (Overseas). Overseas MAJCOMs usually publish unique theater procedures for requesting communications circuits/equipment. Overseas MAJCOMs are normally the approval/disapproval authority for requests for weather communications circuits and equipment within their theater of responsibility. However, when the circuits or equipment Request For Service (RFS) requires processing through HQ SSG OL-B/SDF, Tinker AFB OK or a MAJCOM/MACOM, the MAJCOM/MACOM will inform AWS/SYK. For example, requests for AFMEDS, AFDIGS or dedicated DSN service funded by MAJCOM.

Chapter 7

AUTOMATED WEATHER DISTRIBUTION SYSTEM (AWDS)

7.1. General. AWDS is the primary weather communications system used throughout AFW. Each unit with AWDS receives externally generated weather data forwarded with unique product identifiers to the AWDS data base. This database consists of data collected at and disseminated from an Automatic Digital Weather Switch (ADWS) via the AWN, data disseminated from the CFEP at AFGWC, and data collected and disseminated from the Weather Graphic Switch (WGS) at RAF Croughton UK and Hickam AFB HI. These data contain the basic building blocks upon which locally generated products are prepared. Alphanumeric data not normally stored at the unit are available via ARQ.

7.2. System Management. The unit command meteorologist will normally maintain control of the unit's AWDS, including hardware and software. The unit command meteorologist may appoint an individual as the AWDS System Manager (ASM). The primary and alternate ASMs will attend the formal AETC AWDS System Manager's Course. AWDS is a very flexible system and the command meteorologist will be responsible for establishing the standard procedures and default values the station will use, such as determining which products the unit receives, which charts will be used, and what parameters will be analyzed for using selectable base values and increments. Additionally, AWDS requires the standardization of tasks, such as determining what naming conventions will be used for the locally created graphics products, establishing and/or tailoring command sequences for AWDS to perform certain functions in a preset way. The command meteorologist must also coordinate with their customers to determine which set of alternate airfields will be displayed on specific Flight Control Facility/Air Traffic Control (FCF/ATC) terminals. The ASM maintains the configuration and system tables of all AWDS workstations based on the command meteorologists direction and is the focal point for all AWDS problems and issues.

7.2.1. AWDS System Manager (ASM) Tasks. Tasks performed by the ASM will include:

7.2.1.1. Enter unit-specific data into the AWDS tables.

7.2.1.2. Maintain the AWDS tables in order to satisfy the changing needs of the unit and its customers for AWDS products. This includes the responsibility to manage AWDS product requirements, local forms, command sequences, product alerting criteria, product purge criteria, local product routing, and seasonal requirements.

7.2.1.3. Coordinate with the contractor's maintenance technicians on hardware and software actions.

7.2.1.4. Document and forward, through channels, recommendations concerning software enhancement, new application programs, as well as any observed software problems.

7.2.1.5. Complete and forward through channels system performance reports. See paragraph 7.5.2. for details.

7.2.1.6. Maintain software documentation, positional handbooks, standing operations procedures, and operating instructions associated with the use of AWDS in the unit.

7.2.1.7. Ensure unit-level AWDS training progresses well beyond the basic level taught by the weather school. Command sequences should be used to automate operations as much as possible, but manual procedures may be necessary in the case of a command sequence malfunction. Per-

sonnel must remain proficient in all manual operations of the system, and as a minimum be able to perform the following functions.

7.2.1.7.1. Issue, update and cancel weather warnings and advisories.

7.2.1.7.2. Input and disseminate alphanumeric data (e.g., observations, forecasts, unformatted message, etc.)

7.2.1.7.3. Retrieve, generate and display alphanumeric and graphic products from the database.

7.2.1.7.4. Retrieve and display local and centrally produced vector graphics charts.

7.2.1.7.5. Edit graphics products including creation of a forecast skew-T.

7.2.1.7.6. Create and update product loop sequences.

7.2.1.7.7. Route alphanumeric and graphic to printers and other workstations.

7.2.1.7.8. Create an aircraft accident investigation (AAI) tape.

7.2.1.8. Serve as the unit's AWDS focal point for all AWDS functional areas (FCF/ATC, etc.).

7.2.1.8.1. Assists the NOTAM AWDS System Manager as needed.

7.2.1.9. Develop and maintain an AWDS Continuity Notebook. The system manager will maintain the currency of this critical information, but make it available to all weather station personnel at all times. This binder will contain information to assist the ASM in their duties, and serve as a reference for station personnel in the ASM's absence. This notebook will contain, as a minimum the following items:

7.2.1.9.1. The Contractor Logistic Support (CLS) Management Plan. A copy can be obtained from your MAJCOM AWDS POC.

7.2.1.9.2. The Relocation Plan. A copy can be obtained from your MAJCOM POC or HQ AWS/SYDF.

7.2.1.9.3. The AWDS Site Activation Plan (Siting Criteria Plan).

7.2.1.9.4. List of your customer's data requirements for FCF/FOs and NOTAMS.

7.2.1.9.5. A current copy of your system tables, product and configuration.

7.2.1.9.6. Additional items needed to maintain the system in the absence of the system manager include:

7.2.1.9.6.1. Agency/Name and phone number(s) of important contacts.

7.2.1.9.6.2. AAI tape instructions or a reference of where to quickly find them in positional handbooks.

7.2.1.9.6.3. Site data.

7.2.1.9.6.4. Circuit information (Local and Longline).

7.2.1.9.6.5. Appropriate modem configurations for all in station modems, local and long haul.

7.2.1.9.6.6. Checkpoint tape upload procedures.

7.2.1.9.6.7. Procedures to change customer data sets (FCFs).

7.2.1.9.6.8. Location of terminals, peripheral equipment, etc. (Functional area information).

7.2.1.9.6.9. Metwatch criteria thresholds.

7.2.1.9.6.10. Routing distribution.

7.2.1.9.6.11. Purge table settings.

7.2.1.9.6.12. Graphic command sequences (titles and detailed description of output).

7.2.1.9.6.13. A/N command sequences (titles and detailed description of output).

7.2.1.9.6.14. AFGWC data requirements/disk.

7.2.1.9.6.15. AWN data requirements/disk.

7.2.1.9.6.16. Copy of an accurate Base Master Listing (BML).

7.2.1.10. Both the ASM and the AASM will be proficient at manipulating and controlling the database. This includes proficiency with the following tasks:

7.2.1.10.1. Install a map background.

7.2.1.10.2. Configure local destinations.

7.2.1.10.3. Change/add/delete items in alert and default routing tables.

7.2.1.10.4. Change product purge criteria.

7.2.1.10.5. Change/add/delete entries in external product retention tables (PIDS).

7.2.1.10.6. Change display levels of data on PI Sets.

7.2.1.10.7. Change/add/delete a station to a PI Set.

7.2.1.10.8. Checkpoint tape administration.

7.2.1.10.9. Access and print information from the event log. The AWDS events log contains important messages about equipment performance and can be used to improve system performance. The ASM will maintain references for event log access, printing, and event interpretation (breakdown of codes and how they relate to the status of the system).

7.2.1.10.10. Knowledgeable about procedures for updating or changing data requirements.

7.2.1.10.11. Be able to prepare a checkpoint tape. Checkpoint tapes are used to save important system configuration tables. It is what allows you to restart your system after a hard drive crash/failure. These tapes need to be updated whenever changes to the system are made, and at least weekly.

7.3. Data Types. There are five types of data available over AWDS.

7.3.1. Alphanumeric Data. Data received and transmitted via the AWN (observations, TAFs, NOTAMs, discussion bulletins, etc.).

7.3.2. Vector Graphics. Vector graphics are the “softcopy” versions of National Weather Service facsimile charts (e.g. surface analysis) and certain AFGWC facsimile charts (e.g. Military Weather

Advisory). These products are received as components that personnel can overlay to produce composite charts that resemble our "wall hanging" facsimile charts of old. The CFEP also transmits selected vector graphic products relayed from the NWS AFOS, the European METOC Center (EMC), and the Korean Theater Forecast Unit.

7.3.3. Formatted Binary Data (FBD). FBD are sets of surface or upper air observations that computers have encoded into AWDS computer readable data. These are AWDS' plotting data.

7.3.4. Uniform Gridded Data Fields (UGDF). A UGDF is a uniformly spaced grid of parameter values (e.g. temperatures in degrees Celsius) at each point on the grid. They are used as input to the AWDS isoplething and plotting routines, which produce local vector graphics that can be displayed.

7.3.5. Raster Scan. AWDS uses raster scan for distributing satellite products. The satellite pictures sent to AWDS units are those from the AFGWC Satellite Global Data Base. Presently, this data base contains only polar orbiting satellite imagery (DMSP and NOAA), providing one image of each area of the globe twice daily.

7.4. Technical Assistance and Help. If you require technical assistance or need help with your AWDS, the single POC is the AFGWC Software Technical Applications Facility, Offutt AFB NE, DSN 271-7770. This is a 24 hour a day, 7 day a week service designed to handle all trouble calls concerning your AWDS. If you encounter system problems or need assistance with the Software Technical Applications Facility, you can contact HQ AWS/SYDF, DSN 576-3268, extension 311/314.

7.4.1. Units will develop local procedures to assist station personnel in initial troubleshooting of AWDS system problems. These procedures will assist the personnel in determining whether the problem is a communications, equipment, or software problem, and determine the appropriate agency to call for maintenance. All station personnel will follow these procedures whenever there is an AWDS problem.

7.4.2. Backup. Limited backup of AWDS graphic products may be provided through a combination of AFDIS, indigenous sources, and AWN alphanumeric data. All units will establish written backup procedures.

7.5. Miscellaneous:

7.5.1. Property Management. Accountability of AWDS equipment is monitored by SM/ALC. Units must follow proper procedures for requesting additional, moving existing, or turning in AWDS equipment. These procedures are outlined in the AWDS Relocation Plan.

7.5.2. AWDS CLS Reporting. This is a monthly report generated by each unit with an AWDS. Reporting procedures vary from MAJCOM to MAJCOM; nevertheless, the final report goes to SM-ALC/LHWP at McClellan AFB CA and is used to compute system effectiveness. The procedures for this report are contained in the CLS Manual. If you do not have a copy of this manual, contact SM-ALC.

7.5.2.1. Reports of unsatisfactory service for AWDS equipment should be forwarded through the MAJCOM to SM-ALC/LHWP in letter format. An unsatisfactory service report (USR), may be submitted by the users anytime they believe the service they receive from GTE maintenance, communications maintenance, AFGWC support cell, etc., is unsatisfactory. The user should send a memo to the OPR (SM-ALC, Base Communications Squadron, or AFGWC/DO). The memo should contain detailed information about the incident.

Chapter 8

MWSR-88D DOPPLER WEATHER RADAR

8.1. General. The WSR-88D Doppler weather radar is the second-generation, operational radar replacing the non-Doppler meteorological radar's of the NWS and AFW, in the CONUS, the Pacific (except Yokota AB, Japan), and Lajes Field, Azores. The WSR-88D represents a quantum leap from earlier meteorological radars both in engineering technology and in meteorological measurements. As a fully coherent "Doppler" radar, it provides not only accurate reflectivity measurements and its attendant information on spatial location, distribution, etc., but also measurements of the radial component of motion (mean Doppler velocity along the axis of the radar beam) of the scatters and the dispersion of velocities in the radar sample volume (spectrum width). The information flow rate from the WSR-88D is an order of magnitude larger than the earlier incoherent radars and requires high-speed data processing for signal analysis and information extraction for effective utilization and man-machine interface. The establishment of a comprehensive radar program that integrates these radar derived products into your local analysis and forecast program will be vital to your ability to fully support your customer.

8.2. WSR-88D System Management. Within the Department of Defense (DoD), the US Air Force's Air Weather Service (AWS) manages the worldwide WSR-88D program, providing meteorological and aerospace environmental services to the Air Force, Army, and certain other DoD elements. AFW units, assigned to the MAJCOMs, conduct the day to day operation and maintenance of their WSR-88D Doppler weather radar system.

8.2.1. HQ USAF/XOW is a member of the tri-agency NEXRAD Program Council (along with representation from Departments of Commerce and Transportation). HQ AWS is a member of the NEXRAD Program Management Committtee. As the DoD representative AWS manages the overall program. This responsibility includes membership on various committees and working groups that establish policy and procedures for operating the system. Some of these committees and working groups are listed in FMH 11, Part A.

8.2.2. Unit Responsibilities (CONUS). All DoD CONUS WSR-88D sites (that have Unit Control Positions, i.e., own the radar) are considered Supplemental Sites and have specific responsibilities. These responsibilities are outlined in FMH 11-Part A, and AFSUP 1 to Part A. These responsibilities include:

8.2.2.1. Operate continuously, 24 hours per day, and collect, collate, and make available radar data and products in support of the Department of Defense and the National Command Authority. This support will be performed in accordance with the procedures described in FMH 11, Parts A through D and AFSUPs to FMH 11, Parts A and D, and such agreements as may be made among the principle users.

8.2.2.2. Use one of the operational modes and volume coverage patterns defined in FMH 11-Part A through D and agreed to by the Unit Radar Committee (URC), where established.

8.2.2.3. Provide assistance to NWS offices by providing access to weather radar data for gaps in the National Weather Radar Network. Access is by separate memorandum of agreement between HQ AWS and NWS headquarters.

8.2.2.4. Maintain full time availability of a narrowband communications port, with a controlled access telephone number for exclusive use by the designated NWS office(s).

8.2.3. Unit Responsibilities (Overseas DoD sites). These stations are considered Non-Network sites and have the following specific responsibilities:

8.2.3.1. Operate continuously, 24 hours per day, and collect, collate, and make available radar data and products in support of the Department of Defense and the National Command Authority. This support will be performed in accordance with the procedures described in FMH 11-Parts A through D and AFSUPs to FMH 11-A and D, with the exceptions of Sections 7.2 and 7.4 of FMH 11-A, and such agreements as may be made among the Principle Users.

8.2.3.2. Use one of the operational modes and volume coverage patterns defined in FMH 11-Parts A through D.

8.2.4. WSR-88D System Manager Responsibilities. All units with access to real-time WSR-88D data will ensure the WSR-88D system manager attends a system managers course, either through the NWS WSR-88D Operations Course, or an approved AETC course (NEXRAD Unit Control Position (UCP) Managers Course (UCP E30ZR15W3-015, Principal User Processor (PUP) E30ZR15W3-014). The system manager plays a vital role in the operation of the radar and will become the focal point for questions the unit receives from associated PUPs, and non-associated PUPs (dial-in users). The system manager will ensure they are on requirements for FMH 11, Parts A through D, and AFSUPs to Parts A and D. Additionally, HQ AWS/XON, has system experts available to answer questions about the technical applications use of the radar in various areas of the country. You can reach the person responsible for your area of the United States by contacting HQ AWS/XON and asking for the Meteorological Enhancement Team (MET) member for your area.

8.2.5. Unit Radar Committee (URC). All CONUS WSR-88D units with more than one associated principal user (DoD, NWS, FAA) and overseas radars that have more than one PUP will establish a URC. The goal of the URC is to meet the radar information requirements of all associated users. In addition, the URC ensures the WSR-088D unit is operated in accordance with policies provided in FMH 11, Parts A through D, and AFSUPs to Parts A and D. The URC is required to meet a minimum of twice a year and as often as necessary to conduct business.

8.2.5.1. URC Membership. The URC is composed of one voting member from each associated Principal User Agency connected to a particular WSR-88D unit. The member from DoD represents the interests of all DoD users connected to the WSR-88D unit. Up to four non-voting observers from each associated user agency may attend the URC meeting. Each CONUS WSR-88D unit will maintain a copy of the Memorandum of Agreement (MOA) between the DoD, DoC, and DoT for Interagency Operation of the Weather Surveillance Radar-1988, Doppler (WSR-88D), which contains procedures for resolving conflicts and is obtainable from MAJCOMs. Though not covered in the MOA and not specifically mentioned in FMH 11, Parts A through D or the AFSUPs, AFW policy is that the DoD chairman of a WSR-88D strongly consider inviting outside agencies to attend the URC. These include state and county civil defense officials and non-associated users, such as universities or DoD and tri-agency contractors who are doing algorithm research. These meetings allow you, the URC chairman, to make clear DoD maintenance and operations practices and to head off potential problems at a future date.

