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21ST SPACE WING

21ST SPACE WING INSTRUCTION
15-101

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Weather

WEATHER SUPPORT

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This instruction implements AFMAN 15-129V1 (IC1) *Air and Space Weather Operations – Characterization* and AFMAN15-129V2, *Air and Space Weather Operations – Exploitation.* This instruction establishes responsibilities and weather support processes and procedures for weather services including the following: weather forecasts; weather watches, warnings, and advisories (WWAs); space weather data; information dissemination; and reciprocal support. This instruction applies to units assigned to the 21st Space Wing (SW) and units assigned or attached to, or supported by, Peterson Air Force Base (PAFB) and Cheyenne Mountain Air Force Station (CMAFS) including the Air National Guard and Air Force Reserve. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with AFMAN33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS). Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. This publication may not be supplemented.

SUMMARY OF CHANGES

Major changes include: Updates to the weather flight's operating hours, changes to PAFB and CMAFS WWA procedures and criteria, the removal of support for the 200th Airlift Squadron, and bringing the document into compliance with the AFMAN 15-129V1 (IC1) published 21 March 2017.

Chapter 1

OVERVIEW

1.1. General. A team comprised of the 21st Operational Support Squadron's Weather Flight (OSS/OSW) and the 25 Operational Weather Squadron (OWS) located at Davis Monthan AFB, Arizona, provides weather support to the 21 SW and associated units assigned or attached to PAFB and CMAFS. Basic concepts and procedures are outlined in Air Force and Air Force Space Command (AFSPC) directives, instructions and manuals. This document establishes requirements and procedures for areas of weather support that are coordinated at the local level to meet mission needs. It consolidates weather support requirements and procedures for garrison operations, but does not cover procedures for emergency war operations or other special operations/procedures that are covered in applicable base plans and instructions.

1.2. Concept of Operations. Air Force Weather (AFW) Organization, in accordance with (IAW) the CSAF-approved Strategic Plan for AFW Reengineering dated 8 Aug 97, developed an integrated weather support structure in order to ensure weather operations were conducted at the strategic, operational and tactical levels in an effort to provide more meaningful environmental information, products and data to operational customers.

Chapter 2

ROLES AND RESPONSIBILITIES

2.1. General responsibilities. AFW organizations' responsibilities are outlined in AFI 15-128. Specific responsibilities of the 25 OWS, in regards to the support provided to the 21 OSS/OSW, are outlined in this instruction and on the Installation Data Page between the 21 OSS/OSW and 25 OWS, hosted on the 25 OWS website.

2.2. Operational Weather Squadrons. Operational weather squadrons are responsible for the collection of atmospheric data/information, analysis and prediction of the atmosphere, generation of products based on this analysis, and prediction for use by Weather Flights (WFs) and other agencies.

2.2.1. The 25 OWS:

2.2.1.1. Provides timely, accurate, and relevant weather products as follows:

2.2.1.1.1. Supplies regional and operational-level weather products and information to Air Force and Army units in the Western Region of the Continental United States to include the 21 OSS/OSW.

2.2.1.1.2. Regional and operational-level weather products: weather watches, excluding lightning watches.

2.2.1.1.3. DELETED

2.3. Weather Flights facilitate exploitation of the environment through integration into every phase of operations-planning and execution processes. NOTE: Each flight has unique characteristics and functions based on its parent/host unit's mission, geographic location and level of command.

2.3.1. The 21 OSS/OSW:

2.3.1.1. Briefs transient aircrews passing through Peterson AFB.

2.3.1.2. Issues all weather advisories, warnings, and lightning watches for both PAFB and CMAFS, and creates tailored weather products focused on local missions.

2.3.1.3. Is responsible for supporting other parent/host unit operations where success may depend on mitigation of environmental threats.

2.3.1.4. Carries out multiple functions to include Staff Integration, Mission Integration and Airfield Support.

2.3.1.5. Acts as the Lead Weather Unit for all tactical-level weather support required at PAFB and CMAFS.

2.3.1.6. Supports the base in educating agencies on the purpose, applicability and operating procedures of weather products in reference to Emergency Management Planning Operations as outlined in AFI 10-2501, *Air Force Emergency Management Program Planning and Operations.*

2.3.1.7. Assesses the mission environment to determine environmental threats and finds alternatives to mitigate those threats where possible.

2.3.1.8. Supports the entire spectrum of Air Force, Army and Special Operations' Active and Reserve Component mission types including, but not limited to, aviation and ground operations conducted at home station and deployed locations.

2.4. Colorado Springs Regional Command Post (CSRCP):

2.4.1. Requests weather data from the WF to complete any OPREP-3, AFSPC and 21 SW CCIR, BEELINE or PINNACLE reports which involve severe weather, aircraft mishaps or natural disasters at PAFB or CMAFS.

2.4.2. DELETED

2.4.3. Disseminates WWAs IAW local procedures.

2.4.4. Relays significant weather information (i.e. tornado, funnel cloud, etc.) received from local agencies or airborne aircraft to the WF.

2.4.5. Collects area severe weather impacts as part of the Cooperative Weather Watch (CWW) described in **paragraph 5.11**. and reports them to the WF.

2.4.6. Provides time during training meetings for WF leadership to present information and training on weather subjects in which CSRCP personnel are involved (as applicable).

2.5. Airfield Operations (21 OSS/OSA). During airfield operating hours, 21 OSS/OSA:

2.5.1. Disseminates WWAs as outlined in **Chapter 9**.

2.5.2. Notifies WF of all aircraft ground emergencies/incidents, in-flight emergencies and aircraft accidents via the secondary crash phone.

2.5.3. Provides flight information to the WF on Distinguished Visitors (DVs), transient aircraft schedules and changes to local aircrew flight plans/schedules to include pending arrivals and/or diverts (due to weather conditions) of DVs.

2.5.4. Includes WF leadership in quarterly Airfield Operations Boards as well as provides meeting agendas/minutes to WF leadership.

2.5.5. Supplies the WF with required Flight Information Publications (FLIP) and FLIP-related products. 21 OSS/OSA also notifies the Flight Chief of all changes to published approach minimums at PAFB.

2.5.6. Coordinates FLIP amendments/updates.

2.5.7. Includes weather support information in Notices to Airmen (NOTAMs) issued when 21 OSS/OSA sets other than normal duty hours, upon request, etc.

2.5.8. Monitors the Pilot to Dispatch (PTD) radio (372.2 MHz) for PMSV contacts during WF PMSV outages.

2.6. Colorado Springs (KCOS) Federal Aviation Administration (FAA) Air Traffic Control (ATC) Personnel:

2.6.1. Notify the WF duty forecaster of all significant weather events as reported by ground operators, Security Forces, Fire Department personnel, airborne aircraft, etc.

2.6.2. Relay all Pilot Reports (PIREPs) received from aircraft on descent into or climb out of KCOS, especially Urgent Upper Air (UUA) PIREPs that may impact aircraft operations.

2.6.3. Participate in a CWW as described in **paragraph 5.14**.

2.6.4. Notify the WF duty forecaster whenever the KCOS Automated Surface Observing System (ASOS) suite of sensors becomes inoperative or returns to service.

2.6.5. Take tower prevailing visibility observations when the prevailing visibility, as reported by the ASOS, FAA Observer or ATC personnel, is less than 4 statute miles IAW FAAO JO 7110.65U.

2.6.5.1. When either the ASOS or ATC report prevailing visibility less than 4 statute miles, ATC personnel are required to use the lowest reported prevailing visibility IAW FAAO JO 7110.65U

2.7. KCOS FAA Weather Observer:

2.7.1. Takes and disseminates weather observations IAW FAAO 7900.5C.

2.7.2. Participates in a CWW as described in **paragraph 5.14**.

2.7.3. Notifies the WF duty forecaster of all significant weather events reported by FAA ATC personnel.

2.7.4. Notifies the WF duty forecaster when the KCOS ASOS becomes inoperative or returns to service.

2.8. The 302d Airlift Wing (Air Force Reserve Command), 731st Airlift Squadron, and 98th Flying Training Squadrons:

2.8.1. Relay via Supervisor(s) of Flying (SOF)s all PIREPs and summary of flight weather conditions experienced by their aircrew to weather personnel as received.

2.8.2. Provide feedback IAW paragraph 3.12.

2.8.3. Aircrew:

2.8.3.1. Report unusual or unforecasted weather to the appropriate control agency without delay.

2.8.3.2. Provide PIREPs over PMSV to include weather conditions experienced during climb and descent.

2.8.3.2.1. Provide PIREPs for the following criteria, which are disseminated as UUA reports by weather personnel:

2.8.3.2.1.1. Tornado or funnel cloud.

2.8.3.2.1.2. Thunderstorms.

2.8.3.2.1.2.1. The UUA 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 clouds or not concealed by haze

2.8.3.2.1.3. Squall line.

2.8.3.2.1.4. Severe icing.

2.8.3.2.1.5. Severe, extreme or mountain wave turbulence, including Clear Air Turbulence.

2.8.3.2.1.6. Widespread dust storm or sandstorm.

2.8.3.2.1.7. Low-level Wind Shear (LLWS). When the fluctuation in airspeed is 10 knots or more.

2.8.3.2.1.8. Hail.

2.8.3.2.1.9. Volcanic eruption and/or ash when reported by any source, in the air or on the ground.

2.8.3.3. Provide the WF with accurate weekly/daily flying schedules upon publication and inform the WF of mission cancellations in a timely manner.

2.8.3.3.1. At minimum, schedules should include:

2.8.3.3.1.1. Aircraft call-signs.

2.8.3.3.1.2. Take-off/landing times and locations.

2.8.3.3.1.3. Flight levels.

2.8.3.3.1.4. Locations/times of in-flight operations/Drop Zone locations.

2.8.3.3.1.5. Alternate airfields (as required).

2.8.3.4. Provide the WF/OWS forecaster two hours lead time for preparation of flight weather briefings.

2.8.3.5. Provide the WF with timely notification of changes to scheduled operations that affect weather support.

2.8.3.6. Coordinate two weeks in advance for exercise related weather support and special briefings such as Instrument Refresher Course (IRC), quarterly SOF briefings, safety briefings, etc.

2.8.3.7. Include weather support procedures in the annual flying safety program.

2.9. The 21st Communications Squadron (21 CS):

2.9.1. Provides, coordinates and/or arranges for maintenance of computer and communications equipment utilized by the WF.

2.9.2. Provides a single 24-hour point of contact for logging out equipment listed in **Table 11.1**. The 21 CS focal point periodically updates weather personnel on the status of open maintenance actions.

2.9.3. Responds to WF computer and communication outages within 2 hours.

2.9.4. Notifies the responsible service agencies of outages.

2.9.5. Ensures telephone and weather data circuits are assigned repair priorities.

2.9.6. Coordinates with WF shift supervisor prior to disabling any equipment for scheduled maintenance.

2.9.7. Provides assistance with planning weather system upgrades that interface with the base LAN.

2.9.8. Provides and arranges maintenance of the Local Area Network (LAN) system.

2.10. The 21 SW Safety (21 SW/SE):

2.10.1. Notifies the WF of all mishaps in which weather or weather services could have been a factor.

2.10.2. Provides WF leadership with a minimum of 72 hours' notice when requesting seasonal weather briefings.

2.10.3. Includes WF leadership in regularly scheduled 21 SW/CC Safety Councils and provides meeting agendas/minutes.

2.11. The 21 Civil Engineer Squadron (21 CES):

2.11.1. Ensures the WF and all weather equipment has an automatically starting emergency power supply in the event of power outages.

2.11.2. Provides monthly maintenance checks of emergency power generators.

2.11.3. Notifies the WF of property damage caused by weather phenomena.

2.11.4. Ensures any contractor support requiring weather notifications receive said notification in a timely manner.

2.12. PAFB and CMAFS Fire Departments (21 CES/CEF and 721 CES/CEF):

2.12.1. Collect area impacts of severe weather events as part of the CWW outlined in **paragraph 5.11**. and report them to the WF (or the CSRCP for relay to the WF).

2.13. PAFB and CMAFS Security Forces Squadrons (21 SFS and 721 SFS):

2.13.1. Notify the WF (or CSRCP for relay to the WF) when adverse weather phenomena or conditions are observed at PAFB or CMAFS as part of the CWW detailed in **paragraph 5.11**. Early reports of undetected phenomena could be critical for warning base personnel.

2.13.2. Collect area impacts of severe weather events as part of the CWW detailed in **paragraph 5.14** and report them to the WF (or the CSRCP for relay to the WF).

