BY ORDER OF THE COMMANDER
SPACE LAUNCH DELTA 45

SPACE LAUNCH DELTA 45
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*; AFMAN 15-111, *Surface Weather Observations;* AFMAN 15-124, *Meteorological Codes*; DAFMAN 15-129 *Air and Space Weather Operations*. It establishes responsibilities and weather support procedures. It provides general information for weather services, including weather observations and forecasts; weather watches, warnings, and advisories (WWAs); space weather supported services and dissemination of information and reciprocal support. It applies to the Space Launch Delta 45 (SLD 45), subordinate units, and organizations assigned or attached to, or supported by Patrick Space Force Base (PSFB), to include Cape Canaveral Space Force Station (CCSFS), and the Kennedy Space Center (KSC). Ensure all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Instruction 33-322, Records Management and Information Governance Program, and disposed of in accordance with the Air Force Records Disposition Schedule located in the AF Records Information Management System.

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SUMMARY OF CHANGES

This document has been substantially revised and must be completely reviewed. Major changes include clarification of 45th Weather Squadron (45 WS) support responsibilities, the extraction of lightning watch/warning locations and criteria to a separate document, adjustments to unit references and designations, adjustments to source documents and reference material, format changes to comply with AFI 33-360, *Publications and Forms Management*, and modifications and additions to supported unit requirements.

Chapter 1

CAPABILITIES

1.1. General. The purpose of this instruction is to identify the services provided by the 45 WS. Basic support concepts and procedures are outlined in this instruction along with Air Force and Space Force directives, the Universal Documentation System (UDS) and SLD 45 Operating Instructions for Range Support.

1.2. Concept of Operation. The 45 WS provides a full spectrum of meteorological products and services to government, civilian and commercial organizations on the Eastern Range (ER). The ER includes PSFB, CCSFS, the National Aeronautics and Space Administration (NASA) KSC, and military-controlled portions of Port Canaveral. The 45 WS also provides weather support to Jonathan Dickinson Missile Tracking Annex (JDMTA) and Malabar Complex. Operational support is provided from the squadron's Multi-Domain Operations Center (MDOC) within the Morrell Operations Center (MOC) at CCSFS and the Patrick Weather Operations Center (PWOC) at PSFB.

1.2.1. General services provided to ER customers include surface observations, upper air observations, terminal aerodrome forecasts (TAFs), mission execution forecasts (MEFs), WWAs, and mission-tailored weather support. In addition, the 45 WS provides weather support to customers who perform operations and tests across the ER. The ER is part of the Major Range and Test Facility Bases, a core set of Department of Defense (DoD) test and evaluation capabilities, which ensure effective weapons systems are provided to the warfighter.

1.2.2. The 45 WS provides airfield weather services for PSFB, the CCSFS Skid Strip, and the KSC Shuttle Landing Facility (SLF). These services include airfield weather observations, which are provided by the AN/FMQ-19 Automated Surface Observing Systems (ASOS), as well as a TAF for PSFB.

1.2.3. The 45 WS provides planning and operational weather services for launch and landing generation, execution, and recovery operations on the ER. For activities that may extend beyond the ER (as defined in 1.2. above), the 45 WS supports ER mission partners as listed in **Table 1.1**, and as approved in the appropriate UDS documentation. Requests for 45 WS support beyond these mission areas must be coordinated with the SLD 45 Plans and Program Office (SLD 45/XP). At that time, the 45 WS will evaluate if the capabilities and manpower are available to support the request, considering other ER weather support priorities.

1.2.4. 45 WS Duty Priorities.

1.2.4.1. Perform Emergency War Order taskings.

1.2.4.2. Execute evacuation.

1.2.4.3. Respond to aircraft/ground emergencies.

1.2.4.4. Respond to Pilot to Metro Service (PMSV).

1.2.4.5. Provide weather information to Supervisor of Flying

1.2.4.6. Severe Weather Action Plan (SWAP) operations.

1.2.4.7. Disseminate WWAs and other resource protection products.

1.2.4.8. Record and disseminate surface weather observations/augment AN/FMQ-19 observations for mandatory elements.

1.2.4.9. Provide TAFs.

1.2.4.10. Provide Mission Weather Products (MWPs).

1.2.4.11. Disseminate Pilot Reports (PIREPs).

1.2.4.12. Perform Mission-Scale Meteorological Watch (MISSIONWATCH).

1.2.4.13. Provide other weather services and briefings.

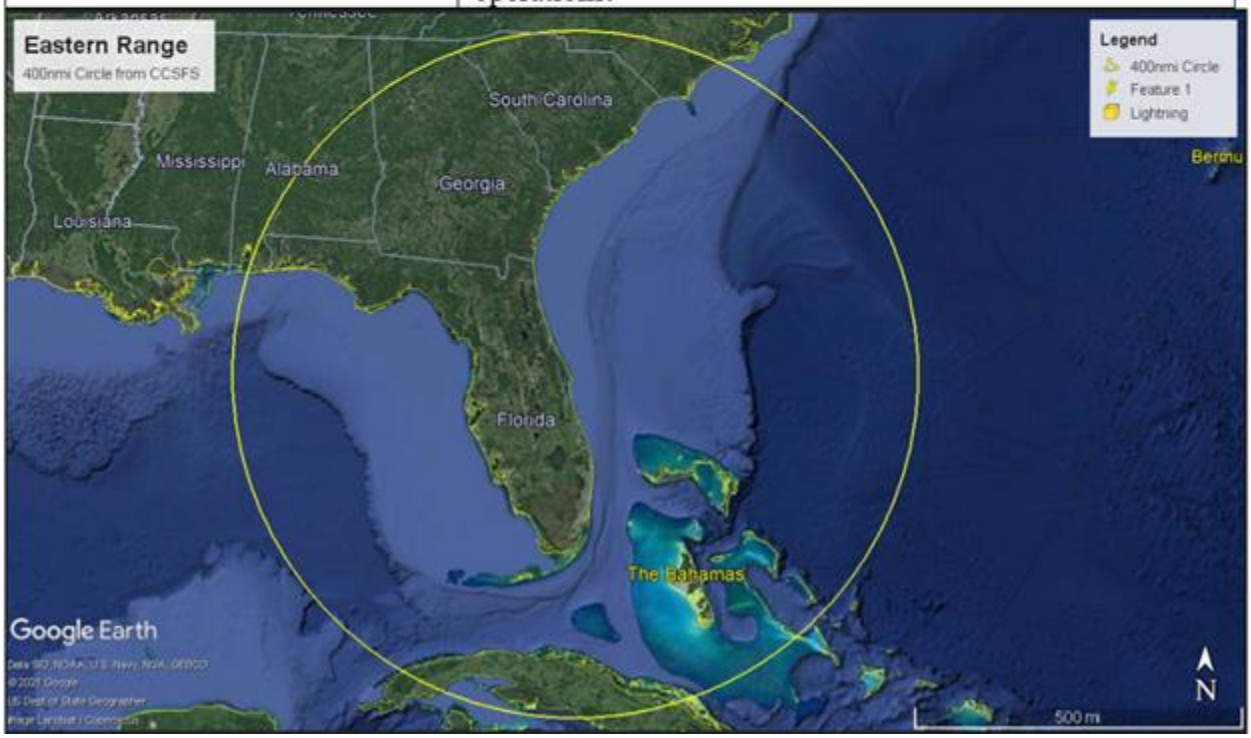
1.2.4.14. Answer operational phone calls.

1.2.4.15. Weather functional training.

1.2.4.16. Accomplish administrative tasks.

Table 1.1. 45WS Weather Support Responsibilities.

Type of Operation	45 WS Support
All crewed and uncrewed launch, test, and recovery operations originating from the ER and landing w/in 400 Nautical Miles (nm) of CCSFS (see image below)	As manning and operational capability allow general weather/sea conditions for initial launch and recovery of vehicle components to be provided upon request
NASA Launch Vehicle Transport	Transportation of NASA launch vehicle hardware to/from the ER
Launch Vehicle and Space Vehicle Transport	Transportation of all government, civilian, and commercial launch vehicles and space vehicles to/from the ER from/to local processing facilities in Brevard County, FL, in support of ER launch, landing, or test operations.



1.3. Operational Sensor Suite. The 45 WS operates the ER meteorological super-system, an extensive suite of weather sensors and systems to ingest, process, manage, distribute and archive meteorological information from local, national, international and space-based sources. The ER meteorological super-system represents one of the largest concentrations of meteorological instrumentation in the world. Details of the system can be found in the ER Instrumentation Handbook - Weather Systems.

1.3.1. The Launch and Test Range System Integrated Support Contract (LISC) personnel provide maintenance and sustainment of the ER meteorological super-system, as identified in the LISC Statement of Work.

1.4. Operational Support Requirements. Supported agencies will:

1.4.1. Ensure 45 WS is informed of critical weather elements affecting their operations.

1.4.2. Ensure procedures are established within their organization to adequately respond to disseminated weather information.

1.4.3. Review this instruction, at least annually, for any changes in support requirements.

Chapter 2

OBSERVING SERVICES

2.1. General. The 45 WS maintains an automated surface weather observing capability at PSFB, the CCSFS Skid Strip, and the KSC SLF. Observations at each airfield are taken by the AN/FMQ-19 ASOS, which reports meteorological conditions 24 hours per day. LISC personnel also provide upper-air observations from the CCSFS Balloon Facility, Building (Bldg) 20185. A variety of weather balloons are released to acquire upper-atmospheric wind speed and direction, temperature, pressure, and humidity data to support operations. Other observational data are generated by an instrumented tower system, wind profilers, and several lightning detection and radar systems located on and around CCSFS, KSC, and PSFB.