8.3. Operational Support Facility (OSF). Operational support for the deployed (installed) WSR-88D system is provided by the Operational Support Facility located in Norman, OK. OSF provides centralized management coordination, and control for comprehensive life cycle support of WSR-88D units. OSF performs systematic and coordinated analyses of the day-to-day operations and maintenance of the radar

to determine the need for improvement and provides both immediate and long-term support during the WSR-88D life cycle. The OSF has several branches to provide life-cycle support. These branches are; Operations Branch, System Support Branch, Engineering Branch, Applications Branch, and the Operations Training Branch.

8.3.1. Technical Assistance and Help. The OSF also maintains a support cell called the WSR-88D Hotline. The Hotline is available to assist units with problems on a real time basis. The Hotline has maintainers and operators available to answer questions and solve problems concerning the operation and maintenance of the radar. The Hotline can be reached 24 hours a day, seven days a week. Their phone number is 1-800-643-3363.

8.4. AFW Support. HQ AWS/SYDR is the program focal point for programmatic issues concerning AFW units. They are available to assist with radar siting issues, TOs, and maintenance issues. Additionally, they handle all Configuration Change Requests (CCRs) and manage configuration control for AFW.

8.4.1. HQ AWS/XOOS is the focal point for operational issues concerning the WSR-88D. They are available to answer questions concerning the various publications applicable to operating the radar. These include the FMH-11, Parts A through D and AFSUPs to Parts A and D. They also evaluate requirement requests for WSR-88D equipment installation and modification.

8.5. Operations. Units will implement local procedures to ensure weather radar products are effectively integrated in observing, forecasting, briefing and meteorological watch services.

8.5.1. The unit radar coordinator will manage a radar program that ensures unit personnel are fully qualified in operating the equipment and interpreting the products available from the radar. Training will be conducted at least seasonally to refresh and train personnel on the seasonal variation in weather radar signatures for the forecast regimes, and keep them proficient in all required PUP and UCP procedures. Personnel should be well versed in manipulating the capabilities of the radar to maximize its use in all weather events, but as a minimum must be able to perform the following procedures.

8.5.1.1. Determine the radar status.

8.5.1.2. Troubleshoot problems IAW local guidance including graphics restarts, PUPUP/PUPDOWN procedures, recover from a PUP software malfunction (software lock-up) and shutdown and startup procedures.

8.5.1.3. Acquire (via the graphics tablet and applications terminal) and interpret graphic and alphanumeric data.

8.5.1.3.1. Data legend: Identify the elevation angle, date/time group, product resolution and current VCP.

8.5.1.3.2. Base reflectivity: Identify range folding, hook echoes, outflow boundaries, front/convergent boundaries (clear air mode), identify bad clutter suppression settings.

8.5.1.3.3. Base velocity: Identify improper velocity dealiasing, low-level and upper level wind maxima, create a vertical wind profile from one elevation scan, frontal boundaries and identify temperature advection patterns.

8.5.1.3.4. Composite reflectivity: explain product interpretation and limitations.

8.5.1.3.5. Echo top: explain product interpretation and limitations.

8.5.1.3.6. VAD wind profile: explain the RMS color coding and interpret the location of radar derived winds for each VCP.

8.5.1.3.7. Vertically integrated liquid: Identify the storm with maximum severe weather potential and explain the limitations of VIL in different VCPs.

8.5.1.3.8. Storm relative velocity map/region: Identify the storm motion subtracted and rotational signatures (e.g., convergent/divergent rotation, etc.).

8.5.1.3.9. Attribute table: explain the interpretation of each attribute - Storm ID, AZRAN, TVS, MESO, Hail, DBZM HGT, Storm Top, FCST MVMT and how each is used.

8.5.1.3.10. 3-D Storm Structure: Interpret elevation angles for use in the 4-panel storm tilt interrogation technique, interpret storm tilt and the depth of rotation.

8.5.1.3.11. Vertical cross section: Create a vertical cross section and explain considerations for cross section placement in both reflectivity and velocity products.

8.5.1.3.12. Change RPS list content and switch to a different RPS list.

8.5.1.3.13. Submit a one time request and access products from a dial-out RDA.

8.5.1.3.14. Acknowledge and interpret alerts.

8.5.2. Local procedures will be established to ensure personnel are aware of the radar status, alert area locations and alert thresholds, the current VCP and RPS list and environmental factors (e.g., environmental wind vs. VWP, Trop height, -20×C height, etc.) prior to data interpretation. Procedures will also guide personnel in making optimum use of RPS lists and VCPs for storm interrogation and assist them in choosing the best products to use for a particular forecast regime.

8.5.3. UCP Operations. Units with UCPs control the RDA and so requests made of them from their associated users. Local procedures will be established outlining the UCP functions agreed upon at the unit radar committee meetings. All radar certified personnel will be able to perform these locally established functions, but at a minimum will be able to perform the following.

8.5.3.1. Change the volume coverage pattern (VCP).

8.5.3.2. Change the pulse repetition frequency (PRF).

8.5.3.3. Modify the environmental wind table.

8.5.3.4. Monitor principle user communication lines.

8.5.3.5. Enable local control of the RDA for maintenance actions.

8.5.3.6. Notify PUP users of changes to the system when they are made.

8.5.3.7. Perform runup/rundown procedures.

8.5.4. Publications. The WSR-88D system manager is responsible for keeping a current radar technical library. The following list of publications are the minimum required to run an effective WSR-88D program at a BWScontrol what products are available to other users of the radar. Personnel at these locations must be prepared to react to any:

•FMH-11, Doppler Radar Meteorological Observations, Parts A through D, and Air Force Supplement 1, to Parts A and D.

- •Memorandum of Agreement for Interagency Operations of the WSR-88D.
- •Operator Handbook Set, Volumes 1 through 3 including:
- •(At UCP sites) Operator handbook UCP, Job Sheets 25 Oct 93, to include changes 1 and 2.
- •(At UCP sites) UCP on-site training program, 2 Apr 92.
- •Radar Product Generation UCP on-the-job proficiency checklist, Version 2, 24 Mar 94.
- •AF TO 31P1-4-108-78-1, PUP User's Guide (WSR-88D Doppler Radar)
- •AF TO 31P1-4-108-61, Operator's Manual - PUP Workstation (WSR-88D Doppler Radar)
- •(At UCP sites) AFTO 31P1-4-108-58-1, User's Guide - Unit Control Position.
- •(At UCP sites) AFTO 31P1-4-108-51, Operator's Manual - Unit Control Position WSR-88D Radar.

8.5.5. All NEXRAD-equipped units (to include units equipped with a PUP) will maintain a continuity binder for use in administering their local NEXRAD program. Suggested contents may include the following items.

- •A list of POCs for various aspects of the system.
- •List of names and phone numbers of members of the URC.
- •System Troubleshooting Guide.
- •Training Plan.
- •RPS lists for VCPs.
- •Other items the NEXRAD System Manager determines to be useful.

8.5.6. The OSF produces aperiodic newsletters and helpful guides which can answer numerous questions on operations of the NEXRAD system. Most are sent autmatically to the unit. In the event of non-receipt, these publications can be ordered on demand throught the OSF’s FAXBACK system. FAXBACK is available by calling 1-800-874-6475.

Chapter 9

PILOT TO METRO SERVICE

9.1. General. Selected AFW units operate Pilot-To-Metro-Service (PMSV) radio equipment on assigned frequencies. These include certain Army radio frequencies which may be temporarily designated by the appropriate Army agency for use as limited PMSVs. Phone patch contacts with airborne aircrews are considered PMSV contacts.

9.1.1. PMSV Operation Qualification. Only PMSV task qualified personnel will respond to PMSV calls. Trainees may respond with proper supervision. Individuals not fully task qualified to make and issue forecasts, will identify themselves as "weather apprentice, not able to make or interpret weather forecasts". They will not make or interpret forecasts for any weather element(s). If a forecast or interpretation of a forecast is required and a fully qualified journeyman or craftsman weather person is not available, refer the aircrew to the nearest operating PMSV facility with forecasting service. The weather apprentice, if not qualified to issue or interpret forecasts, may relay *only* the following information:

9.1.1.1. Surface observations.

9.1.1.2. Radar observations.

9.1.1.3. TAF for which an amendment capability exists (a TAF containing a "LAST" remark does not have an amendment capability).

9.1.1.4. Locally disseminated weather warnings and advisories.

NOTE: The weather apprentice will ensure the valid time for such data is provided to the aircrew when relaying any of the above information.

9.2. Radio Procedures. All PMSV operators will follow proper radio discipline and use standard phraseology found in FAAH 7110.10, Chapter 14. Provide current and complete information upon request. Don't be afraid to volunteer information just because it wasn't asked for. Ensure to warn of all hazards. Include the latest weather radar information when it is significant to the location or proposed route of the aircrew. Identify locations by well-known navigational aids or ground references. Do not use the PMSV to vector aircraft.

9.2.1. Solicit pilot weather reports (PIREPs) during contacts with airborne aircraft.

9.2.2. Documentation of PMSV Contact. Log or tape all PMSV contacts. If logged, at a minimum, document the aircraft call sign or number, a brief summation of the information passed to the aircrew, and the DTG of the contact.

9.2.3. Equipment Check. Perform and document at least one equipment check (an operational contact meets this requirement) each day. Also, check the equipment anytime the operator suspects the radio may have a problem and upon return of radio equipment from maintenance. Try to contact an airborne target first, but any facility you reach is acceptable (the control tower is normally a good alternate selection). Document any discrepancies such as weak contact, weak reception, distortion, static, etc, to assist maintenance personnel in correcting the problem.

9.3. PMSV Outages. Ensure PMSV outages are logged appropriately. The form or method used may be MAJCOM specified. Ensure Air Traffic Control and the Airfield Commander, Airfield Manager, or their authorized representative is notified of actual or expected outages.

9.4. Backup Procedures. Establish written procedures to request a nearby station on the same frequency to answer calls when your PMSV facility is out of service. Notify the station monitoring your PMSV when your PMSV becomes operational. Answer calls for nearby stations if it becomes obvious that the station being called is not responding. If the problem continues, call the station and notify them that they may have a problem with their PMSV. For short-term outages (normally less than one hour), ask the local Air Traffic Control (ATC) facility, such as the control tower, to monitor the assigned PMSV frequency and relay information to the weather station. NOTE: The ATC facility may or may not be able to honor the request based on their workload and duty priorities.

9.5. Limited Duty Stations. Stations with continuous forecasting service will maintain a list of all base weather stations within 200NM that operate PMSV equipment on the same frequency but have limited duty forecasting and/or observing service. They will answer calls for those locations during their published non-duty hours. Stations with limited forecasting service will maintain a list of all PMSVs within 200NM which have continuous forecast service. Non-certified personnel will refer aircrews to one of those stations when forecasting assistance is required. Any station temporarily closed or evacuated during scheduled operating hours will notify the nearest PMSV facility with the same frequency as soon as possible. The contacted station will then monitor and accept calls for the closed facility until normal service is restored.

9.6. Flight Information Publications. AFW units will work with airfield management personnel to ensure all information concerning their PMSV is current and correctly described in DoD Flight Information Publications (FLIP) (the IFR Supplements, Flight Information Handbook, etc). The type of information to be checked for accuracy includes frequency remarks; hours of full service (staffed by a fully forecast task qualified individual), hours of limited service (staffed by an apprentice or a less than fully task qualified forecaster), and any limitations (blind spots). Forward changes to FLIP listings through the Airfield manager (USAF installations) or the Airfield Commander (US Army installations) for inclusion in the applicable FLIP. Stations will maintain a case file on the PMSV radio and coordinate actions regarding the PMSV frequency with the installation frequency manager.

9.6.1. FLIP Revision. Procedures for new or revised entries to the FLIPs and quality assurance are contained in the General Planning (GP) FLIP. New or corrected PMSV entries in FLIP documents will be submitted for publication using the following standardized formats:

9.6.1.1. Units with full-time forecasting and observing: PMSV: METRO - 239.8

9.6.1.2. Units with limited duty hours and full-time observing: PMSV: METRO 344.60 Full Svc 1000-0200Z M-F (except Hol), 1200-2400Z Sat, Sun, & Hol Ltd Svc OT.

9.6.1.3. Units with limited forecaster duty hours and limited observer duty hours (not the same): PMSV: METRO - 126.65 Full Svc 1000-0200Z M-F (except Hol), Ltd Svc 0200-0600Z M-F (except Hol), 1200-2400Z Sat, Sun, & Hol.

9.6.1.4. Units with limited forecaster duty hours and the same limited duty observer duty hours: PMSV: METRO - 375.2 1200-0300Z Dly.

9.6.1.5. If remote briefing service is available from a nearby PMSV, include as “Remote Briefing Svc Avbl: Scott METRO - 239.8.”

9.6.2. FLIP Entries. Entries for PMSV and Weather Radar Facilities Map (in Flight Information Handbook) show:

9.6.2.1. “Continuous” stations are those with full-time PMSV monitoring.

9.6.2.2. “Less Than Continuous” stations are those who do not have full-time PMSV monitoring.

9.7. Evaluating PMSV Facilities. Establish a system to monitor altitude, direction, and distance capability of the PMSV. A documented evaluation is not required for special tactical or operational frequencies, phone patch or direct link with high frequency and/or single side band command and control facilities, or a standard frequency from a temporary location for a designated period of time to meet a unique specific operational requirement, test, or other directed commitment.

9.7.1. Equipment Change. When there is a change in equipment or equipment configuration which might affect PMSV operations, accomplish a new survey. Changes include (but are not limited to) a change in antenna location or antenna type, equipment upgrades, and construction or removal of surrounding structures. Process these changes in the same manner specified above.

9.7.2. FAA evaluations of PMSV deficiencies are normally reported to the local tower facility or regional FAA facility. The weather unit will ensure they receive a copy of the report.

9.7.3. Initial Evaluation. During the initial evaluation and based on aircraft availability, evaluate at least one aircraft contact daily for altitude, direction, and distance. (Units supporting low-level flying operations should accomplish the evaluation for the greatest distance/heights practicable.)

9.7.4. Blind Spot(s). Plot a sufficient number of contacts to ensure reasonable coverage to determine if any “blind spots” exist in your reception/transmit area. If there is a permanent reception limitation (blind spot), pass the information to the local ATC facility and/or FAA maintenance facility and include the information in the next update to the FLIP.

9.7.5. Retain documentation of the evaluation.

Chapter 10

PILOT AND AIR REPORTS

10.1. General. Reports from airborne aircraft are one of the most important sources of information on the current condition of the atmosphere. Timely, accurate dissemination, and effective use of these reports can contribute significantly to the quality of the environmental services provided to your operational customers and other users of the global weather system.

10.2. Definitions:

10.2.1. Pilot Report (PIREP). A PIREP is an aircraft observation that is encoded in accordance with AFMAN 15-124. It is a report of in-flight weather provided by an aircrew member. A PIREP will include the location and flight level of the aircraft, time of the observation, type of aircraft, and description and extent of meteorological elements.

10.2.2. Air Report (AIREP). An AIREP is an evaluation aboard an aircraft in flight, normally outside of the contiguous United States or along routes where a navigator is required. It is encoded in accordance with AFMAN 15-124.

10.3. Requesting and collecting PIREPs/AIREPs.

10.3.1. Ensure supported aircrews and air traffic control personnel are aware of the importance of aircrew weather reports. (i.e., as part of Supervisor of Flying (SOF) training, Air Traffic Control (ATC) training, and Instrument Refresher Course, etc.).

10.3.2. Encourage aircrews to provide timely PIREPs/AIREPs (departure, in-flight, or post-flight) to weather units when those reports include:

10.3.2.1. Meteorological elements observed that may be of operational significance to other aircraft or to surface activities (i.e., low-level wind shear, tornadic activity, etc.).

10.3.2.2. Specific data to fill a gap in the meteorological collecting system; for example, cloud bases and/or tops when departing/arriving, upper winds, or turbulence/icing at a point or between two points.