2.13.3. Wing Inspection Team (WIT) assist WF conducting exercises.

2.14. Airfield Systems Maintenance (21 OSS/MAA).

2.14.1. Provides, coordinates and/or arranges for maintenance of weather equipment and meteorological sensing equipment utilized by the WF.

2.14.2. Responds to weather WF equipment outages within 2 hours.

2.14.3. Notifies the responsible service agencies of outages.

2.14.4. Coordinates with off-base agencies to repair off-base lines.

2.14.5. Performs necessary follow-up actions until service is restored.

2.14.6. Ensures weather data circuits are assigned repair priorities.

2.14.7. Coordinates with WF shift supervisor prior to disabling any equipment for scheduled maintenance.

2.14.8. Ensures 21 OSS/MAA personnel perform routine maintenance requests in a timely manner as workload permits, as well as maintain a periodic maintenance inspection log and schedule for weather equipment.

2.14.9. Provides assistance with planning weather system upgrades that interface with the base LAN.

2.14.10. Maintains and updates all technical orders and advises operators of any significant changes received.

Chapter 3

DUTY PRIORITIES

3.1. The 25 OWS Duty Priorities. Duty priorities listed in Tables 3.1.and 3.2. exist to match and balance limited manning and mission critical tasks. Duty priorities focus efforts during peak work periods prone to task saturation and priority conflicts. A weather operator is to use good judgment in complying with these duty priorities, especially when there is imminent danger to life or property.

Table 3.1. The 25 OWS Mission Execution Support Duty Priorities.

Order Of Priority	Duties
1	Perform Emergency War Order Tasks; Support Combat, Contingency and Military Operations Other Than War (MOOTW); and/or Support Western Air Defense Sector (WADS) Operations.
2	Support Organizations During Aircraft/Ground Emergencies.
3	Execute OWS Building Evacuation.
4	Provide Pilot-to-Metro (PMSV) Service.
5	Disseminate Severe PIREPs/AIREPs (UUA Reports).
6	Provide Scheduled Flight Weather Mission Execution Forecasts (MEFs), including Controlling Mission Execution Forecasts (CMEFSs)
7	Provide Unscheduled Flight Weather MEFs.
8	Prepare and Disseminate Graphical Aviation Weather Products.
9	Provide Other Air and Space Weather Products, Information, and Weather Briefings.
10	Accomplish Administrative Tasks and Recurring Training.

Table 3.2. The 25 OWS METWATCH Operations Duty Priorities.

Order Of Priority	Duties
1	Perform Emergency War Order Tasks; Support Combat, Contingency and Military Operations Other Than War (MOOTW); and/or Support Western Air Defense Sector (WADS) Operations.
2	Support Organizations During Aircraft/Ground Emergencies.
3	Execute OWS Building Evacuation.
4	Provide Resource Protection Forecasts (Weather Watches, Warnings and Advisories).
5	Prepare and Disseminate Military Operating Area Forecasts (MOAFs) and Terminal Aerodrome Forecasts (TAFs).
6	Provide Scheduled Controlling Mission Execution Forecasts (MEFs).
7	Provide Air and Space Weather Products, Information and Weather Briefings.
8	Accomplish Other Routine Weather Requirements.
9	Accomplish Administrative Tasks and Recurring Training.

3.2. The 21 OSS/OSW Duty Priorities. WF duty priorities are listed in **Table 3.3**. Flight personnel are to use good judgment in complying with these duty priorities, especially where there is imminent danger to life or property.

Table 3.3. The 21 OSS/OSW Duty Priorities.

Order Of Priority	Duties
1	Perform Emergency War Order Taskings
2	Execute EU Evacuation
3	Issue Weather Warnings
4	Respond to Aircraft/Ground Emergencies
5	Respond to Pilot-to-Metro Service Contacts
6	Issue Weather Advisories / Lightning Watches
7	Provide Weather Information for Supervisor of Flying
8	Perform Severe Weather Action Plan Operations
9	Disseminate Urgent PIREPs
10	Provide Flight Weather Briefings
11	Disseminate PIREPs
12	Perform MISSIONWATCH Activities
13	Provide GSU Support (Ducted Clutter and Severe Weather Notifications)
14	Special Forecasts (DV/VIP Support)
15	Provide Other Briefings as Required (Significant/Sever Weather Updates)
16	Monitor Local Weather and Communications Equipment
17	Perform On-The-Spot and After-The-Fact Quality Assurance
18	Weather Functional Training
19	Perform Routine Tasks and Administrative Duties

3.3. Operational Hours.

3.3.1. 21 OSS/OSW staff services, outlined in **chapter 7**, are available during normal duty hours (0730L-1630L) Monday through Friday, with the exception of federal holidays or approved closures, or as required.

3.3.2. 21 OSS/OSW duty forecasters are available 24 hours a day, 7 days a week.

3.3.3. 25 OWS weather forecasters are on duty 24 hours a day. 25 OWS staff services are available from 0730L-1630L, Monday through Friday, with the exception of federal holidays or approved closures.

3.4. Assumptions, Shortfalls, and Limitations.

3.4.1. 25 OWS Assumptions:

3.4.1.1. Adequate resources and communications are available to execute the MOA and there is sufficient weather intelligence from various sources on which to base weather operations and production.

3.4.2. 21 OSS/OSW Assumptions:

3.4.2.1. Weather support can only be provided if appropriate facilities, funding, equipment, communications, personnel, and indigenous support (e.g. water, power, etc.) are available.

3.4.3. 21 OSS/OSW Shortfalls:

3.4.3.1. Some services may not be available due to WF staffing, station evacuation or other higher priority missions.

3.4.4. 21 OSS/OSW Limitations:

3.4.4.1. Observing Limitations.

3.4.4.1.1. WF personnel are not a part of the observing process. A fixed base weather observation system (FMQ-22) at CMAFS, is owned and operated by the WF.

3.4.4.1.2. The FAA operates the National Weather Service (NWS)-owned ASOS on PAFB.

3.4.4.1.2.1. The ASOS takes and disseminates Meteorological Aviation Routine (METAR) observations 24 hours a day.

3.4.4.1.2.2. This system is programmed to take and disseminate Special (SPECI) observations based on FAA/NWS criteria. These criteria differ from AFW SPECI criteria.

3.4.4.1.2.3. The ASOS is augmented by FAA-contracted certified weather observers 24 hours a day.

3.4.4.2. Lightning Limitations.

3.4.4.2.1. Lightning may not be seen due to distance, low clouds, or poor visibility. Thunder may not be heard because of flight-line noise.

3.4.4.2.2. The WF owns and operates a dedicated Vaisala National Lightning Detection Network System.

3.4.4.2.2.1. If this system becomes inoperable, the back-up is the Air Force Weather-Web Services (AFW-WEBS). AFW-WEBS lightning display functionality is entirely dependent on the capability of the PAFBs LAN.

3.4.4.3. PMSV Limitations.

3.4.4.3.1. The PAFB PMSV frequency is 226.1 MHz. In the event of an outage, pilots can reach WF personnel via the the 21 OSS/OSA PTD frequency, 372.2 MHz. Pilots may be unable to gain weather information from a back-up source in the event of a power outage, inoperative radio, etc. and would therefore rely on a phone patch. Additionally, PMSV support provided by the 25 OWS is currently only available through phone patch.

3.4.4.4. Climatological Limitations.

3.4.4.4.1. The WF maintains only limited historical and climatological information. Requests beyond WF records require additional processing time. Requests for climatological information may also be submitted through the 14 Weather Squadron webpage, **https://www.climate.af.mil/**.

3.5. Alternate/Back-up Operating Location (AOL).

3.5.1. Real-World Evacuation. In the event of a real-world building evacuation, operational forecasters accompany 21 OSS/OSA personnel to Building 140, room 137.

3.5.1.1. All other personnel move to either the primary evacuation location (the Lyon Park pavilion across the street from Bldg. 122), or the alternate operating location (Bldg. 140, Rm 137, DSN 834-6124/COM 719-556-6124, Fax DSN 834-8542/COM 719-556-8542) as determined by the ranking weather individual.

3.5.1.2. In the event of a shelter-in-place scenario, all WF personnel relocate to Bldg. 122, Rm 114 or the men's latrine on the 1st floor of Bldg. 122, as appropriate.

3.5.1.3. The current AOL affords the WF with limited operational capability compared to the primary operating location.

3.5.2. WF personnel follow duty specific Standard Operating Procedures (SOPs) and WF evacuation checklists in order to resume services at the alternate location as soon as possible.

3.5.2.1. Some WF services are provided, but require case-by-case assessment dependent upon communication line status, equipment status, etc.

3.5.2.2. Most services will likely be somewhat degraded (weather products, pilot briefings, etc.) due to limited facilities and loss of dedicated data services, such as lightning detection.

3.6. Exercise Evacuations.

3.6.1. For flight safety reasons, the WF does not evacuate for exercises, but ensures all personnel are certified/re-certified on evacuation and back-up procedures on an annual basis. See **Chapter 12** for further details on back-up support procedures.

3.7. Release of Weather Information to Non-Department of Defense (DOD) Agencies and Individuals.

3.7.1. Except as authorized by 21 SW Public Affairs, non-DOD organizations and individuals are referred to other government or private weather information services for weather data.

3.7.2. Coordinate any questions/clarifications through the WF Commander and/or Flight Chief.

3.7.3. Weather requests by foreign nationals are to be coordinated with AF Scientific and Technical Information officers before being fulfilled by the WF.

3.8. Post-Mission Analysis/Feedback.

3.8.1. Per AFMAN 15-129V2, Chapter 2, units that regularly utilize weather support from the WF are required to provide post-mission/utilization feedback when possible. This information is used to ensure proper Quality Assurance (QA) and provide a metrics database .

3.8.2. Formal/informal feedback methods include:

3.8.2.1. Transient weather brief feedback forms provided with completed Mission Weather Products (MWP).

3.8.2.2. Feedback forms accompanying all faxed MWPs.

3.8.2.3. Emails to WF leadership (**21oss.osw.ex@us.af.mil**).

3.8.2.4. Phone calls to WF leadership.

3.8.2.5. Routing through the base mail system.

3.8.2.6. Face to face feedback following any briefing.

3.8.3. The WF utilizes feedback to refine their mission support role and gauge unit strengths and weaknesses. Representative sample sizes are necessary to accurately reflect the satisfaction with the weather support being provided to Peterson's flying units. At least one feedback submission per day is desired.

3.9. Mishap Procedures.

3.9.1. In the event of an aircraft mishap or emergency, the WF, OWS and 557 Weather Wing (557 WW) are all involved. In general, the WF ensures applicable data used in the development of any weather information, product and/or service provided are saved for an investigation (to include MWPs, space weather products, mission impact slides, etc.).

3.9.2. The WF is to save enough data before and after the mishap to fully reconstruct environmental conditions.

3.9.3. The WF coordinates with the 25 OWS and/or 557 WW to save all applicable data and products that were used in preparing MWPs. **NOTE*:*** Duplication of saved data between the WF and 557 WW is not required. The WF also coordinates with the 25 OWS to initiate a data save for OWS-produced/provided products used in preparing MWPs. If the WF used products from another OWS(s) to support missions crossing into another Area of Responsibility (AOR), it is necessary to coordinate with all applicable OWSs to initiate a data save. It is essential to coordinate the data save with all AFW units involved. The WF at both the departure installation and the mishap location (if on a military installation) are required to follow the Aircraft Mishap procedures IAW AFMAN 15-129V2, Chapter 3.5.

3.10. Utilization of Weather Station Personnel.

3.10.1. IAW AFI 10-2501, *Air Force Emergency Management Program Planning and Operations*, the Installation Commander ensures base personnel are educated on local severe weather threats and applicable protective measures, as well as on the purpose, applicability, and operating procedures of the watch-warning system, according to AFMAN 15-129 Volumes 1 & 2.

3.10.2. IAW AFMAN 10-129 Volume 2, *Air and Space Weather Operations – Exploitation*, the WF is responsible for providing "eyes forward" support to the regionally responsible OWS during severe weather episodes. Because of the unpredictable nature of severe weather, care should be taken not to task weather flight personnel to additional or temporary duties not related to weather (i.e. security forces augmenters, unit safety representative, etc.). Providing "eyes forward" support and base resource protection has a higher priority of duty than assignment to base details and additional duties out of the weather facility. Agencies wishing to task personnel from the WF should coordinate at least one month in advance with the WF Commander or Flight Chief as to their ability to support the tasking. If weather personnel are tasked for additional duties unrelated to weather, WF leadership reserves the right to recall tasked individuals during severe weather events.

