

**BY ORDER OF THE COMMANDER
SPACE LAUNCH DELTA 30**

**SPACE LAUNCH DELTA 30
INSTRUCTION 15-101**



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Weather

WEATHER SUPPORT

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This instruction implements Air Force Policy Directive (AFPD) 15-1, Weather Operations; Air Force Manual (AFMAN) 10-206, Operational Reporting; Air Force Instruction (AFI) 15-128, Weather Force Structure; AFMAN 15-111, Surface Weather Observations; AFMAN 15-124, Meteorological Codes; AFMAN 15-129, Air and Space Weather Operations. This instruction identifies services, responsibilities, and procedures for weather support on Vandenberg Space Force Base (VSFB). It outlines weather support provided by the 30th Operations Support Squadron Weather Flight (30 OSS/OSW) to VSFB and Western Range (WR) users, including support to mission operations, contingency operations, staff support, Department of Defense (DoD) contractor support and training. This instruction applies to all military personnel, civilians, and DoD contractors assigned to VSFB. All agencies that receive support from, or provide support to, 30 OSS/OSW are required to review this instruction annually during the anniversary month. Refer recommended changes and questions about this publication to the Office of Primary Responsibility (OPR) using the DAF Form 847, *Recommendation for Change of Publication*; route DAF Forms 847 through appropriate chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFI 33-322, *Records Management and Information Governance Program*, and disposed of IAW Air Force Records Information Management System (AFRIMS) Records Disposition Schedule (RDS). The authorities to waive wing/unit level requirements in this publication are identified with a Tier ("T-0, T-1, T-2, T-3") number following the compliance statement. See DAFI 90-160, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for non-tiered compliance items.

SUMMARY OF CHANGES

This Instruction has been substantially revised and must be completely reviewed. Major changes include the 25 Operational Weather Squadron (25 OWS) support within this document, regarding their prior forecast production and resource protection for VSFB. Removing the Cold Spill Hazard Zone Forecasting duties from OSW duties, which is now a Range Safety product. The Range Operations 5-Day Forecast becoming a 7-Day Forecast, changing 30 SW to SLD 30, and updating to Range Weather Forecaster standard office hours.

Chapter 1—CAPABILITIES	6
1.1. General.....	6
1.2. Concept of Operation.....	6
1.3. Operational Sensor Suite.	6
1.4. Duty Priorities.....	7
Table 1.1. Observer Duty Priorities.	7
Table 1.2. Range Weather Forecaster Duty Priorities.	8
1.5. Assumptions, Shortfalls, and Limitations.....	8
1.6. WF SharePoint Site.....	9
1.7. Release of Weather Information.	9
Chapter 2—ROLES AND RESPONSIBILITIES	10
2.1. Space Launch Delta 30 Command Post (SLD 30/CP).....	10
2.2. Space Launch Delta 30 Chief of Safety (SLD 30/SE).	10
2.3. Space Launch Delta 30 Chief of Inspections and Exercises (SLD 30/IG).	10
2.4. 30th Space Communications Squadron (30 SCS).....	11
2.5. 30th Contracting Squadron (30 CONS).	11
2.6. 30 OSS/CC.....	11
2.7. 30 OSS/DO	11
2.8. 30 OSS/OSW CC.....	11
2.9. 30 OSS/OSW	12
2.10. Radar, Airfield, and Weather Systems (RAWS) (30 OSS/OSM).	14
2.11. 30th Civil Engineering Squadron Readiness Flight (30 CES/CEX).	14
2.12. 30th Civil Engineering Squadron (30 CES).	14
2.13. Airfield Management (30 OSS/OSA).	14
2.14. VSFB Control Tower (30 OSS/OSA).	15
2.15. Frontier Control (2 ROPS/DON).	16

2.16.	Bioenvironmental Engineering (30 OMRS/SGXB)	16
2.17.	25 OWS.....	16
Chapter 3—AIRFIELD SERVICES		17
3.1.	WF Availability.	17
3.2.	Terminal Aerodrome Forecasts (TAF).	17
3.3.	Observing Hours of Operation.....	17
3.4.	Basic Weather Watch (BWW).....	17
3.5.	Continuous Weather Watch (CWW).	18
3.6.	Cooperative Weather Watch.	18
3.7.	Observation Types.	18
3.8.	Points of Observation.....	18
3.9.	Special and Local Weather Observation Criteria.....	18
3.10.	Limited Observation Support.....	18
3.11.	Dissemination of Observations.	18
3.12.	Backup Dissemination of Observations.	19
3.13.	Upper-Air Observing.	19
3.14.	PMSV.	19
Chapter 4—PLANNING WEATHER		20
4.1.	Range Operations 7-Day Forecast.	20
Figure 4.1.	Example of Range Operations 7-Day Forecast.....	20
4.2.	Launch-X (L-X) Day Forecasts.	20
Figure 4.2.	Example of L-X Day Forecast.	21
4.3.	Staff Weather Briefings.	21
4.4.	X-37B 7-Day Forecast.	21
4.5.	Joint Strike Force (JSF) Briefs.....	21
Chapter 5—MISSION WEATHER PRODUCTS		22
5.1.	Mission Weather Products (MWP).	22
Table 5.1.	ORM 5-Step Process.....	22
5.2.	Flight Weather Briefing, DD Form 175-1.	22
5.3.	Operating Area Forecasts.....	22
Chapter 6—LAUNCH/RECOVERY WEATHER SERVICES		23
6.1.	Launch/Recovery Support.	23

6.2.	Pre-launch/Recovery Weather Support.....	23
6.3.	Day of Launch/Recovery Weather Support.....	23
Table 6.1.	POV Determination Criteria.....	24
Chapter 7—WEATHER WARNINGS, WATCHES, AND ADVISORIES (WWAS)		25
7.1.	Customer Requirements.....	25
7.2.	Meteorological Watch (METWATCH) Program.....	25
7.3.	WWA Criteria.....	25
7.4.	Weather WWA Customer Thresholds and Actions. Table 7.4.....	25
Figure 7.1.	Weather Pyramid Alerting.....	26
Table 7.1.	Weather Warning Criteria.....	27
Table 7.2.	Weather Watch Criteria.....	28
Table 7.3.	Weather Advisory Criteria.....	28
Table 7.4.	Weather Warning and Watch Customer Thresholds and Actions.....	29
7.5.	Severe Weather Action Procedures (SWAP).....	30
7.6.	Severe Weather Reporting.....	30
Chapter 8—SPACE WEATHER		31
8.1.	General.....	31
8.2.	WF Responsibility.....	31
8.3.	Space Weather Events.....	31
Chapter 9—DISSEMINATION OF WEATHER INFORMATION		33
9.1.	Weather Data Systems.....	33
9.2.	Communication Outages.....	33
9.3.	Telephone Hotlines.....	33
9.4.	Closed Circuit Television (CCTV).....	33
9.5.	Pilot-to-METRO-Service (PMSV).....	33
Chapter 10—EMERGENCY/CRISIS AND BACK-UP SUPPORT		34
10.1.	General.....	34
10.2.	Alternate Observation Site (AOS).....	34
10.3.	Alternate Operating Location (AOL).....	34
Attachment 1—GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION		35
Attachment 2—POINTS OF CONTACT		39
Attachment 3—TAF SPECIFICATION AND AMENDMENT CRITERIA		40

Attachment 4—SPECIAL OBSERVATION (SPECI) CRITERIA

42

Attachment 5—LOCAL OBSERVATION CRITERIA

44

Chapter 1

CAPABILITIES

1.1. General . The purpose of this instruction is to bring together the services provided by the 30 OSS/OSW to all customers on VSFB. For of this instruction's purposes, the term Weather Flight (WF) is used synonymously with the 30 OSS/OSW and refers to the entire WF. Basic support concepts and procedures are outlined in this instruction, along with Air Force and Space Force directives, the Range Universal Documentation System (UDS), and 30 OSS Operating Instructions for range support.

1.2. Concept of Operation . With continuity support from the 25th Operational Weather Squadron (25 OWS), the WF provides operational and staff weather support to the Space Launch Delta 30 (SLD 30) and tenant units; mission weather services for all DoD, civil, and commercial space lift/ballistic missile missions on VSFB; observation and forecasting support for DoD and commercial space lift, ballistic missile test, and air operations on VSFB and west coast offshore operating area; resource protection for VSFB/SLD 30 and tenant unit resources and people; trained weather professionals to support contingencies worldwide; and weather data and studies for planning. The WF operates weather systems to support operations at VSFB. WF weather support to the SLD 30 is not simply confined to the launch day, but is the WF's 24/7/365 effort, and therefore demands the same uptime of range weather instrumentation. Agencies requiring weather support will contact the WF with the pertinent details as early as feasible. Agencies requiring recurring support not covered in this instruction will contact the WF Commander (see [Attachment 2](#), Point of Contact). Adequate notice is essential for optimum support.

1.2.1. The 25 OWS provides continuity of operations for VSFB.

1.2.2. A contract organization provides surface observation data for the VSFB Airfield and upper-air observation data from the surface to approximately 100,000 feet above the range.

1.2.3. Non-flying missions include all space lift and ballistic missile launch/recovery support.

1.2.4. The WF has both an in-place wartime mission and a mobility mission. Active-duty members are assigned to Air and Space Expeditionary Force Unit Task Codes. Activated members receive appropriate training before deployment.

1.3. Operational Sensor Suite. To fulfill the weather support mission, the WF operates an extensive suite of weather sensors and systems to ingest, process, manage, distribute, and archive meteorological information from local sensors, as well as national, international, and satellite sources. As codified within the 30 OSS Western Range Weather Equipment Manual, this suite consists of wind towers including anemometers, Temp/RH sets, radiometers, soil moisture sensors, 915-MHz Doppler Radar Wind Profilers, Mini Sonic Detection and Ranging (SODAR) wind profilers, Vandenberg Operational Lightning Tracking System (VOLTS), FMQ-23s, Automated Meteorological Profiling System (AMPS), and Doppler Radar to gather weather data across the range. Due to the diversity of specialized systems and the number of active sensors, the meteorological equipment suite represents one of the largest concentrations of meteorological instrumentation in the world. The density of sensors, combined with state-of-the-art technology and 24-hour-a-day collection, provides multiple specialized measurements that helps the USAF and its mission customers to successfully complete their missions in various weather conditions.