10.3.3. Establish written procedures (weather support plan or similar document) with local customers to ensure that observed flight conditions are passed to the weather unit as PIREPs/AIREPs.

10.3.3.1. Provide aircrews appropriate forms (AF Form 72, ***Air Report***, or similar MAJCOM form) to record observations for over-water flights or when requested. Request completed forms, regardless if data was previously transmitted, be turned in by the aircrew at their destination.

10.3.3.2. Use code formats contained in AFMAN 15-124 for encoding PIREPs/AIREPs.

10.4. Recording PIREPs.

10.4.1. Use Air Force Form 3805, ***Pilot Report***, MAJCOM, or locally developed form as a worksheet to aid in formatting PIREPs for local/longline transmission. AWDS will automatically encode the PIREP into the specified format.

10.4.2. Use the 3 or 4 letter location identifiers to encode phenomena location. If not possible use latitude and longitude to identify the location.

10.4.3. All PIREPS transmitted longline will follow format procedures as detailed in AFMAN 15-124, Meteorological Codes, Chapter 4.

10.5. Recording AIREPs.

10.5.1. Record receipt of AIREPs on AF Form 72, MAJCOM, or locally developed form.

10.5.2. When entered into AWDS, the AIREP will automatically be recorded onto the AWDS format.

10.6. Dissemination of PIREPs/AIREPs.

10.6.1. Establish procedures that ensure individuals transmit all severe PIREPs (UUA) and AIREP Specials (ARS) longline which contain one or more of the following phenomena:

10.6.1.1. Tornadoes, funnel clouds, and water spouts.

10.6.1.2. Thunderstorms (see note below).

10.6.1.3. Tropical cyclones.

10.6.1.4. Squall line.

10.6.1.5. Severe or extreme turbulence.

10.6.1.6. Severe icing.

10.6.1.7. Mountain wave turbulence.

10.6.1.8. Widespread duststorm or sandstorm.

10.6.1.9. Low-level wind shear.

10.6.1.10. Hail.

10.6.1.11. Volcanic ash cloud.

NOTE: The requirement for thunderstorms refers to the occurrence of an area of widespread activity, thunderstorms along a line with little or no space between individual storms, or thunderstorms embedded in cloud layers or concealed by haze. It does not refer to isolated or scattered thunderstorms not embedded in cloud layers or concealed in haze.

10.6.2. Encode and disseminate longline routine PIREPs unless they:

10.6.2.1. Contain only cloud base heights which are incorporated into the current surface observation.

10.6.2.2. Include substantially the same data already transmitted within the past 30 minutes.

10.6.2.3. Contain only negative reports of icing and/or turbulence from locations outside forecast areas for these phenomena.

10.6.3. Encode and disseminate longline all routine AIREPs received.

10.6.4. Locally disseminate applicable PIREPs/AIREPs.

10.6.5. Units should develop procedures to use data provided by PIREPs/AIREPs to enhance their Local Analysis Forecast Program and improve flight safety.

Chapter 11

FLIGHT WEATHER BRIEFINGS

11.1. Weather Briefing Services. AFW units provide flight weather briefing services to pilots.

11.2. Briefing Documentation. The DD Form 175-1, ***Flight Weather Briefing***, is the standard briefing form. The AWDS equivalent to the DD Form 175-1, a MAJCOM-specific form, or a printout of a locally designated computer-generated flight weather briefing containing DD Form 175-1 information, is an acceptable substitute for the DD Form 175-1. MAJCOMs provide completion instructions for MAJCOM forms and may provide more specific instructions for the completion of the DD Form 175-1.

11.2.1. DD Form 175-1 completion instructions are in **Attachment 8**.

11.2.2. Document verbal briefings (e.g., telephone, closed circuit television, etc.). Note severe/significant weather briefed. MAJCOMs may provide more specific guidance for logging verbal briefings and develop command forms.

11.2.3. Give original DD Form 175-1 to the aircrew and retain a duplicate copy either in files or in the AWDS data base.

11.2.4. If weather is rebriefed, enter the updated information and the time the rebriefing was completed on the DD Form 175-1 (or local form as appropriate) in green.

11.3. General Briefing Content. Using the DD Form 175-1 as an outline, brief the general synoptic situation, current and forecast weather (including flight hazards) for takeoff, en route, destination, and alternates with special emphasis on severe weather and flight hazards. A reasonable rule of thumb is to brief flight hazards within 25 miles either side of the route and within 5,000 feet of the planned flight level.

11.3.1. Ensure weather data used are the most current. Significant changes in weather discovered after the briefing and/or after the crew has departed, will be passed to the crew via the supervisor of flying, operations center, base operations, air traffic control (tower or radar facility), or other local agency(s).

11.3.2. Present a comprehensive, accurate, and current briefing. Evaluate, interpret, and apply the contents of centrally produced advisories and forecasts to each individual flight weather briefing. Radar, satellite imagery, and AWDS products will be used to enhance briefings when possible. Briefings will be operationally consistent with other station products such as warnings, advisories, and the TAF.

11.3.3. Use the term “thunderstorm,” rather than “CB” or “cumulonimbus,” in flight weather briefings.

11.3.4. Be familiar with characteristics of each aircraft routinely supported and its weather limitations.

11.3.5. Request aircrews provide PIREPs during takeoff, enroute, and at destination. Provide PMSV frequencies for all aircrew briefings.

11.4. Flight Publications Requirements. Procedures for pilots to obtain weather briefings at limited duty stations will be listed in FLIPs. See paragraph **9.6.**

Chapter 12

TOXIC CORRIDOR FORECASTS

12.1. General. AFI 32-4001, Disaster Preparedness Planning and Operations specifies responsibilities of various base functions when an accident involving toxic chemicals occurs. Weather units will coordinate required support with their local Civil Engineer Readiness Flight or Army Post Civil Engineer office. Document these requirements in the local weather support plan or other agreements.

12.2. Air Force Toxic Corridor Program (AFTOX). Air Force Chemical Dispersion Model, Version 4.0 (PC-0027B) can be used as the primary means to produce toxic corridor forecasts. However, local base/post authorities may opt to use other software packages for this purpose. Software to be used will be documented in base/post disaster preparedness plans.

12.2.1. AFTOX. This computer program can be obtained through the AWS Technical Library. Manual (backup) procedures to produce a "worst case" can be used if computer capability is not available or when time is of an essence and sufficient information is not available.

12.2.2. Toxic Corridor Calculation Responsibility. If local weather units support group and civil engineer squadrons (or Army post equivalent) desire; then toxic corridor calculation responsibility can be placed in another organization to meet the local commanders need. However, this shift in support responsibility must be clearly documented in local disaster preparedness plan.

12.2.3. Backup Capability. AFW units, when locally tasked to provide toxic corridor calculations, need to maintain the capability and proficiency to provide this support when needed. Units will develop local procedures to produce and disseminate toxic corridor forecasts. The following publications need to be maintained:

- AWS/TR-80/003 Calculating Toxic Corridors
- 7WW/FM-89/001 Toxic Corridors: An Update

Chapter 13

METEOROLOGICAL SATELLITE IMAGERY

13.1. General. Meteorological Satellite (METSAT) Imagery is essential for almost every facet of AFW operations worldwide. Though METSAT imagery display equipment may vary from site to site, METSAT imagery is a basic, but critical, element in the forecast process and as a briefing aid. METSAT data is particularly important in areas where conventional data is sparse or unavailable.

13.2. Unit Responsibilities.

13.2.1. Every AFW unit having forecast or briefing responsibilities will:

13.2.1.1. Ensure access to and exploitation of satellite imagery applicable to its mission.

13.2.1.2. Develop procedures for the proper operation and maintenance of all METSAT equipment.

13.2.1.3. Ensure all task qualified personnel can interpret METSAT data.

13.2.1.4. Establish a training program which trains personnel on the following items as a minimum:

13.2.1.4.1. Types of METSAT imagery (i.e., Infrared, Visual, Water Vapor)

13.2.1.4.2. Non-meteorological elements (image header, enhancement curves, etc.)

13.2.1.4.3. Cloud types.

13.2.1.4.4. Mesoscale cloud features/patterns (Transverse banding, mountain wave, etc.).

13.2.1.4.5. Synoptic features and boundaries (Low centers, jet stream, fronts, etc.,)

13.2.1.4.6. Topographical features.

13.2.1.4.7. Product limitations (e.g., foreshortening, contamination, etc.).

13.2.1.4.8. Looping feature (if available) to evaluate speed and direction of movement of phenomena.

13.2.1.4.9. Strengths and weaknesses of standard enhancement curves (i.e. MB, ZA, etc.)

13.2.1.4.10. Methods to incorporate METSAT imagery and loops (if available) for initializing models, metwatch, briefings, and meteorological discussions.

13.2.1.4.11. Print/archive METSAT data (i.e., in case of an aircraft mishap).

13.2.1.4.12. Reset equipment to accommodate new satellite schedules (if applicable).

13.2.1.5. Designate a METSAT specialist (MSS).

13.2.1.5.1. Each unit MSS will attend an advanced course in satellite imagery interpretation and weather satellite systems as soon as possible after being appointed to their position. If a MSS has previously received formal training at Keesler (the Weather Satellite System and Photo Interpretation course), then they need not attend again.

13.2.1.5.2. The duties of the MSS normally include, arranging initial training on METSAT equipment for newly assigned personnel, development of recurring training to ensure profi-

ciency of unit personnel, seasonal preparation, and developing and maintaining a METSAT imagery reference file.

13.2.1.6. Maintain the following list of publications as a minimum requirement to run an effective METSAT program.

13.2.1.6.1. AWSTR 212, Application of Meteorological Satellite Data in Analysis and Forecasting

13.2.1.6.2. AWSTR 76-264, Satellite Meteorology

13.2.1.6.3. GOES User's Guide (for units with access)

13.2.1.6.4. WEFAX User's Guide (for units with access)

13.2.1.6.5. Applicable METSAT equipment user's guides

13.2.1.6.6. IVD METSAT Imagery Basic Interpretation AWS/ITP-5/001

13.2.1.6.7. Weather Service Forecasting Handbook 6, Satellite Imagery Interpretation for Forecasters.

Chapter 14

TACTICAL OPERATIONS

14.1. Concept of Operations. The technical aspect of tactical operations, how we observe and forecast the weather, should be very similar to base or post weather station operations. Everyday operations in the weather station should help prepare us to observe and forecast the weather if we go to war. Local technical guidance must be developed with this approach in mind.

14.1.1. Areas of Operations (AO). Personnel must be familiar with the AO they would most likely support in wartime. They need to know what types of weather support and products their customers will require. Tasked personnel must be familiar with the weather and communication annexes of OPLANS the unit is tasked to support. Awareness of such items as weather data sources, climatology, geography and terrain, will help prepare personnel for deployment. One way to provide this information to personnel is to prepare an AO familiarization package and incorporate it into the initial and recurring training process. Include regional and site specific climatological information in the package. The package could also include scenarios with "canned" data for weather events in the AO. It will focus on the major weather regimes, weather data types and products available in the AO. Personnel must practice preparing the products the customer requires (those they will produce when deployed). This approach trains personnel for deployment by giving them "experience" in the AO before actually deploying.

14.1.2. OPLANS. Station management must ensure all weather annexes to OPLANS are current. They must know what equipment and personnel are needed to support the OPLAN and identify any shortfalls. The OIC/NCOIC will coordinate weather support prior to and during deployments to ensure the customer is getting what they need. There may be a better way to provide the support the customer needs, but this can't be evaluated if the requirement isn't fully understood. Customer requirements will be documented.

14.2. Tactical Communications (TACCOM) and Tactical Meteorological (TAC MET) Equipment. A working knowledge of all assigned TACCOM and TACMET equipment is essential for providing customers proper weather support. Units will have Technical Orders (TOs) and/or operator manuals for all assigned equipment with copies available for deployment. Maintain at least 30 days of expendable supplies and establish procedures for resupply. Qualified personnel must be able to set up and operate the equipment in accordance with the applicable TO and/or operator manual and be familiar with operator maintenance procedures. Procedures will be established with deployed supply personnel for obtaining maintenance on, or replacement of, equipment while deployed. If required, security procedures for any equipment or associated cryptographic material will be established.

14.3. Observing. Tactical observing is conducted in accordance with OPLANS and other pertinent directives. Observing standards and practices in AFMAN 15-111 will be used, to the maximum extent possible, when establishing and managing tactical observing stations. If required, task qualified personnel must be able to determine the elevation and Military Grid Reference System coordinates of the observation point. Written procedures will describe how to take a tactical observation as well as how to plot upper air soundings, LAWCs, and constant pressure charts.

14.4. Forecasting. Tactical forecasting should mirror base or garrison support as much as possible. MAJCOMs will provide guidance on unique tactical forecast requirements. Refer to other sections of this publication for guidance on developing an LAFP, weather warnings and advisories, flight weather briefings, PMSV, and other applicable procedures and tailor them to meet your tactical situation. References for single station analysis will be available (AWS FM-300/001,2,3, and 4).

14.5. Backup Support. The tactical environment may create a situation in which expected equipment or computer support is not available upon arrival at the deployed location. Because of this, personnel must stay proficient in using backup procedures and manual plotting procedures for the Skew-T, LAWC and constant pressure charts. The AFMAN 15-111 and applicable plotting charts will be available in a deployment kit. Forecasters and meteorologists will stay proficient in manual analysis techniques for weather charts and limited data forecast techniques. Units will establish backup procedures to obtain weather data from alternate sources such as AFDIS, for products such as AFTOX, and calculating solar and lunar data. These procedures may reside on redundant computer systems or systems of other deploying elements.

14.6. Forms Prescribed.

14.6.1. AF Form 3805, **Pilot Report**

14.6.2. AF Form 3806, **Weather Watch Advisory Log**

14.6.3. AF Form 3807, **Watch/Warning Notification and Verification**

14.6.4. AF Form 3808, **Hurricane/Typhoon Military Advisory**

14.6.5. AF Form 3809, **Centralized Point Warning Log**

14.6.6. AF Form 3810, **Weather Warning and Weather Advisory Data**

14.6.7. AF Form 3811, **Quality Control Register**

MARVIN R. ESMOND, Lt General, USAF
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Attachment 1

GLOSSARY OF REFERENCES, ABBREVIATIONS, ACRONYMS, AND TERMS

References

DoD Flight Information Publications (FLIPs)

Air Force Manual (AFM) 1-1, volumes 1 and 2, *Basic Aerospace Doctrine of the United States*

AFDD 45, *Aerospace Weather Operations*

AFPD 15-1, *Atmospheric and Space Environmental Support*

AFMAN 15-111, *Surface Weather Observations*

AFI 15-114, *Weather Support Evaluation*

AFI 15-118, *Requesting Specialized Weather Support*

AFMAN 15-124, *Meteorological Codes*

AFCAT 15-152 Volume I, *Facsimile and Graphics Product Catalog*

AFCAT 15-152 Volume II, *Weather Station Index*

AFCAT 15-152 Volume III, *Weather Message Catalog*

AFI 15-180, *Air Force Weather Standardization and Evaluation Program*

AFI 25-201, *Support Agreements Procedures*

AFI 32-4001, *Disaster Preparedness Planning and Operations*

AFI 33-103, *Requirements Development and Processing*

AFI 37-160 Volume 1, *The Air Force Publications and Forms Management Programs--Developing and Processing Publications*

AFI 37-160 Volume 8, *The Air Force Publications and Forms Management Programs--Developing and Processing Forms*

AFVA 105-2, *Wind Plotting Guide*

AFH 105-56, *Meteorological Techniques*

ATC EO Service Test Workbook, Jan 87

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PACAFI 15-102, *Tropical Cyclone Reconnaissance*

ACCI 15-150, *ACC Weather Operations*

Federal Meteorological Handbook No. 1 (FMH-1), *Surface Aviation Observations*

NAVEDTRA 40520, *Introduction to EO*, Sep 83

AWS/ITP-5/001, *IVD METSAT Imagery Basic Interpretation*

AWSTR 76-264, *Satellite Meteorology*

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AWS/TN-87/001, *What's Hot & What's not-Practical Guide to TDA,* Jul 87