3.11. Records Management.

3.11.1. The WF maintains and disposes of records IAW the Air Force RDS at **https://www.my.af.mil/afrims/afrims/afrims/rims.cfm**

Chapter 4

MISSION INFORMATION

4.1. General. PAFB and CMAFS are home to many different organizations and missions. All missions, organizations, and aircrews are limited by some type of weather parameter. This chapter identifies the most common weather sensitivities associated with PAFB and CMAFS organizations, missions, and aircrews.

4.2. Supported Organizations/Missions/Requirements. The 21 OSS/OSW provides weather support to the following primary organizations (and associated units) with the accompanying missions and requirements:

Table 4.1. Peterson AFB Agency/Mission/Requirement Listing.

Organization	Mission	Requirements
21st Space Wing	Execute global capabilities to defend the homeland and secure space for our nation and allies.	- See Table 4.6. - All WWAs; see Chapter 9
302 Airlift Wing (731st Airlift Squadron)	C-130 Airlift. Provides global cargo airlift support during peacetime and wartime contingencies and wildfire suppression.	- See Table 4.6 - All WWAs; see Chapter 9
721st Mission Support Group	Operate and sustain missile/air warning and space situational awareness systems and a survivable, reliable, and secure installation for "No-Fail" missions for America and its allies.	- See Table 4.6 - All WWAs; see Chapter 9
98th Flying Training Squadron	UV-18 training mission. Provides parachute training to U.S. Air Force Academy Cadets.	- See Table 4.6 - All WWAs; see Chapter 9
HQ AFSPC	Provides resilient and cost-effective Space and Cyberspace capabilities for the Joint Force and the Nation.	- See Table 4.5. - All WWAs; see Chapter 9
HQ NORAD-NORTHCOM	NORAD: Conducts aerospace warning, aerospace control and maritime warning in the defense of North America. NORTHCOM: Partners to conduct Homeland Defense and Civil Support operations within the assigned area of responsibility to defend, protect and secure the United States and its interests.	- See Table 4.5. - All WWAs; see Chapter 9

Organization	**Mission**	**Requirements**
HQ U.S. Army Space & Missile Defense Command and Army Forces Strategic Command	Conduct space and missile defense operations and provide planning, integration, control and coordination of Army forces and capabilities in support of U.S. Strategic Command missions (strategic deterrence, integrated missile defense and space operations).	- See Table 4.5. - All WWAs; see Chapter 9

4.3. Geographic Area of Responsibility. The WF provides mission-tailored weather support to units assigned or attached to PAFB and CMAFS.

4.4. Airframe-Specific Weather Limitations. The following tables provide the general airframe weather limitations based on 11-series (Flying Operations) AFIs.

Table 4.2. USAF General Flight Weather Limitations.

Weather Condition	**Impact**	**Customer Action**
Cig / Vis < 2000 ft. / 3 miles	Alternate Required	Add fuel to allow divert
Cig / Vis < 1000 ft / 2 miles	Terminal not suitable for alternate	Select another alternate
- AMC allows 1000 ft / 2 statute miles depending on approaches. - Alternates are suitable at 500 ft above lowest compatible approach and 2 statute mile visibility		

Table 4.3. C-130 Weather Sensitivities.

The C-130 has several variations, including the MC-130 Combat Talon I and II, MC-130 Combat Shadow, AC-130 Spectre and the C-130 Pathfinder. The weather sensitivities for these variations differ from the standard C-130 airframe and are not listed. General Characteristics:	
Aircraft: C-130	Name: Hercules
Manufacturer: Lockheed	Category Aircraft: II
Primary Mission: Tactical transport	
Crew: Depends on mission	Payload: 38,258 lb of cargo
Weather Sensitivities	
Max Operating Wind: No published limit	
Max Head/Tailwind Component: No published limit	
Max X-Wind Component: ≥ 35 kts (dry), Depends on RCR/Gross Wt (wet)	
Induction Icing Thresholds: Engine anti-icing must be used in ice fog or when the temperature is below 00°F with visible moisture.	
Icing: Possesses anti-icing equipment; may operate in areas of light to moderate icing but avoid severe icing	
Turbulence: Must avoid areas of SVR and OCNL SVR, or MDT or greater mountain wave	
Lightning/TSTMS: Avoid by 10nm below FL230, 20nm at and above and tactical low-level 5nm	
In-Flight Refueling: Only AC-130 and MC-130 have capability with visibility > 1nm	
Landing: Vis ≥ 1/2mi, RVR ≥ 2400 (No Cig requirement unless circling)	
Departure: Cig / Vis > 200ft and 1/2mi, RVR ≥ 1000 (depending on runway lighting and departure alternates)	
Volcanic Activity: Avoid volcanic activity or dust by 20 nm	
Radar: Weather radar installed	
Space: Communications	

Table 4.4. UV-18 Weather Sensitivities.

The UV-18 is a twin-engine utility aircraft used for cargo, regional passenger airlift as well as skydiving operations. It is the military's version of the DHC-6 Twin Otter. General Characteristics:	
Aircraft: UV-18B	Name: Vistaliner
Manufacturer: De Havilland Canada	Category Aircraft: III
Primary Mission: Passenger and cargo airlift	
Crew: Two (pilot and copilot)	Payload: 17 passengers or 4,500 lbs of cargo
Weather Sensitivities	
Max Operating Wind: > 34kts	
Max X-Wind Component: > 23kts	
Icing: May operate in MDT and must avoid severe	
Turbulence: May operate in MDT and must avoid severe mountain wave	
Lightning/TSTMS: Avoid lightning and thunderstorms	
Landing: Cig / Vis ≥ 200 ft and 1/2 mi	
Departure: Cig / Vis > 200 ft and 1/2 mi	
Radar: Color weather radar	
Space: Communications	

4.5. Primary Customer Weather Limitations. The 21 OSS/OSW gains regular exposure to PAFBs primary customer leadership through briefings and weather discussions. Increased awareness of mission limitations is necessary to properly tailor weather support. **Tables 4.5**. and **4.6**. provide primary organizational weather limitations.

Table 4.5. PAFB/CMAFS Ground Operations Mission Limiting Thresholds.

Weather Condition	**Impacts**	**Customer Actions**
Tornadic Activity	Potential loss of life, limb and/or resources.	Watch: All personnel advised; take necessary preventive actions; protect equipment where necessary Warning: All personnel advised to take shelter immediately; protect equipment where necessary
High Winds ≥ 50kts	Potential loss of life, limb and/or resources.	Watch: All personnel advised; take necessary preventive actions; protect equipment where necessary Warning: All personnel advised limit outdoor movement as much as possible; be aware of blowing debis; protect equipment where necessary
Moderate Winds ≥ 35kts but < 50kts	Potential harm to personnel and/or resources.	All personnel advised of risk; protect equipment where necessary.
Surface Winds ≥ 25kts	Potential harm to personnel and/or resources.	Some outdoor activities curtailed.
Hail ≥ 1 inch	Potential loss of life, limb and/or resources.	Watch: All personnel advised; take necessary preventive actions; protect equipment where necessary Warning: All personnel advised to take shelter immediately; protect equipment where necessary
Hail < 1 inch	Potential harm to personnel and/or resources.	All personnel advised to suspend outdoor activities; protect equipment where necessary.
Freezing Precipitation	Potential harm to personnel and/or resources.	All personnel advised; take necessary preventive actions; protect equipment where necessary. Possible Early Release and/or Late Reporting
Snow ≥ Trace, but < 2 inches (CMAFS only)	Potential harm to personnel and/or resources.	Snow removal teams are placed on standby.
Heavy Rain/Snow ≥ 2 inches in 12 hours	Potential harm to personnel and/or resources.	Possible Early Release and/or Late Reporting or Base Closure; halt outdoor activities

Weather Condition	**Impacts**	**Customer Actions**
Blizzard Conditions	Potential harm to personnel and/or resources.	Watch: All personnel advised; take necessary preventive actions; protect equipment where necessary Warning: Possible Early Release and/or Late Reporting or Base Closure; halt outdoor activities
Lightning within 5nm	Potential loss of life, limb and/or resources.	Watch: All personnel advised; take necessary preventive actions; protect equipment where necessary Warning: All personnel advised to suspend outdoor activities; protect equipment where necessary
Intense Rain ≥ 2 inches in 1 hour	Potential harm to personnel and/or resources	All personnel advised to suspend outdoor activities; protect equipment where necessary.
Accumlated Rainfall ≥ 2.5 inches in 24 hours (CMAFS only)	Increase in mountain landslide potential. Potential harm to personnel and/or resources	Limit movement around mountain; protect equipment where necessary
Wind Chill Temperatures 0 to -24°F (PAFB only)	Potential loss of life or limb.	All personnel advised to suspend outdoor activities; protect equipment where necessary.
Wind Chill Temperatures ≤ -25°F (PAFB only)	Potential loss of life or limb.	Suspend outdoor activities; protect equipment where necessary.
Temperatures ≥100°F (PAFB only)	Potential harm to personnel and/or resources	All personnel advised to suspend outdoor activities; protect equipment where necessary.

Table 4.6. Local Flying Customer Mission Limiting Thresholds.

Weather Condition	Impacts	Customer Actions
Tornadic Activity	Potential loss of life, limb and/or resources.	All personnel seek shelter.
High Winds ≥ 50kts	Potential loss of life, limb and/or resources.	Hanger or Tie-down aircraft. If possible, cease flying operations.
Moderate Winds ≥ 35kts but < 50kts	Potential harm to personnel and/or resources.	Tie-down aircraft. If possible, secure equipment.
Surface Winds ≥ 25kts	Potential harm to personnel and/or resources.	Curtail some outdoor activities.
Hail ≥ 1 inch	Potential loss of life, limb and/or resources.	Hanger aircraft. All personnel seek shelter.
Hail < 1 inch	Potential harm to personnel and/or resources.	Curtail some outdoor activities.
Freezing Precipitation (Drizzle or Rain)	Potential harm to personnel and/or resources. Ice may form on aircraft surfaces.	Cease flying operations.
Heavy Rain/Snow ≥ 2 inches in 12 hours	Potential harm to personnel and/or resources.	Curtail some outdoor activities.
Blizzard Conditions	Potential harm to personnel and/or resources.	Cease flying operations during whiteout conditions.
Lightning within 5nm (Forecast or Observed)	Potential loss of life, limb and/or resources.	Watch: Increase awareness Observed Warning: Cease fueling and ground operations.
Wind Chill Temperatures 0 to -24°F	Potential loss of life or limb.	Curtail some outdoor activities.
Wind Chill Temperatures ≤ -25°F	Potential loss of life or limb.	Curtail some outdoor activities.

Chapter 5

AVIATION OPERATIONS

5.1. General. The WF provides services which include those actions that affect the Peterson aerodrome or base as a whole in an effort to reliably inject timely, accurate, and relevant environmental information at every decision point in the mission planning and execution processes. MWPs are the primary tools used to accomplish this task. MWPs are tailored to individual customer requirements. Any event, either flying or non-flying, affected by weather normally requires a MWP.

5.2. Operational Hours.

5.2.1. Most WF services are only required during normal duty and/or flying hours. The WF is required to have at least one person dedicated to aviation operations during flying hours.

5.2.2. DELETED

5.2.3. The WF forecast counter is open 24 hours a day, 7 days a week.

5.2.4. The duty forecaster can be contacted by phone at DSN 834-4337/COMM 719-556-4337 or by fax at DSN 834-4169/COMM 719-556-4169.

5.2.5. A severe weather standby forecaster is available at all times to aid the duty forecaster during severe weather events.

5.2.5.1. If notified after normal duty hours that severe weather is forecast to occur, the WF standby forecaster will assess the situation and report to work as needed.

5.2.5.2. DELETED

5.3. Mission Weather Products.

5.3.1. MWPs are mission-specific forecasts developed using the Mission Execution Forecast Process (MEFP) outlined in AFMAN 15-129V2, and may be provided through various methods (verbally; person-to-person; DD Form 175-1, *Flight Weather Briefing*; etc.).

5.3.2. The WF fuses and tailors strategic and theater scale products with information supplied by local units (e.g. flying schedules) and agencies to enable the direct injection of weather impacts into mission planning and execution.

5.3.3. The end product is designed to provide timely, accurate, and relevant weather intelligence to various customers by whatever means prove most effective.

5.3.4. MWPs are horizontally consistent with (but do not necessarily mirror) products issued by OWSs and the 557 WW. However, during rapidly changing conditions, emergencies, or when conditions threaten resource protection, the WF amends MWPs to accurately reflect conditions and back-briefs the OWS as time permits.