This unique and comprehensive meteorological data is also available to academic and government research scientists, if the WF/CC or designee approves. The Range Instrumentation Handbook describes WF weather equipment in further detail.

1.3.1. The maintenance and sustainment of the WR weather sensors and systems suite is detailed within the Launch and Test Range System (LTRS), Integrated Support Contract (LISC) and carried out by various agencies.

1.4. Duty Priorities. WF operations personnel can become task saturated at times (e.g., sudden onset of severe weather). To assist WF personnel in prioritizing customer support during such times, principal duty priorities are defined below. WF observers (**Table 1.1**) and forecasters (**Table 1.2**) will adhere to these priorities, and supported agencies should understand these priorities.

Table 1.1. Observer Duty Priorities.

1	Perform Emergency War Orders (EWO) Taskings
2	Execute evacuation
3	Respond to aircraft/launch vehicle/missile/ground emergencies
4	Perform mission upper-air observations
5	Disseminate airfield surface observations locally as required
6	Respond to Launch Weather Officer (LWO)/Ops calls during mission operations
7	Perform synoptic upper-air observations
8	Transmit airfield surface observations longline as required
9	Provide briefings
10	Weather functional training
11	Accomplish administrative tasks

Table 1.2. Range Weather Forecaster Duty Priorities.

1	Perform EWO Taskings
2	Execute evacuation
3	Respond to aircraft/launch vehicle/missile/ground emergencies (to include Operational Hazard Zone (OHZ) forecasts)
4	Respond to pilot-to-metro-service (PMSV) calls
5	Issue Weather Warnings, Watches and Advisories (WWAs)
6	Implement Severe Weather Action Procedures (SWAP)
7	Respond to LWO/Western Range Operations Control Center (WROCC)/Ops calls during mission operations
8	MEFP- Produce and Disseminate Forecasts
9	Perform WSR-88D Unit Control Position (UCP) functions
10	Disseminate Urgent Pilot Reports (PIREPs)
11	Disseminate PIREPs
12	Perform MISSIONWATCH activities
13	Provide Briefings
14	Weather functional training
15	Accomplish administrative tasks

1.5. Assumptions, Shortfalls, and Limitations.

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

1.5.2. WF Shortfalls. Some services may not be available (e.g., out of station briefings) due to other higher priority missions.

1.5.3. WF Limitations. Due to the sensitive nature of a limited number of missions, not all operational missions are reflected in this document as required in AFMAN 15-129.

1.5.3.1. Forecasting Limitations. The WF issues operational/mission forecasts valid for periods up to 30 hours. Beyond 30 hours, all forecasts are for planning/information only. Forecasts or outlooks beyond 10 days are largely based on climatology.

1.5.3.2. WWA Limitations. The expanse and topography of the WR requires regional tailoring of forecast support and products. All WWAs will extend out to and include 10 Nautical Miles (NM) from the VSFb boundary. The exception is warnings pertaining to winds, which are issued to cover North VSFb, South VSFb, and/or the airfield. The lightning warning is broken out to cover North VSFb and South VSFb. WWAs are not issued for the airfield during periods of airfield closure. In these cases, North VSFb notices will apply to the airfield environment. Specific WWA procedures are detailed in [Chapter 7](#).

1.5.3.2.1. Wind warnings above 1,000 ft sea level. Topographic features and lack of representative weather instrumentation make it difficult to forecast winds for sites above 1,000 ft sea level. As a result, sites above 1,000 ft use North and South VSFB wind warnings for below 1,000 ft (**Table 7.2**) for winds > 35 knots but ≤ 50 knots as a precursor for potentially higher winds. Sites above 1,000 ft only receive an official wind warning when winds are forecast ≥ 65 knots.

1.5.3.3. Observing Limitations.

1.5.3.3.1. The observer location is slightly behind Bldg 1765 (balloon shelter), with the airfield complex 1 1/2 miles to the south. The facility does not allow a 360-degree view of the runway complex from the official observation point. There is an obstruction from 150–180 degrees due to Base Operations and Flight Line Fire buildings.

1.5.3.3.2. The Alternate Observing Site is located behind Bldg 1746. Buildings adjacent to the flightline and trees restrict the view from the northeast to southeast, out to approximately 3/8 miles.

1.6. WF SharePoint Site. <https://usaf.dps.mil/sites/ussf-sld30/OSS/OSW>. This site provides a link to the 7-day forecast. Upon request, the WF will email data to those who unable to access this site.

1.7. Release of Weather Information. The WF/CC or designee must approve releasing weather information to non-DoD agencies or the public. The WF will consult with SLD 30 Public Affairs and SLD 30 Office of the Staff Judge Advocate before approving release authority.

Chapter 2

ROLES AND RESPONSIBILITIES

2.1. Space Launch Delta 30 Command Post (SLD 30/CP).

- 2.1.1. Expediently relays warnings, watches, and advisories to agencies identified in [Figure 7.1](#).
- 2.1.2. When the Joint Environmental Toolkit (JET) is inoperative, relay above information to Frontier Control first, then proceed with [Attachment 7](#) notifications.
- 2.1.3. Notify the WF of accidents, mishaps, incidents, fires, and airfield operating hours outside of standard hours or any other changes to normal operations requiring weather support.
- 2.1.4. Inform the WF of any incident or significant event involving weather service or WF personnel.
- 2.1.5. Coordinate, if time permits, with 30 OSS/CC or Operations Officer (DO) before transmitting a significant event message to higher headquarters involving weather events, service, or personnel.
- 2.1.6. Send OPREP-3 reports up-channel when weather occurs on VSFB and causes damage that rises to DoD, AF or MAJCOM, USSF or FLDCOM interests IAW AFMAN 10-206.
- 2.1.7. Conduct periodic tests of primary and back-up weather watch/warning dissemination systems IAW DAFI 10-2501, Table 6.1.
- 2.1.8. Inform the WF when the SLD 30/CP JET is inoperative.

2.2. Space Launch Delta 30 Chief of Safety (SLD 30/SE).

- 2.2.1. Identify meteorological requirements for hazard assessments to support both Launch Readiness Reviews and mission execution.
- 2.2.2. Include new and modified weather instrument and support requirements for mission operations in the Range Safety Operations Requirements (RSOR) when the WF requests.
- 2.2.3. Provide required training for WF individuals appointed as Interim Safety Board members or appointed to assist with accident investigations.
- 2.2.4. Coordinate and recommend approval to USSF/SE for range safety constraints concerning natural and triggered lightning. These constraints are documented in SPFCMAN 91-710, *Launch and Range Safety Program Policy and Requirements*.
- 2.2.5. Provide 30 OSS/OSW letters certifying evaluating of all launch vehicles for triboelectrification. Certification enables LWOs to ensure accurate evaluation of the range safety triggered lightning constraint concerning triboelectrification.

2.3. Space Launch Delta 30 Chief of Inspections and Exercises (SLD 30/IG).

- 2.3.1. Coordinate with WF to ensure unit objectives are included in installation exercises through Wing Inspection Team (WIT) program, including periodic exercises of severe weather notification and response actions.

2.4. 30th Space Communications Squadron (30 SCS) .

2.4.1. Ensure WF primary and back-up communications are available to meet customer specified WWA notification timelines.

2.4.2. All weather systems utilizing base communications infrastructure will have the appropriate Information Assurance (IA) accreditation approved by the system's Approving Official (AO).

2.5. 30th Contracting Squadron (30 CONS).

2.5.1. When SLD 30 provides mission support contracts, review, coordinate, and approve all mission requirements.

2.5.2. Ensure additional (new) mission requirement packages include a mission need statement (MNS) signed by the unit commander or an authorized representative.

2.6. 30 OSS/CC.

2.6.1. Organize and equip personnel to provide operational weather support for WR activities.

2.6.2. Provide SLD 30/CC an assessment of WF mission capabilities and up-channel requests for assistance, as required.

2.7. 30 OSS/DO .

2.7.1. The DO is the operations lead for the 30 OSS and serves as the primary point of contact for all meteorological and airfield operational issues for VSF, and fulfills the following responsibilities:

2.7.1.1. Participates on boards and committees concerning weather issues.

2.7.1.2. Serves as the primary Launch Weather Commander (LWC) for DoD, commercial, and civilian space lift, ballistic missile test, and spacecraft recovery operations at VSF.

2.8. 30 OSS/OSW CC .

2.8.1. The Flight Commander is the senior meteorologist for VSF and directs operational weather support for DoD, commercial and military, ballistic and space lift programs, conventional flight operations, senior staff support, and resource protection. Flt/CC will:

2.8.1.1. Communicate directly with all commanders and staff agencies concerning weather operations and support.

2.8.1.2. Ensure weather support is provided to all DoD units, contractors, and commercial mission partners on VSF.

2.8.1.3. Ensure observation, forecast, and notification of weather phenomena for resource protection of facilities and personnel on the VSF complex.

2.8.1.4. Plan for acquiring, integrating, and supporting weather sensing and processing systems to meet current and future base/delta mission requirements.

2.8.1.5. Establish and maintain mission/range weather training programs.

2.8.1.6. Provide trained and certified LWCs, LWOs, range weather forecasters and other mission weather team personnel to support all mission and aviation operations.

2.8.1.7. Ensure back-up support for weather operations is established where needed.

2.8.1.8. Provide weather scenario inputs to SLD 30/IG for base-wide exercises.

2.8.1.9. Provide or arrange weather briefings for: SLD 30 Stand Up; Team V Mission Update; New Strategic Arms Reduction Treaty (NST); deployment; and other meetings.

2.9. 30 OSS/OSW . The Weather Flight develops and provides operational weather support for all WR ballistic missile, space lift, and recovery missions and will:

2.9.1. Manage unit mobility and exercise evaluation programs to include training, certifying, and readying personnel subject to deploy in support of DoD worldwide operations.

2.9.2. Provide Launch Weather Team Unit Qualification Training, Recurring Training, and Supplemental Training. Provide weather instrument refresher course familiarization to SLD 30 mission ready operators.

2.9.3. Evaluate all UDS materials, and provide comments and coordinate required changes with 2d Range Operations Squadron (2 ROPS) Program Support Manager (PSM). Provide requested responses to customer's Program Requirements and Operations Requirements Documents.