AWS/TN-87/003, *Weather Sensitivities of EO Weapon Systems,* Dec 87

AWS/TN-88/001, *Forecaster Handbook #6*

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AWS TR 218, *Preparation of Terminal Forecast Worksheets*

AWSTR 212, *Application of Meteorological Satellite Data in Analysis and Forecasting*

3WW/FM-83/003, *Initializing the LFM, A Case of Good Agreement*

5WW/FM-81/005, *The Damming Effect of the Southern Appalachians.*

7WW/FM-89/001, *Toxic Corridors: An Update*

FOT 52421-DF, *Back to Basics II*, Block II, Part C

AFGWC/FM-81/001, *Meteorological Analysis and the LFM; They Work Together*

AFGL-TR-83-0334, *OTDA Manual* Version, Sep 83

AFGL-TR-84-0108 (I), *OTDA for Laser Weapon Systems Calculator Version MARK I,* Mar 84

AFGL-TR-85-0144, *OTDA for IR Systems MARK III Calculator* Version Jun 85-

AFGL-TR-85-0274, *OTDA for TV Systems Calculator Version MARK II*, Oct 85

AFGL-TR-85-0276 (I) OTDA for Low-Light-Level TV Systems Calculator Version MARK II, Oct 85

AFGL-TR-87-0330, *OTDA Final Report*, Nov 87

TR-0173, *Global EO System Environmental Matrix (GEOSEM) Climatology for Central America,* Jun 85

GOES User's Guide (for units with access)

WEFAX User's Guide (for units with access)

NWS Forecasting Handbook 6, *Satellite Imagery Interpretation for Forecasters.*

Ford Aerospace PAVE TACK EO Target Designator System

HUGHES IR Maverick Operations Supplement, Oct 85

MAV-M-1000-2 HUGHES Operations Sup TV Maverick, Jan 85

FAAH 7110.10, Chapter 14, *Federal Aviation Administration Handbook, Flight Services*

FAAH 7340.1, *Federal Aviation Administration Handbook, Contractions Manual*

FAAH 7350.6, *Federal Aviation Administration Handbook, Location Identifiers*

World Meteorological Organization (WMO) International Cloud Atlas VII, *Cloud Types for Observers*

Technical Orders (TOs) for weather observing equipment

Abbreviations and Acronyms

ADP—Automatic Data Processing

ADWS—Automatic Digital Weather Switch

AFDIGS—Air Force Digital Graphics System

AFDIS—AFGWC Dial-In Subsystem

AFGWC—Air Force Global Weather Central

AFMEDS—Air Force Meteorological Data System

AFTOX—Air Force Toxic Corridor Program

AFW—Air Force Weather

AIREP—Air Report

ALT—Actual Lead Time

AMD—Amendment

AO—Area of Operations

ARQ—Automatic Response to Query

ASOG—Air Support Operations Group

ASOS—Air Support Operations Squadron

ASM—AWDS System Manager

AWDS—Automated Weather Distribution System

AWN—Automated Weather Network

AWNMC—Automated Weather Network Management Center

BAUD—The rate at which data flows on a circuit

BIT—Binary Digit

BWS—Base Weather Station

CCSD—Communications Circuit Service Designator

CFEP—Communications Front End Processor

CFETP—Career Field Education and Training Program

CLS—Contractor Logistic Support for AWDS Management Plan)

CLT—Communications Line Terminal

COMET—Cooperative Program for Operational Meteorology, Education, and Training

COR—Message modifier for a correction to a weather report or bulletin

CONUS—Continental United States

DAU—Data Acquisition Unit

DIFAX—National Weather Service Digital Facsimile System.

DISA—Defense Information Systems Agency

DLT—Desired Lead Time

DMA—Defense Mapping Agency

DTG—Date-Time Group

EOTDA—Electro-Optics Tactical Decision Aid

ETX—End-of-Text

FAA—Federal Aviation Administration

FBD—Formatted Binary Data

FIFO—First-in-First-Out

FLIP—Flight Information Publication

FLENUMMETOCCEN—Fleet Numerical Meteorology Oceanography Center, Monterey CA.

FT—File Time

FU—Forecast Unit

FWA—Forecast Weather Advisory

GCCS—Global Command and Control System

GFE—Government-Furnished Equipment

GMGO—German Military Geophysical Office

GWCS—Global Weather Communications System

GWIP—Global Weather Intercept Program

ICAO—International Civil Aviation Organization.

LAFP—Local Analysis and Forecast Program

LGG—Locally Generated Grids

MAJCOM—Major Command

MDL—Message Distribution Library

MDLT—Met Desired Lead Time

MET—Meteorological Enhancement Team

METSAT—Meteorological Satellite

METAR—Aviation Routine Weather Report

METCON—Meteorological Conference or Discussion

METWATCH—Meteorological Watch

MOMSS—Mode and Message Selection System

MSS—Meteorological Satellite Specialist

NCI—No Content Indicator

NCOIC—Non-commissioned Officer in Charge

NCS—Network Control Station

NEDS—Navy Environmental Display System

NOTAM—Notice to Airmen

NWS—National Weather Service

OIC—Officer in Charge

OJT—On-the-Job Training

OPLAN—Operation Plan

OPSEC—Operations Security

OWA—Observed Weather Advisory

PI—AWDS Projection Indicator

PIREP—Pilot Report

PID—Product Identifier

PMSV—Pilot-to-Metro Service

PUP—Principal User Processor

QT—Qualification Training

QTP—Qualification training Package

RAREP—Radar Report

RASTER SCAN—Picture element (pixel) data

RFS—Request for Service

RTD—Routine Delayed Weather

SAO—Surface Aviation Observation

SAR—Support Assistance Request

SIGMET—Significant Meteorological Phenomena

SOCS—Surface Observation Climatic Summary

SOF—Supervisor of Flying

STS—Specialty Training Standard

SWMT—Severe Weather Management Team

TACCOM—Tactical Communications

TACMET—Tactical Meteorological Equipment

TAF—Terminal Aerodrome Forecast

TFRN—Terminal Forecast Reference Notebook

TSO—Telecommunications Service Order

TSR—Telecommunications Service Request

TYPNO—Inoperative communication equipment or circuit

TYPOK—Restored communications equipment or circuit

UCP—Unit Control Position

UGDF—Uniform Gridded Data Field

UKMO—United Kingdom Meteorological Office

URC—WSR 88-D Unit Radar Committee

VWP—WSR-88D Vertical Wind Profile

WA—Weather Advisory

WW—Weather Warning

WCC—Weather Communications Center

WPC—Weather Plotting Chart

WRDCP—Weather Data Requirements Contingency Package

WSI—Weather Support Instruction

WSP—Weather Support Plan

WSR-88D—Next Generation Doppler Radar

WMO—World Meteorological Organization

WWMCCS—Worldwide Military Command and Control System

Terms

Actual Lead Time—The elapsed time between issue time of an advisory or warning and the first occurrence of the event.

Air Force Digital Graphics System—Provides facsimile products to DoD units worldwide, including the CONUS (CONDIGS), Europe (EURDIGS), Pacific (PACDIGS), and Howard and Lajes (HALDIGS).

Air Force Meteorological Data System—Provides weather alphanumeric products to DoD units worldwide, including the CONUS (COMEDS), Europe (EURMEDS), Pacific (PACMEDS), Alaska (ALMEDS), and the Atlantic (ALTMEDS) which covers the North Atlantic and Caribbean areas.

Air Report—A pilot report made over areas where weather information is limited or nonexistent (example, over an ocean).

Amendment—Used as a message modifier when transmitting a terminal forecast amendment.

Area Meteorological Watch—A meteorological watch conducted for local flying areas, large range complexes, exercise areas, large military reservations, etc.

Automated Weather Distribution System—An integrated automated system designed to provide weather and air traffic control products to support the missions of base weather stations, weather support units, air traffic control agencies, and command posts of the DoD.

AWDS Product Driver System—A system at AFGWC which builds and formats AWDS graphic products.

Automated Weather Network—A global communications network used for collecting and distributing alphanumeric environmental/weather data and Notices to Airmen (NOTAMs). It consists of: two overseas Automatic Digital Weather Switches (ADWSs) which are linked to AFGWC via high-speed communications circuits through a hub ADWS at Tinker AFB OK and the CFEP at Offutt AFB NE; three overseas Weather Intercept Concentrator Units, and their supporting circuits; and the circuitry and interfaces interconnecting the ADWSs with other DoD, federal, and foreign meteorological and aviation facilities.

Automated Weather Network Management Center—The joint 38 EIW, AWS and US Navy office located at Tinker AFB OK. Responsible for overall management of the AWN, including resource allocation and reconfiguration, planning and implementing circuit upgrade actions and maintenance of the Message Distribution Library (MDL).

Automatic Digital Weather Switch—A joint communications/weather operation that performs the communications switching and editing function of the AWN. The AWN is comprised of three ADWSs. The central hub is at Tinker AFB OK and the two overseas hubs are at Hickam AFB HI and RAF Croughton UK.

Automatic Response to Query—An automatic system that employs a separate ARQ data base to store current data for retrieval by authorized stations.

Aviation Routine Weather Report—The WMO code format used worldwide (except US and Canada until 1996) to encode weather observations.

BAUD Rate—Refers to the rate at which data flows on a circuit. The BAUD rate roughly corresponds to the BITs transferred per second.

Binary Digit—A BIT is a fundamental unit of information. BITs per second (BPS) is the number of units of information transferred in a second.

Bogus Data—Data that are either incorrectly input by the originator or are affected by circuit problems which cause them to be erroneously identified in the ARQ data base.

Bulletin Heading—A combination of letters and numbers that describe the contents of a bulletin, including the data type, geographical location, ICAO identifier of the originator and a date-time group.

Case Study—An in-depth, detailed forecast review of a specific event (Ref: AWS/TN-79/002).

Circuit (4-WIRE—)--A 4-wire circuit is a 2-way circuit using two paths so arranged that communication currents are transmitted in one direction only on one path and in the opposite direction on the other path.

Circuit (FULL-DUPLEX—)--A method of operation whereby all telecommunications between stations take place in both directions simultaneously.

Circuit (HALF-DUPLEX—)--A circuit that permits unidirectional electrical communications between

stations. Technical arrangements may permit operation in either direction, but not simultaneously. Therefore, this term must always be qualified by one of the following suffixes: S/O - Send Only, R/O - Receive Only, S/R Send or Receive.

Communications Circuit Service Designator—An 8-character identifier assigned to a communications circuit.

Communications Front End Processor—The communications switch collocated with HQ AFGWC which performs external communications interface functions for AFGWC systems.

Communications Line Terminal—An interface device which transfers data between communications circuits and a computer.

Data Acquisition Unit—An AWS unit at an ADWS responsible for monitoring, editing and processing data. A DAU is normally comprised of a Data Requirements Section, a Programming Section, and a Data Control Section.

Data Deficiency Bulletin—A computer-generated bulletin which identifies those transmitting stations from which a scheduled report was not received or was received with coding errors (either introduced by the originating station or by other causes).

Decay Factor—The time established in the AWN software for a particular product to be kept in the ARQ data base (if not superseded).

Decodable—Individual reports transmitted by a station that are sent in a predetermined code format and must pass a computer software decoder to be accepted into the AWN data base.

Dedicated Circuit—A circuit devoted solely for the use of one customer.

Desired Lead Time—The amount of advance notice a supported agency desires prior to onset of a particular weather phenomenon.

Dissemination Circuit—A circuit used to send weather data from one point to another or to several customers on that circuit.

File Time—The time a weather message or bulletin is scheduled to be transmitted. Expressed either as a specific time or a specific time block during which the message will be transmitted.

First-in-First-Out—The manner in which AWN computers handle the processing of weather messages.

Flight Meteorological Watch—A meteorological watch for specific flight or mission, provided in response to a special request or direction (e.g., Presidential flight metwatch).

Forecast Problem—The inability to correctly forecast a customer-required weather condition.

Forecast Review—A written review of the meteorological data and reasoning used to develop the forecast (Ref: AWS/TN-79/002).

Forecast Worksheet—Tool used to document, track, and evaluate past and future weather events. It may contain forecast rules-of-thumb, question and answer discriminators, decision-logic trees, etc., to help develop a forecast.

Formatted Binary Data—Surface and upper air reports that have been rearranged into a machine readable format.

Garble—An error in transmission, reception, encryption, or decryption that changes the text of a message

or any portion thereof in such a manner that it is incorrect or undecryptable.

German Military Geophysical Office—Located in Traben-Trarbach, Germany (FRG); host for the European Forecast Unit (EFU).

Global Command and Control System—A replacement for WWMCCS.

ICAO Identifier—A specifically authorized 4-letter identifier assigned to a location and documented in ICAO Document 7910.ICAO (used by AWDS): An ICAO identifier with a fifth character appended which designates a specific AWDS functional area (reference AWDS Positional Handbooks).

Initialization—The process of comparing numerical prediction model output to the actual state of the atmosphere at the valid time of the model. Adjustment between the model and the actual state of the atmosphere can then be made to subsequent model outputs.

International Civil Aviation Organization—A United Nations organization specializing in matters dealing with international aviation and navigation.

Issue Time—Time the last agency was notified. Exclude follow-up notifications when determining issue time.

Limited Duty Station—A weather station that provides less than 24-hour a day forecast service.

Local Analysis and Forecast Program—A systematic and consistent approach to weather forecasting. The LAFP identifies techniques and tools used to forecast individual weather elements; describes requirements for locally prepared work charts/composites; and describes refinements and application of centralized products.

Local Forecast Study—A study which specifies techniques for predicting weather elements applicable to one specific terminal or location.

Macroscale—The largest scale of weather systems generally greater than 1,080 nautical miles (2,000 kilometers) with a duration from several days to several weeks; e.g., persistent jet streams, baroclinic waves, semipermanent pressure systems (Bermuda High, Aleutian Low, etc.), or seasonal monsoon circulations.

Mesoscale—Systems which vary in size horizontally from 1 to 500 nautical miles (2 to 926 kilometers) and have a duration from tens of minutes to several hours; e.g., low level jets, squall lines, thunderstorms, clear air turbulence, or land-sea breezes.

Message Distribution Library—A computer management product used within an ADWS to control the distribution of weather messages.

Meteorological Watch—Monitoring the weather for a route, area, or terminal and advising concerned organizations when hazardous conditions that could affect their operations or pose a hazard to life or property are observed or forecast to occur.

Microscale—The smallest scale of weather systems generally less than one nautical mile (two kilometers) with a duration from a few seconds to a few minutes; e.g., tornadoes, dust devils, thermals, or turbulence.

Mode and Message Selection System—A subsystem of the AFDIGS that permits each customer with an AFDIGS terminal to pre-select specific products.

Multipoint Circuit—A circuit which is shared by two or more customers.

Navy Environmental Display System—The US Navy system to automate and modernize Naval Oceanography Command operations.

Network Control Station—The AFC4A activity or unit responsible for operational and procedural management of a weather communications circuit or system. Each ADWS has NCS responsibilities for monitoring the communications service to units directly connected to that ADWS.

No Content Indicator—A contraction sent in place of the text of a scheduled message whenever the report or bulletin is not available at the scheduled time of transmission.

Nondecodable—Data transmitted with no set code format which does not require identification by AWN software decoders. These products are identified and distributed within the AWN by bulletin heading.

Notice to Airmen—A notice containing information concerning the establishment, condition, or change in any aeronautical facility, service, procedures, or hazard, the timely knowledge of which is essential to personnel concerned with flight operations..

Objective Verification—A review to determine if a forecast phenomenon occurred or not.

Pilot Report—A report of in-flight weather provided by an aircrew member.

Precedence (AWN)—A designation indicating the urgency of a message. Messages within the AWN are assigned a precedence to determine the order of importance in the distribution process. AWN precedences are assigned by number (2 through 5). 2=IMMEDIATE, 3=PRIORITY, 4&5=Two levels of ROUTINE precedence.