2.1.1. Airfield Weather Sensor Limitations. The AN/FMQ-19 ASOS is the primary instrument providing surface weather observations. The system has the following inherent limitations:

2.1.1.1. Only three cloud layers are reported.

2.1.1.2. Cloud layers above 25,000 ft are not reported.

2.1.1.3. Cloud cover or amount is determined using weighted readings over a 30-minute period. This results in an underestimation of cloud amount when a new layer moves over the system and an overestimation of cloud amount as a cloud layer moves away from the sensor.

2.1.1.4. Visibility is determined by averaging one-minute readings over a 10-minute period.

2.1.1.5. Runway Visual Range (RVR) is determined by averaging one-minute readings over a 10-minute period.

2.1.1.6. The AN/FMQ-19 ASOS is unable to detect hail, volcanic ash, or tornadoes.

2.1.2. AN/FMQ-19 ASOS Augmentation (PSFB, CCSFS). 45 WS personnel augment observations at PSFB and CCSFS during controlled airfield hours in the event of an AN/FMQ-19 ASOS system/sensor failure or in the event of forecast severe weather (3/4" hail, tornadoes), which the AN/FMQ-19 ASOS cannot detect.

2.1.3. AN/FMQ-19 ASOS Augmentation (KSC SLF). 45 WS personnel only augment observations at the KSC SLF upon request, and with prior coordination to support DoD operations.

2.2. Surface Observations. Observing procedures for all locations are accomplished in accordance with (IAW) standards established in AFMAN 15-111. The 45 WS provides training on decoding and understanding observations to units whose personnel access Joint Environmental Toolkit (JET) or Air Force Weather – Bridging Environmental Intelligence For Responsive Operational Support Portal (BIFROST) information.

2.2.1. PSFB Observing Location. The International Civil Aviation Organization (ICAO) identifier for the PSFB airfield is KCOF. The AN/FMQ-19 ASOS operates continuously to provide weather observations. The AN/FMQ-19 ASOS sensors are located on Runway 03 at the 1,065 ft mark and on Runway 21 at the 1,024 ft mark. The location for taking manual weather observations is approximately 200 ft west of Bldg. 820.

2.2.2. CCSFS Observing Location. The ICAO for the CCSFS Skid Strip is KXMR. The AN/FMQ-19 ASOS operates continuously to provide weather observations. The AN/FMQ-19 ASOS sensors are located on Runway 13 at the 1,480 ft mark and on Runway 31 at the 1,550 ft mark. The location for taking manual observations is the roof of the MOC, located approximately 3.5 nm from the runway. The exception to this is manual visual range observations which are taken from the Skid Strip tower.

2.2.3. KSC SLF Observing Location. The ICAO for the KSC SLF is KTTS. The AN/FMQ-19 ASOS operates continuously to provide weather observations. The AN/FMQ-19 ASOS sensors are located on Runway 33 at the 400 ft mark, Runway 15 at the 1,187 ft mark, and at mid-field. The location for taking manual weather observations is located approximately 500 ft east of the mid-field ASOS.

2.2.4. Hourly Observations. Hourly observations include items in **Table 2.1**.

Table 2.1. Hourly Observation Values.

Type of observation (Standard Hourly: Meteorological Terminal Aviation Routine (METAR))
Location Identifier
Date and time of observation in Universal Coordinated Time
Automatic Observation Indicator
Wind direction and speed (knots)
Prevailing visibility (statute miles)
Present weather
Ceiling and sky condition (hundreds of feet)
Temperature and dew point (Celsius)
Altimeter setting (inches of mercury)
Plain language and coded remarks

2.2.5. SPECI. Special (SPECI) observations are taken to report significant changes in weather elements. SPECI observations are taken at PSFB, CCSFS, and the KSC SLF when existing weather conditions change IAW the criteria listed below.

2.2.5.1. A ceiling decreases to less than or increases to equal or exceed the values in **Table 2.2**.

Table 2.2. Ceiling SPECI Criteria.

KCOF	KXMR	KTTS
3,000 ft1	3,000 ft1	3,000 ft1
2,000 ft1	2,000 ft1	2,000 ft1
1,500 ft1	1,500 ft1	1,500 ft1
1,000 ft1	1,000 ft1	1,000 ft1, 2
800 ft1,3	800 ft1	800 ft1
700 ft1, 2	700 ft1, 2	700 ft1
600 ft2	600 ft2	600 ft2
500 ft1,2	500 ft1,2	500 ft1,2
N/A	N/A	400 ft2
300 ft1,2	300 ft1,2	300 ft1,2
200 ft1,2,4	N/A	200 ft2
N/A	N/A	N/A
[1] Reference AFMAN 15-111 [2] Reference Flight Information Publication (FLIP) [3] Instrument Landing System Localizer Critical Area [4] Helicopter Operational Minimum for 301st Rescue Squadron		

2.2.5.2. Sky Condition (AFMAN 15-111): A layer of clouds or obscuring phenomena aloft is detected below 800 ft and no layer was reported below 800 ft on the preceding observation.

2.2.5.3. The prevailing visibility decreases to less than or, if below, increases to equal or exceed values in **Table 2.3**.

Table 2.3. Visibility SPECI Criteria.

KCOF	KXMR	KTTS
3 statute miles1	3 statute miles1	3 statute miles1,2
N/A	N/A	2 ¾ statute miles2
N/A	2 ¼ statute miles2	N/A
2 statute miles1,2	2 statute miles1,2	2 statute miles1
1 ½ statute miles1,2	1 ½ statute miles1,2	1 ½ statute miles1,2
1 ⅛ statute miles2	1 ⅛ statute miles2	N/A
N/A	N/A	1 ¼ statute miles2
1 statute mile1,2	1 statute mile1,2	1 statute mile1,2
statute mile2	N/A	N/A
¾ statute mile1,2	¾ statute mile1	¾ statute mile1
½ statute mile1,2,3	N/A	N/A
1 Reference AFMAN 15-111 2 Reference FLIP 3 Helicopter Operational Minimum for 301st Rescue Squadron		

2.2.5.4. A tornado, funnel cloud, or waterspout is observed or disappears from sight. Single element specials are authorized for these criteria (AFMAN 15-111).

2.2.5.5. A thunderstorm either begins or ends (AFMAN 15-111). No special observation is required when a new thunderstorm begins if one is currently being reported. **Note**: A thunderstorm is not considered to have ended until 15 minutes after the last occurrence of criteria for a thunderstorm (i.e., thunder and lightning) is detected.

2.2.5.6. Precipitation begins or ends (AFMAN 15-111).

2.2.5.7. Hail begins or ends (AFMAN 15-111).

2.2.5.8. Freezing precipitation or ice pellets begin, end, or change in intensity (AFMAN 15-111).

2.2.5.9. Wind and wind shifts (AFMAN 15-111):

2.2.5.9.1. The wind speed suddenly increases by at least 16 knots and is sustained at 22 knots or more for at least a minute (squall).

2.2.5.9.2. Any wind direction change of 45 degrees or more in less than 15 minutes when the sustained wind speed throughout the shift is 10 knots or greater.

2.2.5.10. Within 15 minutes after returning to duty following a break in hourly coverage if a standard hourly observation (METAR) was not filed as scheduled during that 15-minute period (AFMAN 15-111).

2.2.5.11. Whenever volcanic ash is observed (AFMAN 15-111).

2.2.5.12. Any other meteorological situation occurs that may be critical to the safety of aircraft operations (AFMAN 15-111).

2.2.5.13. The highest value during the preceding 10 minutes from the designated RVR runway decreases to less than, or if below, increases to equal or exceed a value in **Table 2.4**.

Table 2.4. RVR SPECI Criteria.

KCOF	KXMR
6,000 ft1,2	6,000 ft1
5,500 ft2	N/A
5,000 ft1,2	5,000 ft1
4,500 ft2	N/A
4,000 ft1,2	4,000 ft1
2,400 ft1,2	2,400 ft1
2,000 ft1	2,000 ft1
1,600 ft1	1,600 ft1
1,000 ft1	1,000 ft1
600 ft1	600 ft1
1 Reference AFMAN 15-111 2 Reference FLIP	

2.2.5.14. To report RVR when prevailing visibility is first observed at 1 statute mile or less and again when prevailing visibility goes above 1 statute mile.

2.2.6. Dissemination. Observations are disseminated locally and longline over JET or BIFROST. In the event of a JET or BIFROST outage, observations will be disseminated longline via Air Force Weather Web Services.

2.2.6.1. Local. Criteria for LOCAL Observations:

2.2.6.1.1. Aircraft, space vehicle, launch vehicle or missile mishap (AFMAN 15-111).

2.2.6.1.2. Change in runway (AFMAN 15-111).

2.2.6.1.3. For any other meteorological situation significant to local operations (AFMAN 15-111).

2.3. Upper-Air Observations. LISC personnel operate from the CCSFS Balloon Facility (Bldg. 20185) to provide upper-air meteorological observations to support operations. High and low-resolution balloons are released to acquire wind, temperature, pressure, and humidity data to support range operations.

2.3.1. High-Resolution Radiosondes. High-resolution Automated Meteorological Profiling System (AMPS) radiosondes are connected directly beneath a clear Mylar Jimsphere balloon. They provide wind speed and direction using Global Positioning System (GPS) signal. These balloons are limited to an altitude of approximately 55,000 ft. They are called 'high resolution' because of the capability to detect small-scale wind features. High-resolution radiosondes are only used for launch/landing support.