2.9.4. Provide tailored operational weather briefings and mission weather support per launch mission Operation Directives (OD). On the day of mission, weather support typically consists of on console weather briefings, go/no-go weather calls, range weather forecasts, upper-air weather observations from weather balloons, surface weather observations, and a specialized T-0 wind and thermodynamic forecast used by SLD 30/SE to conduct safety analyses to include toxic, blast, and debris hazard assessments.

2.9.5. Develop and ensure Operating Instructions (OIs) and procedures compliance for launch/recovery weather team activities.

2.9.6. Ensure weather instrument and support requirements for mission operations are identified and forwarded to SLD 30/SE to include in the RSOR.

2.9.7. Consult on improvements to Lightning Launch Commit Criteria, in coordination with NASA and the Lightning Advisory Panel.

2.9.8. Ensure mission forecasts issuance for the local area and flying operations, to include Drop Zone operations.

2.9.9. Provide a daily 7-day Range Operations Planning Forecast, which consists of a stop-light chart forecast based on the weather constraints for range operations scheduled to occur during the 7-day period.

2.9.10. Provide meteorological mission watch in support of VSFB aviation and pre-mission operations for protection of personnel and facilities.

2.9.11. Operate, monitor, and provide training to appropriate base agencies, as required, on meteorological sensing and dissemination systems.

2.9.12. Provide aircrew briefings and monitor PMSV radio.

- 2.9.13. Ensure the contracted weather observers provide initial local weather observation training and certification to all tower personnel (Air Traffic Control) to take limited weather observations.
- 2.9.14. IAW AFI 10-2501 Table 7.1 Step 59, provide the following information for OPREP-3 reports to SLD 30/CP, as required:
- 2.9.14.1. The actual severe weather conditions experienced.
 - 2.9.14.2. The forecast valid for the time of the occurrence and any watches or warnings issued.
 - 2.9.14.3. The operational status of meteorological and communication equipment at the time of the event.
- 2.9.15. Provide updated weather operations and sensor information for publication in Notice to Airmen (NOTAM) and Flight Information Publications (FLIP) to Airfield Management (30 OSS/OSA).
- 2.9.16. Review and ensure all weather information in the FLIP is accurate. All weather-related updates will be requested through 30 OSS/OSA. Updates will fall in one of three categories: revisions, changes, or corrections.
- 2.9.17. Provide tailored weather support for senior staff and Distinguished Visitor activities. Requesting agency will notify the WF, at least two duty days prior, if possible, when requesting a trip forecast. At a minimum, include departure and arrival dates, times, and locations.
- 2.9.18. Upon request, provide Chemical Downwind Messages/current weather conditions and forecast to the Emergency Operations Center.
- 2.9.19. Upon request, provide Effective Downwind Fallout Messages to CE Readiness.
- 2.9.20. Provide pre-deployment planning/training to WF members IAW unit OIs.
- 2.9.21. Serve as the technical lead for submitting Requirement Statements into ReqView to formally request new weather information systems to meet WF and supported customer needs, and develop plans to acquire, integrate, and support these systems.
- 2.9.22. Manage maintenance and modification of WR support weather computer systems, instrumentation systems, and data transfer (primary and back-up communications) equipment.
- 2.9.23. Establish and provide oversight of appropriate contractor-supplied weather systems support. Utilize the SLD 30/PMD Technical Customer Feedback process when identifying performance concerns relative to contractor-supplied weather system support.
- 2.9.24. Direct/provide/oversee meteorological and climatological research/studies and scientific services in support of DoD/DoD-contracted or unit missions and operations.
- 2.9.25. Coordinate system Operational Employment and Maintenance Evaluation testing and support to Force Development Evaluation of new or modified range weather equipment and writing/advocating for the commissioning package to approve them as operational.
- 2.9.26. Provide weather system updates to SLD 30 technical documents such as the Instrumentation Handbook.

2.9.27. Identify WR weather support requirements and provide technical user interface into developing plans for modifying, acquiring, integrating, and supporting weather data sensing/processing systems to meet current and future needs.

2.9.28. Upon request, provide meteorological/climatological services and/or studies affecting WR activities. Agencies requiring such support may contact the WF/CC or Chief.

2.9.29. Direct weather balloon support for daily operations.

2.9.30. Oversee all matters concerning configuration management of weather sensing and processing systems.

2.9.31. Act as technical advisor to acquisition program manager and quality assurance specialist for the weather system mission support requirements. Provide inputs on “fitness” of performance of all weather-related support activities (operations, maintenance, engineering, software development, and operational analysis).

2.9.32. Represent the WF at interagency working groups that manage the weather information network; includes providing a SLD 30 representative to the Range Commanders’ Council Meteorological Group.

2.10. Radar, Airfield, and Weather Systems (RAWS) (30 OSS/OSM).

2.10.1. Conduct or arrange maintenance on all airfield weather systems and associated circuits. Restoral priorities depend on current airfield, mission operations and requirements.

2.10.2. Provide WSR-88D on-site technician support when requested.

2.11. 30th Civil Engineering Squadron Readiness Flight (30 CES/CEX).

2.11.1. Conduct annual Hazard, Vulnerability and Capability assessments according to DoDI 6055-17.

2.11.2. Ensure 30 OSS/OSW coordinates and validates all weather hazards for local area notification procedures and requirements supporting disaster preparedness and response.

2.11.3. Ensure that pre- and post-severe weather response requirements are included in applicable SLD 30 plans IAW AFI 10-2501 established guidance.

2.11.4. Collaborate with the WF to provide appropriate mission immersion and ensure base personnel are educated on local severe weather threat and applicable protective measures.

2.12. 30th Civil Engineering Squadron (30 CES).

2.12.1. Provide contract maintenance for air conditioning systems and backup power generators at Bldg. 1764 and Bldg. 21150.

2.13. Airfield Management (30 OSS/OSA).

2.13.1. Provide maximum advanced notice possible to the WF when the airfield will be open or closed outside normal operating hours.

2.13.2. Include PMSV outages in NOTAMs.

2.13.3. Conduct PMSV radio checks with the Range Weather Forecaster (RWF) within one hour of the airfield opening.

2.13.4. When notified, submit weather related NOTAM and FLIP updates.

2.13.5. Contact 30 OSS/OSW when FLIP updates are available.

2.13.6. Activate the Secondary Crash Net for Weather Watches, Warnings, and Advisories.

2.14. VSFB Control Tower (30 OSS/OSA).

2.14.1. During published airfield hours, ensure the Precision Approach Path Indicator (PAPI) lights are turned on and set to the in-use runway. Inform the weather observer whenever the PAPI lights are not turned on (during outages, maintenance etc.), or are not set to the advertised in-use runway.

2.14.1.1. The FMQ-23 automatically detects what runway the PAPI lights are set to and then generates observations from the Ceilometer, wind and visibility sensors from the sensor group in that area. If the PAPI lights are on both runways simultaneously or are not on, the FMQ-23 will set itself to the Runway 30 sensor group.

2.14.2. Inform the weather observer when the active runway is changed.

2.14.3. Inform the RWF when JET is inoperative.

2.14.4. Relay all PIREPs to the RWF not later than five minutes after receipt.

2.14.5. Perform a cooperative weather watch by notifying the weather observer of any perceived difference between the observed and reported weather conditions which may affect flight safety or be critical to the safety or efficiency of other local operations and resources. The observer will reevaluate the weather conditions whenever a reliable source reports weather conditions different from the last disseminated observation and upon receipt of subsequent reportable changes. These conditions include but are not limited to:

2.14.5.1. Location and movement of thunderstorms.

2.14.5.2. Rapidly deteriorating visibility/tower visibility.

2.14.5.3. Presence of fog that could hinder an approach and landing of arriving aircraft.

2.14.5.4. Beginning and ending of precipitation.

2.14.5.5. Observed lightning.

2.14.5.6. Report changes in prevailing visibility and sector visibility to the weather observer when either prevailing visibility and/or sector visibility is less than 4 statute miles and is different from the surface prevailing visibility.

2.14.6. Provide the airfield observer or RWF with a report of any convective activity in the local area.

2.14.7. Provide WF personnel indoctrination training on local air traffic control facilities and capabilities when requested.

2.14.8. When the airfield is open notify Santa Barbara Approach and Los Angeles Air Route Traffic Control Center of all weather balloon launches and provide traffic advisories to all affected aircraft IAW JO 7110.65.

2.15. Frontier Control (2 ROPS/DON).

2.15.1. Notify the WF when same day changes occur (both additions and deletions) to scheduled flight operations on the WR, including the West Coast Offshore Operating Area (WCOOA).

2.15.2. Notify the WF when unscheduled flight operations requiring weather support occur on the WR, including the WCOOA.

2.15.3. Direct the weather aircraft as requested by the LWO during all ballistic, space lift, and recovery mission operations.

2.15.4. Forward all PIREPS to the RWF. During mission operations, forward PIREPS to the LWO on console.

2.16. Bioenvironmental Engineering (30 OMRS/SGXB).

2.16.1. Provides Wet Bulb Global Temperature (WBGT) measurements and provides flag conditions for heat stress.

2.17. 25 OWS.

2.17.1. **Reciprocal support is documented on the Installation Data Page. The Installation Data Page is located at:**
https://25ows.us.af.mil/ows_unique/25data/moa/Vandenberg_AFB_Data_Page.pdf

Chapter 3

AIRFIELD SERVICES

3.1. WF Availability. The Weather Operations Center (WOC), located in Bldg. 21150, standard in office hours are Sunday 2000 local to Friday 2000 local. It is also not open during holidays, family days, or upon 30 OSS/CC direction. WF will flex/surge to meet launch mission requirements and will be in the office to support operations requiring direct weather support and for airfield openings. Even when closed, the WF personnel continually monitor weather conditions to provide resource protection as needed. The forecaster can be reached during closure at the standby number found in [Attachment 2](#), Points of Contact.

3.2. Terminal Aerodrome Forecasts (TAF). RWFs prepare a TAF for the area within a 5-statute mile radius of the airfield at 1500Z and 2300Z Monday through Friday and on weekends if the airfield is open. A third TAF is issued at 0700Z if flight operations are on-going. Times will adjust based on Day Light Savings (14Z, 22Z, and 06Z respectively).