5.4. Flight MWPs.

5.4.1. Forecasters provide verbal or traditional MWPs (Flight Weather Briefings/DD Form 175-1) to aircrews as requested, and follow the duty priorities listed in **Table 3.3**.

5.4.2. Briefings for PAFB aircrews departing from PAFB are provided by the WF.

5.4.3. DELETED

5.4.4. Briefings are conducted at the WF forecast counter building 122, or delivered via email, fax, or telephone.

5.4.4.1. The WF requires 2 hours notice prior to briefing request time to allow for the proper preparation of the MWP.

5.4.5. Out-of-station mass briefings for special missions require 48 hours advance notice, coordination with WF leadership, and are subject to staffing availability.

5.4.5.1. WF leadership can be contacted by phone at DSN 834-7624/4774 or COMM 719-5567624/4774, by fax at DSN 834-4169 or COMM 719-556-4169, or via e-mail to **21oss.osw.ex@us.af.mil**.

5.4.6. Transient aircrews departing PAFB receive MWPs from their home station WF, the 25 OWS, or the PAFB WF as time permits and IAW Duty Priorities.

5.4.6.1. The 25 OWS can be contacted by phone at DSN 228-6598/6599/6588, or via web access at **https://25ows.us.af.mil**.

5.5. Follow-Up Support.

5.5.1. Customers are encouraged to contact the WF with any post-mission information and/or follow-up support requests. See **Chapter 3.12**. for feedback information.

5.6. Mission-Scale Meteorological Watch (MISSIONWATCH).

5.6.1. MISSIONWATCH is a deliberate process for monitoring terrestrial weather or the space environment for specific mission-limiting environmental factors that may adversely impact mission execution.

5.6.2. The PAFB WF performs MISSIONWATCH to identify previously unidentified environmental threats. The WF alrets decisionmakers, and/or airborne mission commanders, to environmental hazards enabling them to make dynamic changes to mission profiles in order to mitigate environmental impacts and maximize the chance of mission success.

5.6.3. Air Force Weather assets are the primary MISSIONWATCH data sources. However, other U.S. government, educational, and commercial meteorological sources may be utilized to accomplish this task.

5.6.4. Forecasters amend or update MWPs as required and contact the owning SOF to pass on critical changes.

5.6.4.1. Significant changes include, but are not limited to: unbriefed hazards, destination and alternates experiencing unbriefed mission limiting threshold conditions, and any PIREPs along the route which contain unbriefed hazards.

5.7. Meteorological Watch (METWATCH).

5.7.1. METWATCH is a deliberate process for monitoring terrestrial weather or the space environment in a specific area or region. METWATCH identifies when and where observed conditions diverge significantly from forecast conditions, and determines courses of action to update or amend forecast products and notify designated agencies.

5.7.2. PAFB weather personnel maintain situational awareness (SA) of the current/future meteorological situation at PAFB and CMAFS. This process involves notifying supported units and updating forecast products when pre-established weather conditions change or are forecast to change (timing, location or forecast values).

5.7.3. Air Force Weather assets are the primary METWATCH data sources. However, other U.S. government, educational, and commercial meteorological sources may be utilized to accomplish this task.

5.7.4. 25 OWS personnel perform continuous terminal METWATCH for PAFB and CMAFS. WF personnel act as "eyes forward" for the 25 OWS, providing immediate feedback on current or anticipated short-term changes in weather conditions.

5.7.4.1. DELETED

5.7.4.2. The duty forecaster performs flight and route METWATCH for transient flights departing PAFB that were briefed by WF personnel.

5.7.5. At minimum, WF personnel conducting METWATCH will maintain awareness of the following:

5.7.5.1. Weather conditions at PAFB, CMAFS, The Air Force Academy, Schriever AFB, and Fort Carson.

5.7.5.2. 25 OWS hazard charts; NEXRAD, space weather forecasts, significant meteorological information (SIGMET), PIREPs, lightning detection system (LDS), and other data sources as necessary.

5.7.5.3. WWA criteria as outlined in **Chapter 9**.

5.7.6. When forecast conditions change during METWATCH, WF personnel notify the 25 OWS PAFB duty forecaster at DSN 228-6674.

5.8. "Eyes Forward."

5.8.1. "Eyes Forward" is a WF role allowing for the integration of weather data, satellite imagery, lightning detection readouts, and non-standard weather data systems to create a consolidated weather picture and near-term forecast for the OWS.

5.8.2. The WF provides meaningful meteorological information not contained in the coded observations to the 25 OWS as part of the "eyes forward" process.

5.9. Airfield Observations.

5.9.1. The FAA is responsible for weather observation at PAFB and the City of Colorado Springs Municipal Airport 24 hours a day.

5.9.2. The airfield's primary observing system is an ASOS that forms and disseminates METAR, SPECI, and local observations IAW FAA Order (FAAO) 7900.5C, *Surface Weather Observing*.

5.9.2.1. FAA SPECI observation criteria are outlined in **Attachment 5.**

5.9.2.2. A certified FAA weather observer augments the ASOS data and provides manual backup when required.

5.9.3. Maintenance and sustainment of the ASOS are outlined in **paragraph 11.2.2**.

5.9.4. Observation Limitations.

5.9.4.1. DELETED

5.9.4.2. DELETED

5.9.4.3. SPECI Observation Reporting Requirements. The observer-augmented ASOS takes, records, and disseminates SPECI observations to report significant changes in weather elements IAW FAAO 7900.5C.

5.9.5. FAA ATC tower personnel add a visibility element to the observation when either the surface prevailing visibility or the tower visibility is less than 4 miles. This criterion is not considered SPECI criteria by FAAO 7900.5C.

5.9.6. A SPECI observation is produced for real-world mishaps and/or emergencies and an "ACFT MSHP" will be included in the remarks section of the observation.

5.10. Basic Weather Watch (BWW).

5.10.1. PAFB weather personnel conduct a BWW IAW AFMAN 15-111, *Surface Weather Observations,* Chapter 2. Paragraph 2.14.1.

5.10.2. This is a process by which weather personnel routinely monitor weather conditions. Weather personnel recheck weather conditions at least every 20 minutes when any of the following are observed, or are forecast to occur within 1 hour:

5.10.2.1. Ceilings:

5.10.2.1.1. Form or dissipate below 1,500 feet.

5.10.2.1.2. Decrease to less than, or increase to equal or exceed 1,500 feet.

5.10.2.2. Visibility decreases to less than or, if below, increases to equal or exceeds 3 statute miles.

5.10.2.3. Precipitation (any form).

5.10.2.4. Thunderstorms or lightning within 5 nautical miles (NM) of PAFB.

5.10.2.5. Any other significant changes in weather conditions.

5.11. Cooperative Weather Watch.

5.11.1. CWW is the process by which FAA personnel (ATC and weather observer), SOF, flying units, and Security Forces personnel report changes in weather conditions to the WF. CWW ensures notification of previously unreported weather conditions that could affect flight safety or impact the safety or efficiency of other local operations and resources.

5.11.2. CWW requires close contact between the PAFB WF and the previously mentioned organizations and/or personnel.

5.11.3. WF leadership is responsible for ensuring CWW compliance by coordinating with units outlined in 5.11.1. See **Chap 2**, Roles and Responsibilities, for additional details.

5.12. Pilot-to-Metro Service.

5.12.1. Weather information is available 24 hours a day on frequency 226.1 MHz to provide aircrews with operational weather support.

5.12.2. For aircraft outside the range of the PAFB PMSV system, the 25 OWS can provide PMSV support via phone patch (DSN 228-6598/COMM 520-228-6598, option 1).

5.12.3. Aircrews may contact PAFB for PMSV support through the 21 OSS/OSA PTD radio frequency (372.2 MHz) as a backup.

5.12.4. WF forecasters request PIREPs during all PMSV contacts IAW AFMAN 15-129V2, *Air and Space Weather Operations - Exploitation*.

5.12.4.1. The WF disseminates PIREPs when they reflect operationally significant weather within 50 NM of PAFB IAW AFMAN 15-124.

5.13. Planning Weather.

5.13.1. WF personnel provide planning weather forecasts and solar/lunar data upon request. ***NOTE:*** Climatological averages are provided for forecasts beyond 5-7 days.

5.14. Exercise/Crisis Weather Support.

5.14.1. The WF provides weather data during crises or wing/base exercises upon request.

5.15. Chemical Downwind Message (CDM).

5.15.1. WF personnel provide CDM support during aerial chemical events, upon request from Emergency Management personnel, the Incident Commander, or a member of the Crisis Action Team (CAT).

5.16. Effective Downwind Message (EDM).

5.16.1. WF personnel provide EDM support during exercise or real-world nuclear fallout events or upon request by Emergency Management personnel.

5.17. Limitations.

5.17.1. Present weather data provided by the WF is valid only at the ASOS sensor suite located on the airfield. Weather parameters for specific areas not located near the airfield are estimated by WF personnel unless on-scene emergency responders are equipped with their own reliable weather observation equipment.

5.18. Tactical Decision Aids.

5.18.1. WF personnel are not equipped to support Tactical Decision Aid requests. Contact the 25 OWS to request this type of support.

Chapter 6

NORAD-NORTHCOM OPERATIONS

6.1. Per the Memorandum of Agreement dated 12 February, 2014, between NORAD-NORTHCOM and the 21st Operations Group, NORAD-NORTHCOM Solar Weather Support has been transferred to the NORAD-NORTHCOM METOC Team at the NORAD-NORTHCOM OPERATIONS CENTER.

Chapter 7

STAFF WEATHER SERVICES

7.1. General. Staff services are a specialized type of MWP focused on a particular event/audience. These briefings are provided primarily by WF leadership.

7.2. Operational Hours.

7.2.1. Staff services are provided during normal duty hours (0730-1630L, Monday through Friday).

7.2.2. Contingency and exercise briefings are provided as needed.

7.2.3. WF leadership can be contacted by phone at DSN 834-7624/4774 or COMM 719-5567624/4774 or by fax at DSN 834-4169 or COMM 719-556-4169.

7.3. Staff Briefings/Operations Intelligence (Ops Intel) Briefings.

7.3.1. Staff weather/Ops Intel briefings for the 21 SW are provided as required and IAW WF Staff Weather Support SOPs.

7.4. Instrument Refresher Course Briefings.

7.4.1. The WF provides IRC briefings as required by course scheduling IAW AFMAN 11-210, *Instrument Refresher Program*, and AFMAN 15-129.

7.4.2. The weather portion of the briefing consists of an overview of the WFs Aviation Operations, WF capabilities, WF and OWS responsibilities, resource protection, seasonal/regional weather, space weather impacts, and procedures for obtaining weather support at other locations.

7.5. Crisis Action Team Briefings.

7.5.1. The WF provides weather briefings as required for CAT meetings and includes:

7.5.1.1. Exercise, real-world emergency management incidents, etc.

7.5.1.2. Weather intelligence required by wing leadership.

7.5.2. DELETED

7.6. Pre-Deployment Planning.

7.6.1. The WF briefs weather information to include forecasts and climatology for the local area, Aerial Port of Embarkation, AOR, and Aerial Port of Debarkation/Final Destination at the deployment concept briefing. If there is no concept briefing, the WF relays information to the Installation Deployment Officer and/or Deployment Control Center as requested.

7.7. Climatology Briefings.

7.7.1. Climatology information is provided upon request. Additionally, monthly climatology is presented at the first Ops Intel briefing of the month.

7.8. FLIP Weather Updates.

7.8.1. The WF is responsible for ensuring all weather information in the FLIP is accurate.

7.8.2. Request all weather related updates through the 21 OSS/OSA FLIP Manager.

7.8.3. The FLIP Manager processes the information to AFFSA/OL-D. Updates are categorized as revisions, changes, or corrections.

7.9. Geographically Separated Unit (GSU) Support.

7.9.1. The 21 SW has numerous GSUs located around the world. WF leadership acts as liaison between 21 SW GSUs and the appropriate supporting weather unit (OWS, NWS, etc.).

7.9.2. The WF monitors and makes appropriate notifications to 21 SW for tropical systems (depressions, storms, hurricanes, typhoons, and cyclones) which could impact 21 SW operations or support locations.

7.9.3. The WF monitors for, and makes notifications of, severe weather warnings at 21 SW GSUs.

7.9.3.1. DELETED.

7.9.3.2. Servicing OWSs and local WFs still provide notifications directly to the GSUs IAW local agreements and Installation Data Pages.

7.9.4. The WF is not manned or equipped to provide direct support to 21 SW GSUs.

7.9.5. WF leadership provides limited SA overview of 21 SW GSU mission limiting weather for 21 SW leadership during weekly Ops Intel briefings.