2.3.2. Low-Resolution Radiosondes. Low-resolution AMPS radiosondes are connected by string 70 ft below a latex balloon. They provide wind direction and speed, temperature, pressure, and humidity using GPS signal tracking. These balloons reach approximately 100,000 ft. The wind measurements are considered 'low resolution' because the pendulum motion of the 70 ft train is filtered out during derivation of the final winds, eliminating small-scale wind features. The low-resolution radiosondes are used for launch/landing support and synoptic upper-air observations.

2.3.3. Synoptic Upper-Air Observations. These observations are taken daily at 0615L and 2315Z. During the convective season (May – Oct), an additional sounding is taken at 1100L.

2.3.4. Launch/Landing Upper-Air Observations. These observations are customer-driven and vehicle-dependent. Range users must coordinate their upper-air observation requirements with LISC personnel and the 45 WS via the UDS.

2.4. Cooperative Weather Watch (CWW) Program. The CWW program is a mechanism to leverage non-weather personnel in the identification and monitoring of unreported weather conditions that could affect flight safety or be critical to the safety or efficiency of operations and resources. Air traffic control (ATC) personnel at PSFB and CCSFS participate in the CWW program and advise 45 WS duty forecasters of pertinent weather conditions. In addition, ATC personnel notify forecasters when the observed tower visibility is less than 4 statute miles (6,000 meters) and differs from the prevailing surface visibility by at least one reportable value, as specified in **Table 2.3**. Finally, ATC personnel relay PIREPs and any other observation they deem significant to 45 WS forecasters.

2.5. Aircraft Mishap. Upon notification of an aircraft mishap, the 45 WS will collect and save data related to the mishap IAW Air Force publication 15 series instructions and manuals.

Chapter 3

METEOROLOGICAL FORECASTING

3.1. General.

3.1.1. The 45 WS provides a TAF, planning forecasts, and mission weather products for activities such as aviation operations, range ground processing activities, and launch/landing operations. All forecasting services are provided from the MDOC located in the MOC, Bldg. 81900, on CCSFS, or the PWOC located in Bldg. 820 on PSFB. Forecasting services are available from the MDOC 24 hours per day, 7 days per week. The MDOC duty forecaster can be contacted at Commercial (321) 853-8484/8485 or DSN 467-8484/8485. Forecasting services are available from the PWOC in circumstances when the MDOC is not operational. The PWOC duty forecaster can be contacted at Commercial (321) 494-7113/7114 or DSN 854-7113/7114.

3.1.2. MDOC Evacuation. If the need to evacuate the MDOC occurs and is expected to last more than 60 minutes, one MDOC forecaster will evacuate to the PWOC if PWOC forecasters are not already on duty and provide support until operations in the MDOC have resumed. For evacuations less than 60 minutes, the MDOC forecaster will be available via cell phone at (321) 501-6212.

3.1.3. In the event the PWOC is unavailable or evacuated, forecasters will relocate to the PSFB ATC tower to perform airfield forecasting duties.

3.2. Terminal Aerodrome Forecasts. The 45 WS will produce and amend TAFs for PSFB (KCOF) IAW AFMAN 15-124 and DAFMAN 15-129. Forecast elements refer to an area within a 5 nm radius centered on the midpoint of the airfield. The term “VC” (vicinity), referring to the area between 5 and 10 nm from the aerodrome complex, may be used in these forecasts.

3.2.1. The PSFB airfield complex is a limited duty operation. As such, the 45 WS issues daily TAFs for KCOF at 1100Z, 1900Z, and 0300Z during Eastern Standard Time and 1000Z, 1800Z, and 0200Z during Eastern Daylight Time. When the airfield is closed, TAFs are not issued or amended. An example of a KCOF TAF is in **Attachment 2**.

3.2.2. Amendment Criteria. The 45 WS amends the KCOF TAF when conditions have exceeded specific thresholds not indicated in the TAF and are expected to persist for 30 minutes or longer. The TAF is amended for the following criteria.

3.2.2.1. The ceiling and/or visibility is, or is expected to be, out of category. The lower of the ceiling or visibility elements determines ceiling/visibility categories. Amendments are not required when either the ceiling or visibility improves to a higher category and the other remains in the lower category. The ceiling/visibility categories are listed in **Table 3.1**.

Table 3.1. KCOF Standard Specification and Amendment Criteria (per AFMAN 15-129).

Ceiling	**Visibility**	Category
Ceiling or Visibility observed or expected to decrease to less than, or if below, increase to equal or exceed:		
≥ 2,000 ft	≥ 3 SM (4800M)	E
< 2,000 ft but ≥ 1,000 ft	< 3 SM (4800M) but ≥ 2 (3200M)	D
< 1,000 ft but ≥ 700 ft	< 3 SM (4800M) but ≥ 2 (3200M)	C
< 700 ft but ≥ 200 ft	< 2 SM (3200M) but ≥ 1/2 SM (800M)	B
< 200	<1/2 (800M)	A

3.2.2.2. Wind speed error of 10 knots or more (predominant or gust), or a direction error of greater than 30 degrees if the predominant wind speed or gusts are expected to be 15 knots or greater.

3.2.2.3. Forecast conditions are not representative and amending the forecast improves safety, efficiency of aircraft operations, assistance to in-flight aircraft or flight planning.

3.2.2.4. Any locally established criterion for weather warnings/advisories that occurs, or is expected to occur, but is not specified in the original TAF. In addition, any locally established criterion that is no longer occurring, or is not expected to occur, but was specified in the original TAF.

3.2.2.5. Thunderstorms occur, or are expected to occur, but are not specified in the original TAF. In addition, thunderstorms are no longer occurring, or are not expected to occur, but were specified in the original TAF.

3.2.2.6. The beginning or ending of turbulence or icing from the surface through 10,000 ft above ground level which meets, exceeds, or decreases below moderate or severe thresholds, and was not specified in the original TAF forecast.

3.2.2.7. Altimeter setting meets or exceeds 31.00 INS, or if above 31.00 INS, drops below and was not specified in the original forecast. Additionally, altimeter setting drops below 28.00 INS and was not specified in the original forecast.

3.2.2.8. Forecast conditions specified as temporary either become predominant, do not occur, or are no longer expected to occur.

3.2.2.9. Forecast change conditions occur before the beginning of the specified period and are expected to persist, do not occur within 30 minutes after the specified time, or are no longer expected to occur.

3.3. Planning Forecasts.

3.3.1. 24-Hour Forecast. The 24-Hour Forecast gives SLD 45 and ER customers an outlook for weather conditions that may impact their operations. The forecast covers only CCSFS and KSC. The forecast is divided into six separate time periods and the forecast parameters are sky cover, precipitation probability, lightning probability, prevailing winds up to 54 feet, temperature range, remarks, and the time period's severe weather potential (slight, moderate, or high). The 24-Hour Forecast is posted on the 45 WS website (**https://www.patrick.spaceforce.mil/About-Us/Weather/**) at 0000L and every 4 hours after. An example of the 24-hour forecast is included in **Attachment 3**.

3.3.2. Weekly Planning Forecast. The 45 WS issues a Weekly Planning Forecast to inform customers of potential weather concerns. This forecast covers a 7-day period and is general in nature. The following criteria are included in the forecast, with each day broken into 12-hour segments (AM/PM): sky cover, precipitation probability, lightning probability, prevailing winds up to 54 feet, maximum/minimum temperatures, remarks, and the day's severe weather potential (slight, moderate, or high). The Weekly Planning Forecast is posted on the 45 WS website every morning, no later than 0800L, and is not amended. An example of the Weekly Planning Forecast is included in **Attachment 4**.

3.4. Launch/Landing Forecasts. The 45 WS provides daily forecasts, as required, in support of ground processing operations. In addition, Launch Weather Officers (LWOs) prepare pre-launch/landing forecasts beginning 3-4 days prior to a launch/landing that include the probability of violating weather Launch Commit Criteria (LCC). Forecasts are disseminated to applicable agencies and posted on the 45 WS website on the day prior to launch (L-1 Day). An example of a day-of-launch forecast is included in **Attachment 5**.

3.5. Aircrew Support. The 45 WS provides the following services to aircraft departing PSFB, the CCSFS Skid Strip, and the KSC SLF:

3.5.1. Mission Weather Product. The 45 WS issues a daily Mission Weather Product. It is the primary MEF for all local area flights around PSFB, CCSFS, and KSC. In addition, the forecast includes drop zone forecasts valid for the same period. This product is produced at 0700L and 1500L each day and is amended as needed. The Mission Weather Product is posted on the 45 WS website. **Attachment 6** includes maps of Avon Park Training Area and local drop zones.

3.5.2. Weather Briefings. The 45 WS provides flight weather briefings for all parent/host unit flights departing PSFB, the CCSFS Skid Strip, and the KSC SLF. The 45 WS also provides and/or updates briefings for transient aircraft as time and resources allow. If duty priorities do not allow the forecaster to provide transient flight weather briefings, the aircrews will be directed to the 26th Operational Weather Squadron (26 OWS), (318)-529-2651 or DSN 331-2651. For Air Mobility Command mobility missions beyond the local flying area (Central, East-Coastal Florida), the 45 WS will coordinate with the 618th Air Operations Center/Tanker Airlift Control Center's weather element (618 AOC (TACC)/XOW) at Scott AFB IL, (618)-229-3181 or (DSN) 779-3181. Either the DD Form 175-1 (**Attachment 7**) or MEF (**Attachment 8**) are used to document flight weather briefings for flights departing the local area. Flight weather briefings are obtained by calling the MDOC or PWOC duty forecaster directly. For aircraft requiring DD Form 175-1 briefings at PSFB, instructions and materials are available at the PWOC in Bldg. 820, Base Operations. Aircrews should notify the PWOC duty forecasters (during airfield hours) or the MDOC duty forecaster as soon as possible when support is required and provide rank(s) and name(s) of personnel requesting support, take-off time(s), destination(s), estimated time(s) of arrival, flight level(s), call sign(s) of aircraft, aircraft type, and delivery method. Verbal weather briefings are recorded on a locally generated form.