3.3. Observing Hours of Operation. At a minimum, weather observers man the Representative Observation Site (ROS) and provide surface observing services from one hour prior to scheduled airfield opening until the airfield closes. Weather observers conduct daily upper-air soundings at 1200Z and 0000Z, when weather conditions warrant additional upper-air sounding data (e.g., releasing a 1900Z balloon 1 day before expected thunderstorm activity), and as required for range operations.

3.4. Basic Weather Watch (BWW). A BWW will be conducted a qualified observer when the airfield is open and there is a radiosonde balloon being tracked in the air. Because of the balloon tracking, the observer cannot monitor the weather continuously and may not detect and report all weather changes as they occur. The BWW observing program establishes the minimum requirements needed to ensure the proper weather watch level is maintained.

3.4.1. During a BWW, the observer will recheck weather conditions, at intervals not to exceed 20 minutes since the last observation/recheck, to determine the need for a SPECI observation, when any of the following conditions are observed to be occurring or are forecast to occur within 1 hour:

- 3.4.1.1. Ceiling forms below or decreases to less than 1,500 feet;
- 3.4.1.2. Ceiling dissipates, or increases to equal or exceed 1,500 feet;
- 3.4.1.3. Visibility decreases to less than 3 miles (4800 meters);
- 3.4.1.4. Visibility increases to equal or exceed 3 miles (4800 meters);
- 3.4.1.5. Precipitation (any form);
- 3.4.1.6. Thunderstorms;
- 3.4.1.7. Fog or mist;
- 3.4.1.8. All supplemental criteria including: Tornado, funnel cloud, waterspout, hail, volcanic ash, and ice pellets; and
- 3.4.1.9. During mandatory back-up of the FMQ-23.

3.4.2. In addition to the above minimum requirements, observers will remain alert for any other weather conditions changes that require a SPECI observation. They will also monitor local area observational and forecast products as often as necessary to keep informed of changes expected to affect their area of responsibility.

3.5. Continuous Weather Watch (CWW). A CWW is conducted when not tracking weather balloons. Observers will monitor weather conditions continuously and perform no other significant duties. The observer will take and disseminate METAR and SPECI observations as conditions occur that meet the criteria.

3.6. Cooperative Weather Watch. VSFB control tower personnel will perform a cooperative weather watch, IAW [Paragraph 2.14.5](#), and notify the observer of previously unreported changes in the weather which could be critical to flight safety or be critical to the safety or efficiency of other local operations and resources.

3.7. Observation Types. The WF produces two types of observations.

3.7.1. Manual Observations. When the airfield is open, a position qualified weather technician is responsible for observing, evaluating, and preparing METAR/SPECI observations. These observations will be disseminated locally and longline via JET.

3.7.2. Automated Observations. During non-duty hours when the airfield is closed, the FMQ-23 will continually sense and measure the atmosphere, sending out observations longline.

3.8. Points of Observation. For most meteorological elements the airfield is the primary Point of Observation.

3.8.1. Airfield. The FMQ-23 is spread across three locations along VSFB's runway. At the southern end (runway 30), the elements sensed include prevailing visibility, present weather, sky condition, temperature, dew point, pressure, wind data, and runway visual range. At the mid-field point, elements sensed include wind data and visibility. At the northern end (runway 12) the elements sensed include wind data, sky condition, and visibility.

3.8.2. Observation Facility. The cloud height and ceiling elements are measured at the airfield via the FMQ-23 sensors and, during hours of manual observing, the weather technician will use these readings as a baseline during evaluating and preparing the METAR/SPECI observations.

3.9. Special and Local Weather Observation Criteria. Observing procedures and observation criteria are derived from AFMAN 15-111, *Surface Weather Observations*, and from DoD FLIP published specifically for VSFB.

3.10. Limited Observation Support. Agencies requiring surface observing support from other VSFB locations will previously coordinate with the RWF or WF/Chief (see [Attachment 2](#), Points of Contact).

3.11. Dissemination of Observations. Airfield observations are disseminated to VSFB air traffic control tower, base operations, command post, and to the worldwide network via JET when observers are on duty at the ROS. FMQ-23 observations are available via telephone when observers are not on duty at the ROS during forecasting operating hours (see [Attachment 2](#), Points of Contact).

3.12. Backup Dissemination of Observations. For a JET outage, airfield observations are disseminated via telephone or direct line, first to the VSFb control tower, then to base operations and command post. Observations are disseminated longline via the Air Force Weather Web Services (AFW-WEBS) or another AF weather station if NIPRNet is inoperable.

3.13. Upper-Air Observing. Upper-air operations are conducted from Bldg. 1764, North VSFb. Upper-air observers will obtain VSFb control tower clearance, when the airfield is open or contact Santa Barbara Approach (when open) and Los Angeles Center when the VSFb airfield is closed before releasing balloons not associated with mission operations. To collect upper-level weather information, the observers release high and low resolution radiosondes.

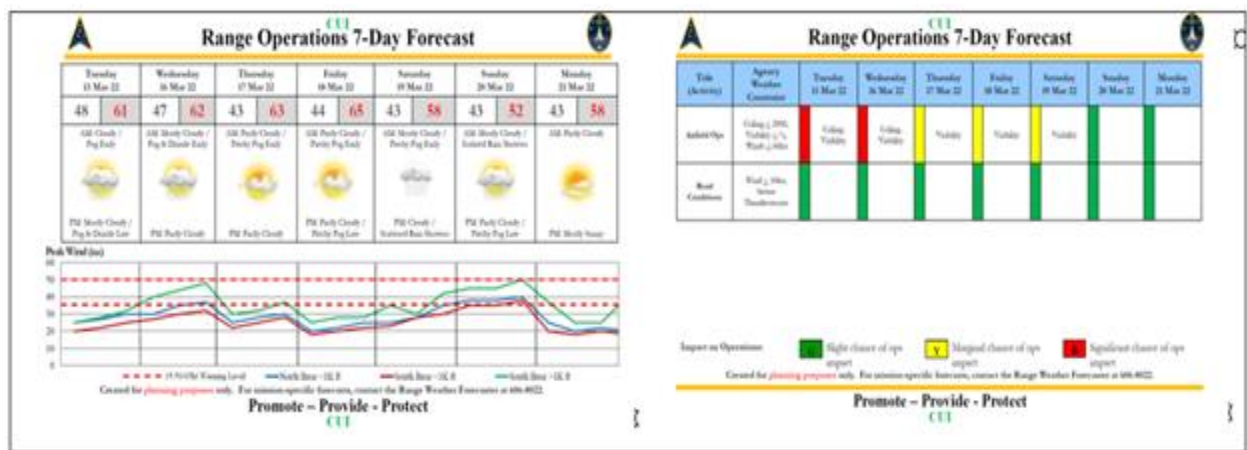
3.14. PMSV. RWFs provide PMSV response during operating hours on assigned frequency 342.4MHz. Aircrews shall relay PIREPs during PMSV contacts. PMSV phone patches will go through the RWF. Contact information is found on [Attachment 2](#), Points of Contact. See [paragraph 9.5](#) for PMSV outage procedures.

Chapter 4

PLANNING WEATHER

4.1. Range Operations 7-Day Forecast. This forecast is for planning purposes and is issued at 0400L Monday through Friday. The forecast highlights weather conditions that may affect upcoming range operations (Figure 4.1 and 4.2.). The forecast is coded Green/Yellow/Red for each specific operation to indicate the likelihood of any weather impacts. If Y or R is forecast for the operation, the weather element expected to violate a constraint is annotated next to the Y or R indicator. This forecast is for mission planning only. Prior to beginning any operation, agencies should contact the RWF to obtain a site/mission-specific forecast.

Figure 4.1. Example of Range Operations 7-Day Forecast.



4.2. Launch-X (L-X) Day Forecasts. The LWO provides operational weather forecasts for all space lift and ballistic missile launch/recoveries when requested. Mission forecasts that specify the probability of violation (POV) for launch constraints are typically issued at L-3 or L-2 days, or as requested and are provided in the standard format (Figure 4.2.). L-X day forecasts are not amended and are issued once per day leading up to a mission.

Figure 4.2. Example of L-X Day Forecast.

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L-2 Day Western Range Operation Forecast																																		
<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <p>Mission: VV7403 MMIII GT-241GM</p> <p>Location: V5FB LF-09</p> <p>Issued: 01 Mar 2022 / 0800L (1500Z)</p> <p>Valid: 02 Mar / 2301 - 3 Mar / 0501L (3 Mar / 0701 - 1301Z)</p> </div> </div>																																		
<p>Forecast Discussion: On Primary Day, the forecast area will be dominated by high pressure with an approaching low pressure system and cold front to the west pushing in upper cirrus clouds and mostly cloudy conditions. A subsidence inversion will set up overnight creating weak onshore flow with light winds out of the NNW and patchy fog causing visibility to decrease to 1/2 to 2 miles. Due to the domination of the upper-level ridge, there will be very little speed or directional shear between 30,000 - 40,000ft with a max of 5kts per 1,000ft, and max wind speed of 35kts from the southwest at 40,000ft. Surface temperature at T-0 will be between 53 - 58°F. The overall PDV for T-0 is 10% due to Thick Clouds. On Backup Day, a low pressure system will move into the forecast area with an approaching cold front, causing convective activity, increased cloud cover, rain showers, and increased onshore wind speeds. Thunderstorm development ahead of the cold front is expected, however they will remain offshore and approximately 125 miles to the NW at T-0. As the low moves to the SW toward the forecast area, thunderstorms will begin to develop immediately east of the forecast area at 15Z with the highest probability of thunderstorms taking place at 11Z. At T-0, cumulus clouds and scattered showers will move across the forecast area bringing visibility down to 2-4 miles and gusty winds up to 25kts out of the southwest. Surface temperature is expected between 52 - 57°F. Due to the placement of the low pressure system to the immediate NW of the forecast area and the polar jet to the immediate southwest, upper level winds will remain out of the southwest with a max of 50kts at 20,000ft. Upper level wind shear will remain light with a max of 5 kts per 1,000ft between 30,000 and 40,000ft. The overall PDV for T-0 is 60% due to Cumulus Clouds and Disturbed Weather.</p>																																		
Probability of Violating Weather Constraints																																		
Launch Day	<p>10% Primary Concerns: Thick Clouds (10%), Wind Shear (<10%)</p>																																	
	Weather Conditions																																	
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24-Hour Delay	<p>60% Primary Concerns: Cumulus Clouds (50%), Disturbed Weather (50%), Thick Clouds (40%), Lightning (30%), Attached Anvil (10%), Detached Anvil (10%), Debris Cloud (10%), Wind Shear (10%)</p>																																	
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<p><small>Note: The Probability of Violating (PDV) is the chance that a Lightning Launch Control Criteria (LLCC) or certain user constraints (e.g. surface winds, precipitation and temperature) will be violated during the launch window. It does not take into account criteria listed under "Additional Risk Criteria."</small></p>																																		
<p>Launch Weather Officer (805) 606-5148 Forecaster (805) 606-8022</p>																																		
<p>Next Forecast Will Be Issued: 02 Mar 2022 / 0800L (1500Z)</p>																																		

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4.3. Staff Weather Briefings. Any SLD 30 agency can request a weather briefing to an audience located on base. Some examples of staff weather briefings are the SLD 30 Stand Up, mission briefs, NST, and deployment weather briefings. If the location of interest for the briefing is susceptible to tropical cyclone activity, keep in mind the 48-to-72-hour tropical cyclone outlooks contain a high degree of uncertainty, are for planning purposes only, and are subject to change. The WF will not deviate from the official tropical cyclone forecasts provided by the 25 OWS, National Hurricane Center, or Joint Typhoon Warning Center.