Precedence Prosign—AUTODIN and addressed messages (including ARQs) are assigned a precedence prosign: OO-Immediate, PP-Priority and RR-Routine. The precedence prosign indicates the urgency of the message and, in the case of AUTODIN and addressed messages, the required time limits for the reply (when applicable).

Principal User Processor—NEXRAD remote workstation.

Product Consistency—Ensuring that products provide basically the same information to the customer, within the constraints of regulations and the local customers' weather support agreements.

Product ID—A 10-character code used to identify each AWDS graphic product.

Raster Scan—Picture element (pixel) data. A collection of these data make up visual imagery products such as satellite pictures, graphics pictures, or facsimile type products.

Regime—A synoptic and/or mesoscale weather pattern which affects a location. (Also known as a Weather Regime)

Request for Service—The document required to add, delete or change communications terminal equipment or circuits.

Route Meteorological Watch—A meteorological watch for a specific route (e.g., refueling tracks, training routes) provided by special request or direction.

Routine Delayed Weather—The message or report modifier used to identify a weather message or report that has been delayed and is being transmitted after the regularly scheduled transmission time.

Rule of Thumb—A concise, empirical forecast rule providing a specific answer which can be verified objectively.

Scheduled—The time that a weather report or bulletin is due to be transmitted. The scheduled transmission time may be expressed as a specific time or a specific block of time during which the data must be transmitted.

Service Message—A short non-meteorological message authorized for transmission on weather circuits for the purpose of discussing matters relating to weather products or service.

Severe Thunderstorm—A thunderstorm that produces hail greater than or equal to 3/4 inch diameter and/or surface wind greater than or equal to 50 knots.

Severe Weather—Any weather condition that poses a hazard to property or life.

Subjective Verification—A review to determine meteorological soundness by comparing the product in question with other weather data and products.

Suboriginal—The term used to describe a facsimile product hard copy received over one facsimile circuit and retransmitted via another.

Surface Aviation Observation—The code format used in US to encode weather observations (US will change to Aviation Routine Weather Report (METAR) code format in 1996).

Synoptic Scale—Systems which vary in size horizontally from 108 to 1,080 nautical miles (200 to 2,000 kilometers) and have a duration of tens of hours to several days; e.g., migratory high and low pressure systems, frontal systems, or tropical cyclones.

Telecommunications Service Order—The DCA authorization to start, change, or discontinue communications services.

Telecommunications Service Request—A valid, approved and funded telecommunications requirement prepared in accordance with the formats prescribed by DCA Circular 310-130-1 and submitted by authorized Telecommunications Certification Offices (TCOs) to DCA activities for action.

Terminal Forecast Reference Notebook—An informal publication containing information on forecasting for locations for which the unit has forecast responsibilities.

Terminal Meteorological Watch—A meteorological watch conducted for a specific terminal, normally by a weather unit located at that terminal.

Timing Error—The difference between the forecast time of occurrence and the actual time of occurrence. Timing error is plus if the event occurred later than forecast and minus if it occurred earlier than forecast.

Uniform Gridded Data Field—A product composed of data values assigned to regularly spaced points.

Unit Control Position—The master computer terminal which controls all function of the NEXRAD.

Unscheduled—Weather messages required to be transmitted when scheduled operations are not being performed. An unscheduled message may have a fixed date-time group with an unscheduled file time due to its availability.

Variable—Weather messages that do not have a fixed origin or a fixed or recurring frequency.

Vector Graphics—Products consisting of data describing weather maps, charts, and figures. These data may be vectors, graphic symbols, environmental symbols, or A/N labels, as required by the product originator to fully define a product.

Weather Advisory—Notice provided to a supported agency when an established weather condition that could affect its operation is occurring or is expected to occur.

Weather Communications Center—The communications unit at Offutt AFB NE responsible for routing graphics products and selected alphanumeric products from AFGWC, NMC and FNOC, to AWDS, AFDIGS, the AWN, AUTODIN, and other users.

Weather Message Withdrawal—The process that removes weather messages from distribution queues when they have lost their operational value due to time.

Weather Warning—Notice provided to a supported agency when an established weather condition of such intensity as to affect operations, pose a hazard to life or property, and requiring protective action, is occurring or expected to occur.

Weather Watch—A special notice of forecast weather phenomena that alerts supported agencies to the potential for mission impacting weather conditions.

Work Chart/Composite—A representation of meteorological elements or features and their variability in space and time. Work charts/composites supplement or refine centralized products.

Attachment 2

INSTRUCTIONS FOR COMPLETING AF FORM 3806 WEATHER ADVISORY (WA) LOG

Use this form to record forecast and observed weather advisories. The following instructions apply to the AF Form 3806:

Block 1. Enter the locally assigned WA number.

Block 2. Enter the month and year.

Block 3. Enter the installation or area for which the advisory is being issued.

Block 4. Enter the initials of the individual issuing the advisory.

Block 5. Enter the valid time of the WA. Leave blank for observed WAs.

Block 6. Enter the extended valid time of the WA.

Block 7. Enter the text of the advisory.

Block 8. Enter agencies the weather station notifies. Include the primary dissemination system and all agencies not on the primary dissemination system which must be notified.

NOTE: Minimize the number of individual notification calls.

Block 9. Enter the notification time (UTC) for each agency listed under Block 8.

Block 10. Enter the initials of the individual at each agency who received the advisory.

Block 11. If the WA is extended, enter the notification time (UTC) for each agency listed under Block 8.

Block 12. If the WA is extended, enter the initials of the individual at each agency who received the extension. Log additional extensions in Block 14 or in the remarks section on the back of the form.

Block 13. If the WA is canceled, enter the notification time (UTC) for each agency listed under Block 8. If the WA is allowed to expire, enter a remark, such as “allowed to expire” or “ATE,” in one of the time blocks.

Block 14. If the WA is canceled, enter the initials of the individual at each agency who received the cancellation.

Block 15. Enter any remarks and observations, radar reports, etc, to verify or validate the advisory.

Block 16. Check the “YES” block if objective or subjective verification is required. Objective verification (determining first occurrence, actual lead time, and timing error) is required except for observed WAs, WAs that downgrade a verified WW or WA with no break in coverage, WA extensions (even though the extension requires no verification, the original WA may), and forecast WAs for low-level wind shear, turbulence, icing, or heavy rain and snow. Subjective verification (review the WA and other products to determine the meteorological soundness of the WA) is required for WAs for low-level wind shear, turbulence, icing, and heavy rain and snow. Enter an appropriate comment in Block 15 or in the remarks section on the back of the form to document subjective verification.

Block 17. If objective verification is required, check the appropriate block; otherwise leave blank. If the WA contains more than one criterion requiring objective verification, enter whether or not any subsequent criteria occurred in Block 15 or in the remarks section on the back of the form.

Block 18. Enter the actual lead time (ALT) only if the advisory was for forecast criteria other than low-level wind shear, turbulence, icing, heavy rain, or heavy snow. Compute the ALT by subtracting the issue time from the time of first occurrence. In cases where an advisory downgrades an earlier advisory or warning, with no break in coverage, and the earlier advisory or warning did not verify, compute ALT using the issue time of the earlier advisory or warning. Otherwise leave blank. If the WA contains more than one criterion requiring computation of ALT, enter the ALT for any subsequent criteria in Block 15 or in the remarks section on the back of the form.

Block 19. Enter the timing error if a lead time was computed. Compute timing error by subtracting "Valid" start time, Block 3, from the time of occurrence. Otherwise, leave blank. If the WA contains more than one criterion requiring computation of timing error, enter any subsequent timing errors in Block 15 or in the remarks section on the back of the form.

Block 20. Enter the initials of the forecaster verifying the advisory.

NOTE: The remarks section on the back of the form is for additional observations, verification data, comments on subjective verification, or any other appropriate information.

Attachment 3

INSTRUCTIONS FOR COMPLETING AF FORM 3807, WATCH/WARNING NOTIFICATION AND VERIFICATION

Use this form to record locally produced weather warnings and watches when used. Overprinting of standard data on this form is authorized in accordance with AFI 37-160 Volume 8. The following instructions apply to the AF Form 3807:

Block 1. Enter the locally specified number or numbers when a watch and corresponding warning have different numbers.

Block 2. Enter the location (installation or area) for which the

watch/warning is valid.

Block 3. Enter the date the watch/warning is issued.

Block 4. Enter the name or initials of the individual who issues the watch/warning.

Block 5. Enter the name or initials of the individual who verifies the watch/warning.

Block 6. Enter the watch/warning criteria. The entries listed here reflect the criteria which are subject to the verification process as described in AFI 15-114.

Block 7. Enter the customer's desired lead time. Watches, other than for winds greater than or equal to 50 knots, hail 3/4 inch or greater, or lightning, do not require lead times.

Block 8. Enter the valid period of the watch (UTC) on the appropriate line (opposite the criteria for which the watch is being issued).

Block 9. Enter the valid period of the warning (UTC) on the appropriate line (opposite the criteria for which the warning is being issued). The ending time for observed lightning will reflect estimated duration.

Block 10. For warnings, enter the specific value or category expected, if different than that listed in the watch/warning criteria block (item number 6). For example, A = 1, Gust = 60, and so forth.

Block 11. Verification, either objective or subjective, is required for all weather warnings and watches. Objective verification is determining the time of first occurrence, computing actual lead time, and computing timing error. (Note: Objective verification for winds greater than or equal to 50 knots or hail greater than or equal to 3/4 inch (or substitute your local severe weather thresholds where different), is based on reported or observed occurrences within the forecast area or within 10 nautical miles. Objective verification for other forecast criteria is based on occurrence within the area covered by the warning). Subjective verification is a review of the weather warning or watch to determine if it was meteorologically sound. Complete objective verification on all weather warnings except those for heavy precipitation. Complete subjective verification for heavy precipitation weather warnings and all watches. Document objective verification in blocks 12, 13, 14, and 15 following the instructions below. Also document objective verification for warnings for winds greater than or equal to 50 knots and hail 3/4 inch or greater that are verified based on reported occurrence within 10 nautical miles, vice the area covered by the warning, in blocks 24 and 25. Document subjective verification with an appropriate remark in block 24.

Block 12. Enter the UTC time the weather element first occurred within the area covered by the warning. For weather warnings issued for winds greater than or equal to 50 knots or hail 3/4 inch or greater that do

not occur within the area covered by the warning, but do occur within 10 nautical miles, use the time the event occurred within 10 nautical miles. If the weather element did not occur, leave blank and indicate the non-occurrence in Block 13.

Block 13. Enter an indication (check mark or an X) for those weather elements which did not occur. If the weather elements did occur at the required intensity, leave blank.

Block 14. Enter the actual lead time if the weather element occurred. Compute the lead time by subtracting the issue time from the time of the first occurrence. In cases where a warning downgrades an earlier warning, with no break in coverage, and the earlier warning did not verify, compute actual lead time using the issue time of the earlier warning.

Block 15. Enter the timing error if a lead time was computed. Compute the timing error by subtracting the "Valid Period" start time from the time of first occurrence.

Block 16. Enter the text and valid period of the watch or warning as it is disseminated. For those locations which relay AFGWC weather warnings verbatim, overprinting of the standardized portion of the AFGWC-issued warning (with blanks for specific criteria) may improve relay times. For example, overprint "THUNDERSTORMS WITH.....INCH HAIL AND.....GUSTS TO KNOTS" OR ".....WIND GUSTS TO.....KNOTS NOT ASSOCIATED WITH THUNDERSTORMS."

Block 17. List all agencies the weather station notifies. Include the primary dissemination system and all agencies not on the primary dissemination requiring notification. Some agencies on the primary dissemination system may require a backup call to verify receipt (indicated by an *); do not consider these in verification statistics. **NOTE: MINIMIZE INDIVIDUAL NOTIFICATION CALLS.**

Block 18. List primary and secondary means of contacting the agencies listed under Block 17.

Block 19. Annotate the form to indicate which agency will be provided a warning whenever one or more of the criteria listed under Block 6 are occurring, or are expected to occur. Indicate by an "X" opposite the agencies name. Always notify in turn.

Blocks 20 & 22. Enter the notification time (UTC) (in the watch and/or warning block as appropriate) for each agency listed under block 17 along with the initials of the individuals passing and receiving the watch or warning.

Blocks 21 & 23. Enter the notification time (UTC) (in the watch and/or warning block as appropriate) for each agency listed under block 17 of the watch or warning cancellation along with the initials of the forecaster canceling the warning and individual receiving it. If the warning runs full term, enter an appropriate remark such as "allowed to expire" or "ATE."

Block 24. Enter any remarks and overprint those which may aid the individual issuing the watch or warning if desired.

Block 25. List all pertinent observations, both "official" and "unofficial" which may assist in either verifying the warning or providing insight as to why the warning was not cancelled when it did not verify. Include radar observations, if available. For weather warnings for winds greater than or equal to 50 knots or hail greater than or equal to 3/4 inch (or substitute your local severe weather thresholds where different), that are verified based on reported or observed occurrences within 10 nautical miles, vice in the area covered by the warning, include information used to verify the warning including radar observations, off-duty observer reports, or local reported weather conditions.

Block 26. Complete this portion of the form following local procedures and guidance in this pamphlet.

Attachment 4

INSTRUCTIONS FOR COMPLETING AF FORM 3808, HURRICANE/TYPHOON MILITARY ADVISORY

Use this form to disseminate tropical weather advisories to supported agencies. The advisories will initially be prepared by either the Tropical Prediction Center (TPC), the Central Pacific Hurricane Center (CPHC), or the Joint Typhoon Warning Center (JTWC). Recording data, as can be seen from the example below, is merely a matter of copying the material from a message to the form. In distributing the form, ensure that supported agencies understand the restrictions and limitations on the use of the 48- and 72-hour outlooks.

Sample TPC Marine Advisory:

WTNT21 KNHC

TCMAT1

HURRICANE GLORIA FORECAST/ADVISORY NUMBER 34

NATIONAL WEATHER SERVICE MIAMI FL

1600Z WED SEP 25 1985

HURRICANE WARNINGS IN EFFECT FROM WILMINGTON NORTH CAROLINA TO ATLANTIC CITY NEW JERSEY. GALE WARNINGS AND A HURRICANE WATCH IN EFFECT FROM CHARLESTON SOUTH CAROLINA TO NEW YORK CITY. SMALL CRAFT STAY IN PORT FROM SAVANNAH GEORGIA TO CAPE COD MASS.

HURRICANE CENTER LOCATED NEAR 27.1N 73.1W AT 25/1600Z. POSITION ACCURATE WITHIN 20 MILES BASED ON AIR FORCE RECONNAISSANCE AND SATELLITE.

PRESENT MOVEMENT TOWARDS THE NORTHWEST OR 315 DEGREES AT 13 KT.

MAX SUSTAINED WINDS 130 KT WITH GUSTS TO 150 KT.

RADIUS OF 64 KT WINDS 75NE 50SE 50SW 75NW.

RADIUS OF 50 KT WINDS 100NE 75SE 75SW 100NW.

RADIUS OF 34 KT WINDS 200NE 150SE 150SW 200NW.

RADIUS OF 12 FT SEAS OR HIGHER 200NE 150SE 150SW 200NW.

REPEAT CENTER LOCATED AT 27.1N 73.1W AT 25/1600Z.

FORECAST VALID 26/0000Z 28.5N 74.5W.

MAX SUSTAINED WINDS 130 KT WITH GUSTS TO 150 KT.

RADIUS OF 50 KT WINDS 100NE 75SE 75SW 100NW.

RADIUS OF 34 KT WINDS 200NE 150SE 150SW 200NW.

FORECAST VALID 26/1200Z 31.0N 76.0W.

MAX SUSTAINED WINDS 130 KT WITH GUSTS TO 150 KT.

RADIUS OF 50 KT WINDS 100NE 75SE 75SW 100NW.

RADIUS OF 34 KT WINDS 200NE 150SE 150SW 200NW.

STORM SURGE FLOODING OF 8 TO 10 FEET ABOVE NORMAL IS EXPECTED NEAR WHERE THE HURRICANE MAKES LANDFALL.

RAINFALL ACCUMULATIONS RANGING UP TO 12 INCHES ARE EXPECTED IN THE PATH OF THE HURRICANE.