3.5.3. Flight and Route MISSIONWATCH. The 45 WS provides route and flight MISSIONWATCH for all flights departing PSFB, the CCSFS Skid Strip, and the KSC SLF for which a flight weather briefing was given by duty forecasters. If weather conditions change from those briefed at departure and will affect flight safety, the duty forecaster will make every attempt to contact the aircraft in flight by any means available (e.g. PMSV, Patrick Command Post, Supervisor of Flying, etc.).

3.5.4. Pilot-to-Metro Service/Phone Patches. PMSV contact is available 24 hours per day on frequencies 225.05 and 123.225 MHz. Phone patches can be routed to the MDOC or PWOC duty forecaster. The duty forecaster solicits PIREPs from aircrews and transmits significant reports via JET or BIFROST to other using agencies. During PMSV outages, the MacDill Weather Flight monitors 225.05. Additionally, a Notice To Airmen (NOTAM) will be issued for extended outages (i.e., longer than 24 hrs).

3.6. Fitness Assessment Support. On request, the 45 WS provides automated weather information to assess conditions for conducting fitness assessments at PSFB and CCSFS. Information is available by contacting the MDOC or PWOC duty forecasters.

3.7. Tropical Weather Support. The 45 WS receives hurricane and tropical storm forecast information from the National Hurricane Center (NHC) four times daily. The 45 WS Commander (45 WS/CC), or designated representative, advises the SLD 45/CC, SLD 45 Staff, Commander, 920th Rescue Wing, Commander, Air Force Technical Applications Center, and senior KSC members on movement, intensity, weather conditions and storm surge associated with tropical cyclones that may affect PSFB, CCSFS, KSC, JDMTA, Malabar Annex, or Ascension Island. Although the 45 WS recommends a Hurricane Condition (HURCON) level, the SLD 45/CC and KSC Director have the responsibility of declaring HURCON levels for his/her specific area of responsibility.

3.7.1. HURCON. HURCON levels are used to alert personnel to the proximity of the storm to ensure hurricane precautionary and preparatory measures are initiated in sufficient time. These categories focus on the forecast time-of-arrival of sustained 50 knot (58 mph) or greater winds associated with a tropical cyclone. The SLD 45 HURCON levels can be found in the SLD 45 Installation Emergency Management Plan 10-2. KSC HURCON levels differ from those of SLD 45 and can be found in the 45 SW 15E-2-2, KCA-1354.

3.7.2. The 45 WS produces a tailored forecast based on the NHC's official forecast track and intensity. Duty forecasters will e-mail the forecast to SLD 45 leadership, tenant unit leadership, and range user points of contact. In addition, duty forecasters will post the tailored forecast to the 45 WS website.

3.7.3. In the event the 45 WS cannot provide weather support due to evacuation, backup weather support will be provided by the 26 OWS IAW the Installation Datasheet Page, Continuity of Operations Criteria for PSFB, CCSFS, and KSC found at **https://26ows.us.af.mil/tech_ref/idp/?usehf=1&icao=KCOF**.

3.8. Staff Meteorological Functions. The 45 WS provides the following staff functions.

3.8.1. Climatological Services. 45 WS will provide or arrange for climatological data or climate-based predictions, as requested.

3.8.2. Staff Weather Briefings. 45 WS provides weather briefings to commanders and staff to exploit the environment when planning and conducting operations. SLD 45 Staff, Crisis Action Team, flying safety, instrument refresher course, pre-deployment planning, and seasonal briefings are provided upon request.

3.9. Meteorological Consulting/Advising Services. Weather subject matter expertise support can be provided to local scientific field studies, technical consultation for research, testing and evaluation conducted on the range, and exercise preparations affected by weather. Contact the 45 WS Operations Officer for additional information regarding these services.

3.10. Forecast Improvement Initiatives. The 45 WS manages operational research programs to improve weather support to the space program through highly focused coordination with universities, national laboratories, and contractors.

Chapter 4

METEOROLOGICAL WATCH

4.1. Meteorological Watch (METWATCH) Program. Certain weather conditions pose a threat to life or create a safety hazard for mission operations. Via the METWATCH program, 45 WS monitors for such weather conditions and issues WWAs to notify agencies when they occur or are forecast to occur. WWAs are written in specific formats as shown in **Attachment 10**. The 45 WS provides METWATCH support to SLD 45 (PSFB, CCSFS, Cape Canaveral Port Area), KSC, and other government and commercial agencies/facilities supporting the ER. If severe weather conditions are forecast or observed, the 45 WS implements a SWAP to ensure timely, accurate services are provided.

4.1.1. METWATCH WWA Dissemination.

4.1.1.1. PSFB WWA Dissemination. The duty forecaster distributes all WWAs through JET or BIFROST. In addition, the duty forecaster notifies the PSFB Command Post of each WWA issuance, update, expiration, and cancellation. The Command Post relays weather alerts via the AtHoc notification and Giant Voice systems. The PSFB ATC tower and Airfield Management Operations receive alert notifications via JET or BIFROST, which directly feeds their local Airfield Automation System.

4.1.1.2. CCSFS WWA Dissemination. The duty forecaster distributes all WWAs through JET or BIFROST. In addition, the duty forecaster notifies the Cape Support office and the KSC contracted Duty Officer of each WWA issuance, update, expiration, and cancellation. Cape Support and the KSC contracted Duty Officer then disseminates the information via various methods (Aural Warning System, telephone, pager, radio, etc.) to customers. The CCSFS ATC tower receives alert notifications via JET or BIFROST, which directly feeds their local Airfield Automation System.

4.1.1.3. KSC WWA Dissemination. The duty forecaster distributes all WWAs through JET or BIFROST. In addition, the duty forecaster notifies the KSC contracted Duty Officer (DO) of each WWA issuance, update, expiration, and cancellation. The KSC contracted DO then disseminates the information via various methods (Aural Warning System, telephone, pager, radio, etc.) to customers.

4.1.1.4. Other Agency/Facility WWA Dissemination. The duty forecaster notifies the established POC via telephone to alert of any applicable WWA issuance or cancellation.

4.1.2. Non-Lightning Weather Warnings. A weather warning is notification of weather conditions of sufficient intensity to pose a hazard to life or property for which an agency must take immediate protective actions. Weather warnings are issued for a designated geographic area such as CCSFS or PSFB. The size of the warning area varies from one to another. Weather warnings are numbered based on a two-digit numeric month designator (MM), followed by a dash and the sequence number that begins at 01 (#MM-XX). The sequence numbers are specific to the geographic location. **Example*:*** *PSFB warning number 12-32 is the 32nd weather warning issued for PSFB in December.*

4.1.3. Non-Lightning Weather Watches. A weather watch is notification of weather conditions that are favorable for future development that may pose a hazard to life or property. Weather watches are used to provide adequate time for personnel to make plans and take protective actions should a weather warning be issued. Weather watches may be superseded by weather warnings if conditions warrant. Weather watches are numbered using the same format as weather warnings but retain sequence numbers independent of weather warnings.

4.1.4. Weather Advisories. The 45 WS issues two types of weather advisories: Observed and Forecast. These advisories are issued for PSFB, CCSFS (to include the Cape Canaveral Port Area), and KSC. Advisories are numbered using the same format as weather warnings and watches but retain sequence numbers independent of warnings and watches.

4.1.4.1. Observed Weather Advisory (OWA). An OWA is a special notice that non-severe weather conditions, which could affect operations, are occurring. An OWA is used when agencies do not require advanced notification of the onset of specific weather conditions. An OWA is issued on the first occurrence of the designated criteria and canceled when the event is no longer occurring.

4.1.4.2. Forecast Weather Advisory (FWA). An FWA is a special notice of mission-limiting, non-severe weather conditions expected to affect a designated geographic area.

4.2. Lightning Warnings & Watches.

4.2.1. Definitions.

4.2.1.1. Lightning Warnings. On the ER, Lightning Warnings are referred to as “Phase II Lightning Warnings.” A Lightning Warning is issued when lightning is imminent or occurring within the specified lightning warning circle. The size of the warning area varies from one to another. Lightning Warnings alert personnel within a particular lightning warning area to take immediate protective actions. The lightning warning circle provides good lightning safety only for a small area at its center.

4.2.1.2. Lightning Watch. On the ER, Lightning Watches are referred to as “Phase I Lightning Watches.” A Lightning Watch is issued when lightning is forecast within the lightning warning circle with a desired lead time of 30 minutes. Lightning Watches alert personnel within a particular lightning warning area to take preliminary protective measures. The lightning warning circle provides good lightning safety only for a small area at its center.

4.2.2. Lightning Warning Areas. A lightning warning circle provides lightning safety, either a single facility or several facilities near each other. Therefore, the radii of lightning warning circles depend on the size and number of facilities protected. In addition, lightning warning areas are often added or adjusted to accommodate new range operations and customer requirements. **For a lightning warning circle to be added or maintained around a given worksite, it must meet each of the criteria found in Attachment 10**. A current geographical portrait of lightning warning areas is available on the 45 WS website (**https://www.patrick.spaceforce.mil/About-Us/Weather/**).