4.4. X-37B 7-Day Forecast. The X-37B 7-Day Forecast is a planning tool for interested Boeing personnel. This planning weather will continue until the supported agency deems it is not required.

4.5. Joint Strike Force (JSF) Briefs. The JSF brief is part of the Major Range Test base support and a product requirement for Frontier controllers and telemetry/radar instrumentation provided by 2 ROPS.

Chapter 5

MISSION WEATHER PRODUCTS

5.1. Mission Weather Products (MWP). The WF will deliver MWPs through Flight Weather Briefing (DD Form 175-1), operating area forecasts, and on console mission forecasts. WF personnel will tailor information delivery to critical decision points (outlined on the MWPs) within the supported agencies' operational cycle (e.g., mission planning) when a weather forecast would provide the maximum benefit to the successful outcome of the mission. IAW AFMAN 15-129 and AFI 90-802, ORM will be implemented through the following table:

Table 5.1. ORM 5-Step Process.

Step	Example
1. Identify the Hazard	Is there a potential for lightning or 50kt winds?
2. Assess the Hazard	How close are we at seeing 50kt winds? Will it be just a one-time occurrence, or do we think the winds will howl for several hours?
3. Develop Controls and Make Decisions	Is VSFB better served with a Weather Watch for potential damaging winds or are we confident enough to go ahead and issue a Warning?
4. Implement Controls	By this point, the RWF will select the appropriate WWA to issue.
5. Supervise and Evaluate	Continue METWATCH and cancel any WWAs if/when warranted.

5.2. Flight Weather Briefing, DD Form 175-1. The WF will provide flight weather briefings to tenant units and transient aircrews when requested. The RWF will conduct the flight weather briefings by telephone, email, or fax. Flight departure, enroute, and destination weather is briefed using DD Form 175-1, Flight Weather Briefing, or local log. WR mission briefings will include offshore weather conditions, sea states and other information, as requested.

5.3. Operating Area Forecasts. The WF will provide operating area forecasts for supported units when requested. These operating areas include approved drop zones and whiskey areas controlled within the Western Range. Support for operating areas will be coordinated through WF Operations NCOIC.

Chapter 6

LAUNCH/RECOVERY WEATHER SERVICES

6.1. Launch/Recovery Support. The WF provides comprehensive launch/recovery support for DoD, commercial, civil, and privatized space lift, ballistic missile test, and spacecraft recovery operations at VSF. Each customer requests weather support in the UDS based on their mission-unique requirements for the space environment, wind, precipitation, temperature, etc. The available 30 OSS/OSW support is then documented in the applicable OD. The major launch/recovery systems supported at VSF include United Launch Alliance (ULA), Northrop Grumman Pegasus, Boeing X-37B, SpaceX Falcon 9, Missile Defense Agency (MDA) interceptors, Minotaur IV orbital, and MMIII test vehicles. Descriptions of these systems are found in the Forecast Reference Material (FRM).

6.2. Pre-launch/Recovery Weather Support. The RWF will continue to issue the normal TAFs and WWA support for the WR. Other weather services provided before the day of launch/recovery include:

6.2.1. Weather Constraint Coordination. The LWO, consulting with the PSM, range safety, and the launch customer, helps determine the launch weather constraints for each mission and how the constraints will be monitored.

6.2.2. Balloon Tests. Members of the LWT will release the balloons and make any required editing of the data during requested balloon tests.

6.2.3. Dress Rehearsals. The LWO participates in rehearsals that are part of each mission campaign, including wet dress and mission dress rehearsals.

6.2.4. Preliminary Briefings/Reviews. The LWO provides operational weather forecasts for all space lift and ballistic missile launches/recoveries. In addition, LWOs provide weather briefings at the Range Readiness Review and Launch Readiness Review, as well as other reviews depending on the launch agency and vehicle.

6.3. Day of Launch/Recovery Weather Support. The WF utilizes the majority of its personnel to provide weather support on the day of launch/recovery.

6.3.1. On Console Weather Support. The LWO leads the Launch Weather Team (LWT) in utilizing all meteorological sensing equipment, to include weather reconnaissance aircraft, to assess the current and forecasted atmospheric conditions for Day of Launch operations.

6.3.1.1. Lightning Launch Commit Criteria (LLCC). The LWT must have *clear and convincing* evidence that all LLCCs and launch agency constraints are not being violated. The LWT currently evaluates nine mandatory range safety LLCCs to protect launch vehicles from natural and triggered lightning. IAW SPFCMAN 91-710v6, *Range Safety User Requirements Manual Volume 6*, all launch vehicles are subject to these launch commit criteria.

6.3.1.1.1. The most current LLCCs, along with associated terms and definitions, are documented in NASA Technical Standard 4010 (NASA-STD-4010), *NASA Standard for Lightning Launch Commit Criteria for Space Flight*.

6.3.1.2. On Console Weather Briefing. During on-console briefings, the LWO provides current status as either "Red" or "Green" indicating a constraint is either currently violated or not violated. The LWO also provides a POV, which indicates the probability that a constraint will be violated at T-0 (Table 6.1.). A high POV value indicates a likely "Red" condition at T-0 and allows the launch agency to choose a desired hold point in the count that occurs before an irreversible event in the countdown. With the concurrence of the LWC, the LWO gives the final weather "go" for launch/recovery.

Table 6.1. POV Determination Criteria.

POV	Recommended Assessment Criteria
0%	There is absolutely no chance of the listed phenomena occurring
<10%	There is a non-zero chance of the phenomena occurring; used to show the phenomena was considered due to the meteorological situation but ruled to be extremely unlikely based on analysis of the data available
10%	The listed phenomena is possible , yet highly unlikely
20%	The listed phenomena is possible , yet unlikely
30%	The listed phenomena has a chance of occurring based on the meteorological situation, but is not expected to occur based on analysis of the data available
40%	The situation is borderline for the listed phenomena, but has less of a chance of occurring than not
50%	Not used ; does not convey enough information for accurate decision making
60%	The situation is borderline for the listed phenomena and has more of a chance of occurring than not
70%	The listed phenomena has a probable chance of occurring with medium confidence
80%	The listed phenomena has a probable chance of occurring with high confidence
90%	Expected to occur; only due to the rarest circumstance will the listed phenomena not occur
100%	The listed phenomena will absolutely occur based on analysis of all data available

6.3.2. Upper-Air and Surface Observing. Upper-air balloon observations as well as balloon editing services are provided on the day of launch/recovery. The launch customer needs these observations to make the final decision to launch; SLD 30/SE to determine flight safety. The balloon schedule is determined by range safety requirements and by the launch customer requirements outlined in the OD.

6.3.3. Hot Spill Weather Forecast (EDITMET). During mission operations the WF provides specialized wind and thermodynamic forecasts for T-0. These forecasts are used by SLD 30/SE to conduct hot spill safety analyses using the Launch Area Toxic Risk Analysis 3D (LATRA3D) program.

6.3.4. Blast Distant Focusing Overpressure (BlastDFO) Model. For certain mission operations, namely large class launch vehicles, the WF provides wind and thermodynamic forecasts to SLD 30/SE to conduct blast distant focusing overpressure analyses using the BlastDFO model.

Chapter 7

WEATHER WARNINGS, WATCHES, AND ADVISORIES (WWAS)

7.1. Customer Requirements. Western Range agencies and customers needing special WWA support will document their requirements and forward them to the WF/CC for review and validation. Customer requirements must include weather phenomenon and thresholds (when applicable), lead-time required for notification, and actions taken by the customer upon receiving a WWA. The final decision is for the WF/CC to approve changes to current lead times due to other users' mission constraints. **Figure 7.1** shows a complete list of those agencies and offices that get notified for a WWA issuance. Customers are notified via JET email notifications and/or via automated phone notification. Should those methods be inoperative, **Figure 7.1** outlines what offices will make phone notifications. 30 OMRS/SGXB, Bioenvironmental Engineering, provides Wet Bulb Global Temperature (WBGT) measurements and provides flag conditions for heat stress.

7.2. Meteorological Watch (METWATCH) Program. Via the METWATCH program, the WF monitor observations and forecasts for weather conditions that will endanger property or life, pose a safety hazard, or adversely affect a supported customer's operations. When these conditions are observed or forecast to occur, the WF will notify customers of these critical weather conditions through WWAs issued via JET.

7.2.1. Weather Warnings. A warning is a special notice to supported agencies of an established weather condition that is either occurring or expected to occur.