Chapter 8

SPACE WEATHER SUPPORT AND SERVICES

8.1. General. This chapter contains information regarding space weather limitations, alerts, warnings, and products available to the 21 SW. USAF communications systems use sky wave and transionospheric propagation (High Frequency [HF], Very High Frequency [VHF], Ultra High Frequency [UHF], and Satellite Communications [SATCOM]) which can be rendered useless by electromagnetic radiation from the sun.

8.2. Limitations.

8.2.1. Lack of sensor data is the largest single limitation to space weather observation and forecasting.

8.2.2. Propagation of solar phenomena occurs between 300 km/sec and the speed of light. This significantly impacts the WF's ability to provide long lead times for solar impacts.

8.3. Space Weather Alerts and Warnings.

8.3.1. Broad-coverage space weather products are available at **https://weather.af.mil/confluence/display/AFWWEBSTBT/Space+Weather+Main+Page** or the 25 OWS web page. These products are used to update the space weather portion (HF, UHF, and GPS) of the MWP and/or the DD Form 175-1.

8.3.2. Space Weather Impacts should be reported through the appropriate link on the Space Weather Home Page. See **Attachment 4** for a detailed description of specific space weather products and descriptions.

8.4. Space Weather Products.

8.4.1. Space Weather products from the strategic center are "now-casts" or short-term forecasts (6-hours). WF forecasters should check for updated products at least twice during their shift, and update the MWP accordingly.

8.4.2. Descriptions of specific space weather products are outlined on the AFW-WEBS Space Weather website at **https://weather.af.mil/confluence/display/AFWWEBSTBT/Events+and+Impacts+Product+Help**.

8.4.3. GPS products are primarily "now-casts" or forecasts less than one hour in duration. WF forecasters only monitor these products when specifically requested by the customer.

8.5. The 21 SW and GSU Support.

8.5.1. WF staff are available to provide after-the-fact assessment support for anomalies at 21 SW GSUs. Staff personnel are also able to answer any space and terrestrial weather support questions and ensure the 21 SW and its GSUs receive appropriate environmental support.

8.6. Anomalous Event assessments.

8.6.1. WF staff provide after the fact anomaly assessment upon request. These assessments analyze the contribution of environmental phenomena to missile warning and space surveillance anomalies. Requests for assessments may be made by 21 SW and 21 SW GSU personnel.

8.6.2. The 21 OSS/OSW personnel may provide feedback to AFSPC weather, JSpOC weather, N-NC weather, and 2 WS during unique events.

8.6.3. WF staff are available during normal duty hours to perform assessments of the following events:

8.6.3.1. Contribution of terrestrial or space weather activity in producing anomalous radar or satellite operations, such as false launch and/or predicted impacts indications.

8.6.3.2. Meteorological and oceanographic (METOC) impacts to foreign missile or space launch detection.

8.6.3.3. Other METOC assessments when requested by the 21 SW. These assessments may include terrestrial or space weather.

8.6.3.4. Upon completion of the assessment, WF personnel notify WF staff in order to provide follow-on assessments on an as-needed basis.

8.6.3.5. Assessment conclusions and impact analysis are coordinated with the JSpOC WST and the 2 WS Space Weather Branch for cross-feed to AFSPC/A3SF.

Chapter 9

RESOURCE PROTECTION SERVICES

9.1. General. Certain weather conditions endanger property or life, pose a safety hazard, or adversely impact operations. This chapter details how the WF/OWS team monitors these phenomena and issues WWAs for significant events.

9.2. Resource protection for PAFB and CMAFS is accomplished through joint effort between the 25 OWS and the PAFB WF.

9.2.1. The 25 OWS is responsible for issuing all forecasted weather watches with the exception of lightning watches.

9.2.2. The WF acts as "eyes forward" for the 25 OWS and is responsible for issuing all forecast and observed warnings and advisories and lightning watches (annotated in Integrated Weather Warning Capability [IWWC] or on the appropriate back-up forms: AF Form 3806, *Weather Watch Advisory Log*, and AF Form 3807, *Watch/Warning Notification and Verification*.)

9.3. Units should be familiar with WWA criteria that affect their operations or personnel, and ensure that notifications are passed to every level that may require the notification for personnel safety and resource protection**.**

9.4. WWAs are disseminated by the OWS or WF via JET IWWC portal IAW WF WWA SOPs.

9.4.1. Weather Watches.

9.4.1.1. A weather watch is a special notice sent to customers indicating that conditions are favorable for the development of a particular type of weather phenomena (e.g. tornadoes, hail, etc.). It provides advanced notification of the potential for weather conditions that may pose a hazard to life or property for which the customer is obliged to take protective actions. Watches are issued for an area within a 5 NM radius of PAFB and CMAFS.

9.4.1.2. The OWS issues weather watches for PAFB and CMAFS with the exception of lightning watches; watches normally precede warnings.

9.4.1.3. All units on PAFB and CMAFS should, at minimum, review their protective action procedures when watches are issued.

9.4.1.4. **Table 9.1** . contains all of the weather watches issued for PAFB, and their desired lead-times.

Table 9.1. PAFB Weather Watch Criteria, Desired Lead-Times, and Issuing Authority.

Criteria	Desired Lead-Times	Issuing Authority
Tornado	As Potential Warrants *	25 OWS
Winds ≥ 50kts	As Potential Warrants *	25 OWS
Winds ≥ 35kts	As Potential Warrants	25 OWS
Moderate Thunderstorms (Winds ≥ 35kts and/or Hail < 1 inch)	As Potential Warrants	25 OWS
Severe Thunderstorms (Winds ≥ 50kts and/or Hail ≥ 1 inch)	As Potential Warrants *	25 OWS
Intense Rain ≥ 2 inches per 1 hour	As Potential Warrants	25 OWS
Heavy Rain or Snow (≥ 2 Inches in 12 Hours)	As Potential Warrants *	25 OWS
Freezing Precipitation	As Potential Warrants *	25 OWS
Blizzard	As Potential Warrants *	25 OWS
Lightning Within 5 NM of PAFB	30 Minutes	21 OSS/OSW
NOTE: A blizzard is defined as a storm with considerable falling or blowing snow, winds in excess of 30 knots, and visibilities of less than 1/4 mile, with all criteria met for at least 3 hours. * Denotes a Weather Watch in which, if issued, requires implementation of the Severe Weather Action Procedures outlined in paragraph 9.15.		

9.4.1.5. **Table 9.2** . Contains all of the weather watches issued for CMAFS, and their desired lead-times.

Table 9.2. CMAFS Weather Watch Criteria, Desired Lead-Times, and Issuing Authority.

Criteria	Desired Lead-Times	Issuing Authority
Tornado	As Potential Warrants *	25 OWS
Winds ≥ 50kts	As Potential Warrants *	25 OWS
Winds ≥ 35kts	As Potential Warrants	25 OWS
Moderate Thunderstorms (Winds ≥ 35kts and/or Hail < 1 inch)	As Potential Warrants	25 OWS
Severe Thunderstorms (Winds ≥ 50kts and/or Hail ≥ 1 inch)	As Potential Warrants *	25 OWS
Intense Rain ≥ 2 inches per 1 hour	As Potential Warrants *	25 OWS
Heavy Rain or Snow (≥ 2 Inches in 2 Hours)	As Potential Warrants *	25 OWS
Freezing Precipitation	As Potential Warrants *	25 OWS
Blizzard	As Potential Warrants *	25 OWS
Lightning Within 5 NM of CMAFS	30 Minutes	21 OSS/OSW
NOTE: A blizzard is defined as a storm with considerable falling or blowing snow, winds in excess of 30 knots, and visibilities of less than 1/4 mile, with all criteria met for at least 3 hours. * Denotes a Weather Watch in which, if issued, requires implementation of the Severe Weather Action Procedures outlined in paragraph 9.15.		

9.4.2. Weather Warnings.

9.4.2.1. Weather warnings are special notices sent out to customers alerting them to a predefined weather event of such intensity as to pose a threat to life or property (e.g. lightning, tornadoes, etc.) that is expected to occur or is occurring. Warnings are issued for an area within a 5 NM radius of PAFB and CMAFS.

9.4.2.2. The WF issues forecast and observed warningsfor PAFB and CMAFS..

9.4.2.3. Units should complete their protective actions upon receipt of weather warnings.

9.4.2.4. **Table 9.3** . contains all of the weather warnings issued for PAFB, and their desired lead-times.

Table 9.3. PAFB Weather Warning Criteria and Desired Lead-Times.

Criteria	Desired Lead-Time
Tornado	10 Minutes *
Winds ≥ 50kts	60 Minutes *
Winds 35kts to < 50kts	60 Minutes
Severe Thunderstorms (Winds ≥ 50kts and/or Hail ≥ 1 inch)	60 Minutes *
Moderate Thunderstorms (Winds ≥ 35kts and/or Hail < 1 inch)	60 Minutes
Intense Rain ≥ 2 inches per 1 hour	Observed
Heavy Rain or Snow (≥ 2 Inches in 12 Hours)	90 Minutes *
Freezing Precipitation	90 Minutes *
Blizzard	90 Minutes *
Lightning Within 5 NM of PAFB	Observed
NWS Red Flag Warning for El Paso County	Observed
NOTE: A blizzard is defined as a storm with considerable falling or blowing snow, winds in excess of 30 knots, and visibilities of less than 1/4 mile, with all criteria met for at least 3 hours. * Denotes a Weather Warning in which, if issued, requires implementation of the Severe Weather Action Procedures outlined in paragraph 9.15.	

9.4.2.5. **Table 9.4** . contains all of the weather warnings issued for CMAFS, and their desired lead-times.

Table 9.4. CMAFS Weather Warning Criteria and Desired Lead-Times.

Criteria	Desired Lead-Time
Tornado	10 Minutes *
Winds ≥ 50kts	60 Minutes *
Winds ≥ 35kts	60 Minutes
Severe Thunderstorms (Winds ≥ 50kts and/or Hail ≥ 1 inch)	60 Minutes *
Moderate Thunderstorms (Winds ≥ 35kts and/or Hail < 1 inch)	60 Minutes
Rain Rate ≥ 2 inches per 1 hour	Observed
Heavy Rain or Snow (≥ 2 Inches in 12 Hours)	90 Minutes *
Freezing Precipitation	90 Minutes *
Blizzard	90 Minutes *
Lightning Within 5 NM of CMAFS	Observed
NWS Red Flag Warning for El Paso and/or Teller County	Observed
NOTE: A blizzard is defined as a storm with considerable falling or blowing snow, winds in excess of 30 knots, and visibilities of less than 1/4 mile, with all criteria met for at least 3 hours. * Denotes a Weather Warning in which, if issued, requires implementation of the Severe Weather Action Procedures outlined in paragraph 9.15.	

9.4.3. Weather Advisories.

9.4.3.1. A weather advisory is a special notice to supported customers alerting them to weather conditions that may affect their operations. Advisories are issued for an area within a 5 NM radius of PAFB and CMAFS.

9.4.3.2. **Table 9.5** . contains all of the weather advisories issued for PAFB along with desired lead-times.

Table 9.5. PAFB Weather Advisory Criteria and Minimum Desired Lead-Times.

Criteria	Desired Lead-Time
Surface Winds ≥ 25 kts	Observed
Wind Chill Temp 0°F to -24°F	Observed
Wind Chill Temp ≤ -25°F	Observed
Air Temperature ≥ 100°F	Observed

9.4.3.3. **Table 9.6** . contains all of the weather advisories issued for CMAFS along with desired lead-times.

Table 9.6. CMAFS Weather Advisory Criteria and Minimum Desired Lead-Times.

Criteria	Desired Lead-Time
Surface Winds ≥ 25 kts	Observed
Rain ≥ 2 inches within 1 hour	Observed
Accumulated Rainfall ≥ 2.5 inches in 24 hours	Observed

9.4.4. Dissemination and Numbering. WWAs are numbered sequentially for an entire month by identifying the type of weather message (watch, warning or advisory) followed by a five-digit number.

9.4.4.1. The first two numbers indicate the current month while the second three numbers indicate the sequence number. For example, the message "Weather Warning 02-005" would identify this warning as the fifth (005) issued in February (02). The message "Weather Advisory 12-013" identifies this advisory as the 13th (013) issued in December (12).

9.4.5. Upgrades/Downgrades.

9.4.5.1. Advisories and warnings are upgraded or downgraded as required. For example, a wind warning for 35 knots would be upgraded if winds increased from 35 knots to 50 knots.