4.2.3. Eligibility for 4 nm lightning protection circle. Programs which would like to capitalize on the lightning protection radii reduction waiver must contact SLD 45 Safety to obtain an exception-to-policy. An LWO must be on-console to support an operation. Only point-sites will be considered for a 4 nm protection circle. A point-site is defined as a work-area or facility with a footprint extending outward less than 0.1 nm from the center. Once an exception has been approved, on-console LWOs will monitor for the potential of Phase I and/or Phase II lightning advisories within 4 nm of the critical facility(s) in which an operation is taking place.

4.2.4. Lightning Safety. Lightning safety procedures are determined by each organization for each facility. All personnel should follow local procedures when a Lightning Watch or Warning is issued for their facility. However, in the absence of local procedures and for personnel located outside of standard lightning warning circles, the 45 WS recommends the following lightning safety procedures.

4.2.4.1. Phase I Lightning Watches. If outdoors, finish any urgent activities quickly and proceed to a safe location. If already in a safe location, stay there until the Phase I Lightning Watch is terminated.

4.2.4.2. Phase II Lightning Warnings. If outdoors, proceed to a safe location immediately. If already in a safe location, stay there until the Phase II Lightning Warning is terminated. If the Phase II Lightning Warning is terminated, but a Phase I Lightning Watch remains in effect, stay in a safe location until the Phase I Lightning Watch is terminated.

4.2.4.3. Safe Locations. The safest location when lightning occurs is a large, fully enclosed building with wiring and plumbing. Examples include office buildings, schools, stores, etc. If a building is not available, take shelter inside a hardtop vehicle with a solid metal roof connected to solid metal sides, with doors and windows closed. Examples include typical cars, trucks, buses, etc. Vehicles such as motorcycles, convertibles, golf carts, etc. do not provide protection from lightning.

4.3. PSFB METWATCH WWA Products. WWAs are issued for a 5 nm radius from the center of the runway at PSFB. Non-lightning WWA criteria for PSFB and appropriate desired lead times are shown in **Table 4.1**.

Table 4.1. PSFB METWATCH Criteria and Desired Lead Times.

Weather Advisories		
Forecast/Observed	Criteria	Desired Lead Time
Observed	Observed Surface Winds ≥ 25 but < 35 kts.	N/A
Observed	A waterspout/landspout has been sighted in the vicinity of PSFB. All personnel should remain vigilant for changes in waterspout/landspout direction of movement and intensity.	N/A
Forecast	Forecast Temperatures ≤ 32 F for ≥ 4 hrs.	16 Hours
Weather Watches		
Watch Type	Criteria	Desired Lead Time
Tornado	Potential for Tornadoes exists at PSFB. (SWAP).	As Potential Warrants
Severe Thunderstorm	Potential for Damaging Winds ≥ 50 kts associated with Thunderstorms and/or Damaging Hail ≥ 3/4 inch (SWAP) at PSFB.	As Potential Warrants
Damaging Winds	Potential for Damaging Winds ≥ 50 kts not associated with Thunderstorms at PSFB.	As Potential Warrants
Weather Warnings		
Warning Type	Criteria	Desired Lead Time
Tornado	Tornado is imminent or occurring at PSFB. TAKE SHELTER IMMEDIATELY. (SWAP)	5 Minutes
Damaging Winds	Forecast Damaging Winds ≥ 50 kts for PSFB.	60 Minutes
Strong Winds	Forecast Strong Winds ≥ 35 but < 50 kts for PSFB.	30 Minutes
Hail	Forecast Hail ≥ 3/4 inch for PSFB. (SWAP)	60 Minutes

4.3.1. For a tornado or funnel cloud affecting PSFB, the duty forecaster contacts the PSFB Command Post. Command Post personnel will activate the base siren warning system. The duty forecaster will issue the tornado or funnel cloud warning on JET or BIFROST after this telephone notification.

4.4. CCSFS METWATCH Products. All non-lightning WWAs are issued for CCSFS for criteria expected to occur within CCSFS boundaries. This information is listed in **Table 4.2**.

Table 4.2. CCSFS METWATCH Criteria and Desired Lead Times.

Weather Advisories		
Forecast/Observed	Criteria	Desired Lead Time
Observed	Funnel cloud observed near CCSFS. Brief waterspouts or landspouts are possible. A tornado warning will be issued later if required.	N/A
Observed	Observed ≥ 18 kt Steady-State Winds occurring at CCSFS from surface (SFC) to 200 ft.	N/A
Forecast	Forecast Temperatures ≤ 32F and Winds ≥ 17 kts for ≥ 3 hours.	16 Hours
Forecast	Forecast Temperatures ≤ 32 F for ≥ 8 hours (ALL AREAS or AREA 57/59 ONLY)	16 Hours
Forecast	Forecast Temperatures ≤ 28 F for ≥ 4 hours. (ALL AREAS or AREA 57/59 ONLY)	16 Hours
Weather Watches		
Watch Type	Criteria	Desired Lead Time
Tornado	Potential for Tornadoes exists at CCSFS. (SWAP)	As Potential Warrants
Severe Thunderstorm	Potential for Damaging Winds ≥ 50 kts associated with Thunderstorms and/or Damaging Hail ≥ 3/4 inch (SWAP) at CCSFS.	As Potential Warrants
Damaging Winds	Potential for Damaging Winds ≥ 50 kts not associated with Thunderstorms at CCSFS.	As Potential Warrants
Weather Warnings		
Warning Type	Criteria	Desired Lead Time
Tornado	Tornado is imminent or occurring at CCSFS. TAKE SHELTER IMMEDIATELY. (SWAP)	5 Minutes
Damaging Winds	Forecast Damaging Winds ≥ 50 kts from SFC to 200 ft for CCSFS.	60 Minutes
Strong Winds	Forecast Strong Winds ≥ 35 but < 50 kts from SFC to 200 ft for CCSFS.	30 Minutes
Hail	Forecast Hail ≥ 3/4 inch for CCSFS. (SWAP)	60 Minutes

4.5. KSC METWATCH Products. All non-lightning WWA are issued for KSC for criteria expected to occur within KSC boundaries. This information is listed in **Table 4.3**.

Table 4.3. KSC METWATCH Criteria and Desired Lead Times.

Weather Advisories		
Forecast/Observed	Criteria	Desired Lead Time
Observed	Observed ≥ 18 kt Steady-State Winds occurring at KSC from SFC to 300 ft.	N/A
Observed	A funnel cloud was observed near KSC. Minimal threat to personnel or facilities is anticipated at this time.	N/A
Forecast	*Forecast Temperature ≤ 40 F.	4 Hours
Forecast	*Forecast Temperatures ≤ 32 F for ≥ 4 hrs.	16 Hours
Forecast	*Forecast Temperatures ≤ 28 F and winds > 10 kts.	16 Hours
*KSC weather towers of concern (i.e., near critical facilities): 211, 311, 397, 313 (3131 and 3132 in MIDDS), 506, 509, 412, 511, 512, 513.		
Weather Watches		
Watch Type	Criteria	Desired Lead Time
Tornado	Potential for Tornadoes exists at KSC. (SWAP)	As Potential Warrants
Severe Thunderstorm	Potential for Damaging Winds ≥ 50 kts associated with Thunderstorms and/or Damaging Hail ≥ 3/4 inch (SWAP) at KSC.	As Potential Warrants
Damaging Winds	Potential for Damaging Winds ≥ 50 kts not associated with Thunderstorms at KSC.	As Potential Warrants
Weather Warnings		
Warning Type	Criteria	Desired Lead Time
Tornado	Tornado is imminent or occurring at KSC. (SWAP)	5 Minutes
Damaging Winds	Forecast Damaging Winds ≥ 50 kts from SFC to 300 ft for KSC.	60 Minutes
Strong Winds	Forecast Strong Winds ≥ 35 but < 50 kts from SFC to 300 ft for KSC.	30 Minutes
Hail	Forecast Hail (any size) for KSC.	60 Minutes

4.6. NAOC Support. The National Airborne Operations Center (NAOC) is a vital asset for National Command Authority continuity of operations. The NAOC occasionally operates from PSFB. This operations center relies on all PSFB WWAs in addition to a NAOC-specific set of criteria listed in **Table 4.4**.

Table 4.4. NAOC METWATCH Criteria and Desired Lead Times.

Weather Advisories		
Forecast/Observed	**Criteria**	**Desired Lead Time**
Hail	Hail < ½ inch	30 min
Observed	Thunderstorm/Lightning observed within 50 nm of PSFB.	N/A
Observed	Thunderstorm/Lightning observed within 25 nm of PSFB.	N/A
Observed	Low level wind shear (outside of Thunderstorms) within 50 nm of PSFB.	N/A
Observed	Visibility < 1 SM.	N/A
Observed	Crosswinds > 20 kts.	N/A
Observed	Moderate or greater icing below 10k ft (outside of Thunderstorms) within 50 nm of PSFB.	N/A
Observed	Moderate or greater turbulence below 10k ft (outside of Thunderstorms) within 50 nm of PSFB.	N/A
Weather Watches		
Watch Type	Criteria	Desired Lead Time
Tornado	Potential for Tornadoes exists w/in 50 nm of PSFB.	As Potential Warrants
Hail	Potential for Hail > 1/2 inch exists.	N/A
Wind	Winds ≥ 35 kts.	N/A
Weather Warnings		
Warning Type	Criteria	Desired Lead Time
Hail	Forecast Hail ≥ 1/2 inch for PSFB.	60 Minutes
Wind	Convective Surface Winds 35-49 kts.	60 Minutes

4.7. NOTU Support. The Naval Ordnance Test Unit (NOTU) occasionally conducts munitions operations in the Cape Canaveral Port area. NOTU personnel will contact the 45 WS via e-mail or telephone no later than three days prior to the operation start date. NOTU personnel will provide the duty forecaster the following: operations start date/time, end date/time, POC name and contact information, and alternate contact information. The NOTU advisory criteria are outlined in **Table 4.5**.