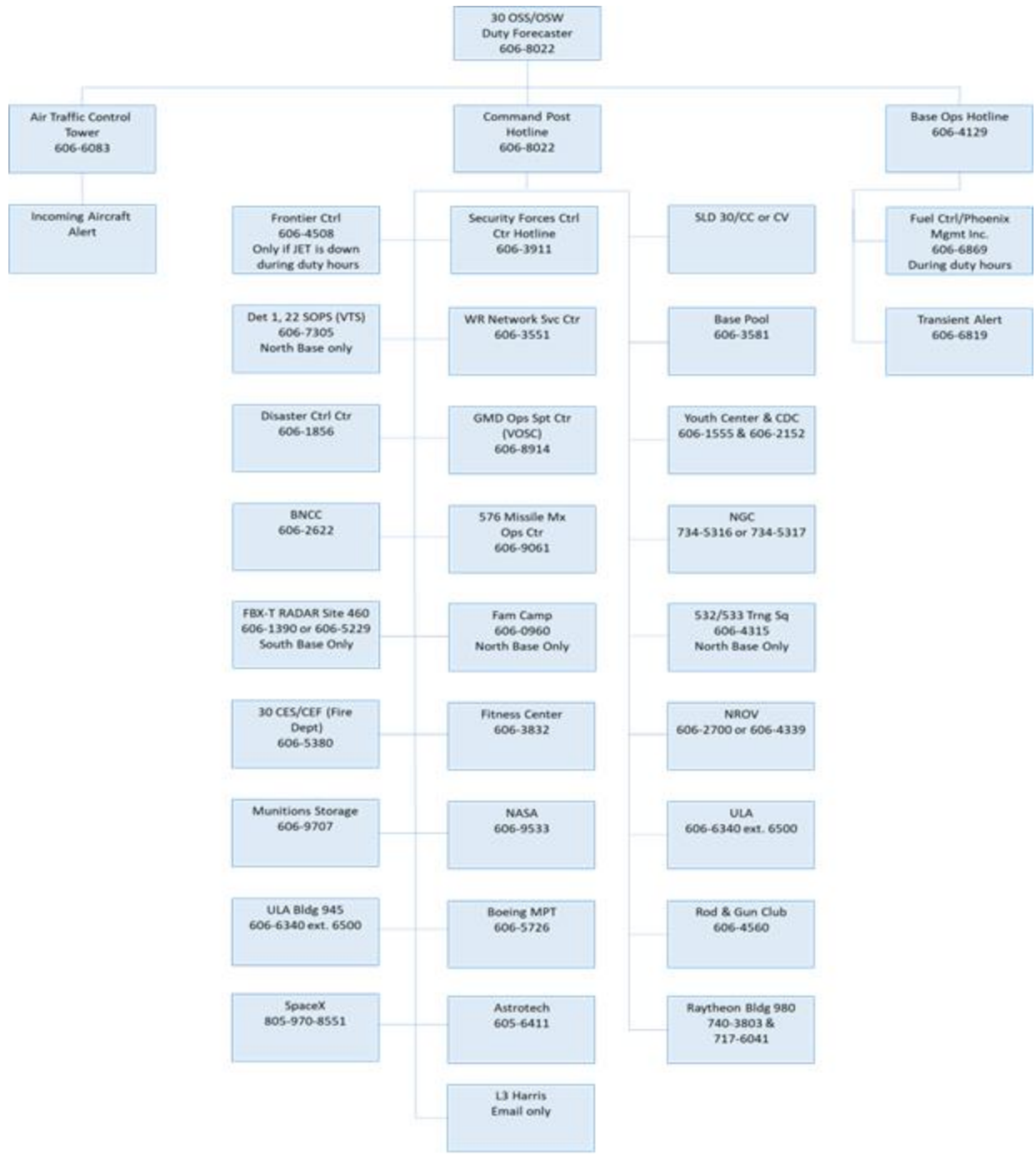
7.2.2. Weather Watches. A watch is a special notice to supported agencies of an established weather condition that has the potential to occur. A warning may be issued if atmospheric conditions persist or worsen.

7.2.3. Weather Advisories. An advisory is a special notice to supported agencies of an established, non-severe (i.e., does not pose a threat to life or property) weather condition that is either occurring or expected to occur.

7.3. WWA Criteria. The WF will issue all WWAs for VSFB as defined in **Table 7.1** through **Table 7.3**. Any deviations from the standard established in AFMAN 15-129 have been coordinated with WR customers and the SLD 30/CC to meet SLD 30's unique mission and resource protection requirements. An example is the requirement for base personnel to take appropriate protective measures due to warnings/watches issued for 10 NM vice 5 NM distances, as noted in AFOSH Standard 91-100. Resource protection and emergency actions resulting from weather events/natural disasters are further addressed in the SLD 30 Installation Emergency Management Plan (IEMP) 10-2.

7.4. Weather WWA Customer Thresholds and Actions. **Table 7.4** shows all of the VSFB weather warning and watch customers, their weather thresholds, and the actions they take when one of their thresholds are met.

Figure 7.1. Weather Pyramid Alerting.



Notifications will be made 24 hours a day and for all portions of the Western Range unless otherwise noted

Table 7.1. Weather Warning Criteria.

CRITERIA	DLT	LOCATION
Tornado	15 Min	Within 10 NM of VSFB boundary
Strong Wind: Surface winds not associated with thunderstorms \geq 35-49 kts for elevations < 1000 ft excluding tower 81 (Boathouse)	1 Hour	North VSFB, South VSFB, and VSFB Airfield
Damaging Winds: Surface winds not associated with thunderstorms \geq 50 kts for elevations < 1000 ft excluding tower 81 (Boathouse)	2 Hours	North VSFB, South VSFB, and VSFB Airfield
Surface wind \geq 65 kts for elevations above 1000 ft and tower 81 (Boathouse)	2 Hours	Elevations above 1,000 feet and tower 81 (Boathouse)
Heavy Rain \geq 2 inches within 12 hours	1 Hour	Within 10 NM of VSFB boundary
Severe Thunderstorm: Winds \geq 50 kts associated with thunderstorms and/or hail \geq 3/4 inch	1 Hour	Within 10 NM of North VSFB, South VSFB
Moderate Thunderstorm: Winds \geq 35 - 49 kts associated with thunderstorms and/or hail \geq 1/4 inch	1 Hour	Within 10 NM of North VSFB, South VSFB
Lightning	Observed	Within 10 NM of North VSFB, South VSFB
Freezing Precipitation	1 Hour	Within 10 NM of VSFB boundary

Table 7.2. Weather Watch Criteria.

CRITERIA	DLT	LOCATION
Tornado	As potential warrants	Within 10 NM of VSFB Boundary
Damaging Winds- Surface Winds not associated with thunderstorms ≥ 50 kts for elevations below 1000 ft excluding tower 81 (Boathouse)	As potential warrants	North VSFB, South VSFB, and VSFB Airfield
Heavy Rain ≥ 2 inches within 12 hours	As potential warrants	Within 10NM of VSFB boundary
Severe Thunderstorm: Winds ≥ 50 kts associated with thunderstorms and/or hail $\geq 3/4$ inch	As potential warrants	Within 10 NM of North VSFB, South VSFB
Lightning	2 Hours	Within 10 NM of North VSFB, South VSFB
Freezing Precipitation	As potential warrants	Within 10NM of VSFB boundary

Table 7.3. Weather Advisory Criteria.

CRITERIA	DLT	LOCATION
Surface Temperature $\geq 85^{\circ}$ F	Observed	Main Base

Table 7.4. Weather Warning and Watch Customer Thresholds and Actions.

ORGANIZATION/LOCATION	WEATHER THRESHOLD(S)	THEIR ACTIONS TAKEN
FBX-T Radar Site, Site 460, South Base	Winds GTE 48 kts (Will use wind watch/warning for surface winds 35-49 kts) Thunderstorms within 10 NM	Shut down power, inspect site, lock doors, and evacuate
Fitness Center North Base	Lightning Watch North Base Rain 2 inches in 12 hrs	Call coaches and teams to cancel sporting events
Pool North Base	Lightning Warning North Base	Evacuate Pool
Fam Camp North Base	Winds 50 kts or greater Tornados Rain 2 inches in 12 hrs	Notify Campers
Det 1, Vandenberg Tracking Station	Winds GTE 39 kts (Will use wind watch/warning for surface winds 35-49 kts) Winds GTE 65 kts	At 39 kts stow 23 ft antenna; at 65 kts stow the domed antenna
BNCC	All warnings	BNCC relays warnings to techs in the field
NRO	All Warnings/Watch	Relay info to all of their Facility Managers (winds and lightning mostly)
Frontier Control	All Warnings/Watches/Advisories	Relay pertinent info to pilots
532d/533d TRS	Advisory for Temp GTE 85° F in cantonment area. Lightning Warning	Limit student physical activity
Security Forces Control Center	Any severe weather on base	Warn duty personnel
Western Range Network Service Center (InDyne)	Any wind, lightning, tornado or rain warnings	Inform maintenance teams to take cover
Fire Department	All warnings and watches	Inform FD team for all situations
Disaster Control Center	All warnings and watches	Inform work crews out climbing power poles and digging holes etc
NASA and Associated Contractor	Lightning w/i 10 NM	Stop all HAZOPS like ordnance work, lifting, or toxics
Munitions Storage Area	Lightning w/i 10 NM	Stop all work on munitions

GMD (VOSC)	All Weather Warnings and Watches	Notify Prime contractor, their sub-contractors, and all GMD facilities that house explosive material or conduct hazardous operations affected by weather
Northrup Grumman Corp (NGC)/Missile Assembly Bldg 1819 North Base	Lightning w/i 10 NM	Inform work crews/Evacuate Building
ULA Bldg 945 & 521	Lightning w/i 10 NM	Evacuate Building
Boeing MPT North Base	Lightning w/i 10 NM	Shut down simulators and trainers
SpaceX	All Weather Warnings and Watches	Warn duty personnel
576 MMOC	All Weather Warnings and Watches	Brief commander, notify maintenance/operation crews
Rod & Gun Club	Lightning w/i 10 NM	Halt firing and range activities
Child Development/Youth Center	Lightning w/i 10 NM Tornado Hail \geq 1/4 inch Surface Wind \geq 50 kts	Youth sports programs cancelled or delayed, no outside play

7.5. Severe Weather Action Procedures (SWAP). The duty forecaster will alert the WF/Chief if there is potentially severe weather. The WF/Chief will determine if the Severe Weather Action Team (SWAT) needs activation. The SWAT team is composed of the SWAT leader (WF/Chief or WF/CC) and any other weather personnel deemed essential by the SWAT leader. Before the expected occurrence of severe weather event, the SWAT will respond, as required, to analyze and assess the weather threat. If the SWAT determines VSFb is at risk for severe weather, then a SWAT contingent will remain on duty, performing enhanced MISSIONWATCH until the threat has passed. However, if the SWAT determines VSFb is not at risk for severe weather, the weather support will return to normal operations.