THE FOLLOWING FORECASTS SHOULD ONLY BE USED FOR GUIDANCE PURPOSE BECAUSE ERRORS MAY EXCEED A FEW HUNDRED MILES.

FORECAST VALID 27/0000Z 35.0N 75.5W.

MAX SUSTAINED WINDS 110 KT WITH GUSTS TO 130 KT.

RADIUS OF 50 KT WINDS 100NE 75SE 75SE 75NW.

RADIUS OF 34 KT WINDS 200NE 150SE 150SW 100NW.

FORECAST VALID 27/1200Z 39.0N 75.0W.

MAX SUSTAINED WIND 80 KT WITH GUSTS TO 95 KT.

RADIUS OF 50 KT WINDS 50NE 50SE 25SW 25SW.

FORECAST VALID 28/1200Z 46.0N 73.0W

MAX SUSTAINED WINDS 40 KT NEAR CENTER.

Attachment 5

SAMPLE STANDING OPERATING PROCEDURE AIRCRAFT EMERGENCY/MISHAP

1. Aircraft Emergency.

   a. Intensify weather watch.

   b. Be ready to respond to short-notice requests for terminal weather information.

2. Aircraft Mishap.

   a. Observer.

      (1) Take and disseminate an aircraft mishap local observation.

      (2) Indicate "(ACFT MISHAP)" on the AF Form 3802, Column 13; do not disseminate this remark.

      (3) Annotate recorder charts.

   b. Radar Operator.

      (1) Take a special radar observation--do not disseminate.

      (2) Indicate "(ACFT MISHAP)" in remarks column.

   c. Forecaster/Observer.

      (1) Initiate AAI tape procedures, mishap time plus last 6 hours of data.

      (2) Solicit information (cause/time/location/etc).

7 May 95 Reviewed _____

NOTE: This is a checklist-type format and serves as a reminder of tasks to be accomplished. A work-center with a low experience level may expand each "bullet" to include more specific instructions.

Attachment 6

SAMPLE SHIFT CHANGE BRIEFING FORMAT

1. The Weather Apprentice:
   a. Past and current weather and trends.
   b. Equipment status, outages, and current trends.

2. The Weather Journeyman/Craftsman:
   a. Hemispheric pattern.
      (1) Location, intensity and continuity of troughs/ridges.
      (2) Rationale for movement of long-wave troughs/ridges.
      (3) Highlights of long-wave bulletin discussion.
      (4) Effects of long-wave pattern on local weather.
   b. Meteorological Satellite (METSAT) data.
      (1) Positions of significant features.
      (2) Continuity of significant features.
   c. Upper air package.
      (1) Location, intensity, and continuity of features.
      (2) Temperature advection.
      (3) Moisture advection.
      (4) Continuity of representative contours (500mb).
      (5) Height falls (500mb).
      (6) Low-level wind maxima (700 and 850mb).
   d. Surface package.
      (1) Location, intensity, and continuity of fronts.
      (2) Location, intensity, and continuity of features.
      (3) Pertinent surface observations.
   e. Centralized products.
      (1) MWA.
      (2) Hazards, etc.
   f. Models.
      (1) Initialization/verification.
      (2) 500mb GPH/vorticity panel.
         (a) Discuss system movement and intensity changes.
         (b) Discuss positive vorticity advection (PVA), negative vorticity advection (NVA), and vorticity maxima/minima.
         (c) Significant height changes.

(3) 700mb panel.
(a) Available moisture.
(b) Precipitation prognosis and vertical velocity.
(4) Surface/thickness panel.
(a) Movement and intensity changes of systems.
(b) Low-level wind flow.
(c) Thickness advection.
(d) Overrunning and frontal positions.

g. Pertinent discussion bulletins and other data.
(1) Incorporate teletype bulletins as appropriate.
(2) Radar data.
(a) Local radar information.
(b) Radar summary chart.

h. Local 24-hour forecast.
(1) TAF
(a) Potential weather problems
(b) Weather warning/advisory/watch in effect or expected?
(c) Climatology (CC tables/SOCS etc).

i. Long-range prognoses - outlook.

j. Operational support-current/future
(1) Metwatch of current flight and ground missions/hazards
(2) Upcoming missions and exercise weather.
(3) Cover operational weather problems.
(4) Summary.

Attachment 7

WEATHER SUPPORT DOCUMENT CHECKLIST

GENERAL

1. Is the document arranged and organized according to AFMAN 37-160, and/or AFI 25-201?

2. Are unit designators current?

3. Have duty priority lists been included?

4. Are terms explained? Have they been taken from official sources?

5. Does the document include limitations of weather service?

6. Are general tasks/responsibilities listed?

7. Does the document include a statement on the release of weather information to non-DoD agencies/ individuals?

FORECASTING SERVICES

1. Have forecaster duty hours been explained? Does the WSI/WSP describe procedures for obtaining forecasting services when the forecaster isn't on duty, for example, flight briefings?

2. Does the WSI/WSP describe procedures on preparing and disseminating the terminal aerodrome forecast (TAF); for example, times, duration, local dissemination code, and so forth?

3. Are TAF specification and amendment criteria included?

4. Are briefing services/procedures described, for example: flight weather briefings, out-of-station briefings, telephone recordings, instrument refresher course briefings, and so forth?

WEATHER WARNINGS/WEATHER ADVISORIES

1. Does the WSI/WSP clearly specify weather warning and weather advisory criteria, desired lead time, and agencies to be notified of each specified condition?

2. Are desired lead times for each weather warning and weather advisory criterion realistic and within the reactive capability of the supported agency.

3. Are back-up support procedures for limited duty forecasting stations discussed?

OBSERVING SERVICES

1. Have observer duty hours and type of support been described?

2. Are local and special observation criteria listed, and has information in the flight information publication (FLIP) been incorporated in the criteria?

3. Are observation site limitations described?

4. Are primary and backup dissemination procedures described?

RECIPROCAL SUPPORT

1. Does the WSI/WSP describe weather equipment maintenance and restoral responsibilities/procedures?
2. Does the WSI/WSP describe air traffic responsibilities?
3. Does the WSI/WSP incorporate regional briefing support and backup support for severe weather?

WEATHER DISSEMINATION SYSTEM

1. Is the weather dissemination system described?
2. Are back-up dissemination procedures described?
3. Does the WSI/WSP include dissemination formats?

Figure A7.1. Sample Table of Contents-Instruction Format.

SAMPLE

DEPARTMENT OF THE AIR FORCE
HQ 70th Wing (ACC)
Sample AFB TX XXXXX-XXXX

SAMPLE AFB INSTRUCTION 15-X

XX Month XXXX

Weather

WEATHER SUPPORT

This instruction establishes the responsibilities and procedures for providing and using weather services at Sample AFB. It applies to all agencies described herein.

Figure A7.2. Sample Table of Contents-Plans Format.

SAMPLE

HEADQUARTERS 70TH WING
Sample AFB, Texas
XX Month XXXX

70TH WING OPLAN 15-XX

TAB I	Disaster Preparedness	H-6-H-1
ANNEX I-J	Not Used	
ANNEX K	Communications	K-1
ANNEX L-Y	Not Used	
ANNEX Z	Distribution	Z-1

Figure A7.3. Example of General Information in Weather Support Document.

1.1. General. The 70 OSS/DOW provides and arranges weather services to the 70th Wing (70 WG) and other units assigned to Sample AFB, Texas. Basic concepts and procedures are outlined in Air Force and Major Air Command directives. This document establishes requirements and procedures for areas of weather support which must be coordinated at the local level to meet mission needs. It consolidates weather support requirements and procedures for peacetime operations and eliminates the need for written agreements between the weather unit and supported organizations. It does not cover weather support procedures for emergency war operations or certain other special operations or procedures; for example, toxic corridor. These are covered in applicable plans/regulations.

1.2. Tasks: The 70 WG Maintenance Squadron Commander will provide support as described in ANNEX H, APPENDIX 6, TAB A.

1.3. Release of Weather Information to Non-DoD Agencies/Individuals. Support to non-DoD agencies and the general public should not be provided until the base Public Affairs Office has given permission.

Figure A7.4. Example of Forecasting Services and Procedures.

HEADQUARTERS 70TH WING
Sample AFB, Texas
XX Month XXXX

70 WG OPLAN 15-XX
APPENDIX 1
ANNEX H
FORECASTING SERVICES

1. Hours of Operation. Weather forecasters provide forecasting services from 0500L to 1700L 7 days a week.

2. Terminal Aerodrome Forecast (TAF). The TAF is issued every 6 hours (when the forecaster is on duty) and covers a 24-hour period. TAFs will be prepared and disseminated over AWDS at 0500L, 1100L, and 1700L. See ANNEX H, APPENDIX 1, TAB A for forecast specification and amendment criteria.

3. Briefing Services:

a. Flight weather briefings. Forecasters provide aircrew briefings at the base weather station and update briefings for local flights by phone. Out-of-station briefings for special missions require 24-hour advance notice. Requests will be coordinated with the appropriate wing weather officer.

b. Planning weather sheet. The duty forecaster prepares a planning sheet each day for delivery at 0600L and 1200L. The sheet includes take-off winds, temperatures, warnings and advisories, forecasts for alternates, and a weather depiction chart. The sheet is for planning purposes only and is not amended.

4. Pilot-to-Metro Services (PMSV). The weather branch provides PMSV 24 hours a day on assigned frequency 344.6mHZ. Observers are permitted to relay weather observations and forecasts when a forecaster is not on duty. Aircrews are encouraged to relay pilot reports during PMSV contacts.

a. TAF specification and amendment criteria. Criteria may be listed in an attachment or a tab (see Figure 5.5). Here it is less cumbersome and provides the reader quicker access to the information.

b. Weather warnings. WW support is one of the most important services provided. Procedures must be clearly described. The document will include:

(1) Area covered.

(2) Criteria (see Figure 5.6).

(3) Lead times.

(4) Dissemination procedures (see Figure 5.7).

c. Weather advisories. A WA may be forecasted or observed and be for a terminal or local flying area, or a combination. Therefore, procedures for handling advisories can be cumbersome and confusing unless thought out completely. Consolidate criteria where possible and use realistic lead times. Include:

(1) Area covered.
(2) Criteria. (see Figure 5.7)
(3) Lead times.
(4) Dissemination procedures (see Figure 5.7).

Figure A7.5. Examples of TAF Specification and Amendment Criteria.

TAF SPECIFICATION AND AMENDMENT CRITERIA

1. Specification criteria. The TAF will specify the time of occurrence, the duration, and the intensity (if applicable) when one or more of the following are expected to occur:

a. Ceiling and/or visibility increases to, exceeds, or decreases to less than any of the following values:

CEILING	VISIBILITY
3,000 feet	3 miles (4800m)
1,500 feet	2 miles (3200m)
1,000 feet	1/2 mile (0800m)
200 feet	

b. A change in wind speed of 10 knots or more, or a change in wind direction of 30 degrees.

2. Amendment Criteria. The TAF will be amended whenever one of the following conditions occurs or is expected to occur but is not specified in the latest forecast. (Note: The TAF might not be amended if conditions are expected to persist less than 30 minutes.)

a. Ceiling or visibility passes through the following categories: (Note: Categories are determined by the lower of the ceiling or visibility elements.)

CEILING	VISIBILITY
3,000 feet	3 miles (4800m)
1,000 feet	2 miles (3200m)
200 feet	1/2 mile (0800m)

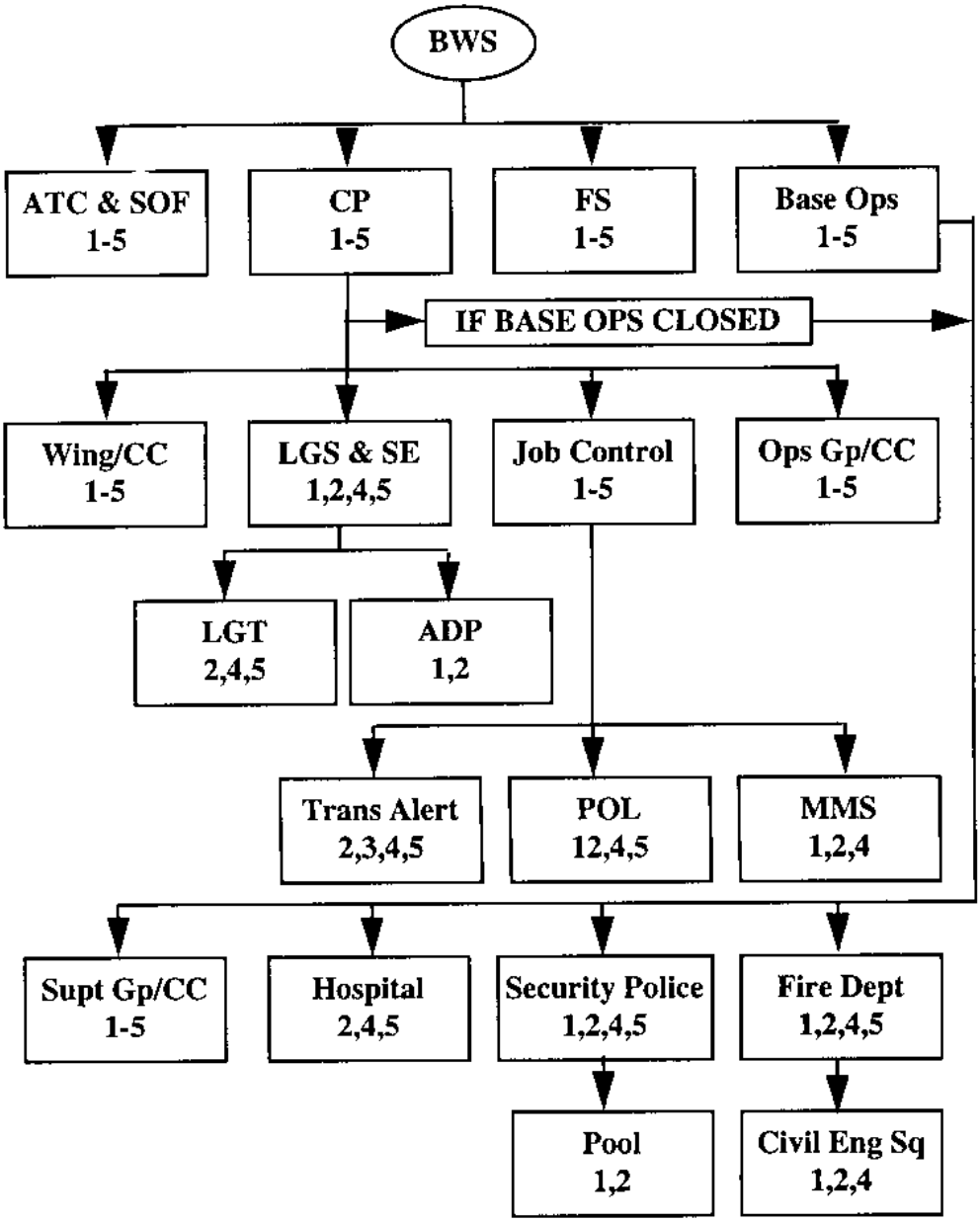
b. A change in wind speed of 10 knots or more, or a 30 degrees.

Figure A7.6. Example of Weather Warning Criteria.

WEATHER WARNING CRITERIA

Criteria	Desired Lead Time
A. Tornadoes	15 minutes
B. Convective winds 35 knots or greater	30 minutes
C. Hail 1/2 inch or greater	30 minutes
D. Freezing precipitation	30 minutes
E. Heavy snow (2 inches in 12 hours)	60 minutes
F. Heavy rain (2 inches in 12 hours)	60 minutes
G. Non-convective winds 35 knots or greater	30 minutes
H. Blizzard conditions (wnds ≥ 35 kts, vsby <1 mile, blowing snow)	60 minutes

Figure A7.7. Sample Weather Advisory Notification Diagram.



WEATHER ADVISORY CRITERIA

1. Thunderstorms within 25 nautical miles
2. Thunderstorms within 5 nautical miles
3. Surface winds 25-34 knots
4. Snow Accumulation less than 2 inches
5. Visibility less than 1/4 mile

Figure A7.8. Examples of Observing Services and Procedures.