Table 4.5. NOTU METWATCH Criteria and Desired Lead Times.

Weather Advisories		
Observed	**Criteria**	**Desired Lead Time**
Observed	Primary Launch Pad Lightning Warning System (LPLWS) sensor (#31) indicates values ≥ 2,000V/m. Note: The duty forecaster will monitor the alternate sensor (#32) for the same threshold value if the primary LPLWS sensor is unavailable.	N/A

Chapter 5

SUPPORTED ORGANIZATIONS THRESHOLDS AND REQUIREMENTS

5.1. General. This chapter summarizes general and specialized weather requirements of agencies and organizations supported by 45 WS. Support requirements not covered should be coordinated with the 45 WS Operations Officer.

5.2. Space Launch Delta 45. The 45 WS will provide the following to SLD45.

5.2.1. **General.**

5.2.1.1. Provide environmental, meteorological, and climatological consultant services.

5.2.1.2. Collect, evaluate, and distribute meteorological data for the ER and worldwide locations to support special projects within resource limitations.

5.2.1.3. Support interim/Major Command accident or safety investigation boards when formed (IAW the applicable plans and directives).

5.2.1.4. Maintain SWAP IAW DAFMAN 15-129 when severe weather threatens PSFB, CCSFS, or KSC.

5.2.1.5. Serve as the weather subject matter expert to Chemical, Biological, Radiological, Nuclear, and High-Yield Explosive operations IAW DAFMAN 15-29, and DAFI 10-2501, *Emergency Management Program*.

5.2.1.6. Alert SLD 45 leadership of any tropical cyclone, tsunami or volcanic activity affecting SLD 45 assets.

5.2.2. **Patrick Command Post.** The 45 WS will provide Patrick Command Post the following for OPREP-3 reports to higher headquarters:

5.2.2.1. The weather forecast valid at the time of the accident/incident, to include actual severe weather, pertinent observations and any watches and warnings issued.

5.2.2.2. The operational status of meteorological equipment (e.g., radar, wind sensors, etc.) at the time of the event.

5.2.3. **SLD 45 Safety (SLD 45/SE).** The 45 WS will provide SLD 45/SE the following services:

5.2.3.1. Meteorological data for various Range Safety physics models that assess the following hazards: toxic dispersion (both launch day and non-launch day), distant focusing overpressure and debris.

5.2.3.2. Coordinate with 557th Weather Wing and the ER Safety Risk Analysis Section (SLD 45/SELR) to generate (toxic dispersion) effective downwind messages for the Civil Engineering Emergency Management Flight (45 CES/CEX). See SLD 45 Installation Emergency Management Plan 10-2 for further required roles and responsibilities.

5.2.3.3. Ensure compliance with SLD 45/SE meteorological requirements as detailed in EWR 127-1, *Eastern and Western Range Safety Requirements*, and SSCMAN 91-710, Vol 6, *Range Safety User Requirements Manual - Ground And Launch Personnel, Equipment, Systems, And Material Operations Safety Requirements*.

5.2.3.4. Provide model recommendation to SLD 45/SEL for ingest into Range Safety models. The recommendation will be conveyed in the pre-launch forecast e-mail distributed by the LWO.

5.2.4. **SLD 45 Inspector General.** The 45 WS will provide products and briefings for real-world or simulated weather in support of all exercises.

5.2.5. **SLD 45 Public Affairs (SLD 45/PA).** SLD 45/PA is the primary point of contact when releasing public information within media, internal information and community relations activities involving the SLD 45 and the activities of the units and individuals located at PSFB and CCSFS, including any information regarding environmental issues, accidents and incidents. SLD 45/PA will use official 45 WS forecasts, watches, warnings and advisories as the authoritative source of weather information for PSFB, CCSFS and KSC.

5.2.5.1. SLD 45/PA has primary responsibility for scheduling and controlling base tours. The 45 WS will provide tours of 45 WS facilities upon SLD 45/PA request and coordination.

5.2.5.2. SLD 45/PA maintains control of material and information posted on the official base website and social media sites. The 45 WS may be provided access to the SLD 45 webpage for the purpose of updating weather information. The 45 WS will coordinate website access and training requirements with SLD 45/PA.

5.2.6. **SLD 45 Eastern Western Operational Communications Services (EWOCS).** EWOCS provides all communications support to wing operations. The 45 WS will provide the following services to EWOCS:

5.2.6.1. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.1**.

Table 5.1. EWOCS Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Lightning within 5 nm	Weather Watch and Warning (Phase I and II)	Hazardous Work Environment	Stop All Outdoor Work

5.2.6.2. The 45 WS will notify EWOCS of:

5.2.6.2.1. Specific maintenance actions performed by contractor personnel to correct problems, if known.

5.2.7. **45LRS/OSA – Airfield Operations Flight.** The 45 WS will:

5.2.7.1. Provide WWAs to PSFB and CCSFS ATC tower Airfield Automation Systems (AFAS), via JET or BIFROST. Provide immediate support to resolve or dismiss any discrepancy between ATC personnel weather observations and 45 WS personnel or sensor weather observations.

5.2.7.2. Notify PSFB ATC personnel when 45 WS are operating at the PWOC.

5.2.7.3. Provide operational status of the PMSV and changes to forecast/observing support hours to the PSFB/CCSFS AM Ops Coordinator.

5.2.7.4. Train and certify, on request, ATC tower operators on the Cooperative Weather Watch Program (Limited Weather Observation Training) and document that training on AF IMT 3622.

5.2.7.5. Validate visibility charts annually.

5.2.7.6. Notify PSFB/CCSFS ATC personnel of any outages of the AN/FMQ-19 ASOS equipment.

5.2.7.7. Provide tours of weather facilities for ATC personnel as requested.

5.2.8. **45th Civil Engineer Squadron (45 CES).**

5.2.8.1. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.2**.

Table 5.2. 45CES Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Winds 24 – 34 kts	Observed Weather Advisory	Hazardous to Equipment	Stop Crane Operations
Winds ≥ 35 kts	Weather Warning	Hazardous Work Environment	No Bucket Truck or Above Ground Operations
Temperatures ≤ 28 F for ≥ 4 hrs	Weather Advisory	Hazardous to Infrastructure	Take Freeze Precautions
Lightning within 5 nm	Weather Watch and Warning (Phase I and II)	Hazardous Work Environment	Stop All Outdoor Work

5.2.8.2. Provide wind forecasts for firefighting, toxic/hazardous spills, and training exercises.

5.2.8.3. Provide Chemical Downwind Message and Effective Downwind Message to the Civil Engineer Emergency Management Flight as requested.

5.2.9. **45th Force Support Squadron (45 FSS).** The 45 FSS operates all Morale, Welfare and Recreation facilities on the base. They are concerned with any weather that may threaten the safety of patrons and possible damage to facilities. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.3**.

Table 5.3. 45FSS Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Wind > 35 kts	Weather Warning	Creates Hazard	Outdoor Recreation Boat Rentals Canceled
Wind > 25 kts	Observed Weather Advisory	Creates Hazard	Outdoor Recreation Restricts Use of Smaller Vessels
Lightning within 5 nm	Weather Watch and Warning (Phase I and II)	Hazardous Work Environment	Clear Swimming Pools, Recall Boats to Marina, Outside Intramurals Canceled, Close Golf Course

5.3. 920th Rescue Wing (920 RQW). The 920 RQW mission is to save lives through the combined efforts of Combat Search and Rescue and Aeromedical Staging operations. The 920 RQW flies HC-130 aircraft, HH-60 helicopters and possesses Guardian Angel, Aeromedical Staging personnel. Weather critical thresholds, notification products, impacts and general customer actions are listed in **Table 5.4**. **Note**: Customer actions listed in the table are for informational purposes only. Specific actions are governed in separate operational instructions.

Table 5.4. 920RQW Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Lightning Forecast w/in 5 nm	Weather Watch (Phase I)	Potential Hazardous Work Environment	Prepare to Suspend Outdoor Operations
Lightning Observed w/in 5 nm	Weather Warning (Phase II)	Hazardous Work Environment	Suspend Outdoor Operations
Ceiling ≤ 200 ft Vis ≤ 1 mi, Vis ≤ 2 mi	Observation	Below Field Minimums	Hold / Divert Aircraft
En Route Ceiling ≤ 700 ft, Vis ≤ 1 mi, Vis ≤ 2 mi	MWP	Cannot Perform Certain Mission Tasks	Change Operations Area
Ceiling ≤ 1,500 ft, Vis ≤ 3 mi, Vis ≤ 1 mi	MWP	Cannot Perform Certain Mission Tasks	Change Operations Area
Moderate (MDT) Precip w/ restricted vis SFC – 500 ft	MWP, Observation	Cannot Perform Certain Mission Tasks	Change Operations Area