7.6. Severe Weather Reporting. After an occurrence of severe weather (winds 50 knots or greater, hail 3/4 inch or greater, or tornado), the weather unit will report the following items to the SLD 30/CP, if requested: the actual severe weather conditions experienced; the forecast valid at the time of the occurrence to include any watches or warnings issued; and the operational status of meteorological equipment at the time of the occurrence. If there is damage to Air Force or Space Force property that rises to DoD, AF, USSF, MAJCOM, or FLDCOM interests, the SLD 30/CP will report the severe weather occurrence on VSFb IAW OPREP-3 reporting procedures in AFMAN 10-206.

Chapter 8

SPACE WEATHER

8.1. General. The foundation for information dominance lies in effective, secure military communications. Both space and terrestrial weather environments can degrade military communication systems. One of the 557th Weather Wing's (557 WW's) objectives is to provide analysis and forecast products that provide military communicators and end users with a single picture of potential environmental effects that may impact their systems. Several VSFb platforms are affected by space weather and could delay or scrub a launch/recovery.

8.2. WF Responsibility.

8.2.1. Identify those units and operations, within its purview, that space weather events may affect and should receive space weather support and interpret, apply, and tailor 557 WW and other space products to provide mission-enhancing data to their supported agencies.

8.2.2. Interpret, apply, and tailor existing products for the appropriate supported agencies.

8.2.3. Submit any known space weather impacts within launch area to the 557 WW via the Space Weather Impact Debriefing and Assessment Form located on AFW-WEBS.

8.2.4. Know the 557 WW space weather products built around six categories of missions/systems adversely affected by space weather.

8.2.5. Know these space weather products and determine their utility to other supported agencies. If existing products do not meet supported agency's needs, submit requests for new products through 557 WW to meet requirements.

8.2.6. Monitor real-time space weather data from the 557 WW and notify customers if space weather thresholds are violated during operations.

8.2.7. Supported agencies will review solar impacts and contact the WF with their requirements.

8.3. Space Weather Events.

8.3.1. Each mission partner has specific criteria and thresholds for their launch and/or space vehicles. These are three space weather events that could cause impacts to operations:

8.3.1.1. Solar Activity: Occurrence of M-class or X-class solar flares and significant (R3 or greater) solar radio bursts.

8.3.1.2. Charged Particle Environment: When high energy protons ≥ 50 mega electron volts (MeV) increase above 10 particle flux units (pfu).

8.3.1.3. Geomagnetic Activity: When the planetary index (better known as the K-index) rises above 7.

8.3.2. There are six space environmental impacts:

8.3.2.1. High Frequency (HF) communications: Temporary degraded or total loss of HF communications. Solar flares usually affect the lower portion of the HF spectrum but can blackout the entire spectrum if sufficiently energetic. Strong geomagnetic activity often results in decreasing the ionosphere's ability to reflect HF signals.

8.3.2.2. Ultra High Frequency (UHF) SATCOM: Temporary degraded or total loss of UHF SATCOM communications due to changes in the ionosphere and occurs in the high latitudes and equatorial region. Strong geomagnetic activity can significantly degrade UHF communications.

8.3.2.3. Satellite Operations/Health: Spacecraft anomalies and degradation of spacecraft components due to radiation interference to communication satellite circuits. Geomagnetic particles can enhance and accelerate particles in the space environment, which can cause damage through a discharge or can damage the satellite through collision or by overwhelming or disorienting the satellite's sensors.

8.3.2.4. Satellite Object Tracking/Satellite Drag: Space object tracking loss and increase drag on low earth orbiting spacecraft. Drag results from the heating or cooling of the upper atmosphere due to the changes in the sun's radiation output or to geomagnetic activity.

8.3.2.5. High Altitude Flight: Harmful radiation dosage to personnel in high altitude operations. This radiation is a product of cosmic rays from outside the solar system as well as very high-energy protons occasionally produced by sun explosive events.

8.3.2.6. Radar Interference/Anomalous Returns: Increased interference or false returns to sunward and/or poleward looking radars. Radio frequency bursts from the sun can cause interference to radars when the sun is in their field of view. Anomalous returns can occur when the geomagnetic activity disturbs the ionosphere.

Chapter 9

DISSEMINATION OF WEATHER INFORMATION

9.1. Weather Data Systems.

9.1.1. JET is used to acquire, process, display, and disseminate weather information. JET is used to transmit and receive weather observations, forecasts, and WWAs. Anyone possessing a valid JET account within the VSFB firewall can access weather information going to <https://owsjet25.us.af.mil/portal/public/Guest/>. Additional supported agencies requiring JET access should contact the WF/Chief.

9.1.2. Integrated Data System 5 (IDS 5). The IDS 5 system displays many types of airfield-related information, including weather, to Command Post and the Airfield Tower.

9.1.3. External User Interface (XUI). The XUI is a website on which users can monitor and download upper-air sounding, wind tower, 915 MHz wind profiler, and Mini-SODAR data from across the WR.

9.2. Communication Outages.

9.2.1. JET External Communications. For a system outage, the WF will contact the Base Network Control Center (BNCC) and/or JET Helpdesk to troubleshoot and mitigate the problem. In the interim, retrieve weather data via the Internet, using AFW-WEBS or other meteorological web pages.

9.2.2. JET Terminal Outage. If a supported agency's JET access is unavailable, the supported agency will notify the WF of the outage and during the outage arrange alternate support if possible.

9.3. Telephone Hotlines. Hotlines connect the WOC to other VSFB agencies as listed below. Agencies must report hotline outages to 30 SCS telephone maintenance.

9.3.1. SLD 30/CP (Bldg. 10577)

9.3.2. Upper-air Observatory (Bldg. 1764)

9.3.3. Alternate Observation Site (AOS) (Bldg. 1746)

9.3.4. 30 OSS/OSA: Airfield Management Operations Flight Planning Room (Bldg. 1746)

9.4. Closed Circuit Television (CCTV). During WR mission operations, weather information is routinely disseminated via the VSFB CCTV network.

9.5. Pilot-to-METRO-Service (PMSV). Edwards AFB provides backup PMSV coverage during extended PMSV outages. Airfield Management will update NOTAMs as needed.

Chapter 10

EMERGENCY/CRISIS AND BACK-UP SUPPORT

10.1. General. For an emergency or crisis WF members will follow checklists outlined in the unit Emergency Action Binder located in Bldg. 21150. If all other backup options are exhausted (to include commercial WI-FI and utilization of AOLs) and the capability exists, the 25 OWS will provide backup during catastrophic communication and/or power outages as outlined on the Installation Data Page. If neither the Emergency Action Binder nor Installation Data Page covers the emergency/crisis, WF members will follow leadership direction using the ORM 5-step process outlined in **Table 5.1** and will take back support as soon as possible.

10.2. Alternate Observation Site (AOS). If Bldg. 1764 is evacuated, surface observing support will be conducted from Base Operations, Bldg. 1746. Service may be slightly degraded while the observer is operating from Bldg. 1746. There is no alternate upper-air observing location.

10.3. Alternate Operating Location (AOL). If Bldg. 21150 is evacuated, forecast operations and toxic hazard zone support will be conducted from the WF Surface and Upper-air Observing Facility, Bldg. 1764. All products and services that are produced at the primary location, Bldg. 21150, except PMSV information, can and will be produced at the alternate location. The quality of forecast products may be slightly degraded while the forecaster is operating from Bldg. 1764 due to lack of access to the Doppler weather radar, local lightning detection system and locally-saved climatology data. As a backup for the PMSV, Edwards AFB will be asked to monitor our frequency in order to ensure pilots receive needed service.

ROBERT A. LONG, Colonel, USSF
Commander

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

DoD Flight *Information Publications*

AFPD 15-1, *Weather Operations*, 14 November 2019

AFI 15-128, *Weather Force Structure*, 21 June 2019

AFI 90-802, *Risk Management*, 1 April 2019

AFMAN 10-206, *Operational Reporting*, 18 June 2018

AFI 10-2501, *Emergency Management Program*, 10 March 2020

AFMAN 15-111, *Surface Weather Observations*, 12 March 2019

AFMAN 15-124, *Meteorological Codes*, 16 January 2019

AFMAN 15-129, *Air and Space Weather Operations*, 9 July 2020

DoDI 6055.17, *DoD Emergency Management (EM) Program*, 13 February 2017

NASA-STD-4010, *NASA Standard for Lightning Launch Commit Criteria for Space Flight*, 27 June 2017

SPFCMAN 91-710, *Launch and Range Safety Program Policy and Requirements*, 17 February 2020

SLD 30 IEMP 10-2, *Installation Emergency Management Plan*, 21 July 2021

EWR 127-1, *Eastern and Western Range Safety Requirements*, 31 December 1999

Abbreviations and Acronyms

AOL—Alternate Operating Location

AOS—Alternate Observation Site

AMPS—Automated Meteorological Profiling System

AWIPS—Advanced Weather Interactive Processing System

BNCC—Base Network Control Center

BWW—Basic Weather Watch

CCTV—Closed Circuit Television

CDM—Chemical Downwind Message

CWW—Cooperative Weather Watch

DCC—Damage Control Center

DLT—Desired Lead Time

DoD—Department of Defense

FLIP—DoD Flight Information Publications
FMQ—Fixed Meteorological Equipment
HF—High Frequency
JET—Joint Environmental Toolkit
LWO—Launch Weather Officer
LWC—Launch Weather Commander
LWT—Launch Weather Team
MDA—Missile Defense Agency
METWATCH—Meteorological Watch
MSL—Mean Sea Level
MWP—Mission Weather Product
METWATCH—Meteorological Watch
NM—Nautical Miles
NOTAM—Notice to Airmen
NST—New START Treaty
OD—Operation Directive
OHZ—Operational Hazard Zone
OWS—Operational Weather Squadron
PAPI—Precision Approach Path Indicator
PIREP—Pilot Report
PMSV—Pilot-to-Metro-Service
POV—Probability of Violation
RAWS—RADAR, Airfield, and Weather Systems
ROS—Representative Observation Site
RSOR—Range Safety Operations Requirements
RWF—Range Weather Forecaster
SLD—Space Launch Delta
SODAR—Sonic Detection and Ranging
SPECI—Special Weather Observation Criteria
START—Strategic Arms Reduction
SWAP—Severe Weather Action Plan
SWAT—Severe Weather Action Team

TAF—Terminal Aerodrome Forecast
UCP—Unit Control Position
UDS—Universal Documentation System
UHF—Ultra High Frequency
ULA—United Launch Alliance
VOLTS—Vandenberg Operational Lightning Tracking System
VSFB—Vandenberg Space Force Base
WF—Weather Flight
WIT—Wing Inspection Team
WOC—Weather Operations Center (Bldg. 21150)
WR—Western Range
WROCC—Western Range Operations Control Center
WWA—Warning, Watch Advisory
WBGT—Wet Bulb Global Temperature
XUI—External User Interface

Terms

Aircraft Mishap—Term used to denote the occurrence of an aircraft accident or incident.