9.4.5.1.1. Upgrades should meet the desired lead-times specified in **Tables 9.3 and table 9.5**. Only one forecasted warning, excluding observed lightning warnings, may be in effect at one time.

9.4.5.1.2. If a warning is in effect for one event and it becomes necessary to warn for another, a new warning is issued to cover all criteria observed or forecasted to occur. A separate valid time may be specified for each criterion if necessary.

9.4.6. Extensions or Changes.

9.4.6.1. Extensions or changes are only issued to change the valid time, and are issued before the original watch or warning expires. New warnings and watches are issued for any change in weather criteria.

9.4.7. Cancellation.

9.4.7.1. Watches and warnings may be cancelled when the weather phenomena are no longer occurring or expected to occur. WWA that are not cancelled expire at the end of the valid period.

9.4.7.2. Observed warnings and advisories are cancelled when the phenomena are no longer occurring and are not expected to occur again within the next hour. Lightning is considered to have ended 15 minutes after the last observed strike.

9.4.7.3. Lightning watches are cancelled when lightning is no longer expected to occur within 5 NM of PAFB or CMAFS.

9.5. Severe Weather Action Procedures (SWAP).

9.5.1. The purpose of SWAP is to ensure weather station management (senior, experienced personnel) is notified and responds to both potential and/or actual severe weather events within the WF's area of responsibility.

9.5.2. SWAP activation criteria may include any watch/warning criteria, but are primarily used for severe watches/warnings (tornado, severe thunderstorm, wind $\geq$ 50kts, heavy rain, blizzard conditions and freezing precipitation).

9.5.3. During non-duty hours, the duty forecaster will coordinate SWAP criteria with the 25 OWS and notify the standby forecaster if a severe watch or warning is issued.

9.5.4. During duty hours, the duty forecaster will coordinate activation of SWAP with guidance from flight leadership and coordination with the 25 OWS. Additional details are provided in the WF SWAP SOP. ***NOTE:*** WF operational support may be limited to base units/customers during severe weather events due to limited manning and availability. Limitations may include, but are not limited to: WF personnel answering only telephone hotlines, shortened/cancelled weather briefings, long telephone hold periods, slower updates to various MWPs, etc.

9.5.5. SWAP Activation Conditions.

9.5.5.1. The duty forecaster notifies the Severe Weather Action Team (SWAT) leader if severe weather is forecast to occur.

9.5.5.2. Once contacted, the SWAT leader determines whether to activate the team. If deemed appropriate, the SWAT leader reports to the WF as soon as possible, and may recall additional personnel to assist.

9.5.5.3. The 25 OWS provides backup SWAT support for the WF in the event of communication failure, equipment outages, personnel unavailability, etc. ***NOTE:***WF leadership conducts and documents an annual SWAP exercise IAW AFMAN 15-129V2. Real-world severe weather events may be used in place of these exercises.

9.5.6. Procedures Before and During Potential Severe Weather.

9.5.6.1. The duty forecaster keeps SWAT stand-by personnel/leadership informed of the potential for severe weather.

9.5.6.2. The duty forecaster notifies the SWAT leader whenever the potential for severe weather moves or forms within 100 NM of PAFB/CMAFS and/or is expected to affect PAFB/CMAFS within 4 hours.

9.5.6.3. The SWAT leader and duty forecaster discuss, analyze, and assess the severe weather threat in conjunction with 25 OWS PAFB/CMAFS forecasters. The goal is to commit early to issuing severe weather watches and warnings based more on severe weather indicators than actual sightings.

9.5.6.4. If the SWAT leader, OWS forecaster, and duty forecaster determine there is a risk for severe weather, implementation of a contingency team may be needed or required. Otherwise, the WF returns to normal operations.

9.5.6.4.1. Task Assignments. Once the team is in place, the SWAT leader assigns tasks (monitor weather radar, answer telephones, etc.) and ensures special attention is paid to WF Duty Priorities (**paragraph 3.3**.) Team members dedicate their efforts to their assigned tasks and keep the team leader updated on events. The duty forecaster maintains primary focus on changing weather conditions, and coordinates with the OWS and SWAT leader for a final decision on which weather products to issue.

9.5.6.4.2. Post-Event Procedures. Once the SWAT leader, OWS forecaster, and duty forecaster have determined the severe weather threat has passed, the SWAT leader ensures the WF is returned to "ops normal", and reports any severe weather damage before dismissing the SWAT. ***NOTE:*** If unsecure means are used to forward installation damage, ensure Operations Security measures are implemented to protect critical information. Encrypt all e-mail messages containing descriptions of damage which cause loss of capability and mission effectiveness.

9.5.6.4.3. Additional SWAP Notification. In addition to criteria listed in **paragraph 9.5.2**., the SWAT leader is notified by the duty forecaster when PAFB or CMAFS are included in the following:

9.5.6.4.3.1. The NWS issues a tornado or severe thunderstorm watch or warning area for El Paso County. The duty forecaster may, at their discretion, notify the SWAT leader for upstream or nearby counties.

9.5.6.4.3.2. The Storm Prediction Center has PAFB or CMAFS in an area with the potential for severe weather.

9.6. Severe Weather Damage Reporting.

9.6.1. IAW AFMAN 15-129V2, *Air and Space Weather Operations – Exploitation,paragraph 2.20.* and AFI 10-2501, *Air Force Emergency Management Program, para 1.17.2.2.3.*, the WF develops procedures to provide appropriate information to the CSRCP.

9.6.2. The WF coordinates with the CSRCP for weather related Operational Report 3 (OPREP-3) and provides the CSRCP with any pertinent base information.

9.6.3. The CSRCP, in turn, notifies the WF when a weather related OPREP is available for viewing on Asynchronus means.

9.6.4. The WF provides damage reports and OPREP-3s to the OWS.

9.6.5. Information required to be provided by the WF to the CSRCP includes:

9.6.5.1. Actual severe weather conditions experienced.

9.6.5.2. The forecast valid at the time of the occurrence, and any watches or warnings issued.

9.6.5.3. Operational status of meteorological equipment (radar, wind sensors, etc.).

9.6.5.4. Any other pertinent information (damage reports, visual/radar tornadic confirmations, etc.)

9.7. Toxic Corridor.

9.7.1. Fire Emergency Services are responsible for toxic corridor information per AFI 10-2501. The WF provides weather data to Fire Emergency Services and/or the Emergency Operations Center for calculation of Toxic Corridors. The OWS may provide supplemental meteorological data to PAFB and CMAFS organizations if requested and the WF is unable to provide the data.

9.8. Chemical Downwind Messages/Effective Downwind Messages.

9.8.1. Office of Emergency Management is the primary OPR for CDM/EDM support. CDM and EDM are used to determine the spread of chemical and biological agents. The WF provides meteorological data for the calculation of Toxic Corridor products per AFI 10-2501. The OWS may provide supplemental meteorological data to PAFB and CMAFS organizations if requested and the WF is unable to provide the data.

Chapter 10

WEATHER INFORMATION DISSEMINATION

10.1. General. Weather information is only useful if customers have access to the information. Timely and efficient dissemination of weather information is crucial to the success of the PAFB and CMAFS missions and resource protection. Most organizations receive this information via the primary dissemination system. AFI 10-2501 Table 5.2. directs the use of base warning notification pyramid structure. WF personnel restrict the number of organizations they directly notify (via telephone) in order to focus on incoming weather phenomena. This chapter describes the weather dissemination systems and dissemination procedures as well as backup systems and procedures.

10.2. Dissemination Systems and Backups.

10.2.1. JET. The WF/OWS team uses JET as its primary method for WWA dissemination. JET is a web-based graphical interface. Agencies requiring direct access to JET may request access through the WF JET Manager.

10.2.2. Agencies without direct JET access receive critical weather information through their unit's own dissemination system (e.g. Pyramid Alert Recall, Unit Control Center, etc.). The same information is also available on the 25 OWS webpage. The WF/OWS follow documented backup dissemination procedures in the event that the JET server is inoperative (other units should access this information via the 25 OWS webpage at **https://25ows.us.af.mil**).

10.2.3. If JET is inoperative, the WF follows back-up dissemination procedures IAW published SOPs.

10.3. The 21 CS conducts vulnerability scans against local JET hardware connected to the PAFB NIPRNet. 557 WW applies patches, upgrades, and updates to secure identified vulnerabilities.

10.4. Local Area Network. The LAN is the primary method used for disseminating MWPs. In the event of a LAN outage, MWPs are faxed to operational customers or made available on a disk for pickup by the flying customers for posting on computers within their respective units.

10.5. Watches, Warnings and Advisories. WWAs are disseminated via JET. If JET is not functioning, the 25 OWS and/or WF contact the same organizations via telephone. WWAs are further disseminated by the CSRCP through AtHoc (see note below) and by 21 OSS/OSA via the secondary crash net. ***NOTE:*** All Watches/Warnings that do not impact mission or personnel safety will be limited to distribution during duty hours only. Weather Advisories are not distributed by CSRCP to anyone on any system.

10.5.1. DELETED

10.5.2. Listed units develop methods to notify subordinate agencies.

10.5.3. Groups should use their 24-hour operations to recall other key personnel/units that are needed to implement resource protection plans.

10.5.4. 21 OSS/OSA. 21 OSS/OSA relays all weather warnings via the secondary crash net.

10.5.5. Command Post. The CSRCP provides notification of significant weather events via the base AtHoc system. This system provides users who are logged onto the PAFB LAN with pre-formatted messages that outline the specific weather conditions, forecasted and/or observed, valid times, and recommended protective actions.

10.5.6. DELETED

10.6. Tornado Warnings. The CSRCP has the primary responsibility for sounding the base siren when a Tornado Warning is issued. During the issuance of tornado warnings, 21 OSS/OSW personnel verify issuance with the CSRCP before taking shelter.

10.7. Lightning Warnings. The CSRCP activates the Giant Voice when a lightning warning is issued.

Chapter 11

WEATHER EQUIPMENT/SOFTWARE

11.1. General. This chapter provides a brief description of the meteorological and communications equipment used by the WF. Additionally, it provides information on backup systems, maintenance and restoring priorities.

11.2. Weather Equipment. The WF uses a wide range of equipment and software to determine the current state of the atmosphere. These critical systems are used continuously to provide customers the most timely, accurate and relevant weather intelligence possible.

11.2.1. CMAFS Weather Equipment. The WF operates an FMQ-22 at CMAFS, just east of Bldg. 104. Readouts for this equipment are obtained via the JET Portal. This system measures wind speed and direction; temperature and dew point; pressure; prevailing visibility, present weather; cloud ceiling heights; precipitation amounts; freezing rain, and lightning strikes.

11.2.1.1. Maintenance and Sustainment. The 21 OSS/MAA provides maintenance and sustainment support of this system, to include hardware preventative maintenance, system repair, and limited software assistance.

11.2.2. KCOS ASOS.

11.2.2.1. PAFB shares a single-instrument runway complex with the Colorado Springs Municipal Airport. The WF operates a Video Display Unit (VDU) at the forecast counter. The VDU connects to the ASOS via landline, and receives the most recent observation as well as current sensor measurements. The system is capable of measuring wind speed and direction; temperature and dew point; pressure; prevailing visibility and present weather; cloud ceiling heights; precipitation amounts; freezing rain detection and lightning strike detection.

11.2.2.2. There is only one ASOS on the airfield complex. The sensor group is located near the approach end of runway 17L.

11.2.2.3. Maintenance and Sustainment. The NWS owns the ASOS equipment and has sole responsibility for maintenance and sustainment IAW NWSPD 30-211.

11.2.2.3.1. The WF calls the ASOS Operations Maintenance Center (AOMC) at 1-800-242-8194 for VDU maintenance. If the VDU is unserviceable and irreperable, the AOMC replaces the terminal as funds allow.

11.2.2.4. Next Generation Radar (NEXRAD)/Weather Surveillance Radar – 1988 Doppler (WSR-88D).

11.2.2.4.1. NEXRAD is a Doppler weather radar and data processing system which collects, processes and displays high-resolution reflectivity and velocity data with an effective range of 248 NM.

11.2.2.4.2. The WF utilizes Gibson Ridge radar software to analyze and interpret NEXRAD data.

11.3. JET is the primary system for dissemination of WWAs. Telephone is used as a back-up to this system.

11.4. PMSV Radio. The PMSV Radio (226.1 MHz) allows the WF to communicate with aircrews, both on the ground and in the air, as well as tower personnel. If the PMSV is out of service, 21 OSS/OSA issues a NOTAM to notify aircrews so they can contact the 25 OWS via phone patch (where possible) to get weather data.