Weather Threshold	Notification Product	Impact	Customer Action
Turbulence (TURBC) ≥ MDT SFC – 10,000 ft	MWP	No Flight Through	Reroute Flight Path
Icing (ICG) ≥ MDT with Deicing Capability	MWP	Damage to Aircraft	Reroute Flight Path
Drop Zone (DZ) Winds > 13 kts	MWP	Cannot Perform Certain Mission Tasks	Change Operations
DZ Winds > 25 kts	MWP	No Airdrops	Evaluate Drop Plan
Thunderstorms	MWP	No Flight Through	Reroute Flight Path
Lunar Data (<10% lunar illumination (0.8 millilux))	MWP	Determines Equipment For Mission Use (NVG, FLIR)	Change Mission Plan
Space Weather Constraint GPS error > 50 meters	MWP	Position Error	Evaluate Navigation System
SFC Winds ≥ 30 kts (uses 25 kt wind advisory)	Observed Weather Advisory	Hazardous Work Environment	Stops Work on Top of Aircraft
SFC Winds ≥ 45 kts	Weather Warning	Damage to Aircraft	Moor or Hangar HH-60 Aircraft
SFC Winds ≥ 50 kts	Weather Warning	Damage to Aircraft	Moor HC-130 Aircraft
SFC Winds ≥ 60 kts	Weather Warning	Damage to Aircraft	Remove Main Rotor or Hangar HH-60 Aircraft
SFC Winds ≥ 75 kts	Weather Warning	Damage to Aircraft	Hangar HH-60/ HC-130 Aircraft
Hail > 3/4”	Weather Warning	Damage to Aircraft	Hangar/ Divert Aircraft
Low Level Wind Shear (LLWS)	MWP	Flight Hazard	Avoid Hazard/ Hold/ Divert Aircraft

5.4. Department of State. The State Department provides training for low-level aerial spray operations and operates a maintenance depot for refurbishment and general maintenance. The organization operates UH-1, S-61 and CH-46 aircraft. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.5**.

Table 5.5. Department of State Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Ceiling ≤ 1,500 ft, Vis ≤ 3 m,	MWP	Below Aircraft Minimums	Cancel Flights, Divert Aircraft
Gust Spread ≥ 15 kts (use 25 kt wind advisory)	MWP	Creates Hazard	Do Not Operate UH-1 Aircraft
SFC Winds ≥ 30 kts (uses 25 kt observed advisory)	MWP and Weather Advisory	Creates Hazard	Do Not Operate UH-1 Aircraft
ICG > Trace	MWP	Creates Hazard	Cancel UH-1 Flights
En route Thunderstorms	MWP	No Flight Through	Reroute Flight Path
TURBC ≥ MDT SFC – 10,000 ft	MWP	Damage to Aircraft	Change Flight Path
GPS Error > 50 meters	MWP	Position Error	Evaluate Navigation System/Utilize backup charts
Lunar Data	MWP	Creates Hazard	Determine Flight Parameters
Lightning w/in 5 nm	Weather Watch and Warning (Phase I and II)	Hazardous Work Environment	Prepare to Suspend Work Suspend Refueling and Outside Operations
Lightning w/in 5 nm	Weather Watch and Warning (Phase I and II)	Alerts Personnel of Pending Inclement Weather	Alert Personnel, Prepare to Clear Ramp, Suspend Refueling, Outside Operations Cancelled

5.5. Cape Support Duty Office. Cape Support provides base operations and space launch support services to SLD 45, NASA, and commercial launch services and contractors at CCSFS. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.6**.

Table 5.6. Cape Support Duty Office Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
SFC Winds ≥ 18 kts Steady	Weather Advisory	Hazardous Work Environment	Stop Crane Operations, Halt Aerial Tree Trimming
Temperature ≤ 28 F for ≥ 4 hrs	Weather Advisory	Endangers Assets	Activate Freeze Plan
Wind > 35 kts SFC-200 ft	Weather Warning	Hazardous Work Environment Endangers Assets	Secure Outdoor Items, Cease Above Ground Electrical, Voltage, HVAC, Mechanical and Communications Operations
Wind > 50 kts SFC-200 ft	Weather Warning	Hazardous Work Environment	Pull Security Guards from Towers
Severe Thunderstorm/Tornado Watch	Weather Watch	Alerts Personnel of Pending Inclement Weather	Plan Operations Accordingly
Lightning	Weather Watch and Warning (Phase I and II)	Hazardous Work Environment	Halt Outside Operations, Bring Visitors Indoors

5.6. LISC. The LISC contractor provides technical services to NASA and SLD 45 in support of ER operations. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.7**.

Table 5.7. LISC Contractor Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
SFC Winds ≥ 18 kts Steady	Weather Advisory	Hazardous Work Environment	Pull Workers Off Antennas
Severe Thunderstorm/Tornado Watch	Weather Warning	Alerts Personnel of Pending Inclement Weather	Plan Operations Accordingly
Lightning	Weather Watch and Warning (Phase I and II)	Alerts Personnel of Pending Inclement Weather, Hazardous Work Environment	Alert Personnel, Plan to Stop Work, Revise Work Schedules, Halt Outside Operations

5.7. Office of Space Launch (OSL), Det 1. The National Reconnaissance Office, Office of Space Launch is located on CCSFS. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.8**.

Table 5.8. OSL, Det 1 Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Severe Thunderstorm/Tornado Watch	Weather Watch	Alerts Personnel of Pending Inclement Weather	Plan Operations Accordingly
SFC Winds ≥ 18 kts Steady	Weather Advisory	Hazardous Work Environment	Plan Operations Accordingly
Temperatures ≤ 32 F for ≥ 4 hrs	Weather Advisory	Hazardous to Infrastructure	Take Freeze Precautions
Lightning	Weather Watch and Warning (Phase I and II)	Alerts Personnel of Pending Inclement Weather, Hazardous Work Environment	Alert Personnel, Plan to Stop Work, Revise Work Schedules, Halt Outside Operations

5.8. KSC Support. The 45 WS will:

5.8.1. Support IAW Department of the Air Force publication series 15 instructions and manuals unless specifically stated otherwise.

5.8.2. Adhere to the following support agreements, memoranda of agreement/understanding and procedural requirements:

5.8.2.1. KCA-1645, *Agreement between the DoD and NASA, Regarding Management of the Atlantic Missile Range of DoD and the Merritt Island Launch Area of NASA*, 17 January 1963 (Webb-McNamara Agreement).

5.8.2.2. U.S. Space Command (USSPACECOM) Operations Orders for DoD Human Space Flight Support.

5.8.2.3. SLD 45 15E-2-27, KCA-4441, Rev A, *Memorandum of Agreement between the Space Launch Delta 45/45th Weather Squadron (SLD/45 WS) and Range Management (SLD/RM) and the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service (NWS) for the Operation of the Applied Meteorology Unit (AMU)*, 5 July 2023.

5.8.2.4. SLD 45 15E-2-2, KCA-1354, Rev D-1, *Memorandum of Agreement between the Space Launch Delta 45 (SLD 45) and the National Aeronautics and Space Administration John F. Kennedy Space Center (NASA-KSC) for Joint Operations, Support, and Cooperation*, 27 March 2023.

5.8.2.5. Universal Documentation System meteorological support requirements, Program Requirements Documents and Operations Requirement documents for NASA launch programs.

5.8.3. Provide operational weather support (e.g. forecasts, METWATCH) for NASA launch/landing generation, execution and recovery operations including, but not limited to: Space Launch Complex area forecasts, recovery operations and exercises, shipboard operations, prescribed burn operations, ground operations, and KSC Radiological Control Center operations.

5.8.4. Provide a weekly planning forecast of sky condition, weather, precipitation and lightning probabilities, prevailing wind direction and speed, and maximum and minimum temperature by 0800L daily. Provide a 24-hour forecast of sky condition, weather, precipitation and lightning probabilities, prevailing wind direction and speed, and temperature range by 0615L daily. These products are available on the 45 WS website (**https://www.patrick.spaceforce.mil/About-Us/Weather/**).

5.8.5. Provide e-mail notification to the KSC DO, KSC Weather Office, Spaceport Integration Office and the Emergency Management Office at least 72 hours prior to the potential of severe weather at KSC or when severe weather unexpectedly occurs. The severe weather statement will be pre-coordinated between the NASA LWO and duty forecasters prior to dissemination. Notify the same offices when the conditions are no longer a threat.

5.8.6. Provide e-mail or telephone notification of all tropical cyclone advisories to the KSC Hurricane Storm Data distribution list (**KSC-DL-SI-Hurricane-Storm-Data@mail.nasa.gov**) which includes the KSC Weather Office, Emergency Decision Team (EDT) and Emergency Operations Center (EOC) regarding cyclones that potentially threaten the area. Provide advisories from the time the tropical cyclone forecast uncertainty during the next 120 hours (120-hour uncertainty cone) is within 500 nm until the storm is no longer a threat to the ER. Provide the probability of exceeding a critical wind threshold versus time of arrival. Coordinate threshold value(s) and required implementation time of the chart with the EDT Chairman (typically, the wind probability chart will be issued when the 120-hour forecast for the probability of winds exceeding the threshold is greater than zero, for the ER).

5.8.7. Provide staff meteorological services to include coordinated briefings, environmental consultation, current weather monitoring capabilities, climatological information, meteorological advice and technical evaluation of meteorological proposals. Participate in the coordination and operational implementation of meteorological requirements. **Note**: All meteorological LCC changes must be properly coordinated through appropriate NASA and SLD 45 channels before implementation.

5.8.8. Provide access to weather systems and sensor data within the MDOC, on a non-interference basis, for NASA-directed meteorological research, development and technology transition.

5.8.9. Provide required meteorological data for ingest into the Meteorological and Range Safety Support System (MARSS) operational toxic model as requested by the KSC Weather Office.

5.8.10. Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.9**.