1.1. Basic weather watch. Observers conduct a basic weather watch (BWW) from the base weather station. In addition to taking scheduled observations, the observer rechecks weather conditions at least every 20 minutes when any of the following are observed or forecast to occur within 1 hour:

-Ceiling 1,500 feet or less

-Visibility 3 miles or less

-Precipitation

-Fog

2. Observing Site Limitations. Buildings obstruct the observer's view of the approach end of Runway 18. At night, floodlights near the flight line make it difficult to see clouds and visibility markers.

2.1. Cooperative Weather Watch. Under the BWW, tower personnel assist weather observers in monitoring weather conditions. They will notify the duty observer of significant weather phenomena, including reduced prevailing and sector visibility's, precipitation, thunderstorms/lightning, and any other significant weather. Weather personnel will train air traffic controllers in cooperative weather watch observation techniques.

3. Dissemination Procedures. Observers will disseminate observations over the AWDS. If the AWDS is inoperative, observations will be disseminated by phone to the tower, command post, and base operations. The command post will relay observations to all other agencies on the AWDS until the system is restored.

Figure A7.9. Examples of Base/Post Reciprocal Services and Responsibilities.

1.1. General. The agencies listed in the chapter will provide services as described below.

1.2. The 3001st Maintenance Squadron will maintain all meteorological equipment except that maintained by civilian contract. Maintenance personnel will respond to reports of equipment outages and restore equipment according to the following priorities:

1.3. Control tower will:

a. Relay PIREPs to the weather unit.

b. Conduct operational checks of the PMSV radio.

c. Notify the weather unit of changes in the active runway and changes in runway light setting.

d. Provide cooperative weather watch.

1.4. Radar Approach Control (RAPCON) will provide back-up radar support, workload permitting, whenever the weather unit's radar is inoperative.

1.5. The weather unit will:

a. Notify 3001st Job Control of all outages involving meteorological equipment.

b. Request daily PMSV radio checks.

c. Provide weather training for air traffic control tower personnel.

1.6. Operations center will relay warnings and advisories according to paragraph 4-4 and paragraph 5-3.

1.7. Base operations will:

a. Provide runway surface condition/runway condition reading data to the weather unit.

b. Notify the weather unit of aircraft mishaps and emergencies.

c. Include appropriate weather information in the Flight Information Publications (FLIP).

d. Relay weather warnings and advisories according to paragraph 4-4 and paragraph 5-3.

Attachment 8

DD FORM 175-1 COMPLETION INSTRUCTIONS

1. General Instructions. Entries in individual blocks are at the discretion of the briefer, based on aircrew requirements and the weather situation. Make all time entries in Coordinated Universal Time (UTC). Enter all heights in hundreds of feet, surface level as "SFC."

2. Section 1, Mission/Takeoff Data:

a. DATE. Enter UTC departure date.

b. AIRCRAFT TYPE/NO. Enter aircraft type (F4, B52) and radio call sign, mission number, or last three digits of tail number.

c. DEP PT/ETD. Enter departure airfield call letters and estimated time of takeoff. Enter departure grid point or latitude/longitude for locations that don't have location identifiers.

d. RUNWAY TEMP AND DEW POINT. Enter in degrees Celsius unless requested in Fahrenheit.

e. TEMP DEV. Enter in degrees Celsius unless requested in Fahrenheit. For USAF flights enter "Temp Dev" as the difference between the forecast temperature for climb and the US Standard Atmosphere temperature. For Navy, enter the difference between forecast runway temperature and US Standard Atmosphere temperature corresponding to field elevation.

f. PRESSURE ALT/DENSITY ALT. Enter in feet, with algebraic sign. USAF usually uses pressure altitude; Army aviators usually use density altitude in mountainous terrain only.

g. SFC WIND. Enter magnetic direction for local briefings; give true direction for remote briefings. In either case, specify "magnetic" or "true" during the briefing, and suffix magnetic entries with an "M."

h. CLIMB WINDS. Enter true direction. Enter a representative wind (or winds) from takeoff to cruise altitude. Brief climb winds in layers if there are significant differences from one stratum to another.

i. LOCAL WEATHER WARNING ADVISORY. Enter weather warning or weather advisories valid for ETD +/-1 hour.

j. RCR. Enter latest reported Runway Conditions Reading (RCR) for

departure airfield, if available.

k. REMARKS/TAKEOFF ALTN FCST. Enter remarks on weather that will affect takeoff and climb (i.e., inversions, icing, turbulence). Ensure the contents of the briefing and the Terminal Aerodrome Forecast are consistent. If requested, enter a terminal forecast for the takeoff alternate.

3. Section II, En Route Data: Enter data for the entire route. Insert specific briefings for drop zones, ranges, air-refueling areas, or low-level routes at the appropriate point during the en route briefing.

a. FLT LEVEL. Enter planned flight level in hundreds of feet, in three digits (e.g., "280" for 28,000 feet, "080" for 8,000 feet).

b. FLT LEVEL WINDS/TEMP. Enter true wind direction at flight level in tens of degrees, speed to the nearest 5 knots. Enter temperature in degrees Celsius. If there are significant differences, break the forecast into legs (e.g., BLV-MXF 2745/-45); otherwise, brief a representative wind and temperature for the entire route. Identifiers are not necessary (e.g., 3240/-38). If a computer flight plan (CFP) is available, forecasters need to review it for accuracy prior to briefing aircrews. If accurate, enter "See CFP" in this block.

c. CLOUDS AT FLT LEVEL. Check appropriate block. "Yes" implies flight in cloud at least 45 percent of the time; "No" implies that the flight will be in cloud less than 1 percent of the time; and "In and Out" implies that flight will be in cloud between 1 percent and 45 percent of the time.

d. MINIMUM VISIBILITY AT FLT LEVEL OUTSIDE CLOUDS. Enter minimum horizontal visibility enroute outside of clouds. Specify the phenomena that will lower the visibility.

e. MINIMUM CEILING AND LOCATION. Enter minimum ceiling en route in

hundreds of feet (AGL) and the geographical location; e.g., "060 ft BLV-MXF." If the minimum ceiling is over hilly or mountainous terrain, or in thunderstorms, so indicate; e.g., "010 ft BOSTON MTS," or "020 ft SW KY TSTMS."

f. MAXIMUM CLOUD TOPS AND LOCATION. Enter maximum tops of cloud layers (exclusive of thunderstorm tops) with more than 4/8 coverage in hundreds of feet mean sea level (MSL), and the geographical location.

g. MINIMUM FREEZING LEVEL AND LOCATION. Enter height of lowest freezing level en route in hundreds of feet MSL, and geographical location. If lowest freezing level is at the surface, enter "SFC" and geographical location.

h. THUNDERSTORMS. Enter applicable Metwatch Advisory/Weather Warning (MWA/WW) number or date/time of product used and check applicable blocks. Enter geographical location and maximum tops of thunderstorms that may affect the flight. Never use the terms "cumulonimbus" or "CB."

i. TURBULENCE. Enter date/time group of the turbulence forecast used (FANH, SIGMET, AIRMET). If forecast is based on SIGMETs or AIRMETs, strike out "CAT" and substitute "SIGMET" or "AIRMET," as appropriate. Check applicable blocks and enter levels and locations of turbulence (not associated with thunderstorms) that may affect the flight.

NOTE: SIGMETs are advisory in nature, like the turbulence charts produced at Air Force Global Weather Central (AFGWC). The forecaster must evaluate the potential and forecast the effects on the aircraft at the time. The forecaster must also alert aircrews to any existing SIGMETs that affect their mission. Annotate in the "Remarks" section if the forecaster disagrees with the SIGMET. Whether or not the condition described is potentially hazardous to a particular flight is for the pilot to evaluate on the basis of own experience and the operational limits of the aircraft being flown.

j. ICING. Check applicable blocks and enter levels and geographical location of icing (not associated with thunderstorms) that may affect the flight.

k. PRECIPITATION. Check applicable blocks and enter geographical location of precipitation areas that may affect the flight.

4. Section III. Terminal Forecasts. Enter a forecast for first stop and alternate, if an alternate is required. Brief the worst conditions expected to prevail during the valid period for both destination and alternate. Because of the complexity of the process, the necessity for and selection of alternates is a pilot decision. However, forecasters need to know basic AFI 11-206 provisions for alternate selection. Enter forecasts for subsequent stops and alternates on request, but advise the pilot that updates are necessary. Brief destination forecasts in terms that the pilot will understand..

a. DEST/ALTN. Line out or circle appropriate designator and enter station identifier. For Army multi-stop missions, enter "A/S" (for "all stops") where the terminal forecast for all stops is similar.

b. CLOUD LAYERS; VISIBILITY/WEATHER. Enter the lowest prevailing condition expected during the valid period. Enter conditions described by an INTER group on the next line. Enter visibility and cloud layers in units that will be used at destination; e.g., visibility in meters for European destinations, statute miles for CONUS; and cloud layers in METAR. For Army "A/S" missions, enter the worst conditions expected along the route and identify the terminal; these entries imply that conditions at all other stops are the same, or better.

c. SURFACE WIND. Enter true direction if the destination is an airfield other than your own; if the flight is a "round robin" that will terminate at your own airfield with no intermediate stops; enter the direction magnetic. In either case, specify "magnetic" or "true" during the briefing and suffix magnetic entries with "M." Use four digits for CONUS stations and five digits for foreign stations. For "A/S" missions, enter the highest wind speed expected (including gusts) and the location.

d. ALTIMETER. Enter the lowest altimeter setting expected during the valid period in all cases except those in which it is impossible to obtain or determine one. For "A/S" missions, enter the lowest value expected en route and the location.

e. VALID TIME. Enter valid time usually as 1 hour either side of ETA. Briefings for Army aviators require a valid time from ETA through 1 hour after ETA. For flights of less than 1 hour, make the first entry the same as ETD. For "A/S" entries, valid times are determined from original ETD to last stop ETA + 1 hour.

5. Section IV, Comments/Remarks.

a. BRIEFED ON LATEST RCR FOR DEST AND ALTN. Check appropriate block.

b. PIREP REQUESTS. If Pilot Reports (PIREPs) are requested for specific areas, enter the areas or pilot-to-metro service (PMSV) frequency.

c. REMARKS. Enter any other significant data; for example:

(1) Data for which there was insufficient space in other blocks.

(2) Comments and remarks on terminal forecasts.

(3) Icing and turbulence on letdown to destination (enter location, type, intensity, and level).

(4) Specialized remarks, such as for low-level mission areas, air refueling, or gunnery/bombing ranges.

6. Section V, Briefing Record.

a. WEATHER BRIEFED AT. Enter time the briefing was completed.

b. FLIMSY/BRIEFING NO. If a flight weather briefing folder, flimsy, or CFP was prepared for this mission, enter the folder, flimsy, or CFP identification.

c. FORECASTER'S SIGNATURE OR INITIALS. Enter a legible signature or initials.

d. VOID TIME (Army, Navy Only). Army: Add 1:30 to the entry in "Weather Briefed" and enter it in this block. Navy: Void time of the brief will not exceed 1/2 hour past ETD or 2 hours from the time entered under "Weather Briefed" or "Weather Restricted."

e. EXTENDED TO (Army, Navy Only). When an Army or Navy pilot asks for an extension, recheck all weather entries, rebrief, and make required changes in green. Army: Add 1:30 to the new "Weather Briefed" time and enter it in this block. Navy: Enter time of extension of the briefing "void time" as appropriate, indicated above.

f. WEATHER BRIEFED AT (not required for Army, Army equivalent is "extended to" entry). If weather is rebriefed, make changes to original weather entries in green, and enter the time the rebriefing was completed.

g. FORECASTER'S INITIALS. Enter initials of the forecaster providing the extension, rebriefing, or update.

h. NAME OF PERSON RECEIVING BRIEFING. (Remote Briefings only). Enter name and grade.

Attachment 9

STANDARD REPRESENTATIONS; WEATHER FEATURES

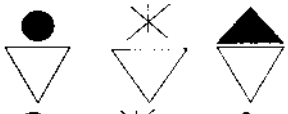
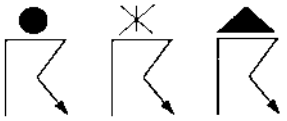
Feature	Symbol	Color
Zones of continuous precipitation	 solid shading or cross hatching	Green

The WW symbol appropriate to the type of precipitation may be distributed over the zone, e.g. for drizzle, rain or snow (in red for freezing precipitation for polychromatic system).

Zones of intermittent precipitation	 single hatching	Green

The appropriate weather symbol may be distributed over the zone (in red for freezing precipitation for polychromatic system).

Large shower symbols distributed over the area with the symbol for rain, snow or hail as appropriate, e.g.

Area of showers		Green
Area of thunderstorms, tornadoes, funnel clouds, waterspouts		Red

The appropriate symbols distributed over the area with the symbol for rain, snow or hail added as appropriate, e.g.

Areas of fog	 solid shading	Yellow

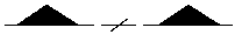
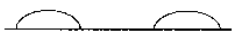
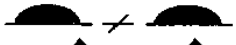
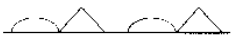
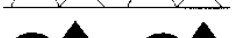
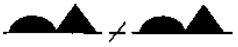
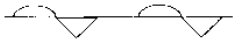
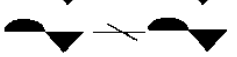
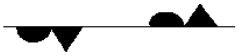
Large symbols for the appropriate phenomenon distributed over the area

Areas of duststorm, sandstorm, dust or haze	 solid shading	Brown

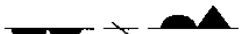
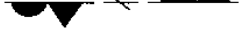
Large symbols for the appropriate phenomenon distributed over the area

Attachment 10

SYMBOLS FOR FRONTS AND ALLIED PHENOMENA

Item	Symbol	Color
Cold front at the surface		Blue
Cold front above the surface		↓
Cold front frontogenesis		↓
Cold front frontolysis		↓
Warm front at the surface		Red
Warm front above the surface		↓
Warm front frontogenesis		↓
Warm front frontolysis		↓
Occluded front at the surface		Purple
Occluded front above the surface		↓
Occluded front frontolysis		↓
Quasistationary front at the surface		Alternate
Quasistationary front above the surface		Red and Blue
Quasistationary front frontogenesis		↓
Quasistationary front frontolysis		↓
Quasistationary occluded front at the surface		↓
Quasistationary occluded front above the surface		↓
Quasistationary occluded front frontolysis		↓
Instability line		Black
Shear line		↓
Inter-Tropical Convergence Zone		Orange

Note: The separation of the two horizontal lines gives a qualitative representation of the width of the ITCZ. The diagonal lines may be added to indicate areas of activity.

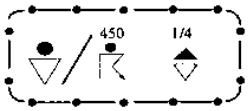
Inter-Tropical discontinuity		Alternate Red, and Green
Sub-Tropical discontinuity		Brown
Axis of trough		Black
Axis of ridge		↓

NOTE: Symbols may be depicted in either the monochromatic or polychromatic methods in accordance with local directives. AFGWC and other centers may develop specialized symbols in lieu of these symbols; however, such deviations must be documented.

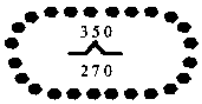
Attachment 11

STANDARD OUTLINING; SYMBOLS AND COLORS

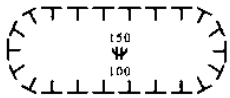
Standard outlining of weather areas. The following representation of weather feature outlines will be used for display purposes.