11.5. Phones/Hotlines. Phones and hotlines primarily serve as a backup system as well as for passing along Critical and time sensitive information rapidly.

11.6. Local Area Network (LAN). The WF relies heavily on the LAN, both unclassified (NIPR) and classified (SIPR), to improve the timeliness and accuracy of weather intelligence to our customers.

11.7. Lightning Detection System (LDS). The WF maintains a Vaisala LDS system which includes software, hardware (satellite dish receiver) and annual data and communication line subscriptions. The LDS allows the WF to maintain dedicated access to the National Lightning Detection Network (NLDN). The NLDN provides real-time monitoring of cloud-to-ground lightning activity across the CONUS, 24 hours a day and 365 days a year.

11.8. Maintenance. All equipment requires some sort of maintenance from time-to-time. Weather data is obtained via leased commercial telephone lines, the Internet and satellite download for ingest into the various weather systems.

11.8.1. **Table 11.1** . outlines the organizations that provide preventive maintenance and repair of weather communications equipment or interface.

Table 11.1. Maintenance Matrix.

Equipment/Interface	**OPR**
LAN	21 CS
Telephone Lines	21 CS
FMQ-22	21 OSS/MAA
PMSV	Radio Maintenance
ASOS	NWS
JET	AFWA Helpdesk / 21 CS
LDS	Vaisala

Chapter 12

25 OWS/21 OSS/OSW BACKUP SUPPORT

12.1. General. There are dozens of scenarios that could cause an interruption of service from either the 25 OWS or the WF. This chapter briefly describes how weather services are provided should any such events occur.

12.2. When weather operations at the 25 OWS are interrupted (e.g. power outage, natural disaster, etc.), resource protection and WWA responsibility are transferred to the WF until the 25 OWS is prepared to resume operations. Other 25 OWS weather information responsibilities (e.g. graphical products) are transferred to other agencies, as necessary.

12.3. For standard station evacuations, support will resume from the AOL with the OWS assuming responsibilities during the interim period. For longer interruptions, the WF coordinates required support with other organizations.

12.3.1. The 25 OWS does not normally produce and disseminate tactical-level weather products for PAFB and CMAFS mission execution. However, when operational constraints prevent the WF from accomplishing tasks, the 25 OWS may produce and disseminate selected tactical-level weather products (Web-Based MWPs, verbal discussions, faxed products, etc.) on a short-term basis.

12.3.2. The WF coordinates the transfer of this responsibility with the 25 OWS.

TODD R. MOORE, Colonel USAF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFMAN 15-129V2, *Air and Space Weather Operations – Exploitation***,** 7 Dec 11

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AFI 11-2C-130JV3, *C-130 Operations Procedures*,8 Dec 2009

AFI11-2C-130JV3ADDB, *C-130 Modular Airborne Fire Fighting System (MAFFS) Procedures, 8 Oct 14*

AFI 11-2C-21V3, *C-21 Operations Procedures*, 24 Sep 10

AFI 11-202V3, *General Flight Rules*, 7 Nov 14

AFI 11-418, *Operations Supervision*, 14 Oct 15

AFI 91-202, *The US Air Force Mishap Prevention Program*, 24 Jun 15

AFMAN 11-210, *Instrument Refresher Program (IRP) Program*, 3 Feb 05

AFMAN 15-111, *Surface Weather Observations*, 27 Feb 13

AFMAN 15-124, *Meteorological Codes*, 28 Feb 13

AFMAN 33-363, *Management of Records*, 1 Mar 08

AFMAN 91-223, *Aviation Safety Investigations and Reports*, 16 May 13

AFMAN 91-224, *Ground Safety Investigations and Reports*, 24 Mar 15

AFPD 15-1, *Atmospheric and Space Environmental Support*, 19 Feb 10

Air Force Strategic Plan on Weather Reengineering, 8 Aug 97

FAAO 7110.65N, *Air Traffic Control*, 9 Feb 12

FAAO 7900.5C, *Surface Weather Observing*, 11 May 01

FMH 1, *Surface Weather Observations and Reports*, 1 Sep 05

NWSPD 30-21, *Maintenance, Logistics and Facilities*, 27 Nov 06

Prescribed Forms

None

Adopted Forms

AF Form 3806, *Weather Watch Advisory Log*

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

DD Form 175-1, *Flight Weather Briefing*

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AAI—Aircraft Accident Investigation

AF—Air Force

AFMAN—Air Force Manual

AFI—Air Force Instruction

AFB—Air Force Base

AFCCC—Air Force Combat Climatology Center

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFSPC—Air Force Space Command