Airfield—The geographical coordinates are 34 degrees and 44 minutes North latitude and 120 degrees and 35 minutes West longitude with a field elevation of 367 ft above MSL. The magnetic deviation for VSFB/SFB is +14.5°; we round this to +10° for airfield operations, and there is -8 hours difference between local standard time and GMT (-7 hours during Daylight Savings Time).

Ceiling—In aviation forecast code, the ceiling is equal to the height above the earth's surface of the lowest broken (5/8ths coverage or more) or overcast (8/8ths coverage) layer of clouds or the vertical visibility into an indefinite ceiling.

Chemical Downwind Message—A chemical downwind message (CDM) contains wind, stability, temperature, relative humidity, weather, and cloud data, valid for a 6-hour period, used to calculate chemical downwind hazards.

Desired Lead Time—The amount of advance notice an agency requires prior to the onset of a particular weather phenomenon.

Indefinite Ceiling—The vertical visibility, measured in feet, into a surface based total obscuration which hides the celestial dome (8/8ths coverage).

Main Base—The main base is located near the windward side of the Santa Lucia Range. This would include the cantonment area of the base, the airfield to the west, and the Lompoc Gate to the south.

METWATCH—Meteorological Watch. The process of monitoring the weather and informing designated agencies when certain weather conditions could impact operations or pose a hazard to property or life.

Missile Mishap—A term used to denote the occurrence of a missile accident or incident.

North VSF—North of the Santa Ynez River (Highway 246) is the main base complex, airfield, WOC, ROS, and the majority of base facilities. This area is generally flat; however, there are numerous deep ravines formed by the San Antonio Creek and its tributaries. NVSF starts at sea level along the beaches and rises very steeply ½ mile inland to about 350 ft and levels off. It rises again about 3-4 miles inland to heights of over 1,500 ft.

Severe Thunderstorm—Thunderstorms with wind speed greater than or equal to 50 knots and/or hail stones greater than or equal to 3/4 inch in diameter.

Severe Weather—High winds ≥ 50 kt; hail $\geq 3/4$ inch in diameter; or tornado.

South VSF—South VSF lies entirely in the Santa Ynez mountains. These mountains extend west to east from the Pacific Ocean to just east of Santa Barbara. The Pacific Ocean and Santa Ynez Valley border SVSF on the west and south. The area is mountainous and rises from the beaches to over 2,000 ft. Tranquillon Peak is the highest point on SVSF with an elevation of 2,159 ft.

Attachment 2
POINTS OF CONTACT

Table A2.1. Points of Contact.

ORGANIZATION	PHONE NUMBER
25 OWS MEFs	228-6598 / 6599
25 OWS Forecaster	228-6674
WF Range Weather Forecaster	606-8022/3
WF Range Weather Forecaster Standby	805-833-2655
WF/CC	606-5148
WF/Chief	605-5591
Weather Control Center (WCC)	605-8582/8586
Weather Operations Center (WOC)	606-8022/3
CE Readiness	605-8996
CES Damage Control Center (DCC)	606-1856
Base Operations	606-6941
Frontier Control	606-4508
Observing Facility, Bldg 1764	606-6825
Command Post	606-9961
Tower	606-6083
JET Help Desk	DSN 272-2785/2783
557 WW Help Desk	DSN 271-2586
Telephone Maintenance (30 SCS)	606-2622
RAWS	606-7924
Emergency Operations Center Manager	606-4534

Attachment 3

TAF SPECIFICATION AND AMENDMENT CRITERIA

A3.1. TAF Specification and Amendment Criteria. The TAF will specify the onset, duration, and intensity for the standard criteria outlined below throughout the valid period of the forecast. Forecasts will be amended when conditions do not match specified conditions within the criteria listed in Table A3.1 and A3.2.

Table A3.1. TAF Specification and Amendment Criteria for Ceiling and Visibility.

Forecast Element/Occurrence	Specification and Amendment Criteria
Ceiling observed or later expected to decrease to less than, or if below, increase to equal or exceed:	$\geq 2,000$ feet $< 2,000$ feet but $\geq 1,000$ feet $< 1,000$ feet but ≥ 600 feet < 600 feet but ≥ 100 feet < 100 feet
Prevailing visibility observed or later expected to decrease to less than, or if below, increase to equal or exceed:	≥ 3 statute miles < 3 statute miles but ≥ 2 statute miles < 2 statute miles but $\geq 1/2$ statute mile $< 1/2$ statute mile

Table A3.2. Specification and Amendment Criteria Other Than Ceiling and Visibility.

	Specification Criteria	Amendment Criteria
Surface Wind Speeds	Specify wind speed changes of 10 knots or more	Amend if predominant wind speed is in error by 10 knots or more
Surface Wind Gusts	Specify onset, duration, and intensity of wind gusts	Amend if wind gust speed is in error by 10 knots or more
Surface Wind Direction	Specify a change in prevailing wind direction of more than 30 degrees when the predominant wind speed or gusts are expected to be 15 knots or more	Amend if prevailing wind speed is in error by more than 30 degrees OR winds are 15 knots or more
Icing	Specify Icing not associated with thunderstorms from surface to 10,000ft AGL	Amend if beginning or ending of icing first meets, exceeds, or decreases to less than or greater than moderate intensity and was not specified in the forecast
Turbulence	(Weather Category II Aircraft) Specify turbulence not associated with thunderstorms from surface to 10,000 ft AGL	Amend if the beginning or ending of turbulence first meets, exceeds, or decreases below moderate or greater intensity and was not specified in the forecast

Weather Warning Criteria and/or Weather Advisory Criteria	Specify the onset, duration, and intensity of weather warning and/or advisory criteria	Including non-convective low-level wind shear: Occur, or are expected to occur, during the forecast period, but were not specified in the forecast. Were specified in the forecast, but are no longer occurring or expected to occur during the forecast period
Altimeter Setting		Altimeter setting meets or exceeds 31.00 INS and was not specified in the forecast; if above, drops below 31.00 INS and was not specified during the forecast period; drops below 28.00 INS and was not specified in the forecast; or if below 28.00 INS, increases above 28.00 INS and was not specified in the forecast
Thunderstorms	Specify onset and duration of thunderstorms at the aerodrome complex	Amend if the start or end time of the thunderstorm is incorrectly specified
Temporary Conditions	Specify the onset and duration of temporary conditions	1. Amend if temporary conditions become predominant. 2. Amend if temporary conditions do not occur as forecast. 3. Amend if temporary conditions are no longer expected to occur.
Changes to Predominant Conditions	Specify the onset, duration, and intensity (if applicable) of changes to predominant conditions	Forecast change conditions (BECMG or FM group) occur before the beginning of the specified period of change and are expected to persist; do not occur within 30 minutes after the specified time; or are no longer expected to occur.
Representative Conditions		Amend if forecast conditions are considered unrepresentative of existing or forecast conditions and amending the forecast improves safety, flight planning, operations efficiency, or assistance to in-flight aircraft.

Attachment 4

SPECIAL OBSERVATION (SPECI) CRITERIA

Table A4.1. Special Observation (SPECI) Criteria.

DEFINITION	CRITERION
Ceiling	Ceiling is observed to form below, decrease to less than or, if below, increase to equal or exceed the following values: 3000, 2000, 1500, 1200, 1000, 800, 700, 600, 500, 400, 200, 100 feet IAW local requirements, AFMAN 15-111, and all published landing minima per current DoD Flight Information Publication (FLIP).
Sky Condition	A layer of clouds or obscuring phenomena aloft is observed below 1200 feet and no layer aloft was reported below this height in the previous observation.
Visibility	Prevailing visibility is observed to decrease to less than, or, if below, increase to equal or exceed the following values: 3, 2 1/4, 2, 1 3/4, 1 1/2, 1 1/4, 1, 3/4, 1/2 statute miles IAW local requirements, AFMAN 15-111, and all published landing minima per current DoD Flight Information Publication (FLIP).
Tornado, Water Spout or Funnel Cloud	Is observed, disappears from sight, or ends
Thunderstorm	Begins or ends (occurring at the station). A SPECI is not required to report the beginning of a new thunderstorm if one is currently reported.
Precipitation	Hail begins or ends. Freezing precipitation or ice pellets begin, end, or change intensity. Any other precipitation type begins or ends.
Wind	Wind direction changes by 45 degrees or more in less than 15 minutes with sustained winds of 10 knots or more throughout the wind shift. When a squall occurs. Mean or maximum speed first exceeds: 35, 50, 65 knots. IAW local requirements.
Volcanic Eruption	When eruption or volcanic ash cloud first noted.
Aircraft or Missile Mishap	Immediately upon notification or observation of a mishap, accident or incident. Locals are not required for in-flight emergencies. IAW local requirements.
Space lift or Missile Launch or Recovery	Immediately upon notification of a launch or recovery. IAW local requirements.
Upon resumption of observing function	A special (SPECI) observation will be taken within 15-minutes after the weather technician returns to duty following a break in observing coverage or augmentation at the observing location unless a record observation is filed during that 15-minute period.

Runway Change	When active runway is changed. IAW local requirements.
Miscellaneous	Any other meteorological situation that, in the weather technician's opinion, is critical.

Attachment 5**LOCAL OBSERVATION CRITERIA****Table A5.1. Local Observation Criteria.**

DEFINITION	CRITERION
Altimeter Setting	At a frequency not to exceed 35 minutes when there has been a change of 0.01 inches since the last locally disseminated value.