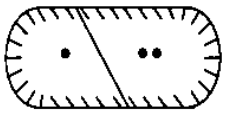
a. Thunderstorm-Convective Areas (Red)



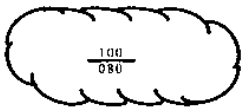
b. CAT Areas (Blue)



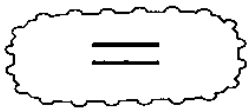
c. Icing Areas (Brown)



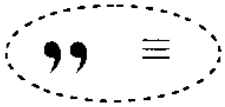
d. Nonconvective Continuous or Intermittent Precipitation Areas (Green)



e. Ceilings less than 10,000 feet and Basic Cloud Areas with Bases/Tops (Purple)



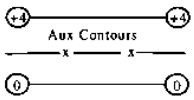
f. Ceilings less than 3,000 feet and/or visibility less than 3 miles (Blue)



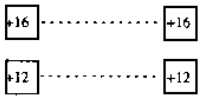
g. Ceilings less than 1,000 feet and/or visibility less than 1 mile (Red)

h. Less than 2/8 Cloud Cover (Black)

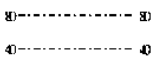
i. Jet Stream Maximum Wind Line (Red)



j. Upper Level Contours (Black)



k. Isotherms (Red)



l. Isotachs (Purple)

*U.S. G.P.O.:1996-405-724:40286

Attachment 12

IC 97-1 TO AFMAN 15-125, WEATHER STATION OPERATIONS

SUMMARY OF REVISIONS

This interim change (IC) 97-1 mandates a 60 minute lead time for severe weather events unless waived by the local wing commander.

Chapter 2, 2.4.4.1. (Added). Minimum desired lead time for wind gusts of 50 knots or greater, hail 3/4 inch or greater in diameter (or substitute your local substitute severe weather thresholds where different) will be at least 60 minutes unless a written waiver from the wing commander or equivalent is obtained.

Chapter 2, 2.5.3. Warning minimum desired lead time. Lead times are established based on supported agency requirements (see **Attachment 2** for instructions on completing AF Form 3806). Units that prepare centrally produced weather warnings will establish standard lead times. In line with this, AFGWC will establish a 30 minute lead time for tornadoes, 60 minute lead time for severe thunderstorms, and a 90 minute lead time for other criteria. As centrally produced WWs must be relayed through another unit, delaying receipt by the customers, centralized units will issue these WWs as soon as a reasonable threat exists, regardless of established lead times. Measure lead time from the time the centralized unit enters the warning into the communication system."

Attachment 13

IC 97-2 TO AFMAN 15-125, WEATHER STATION OPERATIONS

SUMMARY OF REVISIONS

This interim change (IC) 97-2 establishes new weather support procedures required to implement revised AFOSH standard guidance pertaining to lightning.

Chapter 2, 2.1.1.2. Weather Watch. A weather watch is a special notice provided to supported customers that alerts them of a potential for weather conditions of such intensity as to pose a hazard to life or property for which the customer must take protective action (e.g., tornadoes, thunderstorms with winds greater than 50 knots and/or hail greater than or equal to 3/4 inches, lightning within 5 nautical miles, winter storms, blizzard conditions).

Chapter 2, 2.1.1.7. Minimum Desired Lead Time. The minimum desired lead time is the minimum amount of advance notice an agency requires prior to the onset of a particular weather phenomenon (minimum desired lead-time for weather warnings for lightning and all observed weather advisories is always assumed to be zero). An actual value in minutes and/or hours must be specified as opposed to vague terms such as “ASAP.”

Chapter 2, 2.2.4.5.1 to 2.2.4.5.6. Deleted.

Chapter 2, add 2.2.4.5.1. Coordinate with their local customer and base safety office for the requirements for lightning watches and warnings to be issued during hours the weather station is closed or manned solely by an observer. If lightning watch/warning support is required by the base during hours support is normally unavailable, then the remainder of the requirements in para 2.2.4.5. apply to lightning as well.

Chapter 2, add 2.2.4.5.2. Establish a written agreement with the weather agency providing the support to notify supported agencies when, at a minimum, severe weather may affect the agency’s operation. If centralized warnings (e.g., AFGWC Point Warning) meet customer requirements, document their use in a weather support plan or similar document. AF Form 3809, Centralized Point Warning Log, may be used by any agency that issues or relays warnings for customers not collocated with the issuing/relaying agency. The form’s instructions are self-explanatory.

Chapter 2, add 2.2.4.5.3. Designate a standby, fully task certified forecaster when the weather station is closed and establish recall notification procedures.

Chapter 2, add 2.2.4.5.4. Establish procedures to manage a severe weather threat if the unit has a forecast metwatch responsibility. As a minimum these procedures will:

Chapter 2, add 2.2.4.5.4.1. Provide appropriate actions for shift personnel to take when initial indications of severe weather are first detected.

Chapter 2, add 2.2.4.5.4.2. Detail actions for activating the Severe Weather Management Team (SWMT). See paragraph **1.3.5.**.

Chapter 2, add 2.2.4.5.4.3. List or provide for the assignment of specific responsibilities for each SWMT member responding to the alert of severe weather.

Chapter 2, add 2.2.4.5.5. Establish a unit tracking system and document issuance of WAs, WWs, and watches, on AF Form 3806, *Weather Advisory Log*, or the AWDS format; AF Form 3807, *Watch/Warning Notification and Verification*, or the AWDS format; and AF Form 3808, *Hurricane/Typhoon Military Advisory*, as appropriate.

Chapter 2, add 2.2.4.5.6. Subjectively verify all forecast WAs and WWs. Exceptions are: downgrades that have already been verified and extensions. ALT will always be computed from local observational data.

Chapter 2, add 2.2.4.5.7. Establish BWS evacuation procedures.

Chapter 2, add 2.2.4.5.7.1. CONUS units evacuating a BWS will notify AFGWC (DSN 271-2586), when an alternate location is active, if unable to successfully continue resource protection efforts from the alternate location, and provide a single contact point for centralized warning support. These units will also notify AFGWC when normal operations resume.

Chapter 2, add 2.2.4.5.7.2. Overseas units will develop similar procedures with supporting centralized warning facilities if unable to successfully continue resource protection efforts from the alternate location.

Chapter 2, 2.4.2. Area covered by warnings. Weather units issue warnings for installations (base or post) and/or areas (training areas, missile complex, drop zone, etc.). BWSs and other weather agencies will work with their customers to identify requirements and define locations covered by the warnings. Warnings cover separate and distinct areas normally not larger than 5 nautical miles in radius (except for lightning warnings which have a minimum radius of 5 nautical miles).

Chapter 2, add 2.4.2.1. Area covered by lightning warnings. The requirement to issue watches and warnings for lightning within 5 nautical miles applies only to AF weather units located on an AF installation providing support to on-base customers. AF weather units located on an Army post, or supporting off-base customers, will work with their supported customer to establish lightning support requirements.

Chapter 2, add 2.4.3.8. Lightning within 5nm (required to implement AFOSH Standards 91-66 and 91-100).

Chapter 2, add 2.4.4.2. Lightning warnings are for lightning observed within 5 nautical miles thus do not require a lead-time.

Chapter 2, add 2.4.5.1.1. Lightning watches will be issued at least 30 minutes prior to thunderstorms being forecast within areas where watch/warning support is required. Lightning watches will be canceled only when the potential for lightning within the next 30 minutes is no longer forecast. (Required to implement AFOSH Standards 91-66 and 91-100).

Chapter 2, para 2.4.5.7. The following examples of weather watches and warnings serve as a guide:

WATCH #4-8. The potential exists for tornado development at Moody AFB during the period 20/1700Z to 20/2100Z. A warning will be issued later if required.

WEATHER WARNING #4-2. Tornado sighted 10 NM SW of Moody AFB moving NE. Expect tornado activity in Moody area current-20/2000Z. Weather Watch #4-8 remains in effect.

WATCH #6-9. The potential exists for severe thunderstorm development at Moody AFB during the period 21/1600Z to 21/2300Z. Winds of 50 knots or greater and/or hail of 3/4 inch or greater accompanying severe thunderstorms. A warning will be issued later, if required.

WEATHER WARNING #6-4. Thunderstorms with wind gusts to 55 knots and 1-inch hail at Moody AFB during the period 21/1900Z to 21/2300Z. Weather Watch #6-9 remains in effect.

WATCH #1-2. The potential exists for blizzard conditions developing at Grand Forks AFB during the period 25/0000Z to 25/1400Z. Winds 30 to 40 knots with heavy snow accumulation of 4 inches or more within 12 hours are possible. A warning will be issued later, if required.

WEATHER WARNING #1-2. Blizzard conditions; winds 40 knots with snow and blowing snow causing visibility of 1/4 mile or less and accumulation of 2-4 inches within 12 hours at Grand Forks AFB for the period 25/0200Z to 25/1000Z.

WATCH #7-5. The potential exists for lightning at Langley AFB during the period 15/1900z to 15/2100z. A warning will be issued later if required."

weather warning #7-10. Lightning within 5 nm of Langley observed at 15/1945z with estimated duration until 15/2015z. Weather Watch #7-5 remains in effect." (if another warning has been issued for forecast severe weather parameters, the effect on that warning would also be referenced; i.e., "weather watch #7-5 and weather warning #7-9 remain in effect)

Chapter 2, 2.4.6 through 2.4.6.4. Delete.

Chapter 2, add 2.4.6. Warning format. A warning for observed lightning will be issued separately from, and can be issued concurrent with, a warning issued for any or all other criteria. The warning for observed lightning is the only criterion that will be issued separately from other warning criteria. All criteria will be verified separately.

Chapter 2, add 2.4.6.1. The following additional requirements apply to warnings issued for criteria other than observed lightning:

Chapter 2, add 2.4.6.1.1. Only one warning will be in effect at one time for any given location (airfield, range, etc.).

Chapter 2, add 2.4.6.1.2. If a warning is issued for one criterion and it later becomes necessary to issue a warning for another criterion, then a new warning will be issued to include both criteria forecast to affect that location.

Chapter 2, add 2.4.6.1.3. Each warning issued for a particular location is an entity and supersedes any previously issued warning for that location.

Chapter 2, add 2.4.6.1.4. A separate valid time may be specified for each criterion.

Chapter 2, add 2.4.6.1.5. Issue warnings to cover all occurrences of weather phenomena that meet a supported agency's established weather warning criteria. However, a warning need not be issued if there is an unforecast single occurrence that has stopped and is not forecast to recur.

Chapter 2, add 2.4.6.2. Word the text of each warning to clearly describe the weather conditions in terms non-weather personnel can understand. Each warning must clearly identify:

Chapter 2, add 2.4.6.2.1. The location (installation or area) for which it is valid.

Chapter 2, add 2.4.6.2.2. The specific conditions forecast.

Chapter 2, add 2.4.6.2.3. The specific valid period. For an observed lightning warning, the ending time will reflect estimated duration.

Chapter 2, add 2.4.6.2.4. The warning number (i.e., Moody AFB Weather Warning #6-2).

Chapter 2, add 2.4.6.2.5. The effect the warning has on any previously issued warning in the text. For example, downgrades Weather Warning #7-10; upgrades Weather Warning #4-8; or in the case of lightning warnings, Weather Warning #8-3 remains in effect."

Chapter 2, 2.4.8. Canceling warnings. Weather units should cancel warnings when previously forecast/ observed conditions abate or are no longer expected to recur. Lightning warnings will be canceled when thunderstorms have passed beyond the area covered by the warning. For lightning warning cancellations, include a statement indicating impact on any previously issued warnings such as "weather warning #6-3 remains in effect". Disseminate cancellations following locally established formats."

Attachment 3 Block 9. Enter the valid period of the warning (UTC) on the appropriate line (opposite the criteria for which the warning is being issued). The ending time for observed lightning will reflect estimated duration.

Attachment 14

INTERIM CHANGE 98-1 TO AIR FORCE MANUAL 15-125

SUMMARY OF REVISIONS

This interim change (IC) 98-1 mandates a 2 hour lead time for severe weather warnings and a 4 hour lead time for severe weather watches (unless waived by the base or post commander); updates verification procedures for these warnings by allowing units to objectively verify warnings based on reported occurrences within a 10 nautical mile radius; and implements mandatory Severe Weather Action Team (SWAT) recall procedures.

1.3.5. Severe Weather Action Team (SWAT). AFW units tasked with resource protection responsibilities will develop procedures to ensure weather station management responds to both potential and actual severe weather events within the unit's area of responsibility. As a minimum, the unit will:

Add 1.3.5.6.1. Unless waived by wing or post commanders, establish procedures to activate their SWAT whenever their installation is placed in a tornado or severe thunderstorm area by the Air Force Weather Agency (AFWA) Military Weather Advisory (MWA) or their supporting Operational Weather Squadron's (OWS) MWA or like product. The SWAT will respond 4 hours before the expected occurrence of a severe weather event to analyze and assess the weather threat. If the SWAT determines that their installation is at risk for severe weather, then a contingent of the SWAT will remain on duty until the threat is passed. However, if the SWAT determines that their installation is not at risk for severe weather, the weather unit will return to normal operations.

2.2.4.5.4.2.Detail actions for activating the Severe Weather Action Team (SWAT). See paragraph **1.3.5.**

2.2.4.5.4.3.List or provide for the assignment of specific responsibilities for each SWAT member responding to the alert of severe weather.

2.4.4.1.Minimum desired lead-time for wind gusts of 50 knots or greater; hail 3/4 inch or greater in diameter (or substitute your local severe weather thresholds where different) will be at least 2 hours. This lead-time requirement can be shortened by wing or post commanders through issuance of a local written waiver, if this amount of lead-time is not needed to properly react to severe weather.

Add 2.4.5.1.2. Minimum desired lead time for wind gusts of 50 knots or greater; hail 3/4 inch or greater in diameter (or substitute your local severe weather thresholds where different) will be at least 4 hours. This lead-time requirement can be shortened by wing or post commanders through issuance of a local written waiver, if this amount of lead-time is not needed to properly react to severe weather.

2.5.3.Warning minimum desired lead time. Lead times are established based on supported agency requirements (see **Attachment 2** for instructions on completing AF Form 3806). Units that prepare centrally produced weather warnings will establish standard lead times. In line with this, AFWA, or the supporting Operational Weather Squadron (OWS), will establish a 30 minute lead time for tornadoes, a 2 hour lead time for severe thunderstorms, and 90 minutes for all other criteria. As centrally produced WWs must be relayed through another unit, delaying receipt by the customers, centralized units will issue these WWs as soon as reasonable threat exists, regardless of established lead times. Measure lead time from the time the centralized unit enters the warning into the communication system.

Attachment 3, Block 7. Enter the customer's desired lead time. Watches, other than for winds greater than or equal to 50 knots, hail 3/4 inch or greater, or lightning, do not require lead times.

Attachment 3, Block 11. Verification, either objective or subjective, is required for all weather warnings and watches. Objective verification is determining the time of first occurrence, computing actual lead time, and computing timing error. (Note: Objective verification for winds greater than or equal to 50 knots or hail greater than or equal to 3/4 inch (or substitute your local severe weather thresholds where different), is based on reported or observed occurrences within the forecast area or within 10 nautical miles. Objective verification for other forecast criteria is based on occurrence within the area covered by the warning). Subjective verification is a review of the weather warning or watch to determine if it was meteorologically sound. Complete objective verification on all weather warnings except those for heavy precipitation. Complete subjective verification for heavy precipitation weather warnings and all watches. Document objective verification in blocks 12, 13, 14, and 15 following the instructions below. Also document objective verification for warnings for winds greater than or equal to 50 knots and hail 3/4 inch or greater that are verified based on reported occurrence within 10 nautical miles, vice the area covered by the warning, in blocks 24 and 25. Document subjective verification with an appropriate remark in block 24.

Attachment 3, Block 12. Enter the UTC time the weather element first occurred within the area covered by the warning. For weather warnings issued for winds greater than or equal to 50 knots or hail 3/4 inch or greater that do not occur within the area covered by the warning, but do occur within 10 nautical miles, use the time the event occurred within 10 nautical miles. If the weather element did not occur, leave blank and indicate the non-occurrence in Block 13.

Attachment 3, Block 25. List all pertinent observations, both “official” and “unofficial” which may assist in either verifying the warning or providing insight as to why the warning was not cancelled when it did not verify. Include radar observations, if available. For weather warnings for winds greater than or equal to 50 knots or hail greater than or equal to 3/4 inch (or substitute your local severe weather thresholds where different), that are verified based on reported or observed occurrences within 10 nautical miles, vice in the area covered by the warning, include information used to verify the warning including radar observations, off-duty observer reports, or local reported weather conditions.