AFW—Air Force Weather

AFWA—Air Force Weather Agency

AFW-WEBS—Air Force Weather Web Services

AOL—Alternate Observing Location

AOMC—ASOS Operations Maintenance Center

AOR—Area of Responsibility

ASOS—Automated Surface Observing System

ATC—Air Traffic Control

BWW—Basic Weather Watch

C4ISR—Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance

CAT—Crisis Action Team

CCD—Command Center Director

CDM—Chemical Downwind Message

CCIR—Commander's Critical Information Requirement

CE—Civil Engineer

CES—Civil Engineer Squadron

CIG—Ceiling

CMAFS—Cheyenne Mountain Air Force Station

CONUS—Continental United States

CPX—Command Post Exercise

CS—Communications Squadron

CSAF—Chief of Staff of the Air Force

CSRCP—Colorado Springs Regional Command Post

CWW—Cooperative Weather Watch

DEST—Final Destination

DoD—Department of Defense

DSCA—Defense Security Cooperation Agency

DV—Distinguished Visitor

EDM—Effective Downwind Message

EWO—Emergency War Orders

FAA—Federal Aviation Administration

FAAO—Federal Aviation Administration Order

FAM—Functional Area Manager

FLIP—Flight Information Publication

FMH—Federal Meteorological Handbook

FMQ-22—Fixed Based Weather Observation System

GPS—Global Positioning System

GSU—Geographically Separated Unit

HF—High Frequency

IAW—In Accordance With

IRC—Instrument Refresher Course

IWWC—Integrated Weather Warning Capability

JET—Joint Environmental Toolkit

JSpOC—Joint Space Operations Center

KCOS—Colorado Springs, Colorado

KT—Knots

LAN—Local Area Network

LDS—Lightning Detection System

LLWS—Low Level Wind Shear

LOCAL—Local Observation

MEDEVAC—Medical Evacuation

MEFP—Mission Execution Forecast Process

METAR—Routine Meteorological Observation Report

METNAV—Meteorological and Navigational

METOC—Meteorological and Oceanographic

METSAT—Meteorological Satellite

METWATCH—Meteorological Watch

MOA—Memorandum of Agreement

MWP—Mission Weather Product

N2C2—NORAD-NORTHCOM Command Center

NCOIC—Non-Commissioned Officer in Charge

NEXRAD—Next Generation Radar

NHC—National Hurricane Center

NI—NORAD Instruction

NIPR—Non-Classified Internet Protocol

NLDN—National Lightning Detection Network

NM—Nautical Mile

N—NC – NORAD-NORTHCOM

NOAA—National Oceanic and Atmospheric Administration

NOTAM—Notice to Airmen

NWS—National Weather Service

NWSPD—National Weather Service Policy Directive

OIC—Officer in Charge

OPREP—Operational Report

OSA—Airfield Operations Flight

OSS—Operations Support Squadron

OSW—Weather Flight

OWL—Operational Weather Limiters

OWS—Operational Weather Squadron

PA—Public Affairs

PAFB—Peterson Air Force Base

PIREP—Pilot Report

PMSV—Pilot to Metro Service

POC—Point of Contact

PTD—Pilot to Dispatch

QA—Quality Assurance

RVR—Runway Visual Range

SA—Situational Awareness

SATCOM—Satellite Communications

SE—Safety

SFS—Security Forces Squadron

SIGMET—Significant Meteorological Information

SIPR—Secure Internet Protocol

SM—Statue Mile

SMO—Senior METOC Officer

SOF—Supervisor of Flying

SOP—Standard Operating Procedure

SPC—Storm Predication Center

SPECI—Special

SW—Space Wing

SWAP—Severe Weather Action Procedures

SWAT—Severe Weather Action Team

TAF—Terminal Aerodrome Forecast

TBD—To Be Determined

TDA—Tactical Decision Aid

TOI—Track of Interest

UA—Upper Air

UHF—Ultra High Frequency

UUA—Urgent Upper Air

VDU—Video Display Unit

VHF—Very High Frequency

VIS—Visibility

VSAT—Very Small Aperture Terminal

WBGTI—Wet Bulb Global Temperature Index

WF—Weather Flight

WIT—Wing Inspection Team

WS—Weather Squadron

WSE—Weather Support Element

WSR-88D—Weather Surveillance Radar-1988 Doppler

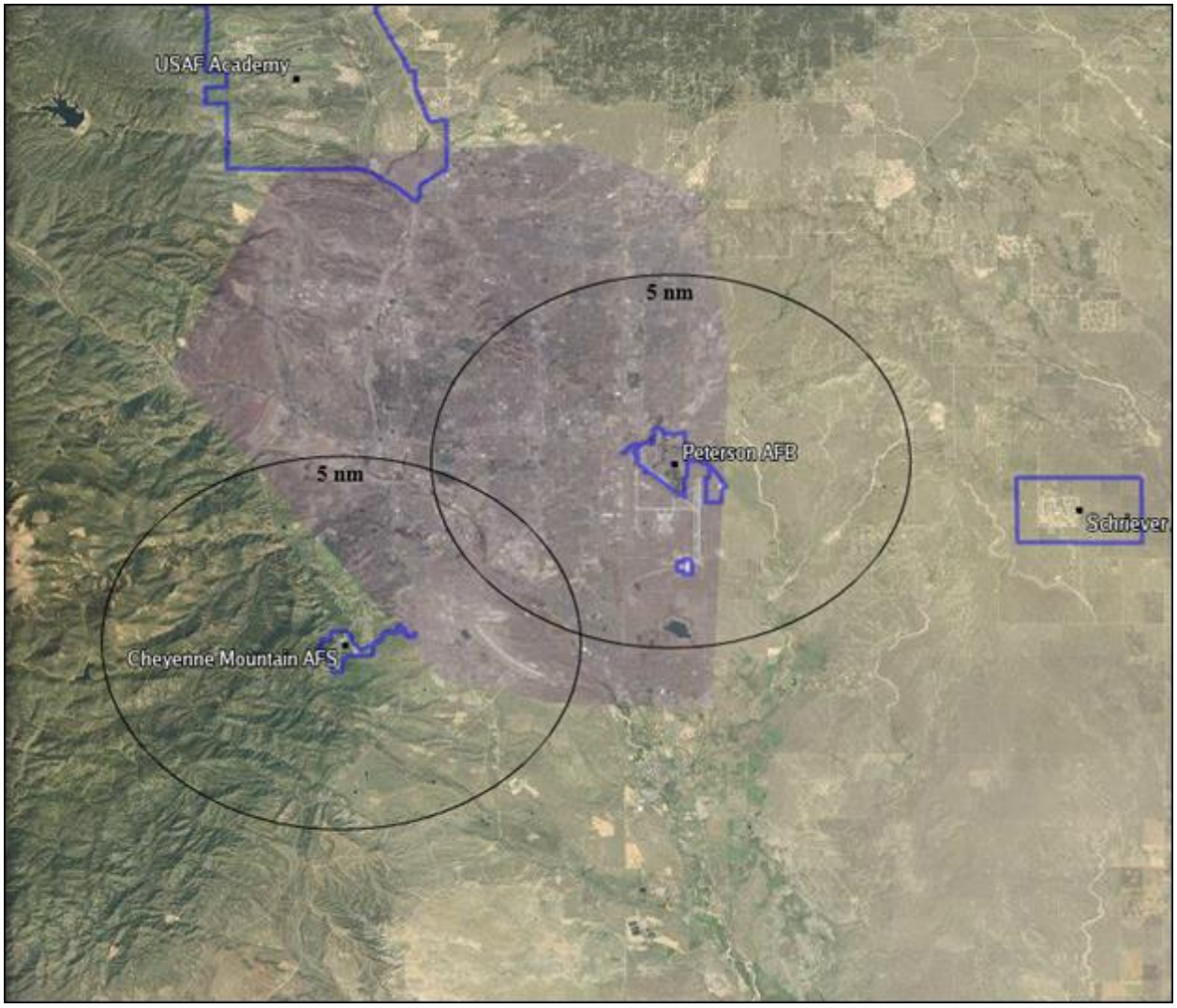
WST—Weather Specialty Team

WWA—Weather Watch, Warning and Advisory

Attachment 2

WARNING ZONE MAP

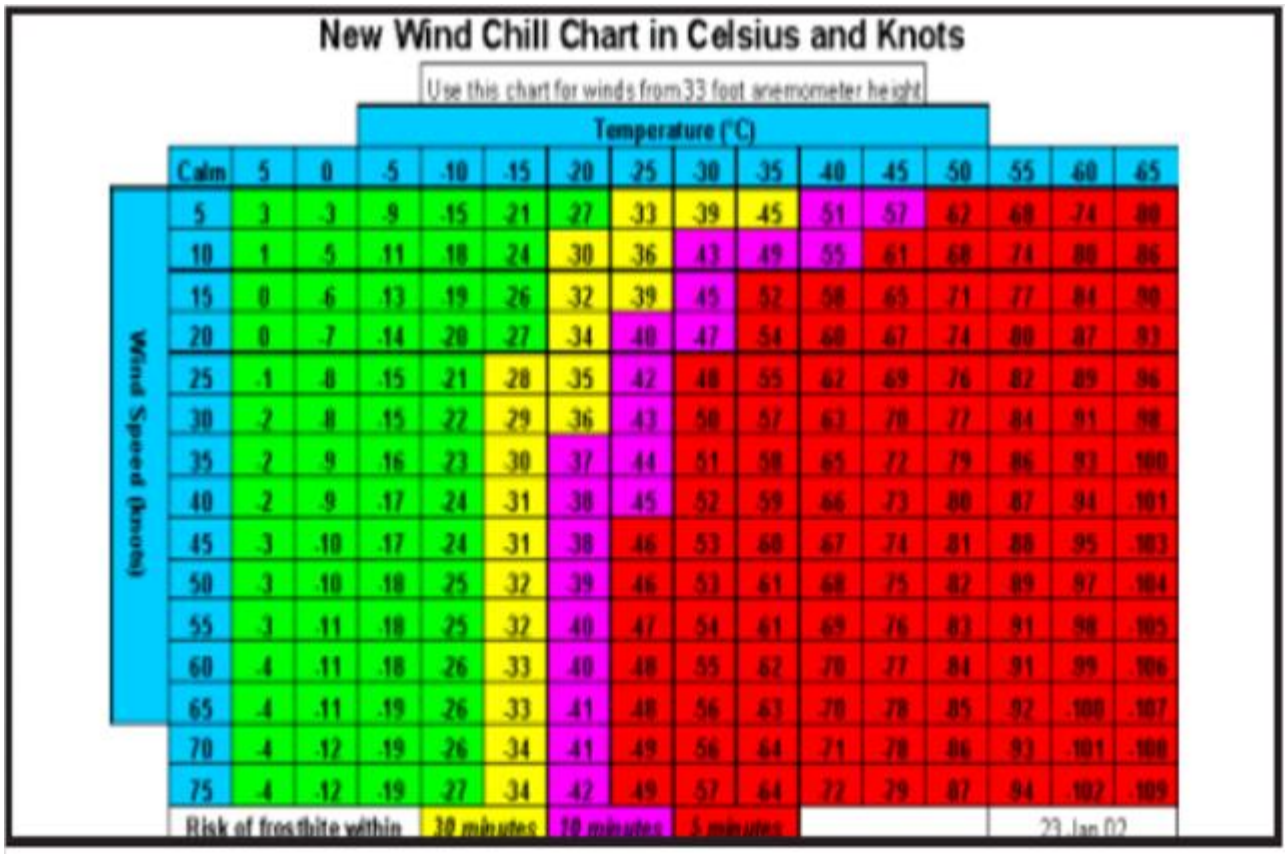
Figure A2.1. PAFB/CMAFS Warning Zone Map.



Attachment 3

CHILL INDEX CATEGORY CHART

Figure A3.1. Chill Index Chart.



Attachment 4

SPACE WEATHER ANALYSIS, FORECAST, ALERTS, AND WARNINGS

Figure A4.1. Space Weather Analysis, Forecast Alert and Warnings.

Mission Area	AFWA Product	Description
HF Communications and other applications using over-the-horizon HF radio waves	Regional 6-hr ionospheric analysis; issued four times daily on AFW-WEBS/AFW-WEBS-SCI	Identifies location where space weather conditions have caused degradation of HF communications and other HF applications.
	Regional ionospheric forecasts; issued four times daily on AFW-WEBS/AFW-WEBS-SCI	Identifies locations where space weather conditions are expected to degrade HF communications and other HF applications.
	Point-to-point forecasts of useable HF frequencies; issued on AFW-WEBS/AFW-WEBS-S upon request of customer/user	Identifies maximum, minimum and optimal HF frequencies for customer-specific transmitter and receiver locations based on expected ionospheric conditions.
	Point-to-regional HF illumination maps; issued every hour on AFW-WEBS-S for customer requested locations	Identifies areas where user-defined HF signals from a user-defined point location are most likely to have greatest strength.
	Short Wave Fade Advisory; issued via AFW-WEBS, fax, phone, pager and e-mail when a space weather disturbance suddenly degrades HF conditions	Identifies the HF frequency ranges and locations that are effected by an observed sudden disturbance and then forecasts the duration and magnitude of that degradation.
	Polar Cap Absorption Advisory; issued via AFW-WEBS, fax, phone, pager and e-mail when HF conditions have been severely degraded above/below 55 degrees north or south due to a space weather disturbance	Identifies that conditions exist which may prevent use of all HF communications in the polar zones.
Ultra High-Frequency Satellite Communications (UHF SATCOM)	Regional 6-hr ionospheric forecasts; issued four times daily on AFW-WEBS/AFW-WEBS-SCI	Identifies locations where space weather conditions are expected to degrade UHF SATCOM. Valid for UHF SATCOM frequencies 245 MHz-410 MHz.

	Regional nowcasts of ionospheric conditions; issued for selected global regions every 30 minutes on AFW-WEBS-SCI	Identifies locations where space weather conditions are currently degrading UHF SATCOM signals.
UHF SATCOM and Super High-Frequency (SHF) SATCOM	Solar radio wave burst warning; issued via the AFW-WEBS, fax, telephone, pager and e-mail when the Sun emits a severe burst of radio wave energy	Identifies UHF and/or SHF SATCOM frequency ranges affected by an observed burst of radio wave energy capable of causing interference; includes burst strengths and frequencies.
GPS Navigation	Regional nowcasts of single-frequency GPS accuracy; issued every hour on AFW-WEBS/AFW-WEBS-SCI	Identifies estimates of current single-frequency GPS accuracy based on calculations that take into account satellite availability and geometry as well as ionospheric-induced errors.
Satellite Operations	Hourly magnetometer analyses—Ap index; issued every hour via the AFW-WEBS and AFW-WEBS/AFW-WEBS-SCI	Quantifies the level of disturbance in the electrical current network of the ionosphere and magnetosphere. Possible effects are satellite drag on low earth orbit satellites, SATCOM scintillation, HF radio communication interference, or launch trajectory errors.
	Geomagnetic storm advisory/warning/ issued via the AFW-WEBS, fax, telephone, pager and e-mail when the hourly Ap and/or 24-hourly Ap index reaches or is expected to reach significant levels	Identifies the expectation or the observation that the electrical current network of the ionosphere and magnetosphere has reached significantly disturbed levels. Includes forecast of storm strength and duration. Possible effects are satellite drag on low earth orbit satellites, SATCOM scintillation, HF radio communication interference or launch trajectory errors.
	Energetic Proton Flux Advisory; issued via the AFW-WEBS, fax, telephone, pager, and e-mail when high-energy proton fluxes at geostationary orbit are expected to reach significant levels	Identifies the expectation for satellites to be bombarded with high-energy protons; includes a forecast of proton flux strength and duration; identifies potential for anomalous behavior in satellites due to proton bombardment.

Mission Area	AFWA Product	Description
	Energetic Proton Flux Warning; issued via the AFW-WEBS, fax, telephone, pager and e-mail when high-energy proton fluxes at geostationary orbit have reached significant levels	Identifies observed conditions that may lead to anomalous behavior of satellites caused by the bombardment of high-energy protons; includes current and forecasted proton flux strength and forecasted duration.
	Internal Electrical Charging Advisory; issued via the AFW-WEBS, fax, telephone, pager and e-mail when high-energy electron fluxes at geostationary orbit reach significant levels	Identifies observed conditions that may lead to anomalous behavior of satellites caused by internal charging/discharging due to a satellite being bombarded by high-energy electrons.
Space Tracking	Solar radio wave burst warning; issued via the AFW-WEBS, fax, telephone and e-mail when the Sun emits a severe burst of radio wave energy	Identifies observed conditions that may lead to interference affecting ground-based space tracking radars using UHF-SHF frequencies; includes specific frequencies and strengths of radio energy burst.
	Auroral radar clutter analyses; issued hourly via AFW-WEBS-S/AFW-WEBS-SCI	Identifies locations and strengths of potential interference to ground-based space radars caused by electron precipitation (auroral electrons).
	Hourly magnetometer analyses—Ap Index; issued every hour via the AFW-WEBS and AFW-WEBS/AFW-WEBS-SCI	Quantifies the level of disturbance in the electrical current of network of the ionospheric and magnetospheric; identifies potential for increased drag to cause objects in space to change orbital profile.
	Advisory/Warning of Geomagnetic Storming; issued via the AFW-WEBS, fax, telephone and e-mail when the hourly Ap and/or 24-hourly Ap index reaches or is expected to reach significant levels	Identifies the expectation or the observation that the electrical current network of the ionosphere and magnetosphere has reached significantly disturbed levels; identifies potential for increased drag to cause objects in space to change orbital profile; includes forecasts of strength and duration.
High Altitude Flight (Flight transiting polar regions)	Radiation Dosage Analyses; issued four times daily via AFW-WEBS based on cosmic radiation measurements	Quantifies the global level of radiation dosage at high altitudes based on background cosmic radiation.

Mission Area	AFWA Product	Description
	Energetic Proton Flux Advisory; issued via the AFW-WEBS, fax, telephone, pager and e-mail when high-energy proton fluxes at geostationary orbit are expected to reach significant levels	Identifies the expectation for radiation dosage due to high-energy protons at high altitudes to exceed significant levels; includes a forecast of proton flux strength and duration.
	Energetic Proton Flux Warning; issued via the AFW-WEBS, fax, telephone, pager and e-mail when high-energy proton fluxes at geostationary orbit have reached significant levels	Identifies observed high- altitude radiation dosage conditions that have exceeded significant levels; includes current and forecasted proton flux strength and forecasted duration.
Intelligence Collection	Various classified products as well as unclassified products shown above	The ability to collect intelligence information can be affected by space weather conditions. For example, the ability to intercept HF signals is affected by space weather. Furthermore, the ability to use ground-based and/or space-based intelligence collection assets to gather data may be prevented or inhibited, or it may be facilitated, depending on space weather conditions. Likewise, the ability of an adversary to conduct operations may be impacted due to space weather.

Attachment 5

FAA SPECIAL OBSERVATION CRITERIA

Figure A5.1. Special Observation Criteria.

Phenomenon:	Criteria:
Wind Shift.	Wind direction changes by 45 degrees or more in less than 15 minutes and the wind speed is 10 knots or more throughout the wind shift.
Visibility.	Visibility as reported in the body of the report decreases to less than, or if below, increases to equal or exceed: (1) 3 miles (2) 2 miles (3) 1 mile (4) 1/2 mile.
Tornado, Funnel Cloud, or Waterspout.	(1) Is observed (2) Disappears from sight or ends
Thunderstorm.	(1) Begins (a SPECI report is not required to report the beginning of a new thunderstorm if one is currently reported) (2) Ends
Precipitation.	(1) Hail begins or ends (2) Freezing precipitation begins, ends, or changes intensity (3) Ice pellets begin, end, or change intensity
Squall.	Wind speed suddenly increases by at least 16 knots and is sustained at 22 knots or more for at least one minute.
Ceiling.	The height of the base of clouds covering five eighths or more (e.g., broken and overcast) of the sky forms or dissipates below, decreases to less than or, if below, increases to equal or exceed: (1) 3,000 feet (2) 1,500 feet (3) 1,000 feet (4) 500 feet (5) 200 feet.
Sky Condition.	A layer of clouds or obscuring phenomenon aloft is present below 1,000 feet and no layer aloft was reported below 1,000 feet in the preceding METAR or SPECI observation.
Volcanic Eruption.	When eruption is first noted.
Aircraft Mishap.	Upon notification of an aircraft mishap, unless there has been an intervening observation.
Miscellaneous.	Any other meteorological situation that, in the opinion of the observer, is critical.