Table 5.9. KSC Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
SFC Winds ≥ 18 kts Steady	Weather Advisory	Hazardous Work Environment	No Erection or Work on Floats, Spiders and Scaffolding.
Temperature ≤ 40 F	Weather Advisory	Endangers Assets	Perform Fuel TVS freeze protection if not already de-serviced.
Temperature ≤ 32 F for ≥ 4 hrs	Weather Advisory	Endangers Assets	Activate FIREX, sound suppression and potable water systems freeze protection plan.
Temperature ≤ 28 F and Winds > 10 kts	Weather Advisory	Endangers Assets	Activate HVAC LC-39 freeze protection plan.
Funnel Cloud	Observed Weather Advisory	Endangers Assets, Hazardous Work Environment	Comply with Adverse Weather Plan, KDP-KSC-P-3005 Video track and record path of the waterspout/funnel cloud. Notify personnel to prevent concern of tornado.
Severe Thunderstorm	Weather Watch	Alerts Personnel of Pending Inclement Weather, Hazardous Work Environment	Review, Adverse Weather Plan, KDP-KSC-P-3005
Damaging Winds	Weather Watch	Alerts Personnel of Pending Inclement Weather, Hazardous Work Environment	Comply with Adverse Weather Plan, KDP-KSC-P-3005. Secure Debris if possible.
Lightning	Weather Watch and Warning (Phase I and II)	Hazardous Work Environment	Comply with Adverse Weather Plan, KDP-KSC-P-3005. Phase I: secure operations before Phase II. Phase II: Halt Outside Operations, Seek Shelter, Close VAB High Bay Doors (when applicable.)

Weather Threshold	Notification Product	Impact	Customer Action
Tornado	Weather Warning	Alerts Personnel of Pending Inclement Weather	Comply with Adverse Weather Plan, KDP-KSC-P-3005. Activate Tornado Area Warning System. Video Track and Record Path of the Tornado, Immediately Take Cover Away from Windows, etc.
Damaging Winds	Weather Warning	Alerts Personnel of Pending Inclement Weather	Comply with Adverse Weather Plan, KDP-KSC-P-3005, Secure Debris if Possible. Seek shelter/stay inside.
Strong Winds	Weather Warning	Alerts Personnel of Pending Inclement Weather	Based on defined wind limit thresholds, possible actions include No Flight Hardware Transport Ops between Facilities, No Work on Facility Roofs, Structure Tops, Unprotected Areas and Outside Handrails.
Hail	Weather Warning	Alerts Personnel of Pending Inclement Weather	Comply with Adverse Weather Plan, KDP-KSC-P-3005. Seek shelter/Stay Inside Away from Windows.

5.9. Department of Energy. The 45 WS provides the Department of Energy weather information during day of launch for missions that involve any type of radiological material. This data is used to compute radiological plume information in case of a mishap. The 45 WS may also provide two representatives to serve at the KSC Radiological Control Center.

5.10. Human Space Flight Support. Provide meteorological support IAW Chairman Joint Chiefs of Staff instructions, USSPACECOM Operations Orders and associated Annexes. Meteorological support will be coordinated through Space Launch Delta 45, Human Space Flight Support Office, Detachment 3 and the USSPACECOM Senior Meteorology and Oceanography Officer.

5.11. 114th Space Control Squadron, Air National Guard. The 45 WS will provide general forecast information upon request.

5.12. 45th Security Forces Squadron (45 SFS). Weather critical thresholds, notification products, impacts and customer actions for operations are outlined in **Table 5.10**.

Table 5.10. 45SFS Critical Weather Thresholds.

Weather Threshold	Notification Product	Impact	Customer Action
Observed surface winds ≥ 25 kts but < 35 kts	Weather Advisory	Hazardous Work Environment	Notify all posts/patrols. Limit driving to mission-essential/response actions only.
Funnel Cloud	Weather Advisory	Endangers Assets, Hazardous Work Environment	Notify posts/patrols. Shelter in place as appropriate.
Temperature ≤ 32 F for ≥ 4 hrs	Weather Advisory	Endangers Assets, Hazardous Work Environment	Notify posts/patrols. Continue normal ops.
Tornado Watch	Weather Watch	Alerts Personnel of Pending Inclement Weather	Notify all posts/patrols. Limit driving to mission-essential/response actions only.
Severe Thunderstorm	Weather Watch	Alerts Personnel of Pending Inclement Weather	Notify all posts/patrols. Limit driving to mission-essential/response actions only.
Damaging Wind Watch	Weather Watch	Alerts Personnel of Pending Inclement Weather	Notify all posts/patrols. Limit driving to mission-essential/response actions only.
Lightning Watch (Phase I)	Weather Watch	Alerts Personnel of Pending Inclement Weather	Notify all posts/patrols. Continue normal ops.
Tornado	Weather Warning	Endangers Assets, Hazardous Work Environment	Notify all posts/patrols. Shelter in place as appropriate.
Damaging Winds ≥ 50 kts	Weather Warning	Endangers Assets, Hazardous Work Environment	Notify all posts/patrols. Shelter in place as appropriate.
Strong Winds ≥ 35 kts	Weather Warning	Endangers Assets, Hazardous Work Environment	Notify all posts/patrols. Limit driving to mission-essential/response actions only.

Hail ≥ ¾ Inch	Weather Warning	Endangers Assets, Hazardous Work Environment	Notify all posts/patrols. Shelter in place as appropriate.
Lightning Warning (Phase II)	Weather Warning	Hazardous Work Environment	Notify all posts/patrols. Limit driving to mission-essential/response actions only.

Chapter 6

LAUNCH/LANDING WEATHER SUPPORT

6.1. General. The 45 WS provides comprehensive launch/landing support to DoD, NASA and commercial vehicles at CCSFS and KSC from the MDOC. Specific support requirements for each program are coordinated via the UDS process and documented in the appropriate Operations Directive. In addition, the ER has safety constraints known as Lightning Launch Commit Criteria (LLCC). The LLCC are codified in the NASA Technical Standard, NASA-STD-4010, *NASA Standard for Lightning Launch Commit Criteria for Space Flight*, which is updated regularly and available at **https://standards.nasa.gov/standard/nasa/nasa-std-4010**. These launch safety rules identify meteorological conditions that trained LWOs must monitor to protect launch and space vehicles from natural and triggered lightning. These constraints are applicable to every vehicle launching from the ER. Reference SSCMAN91-710V6 for details concerning these requirements.

6.2. New Launch/Landing Systems. All new organizations establishing operations on the ER must coordinate range access and support permissions through SLD 45/XP. Once an organization is approved to plan or operate by SLD 45 leadership, via SLD 45/XP, 45 WS and the organization may coordinate weather support. Specific weather constraints and support requirements for each system must be outlined in the appropriate UDS documents. Additional information may be found on the "New Customer Information Page" at **https://www.patrick.spaceforce.mil/About-Us/New-Customer-Information**.

Chapter 7

RECIPROCAL SUPPORT

7.1. General. The 45 WS requires reciprocal support from various base agencies, particularly when the required support is beyond 45 WS capabilities. The support requirements outlined herein are essential to the 45 WS in providing timely, accurate weather support.

7.2. SLD 45 Deputy Commander (SLD 45/CD). The SLD 45/CD will chair the Emergency Management Working Group, which reviews results of the SLD 45 Hazard Assessment IAW DAFI 10-2501. Note: 45 CES Emergency Management is the POC for the review.

7.3. PSFB Command Post. The Patrick Command Post will:

7.3.1. Notify the 45 WS of all incidents involving weather personnel or resources, severe weather, and damage to wing resources due to severe weather.

7.3.2. Disseminate weather WWAs as soon as they are issued by the 45 WS.

7.4. 1st Range Operations Squadron (1 ROPS). 1 ROPS will:

7.4.1. Coordinate programmed UDS weather support requirements and procedures between the 45 WS Operations Officer and contractors.

7.4.2. Ensure priority is given to restoration of weather equipment in a post-hurricane/tropical system environment.

7.4.3. Provide oversight of service contract. Surface and upper air weather observing services at ER locations will be maintained by the contractor IAW the current LISC Performance Work Statement.

7.4.4. Establish trouble reporting, tracking, and restoral procedures for all government furnished weather instrumentation and Range communication facilities at all ER locations IAW the current LISC Performance Work Statement.

7.4.5. Inform the 45 WS/CC of any significant changes to operational weather support requirements.

7.4.6. Establish, in writing and in coordination with 45 WS, an operational effectiveness metric, for the range contractor's performance, IAW DAFMAN 15-129.

7.4.7. Complete all weather coordination through the duty forecaster or LWO, unless otherwise instructed.

7.5. 45LRS/OSA – Airfield Operations Flight. Airfield Operations Flight will:

7.5.1. Report AFAS outages at PSFB/CCSFS to the duty forecaster and the AFAS Administrator.

7.5.2. Immediately report any disparity on weather observations to the duty forecaster.

7.5.3. When notified by 45 WS that weather reporting capabilities are unusable, coordinate NOTAM actions as required.

7.5.4. Notify the duty forecaster of all in-flight emergencies and aircraft accidents at PSFB/CCSFS via secondary crash net.

7.5.5. Notify the duty forecaster of scheduled after-hours aerodrome observation requirements no later than 1500L on the day prior to the requirement, time and circumstances permitting (more lead-time is desirable). Exceptions will be made for emergencies, search and rescue missions, and special missions.

7.5.6. Provide daily radio checks between 0800-0900L on the PMSV frequencies 225.05 and 123.225 MHz and when requested.

7.5.7. Notify the duty forecaster when normal landline communications are disrupted and advise of alternate method(s) required to relay weather information.

7.5.8. Participate in a Cooperative Weather Watch at PSFB and CCSFS by informing the duty forecaster of conditions IAW AFMAN 15-111. Coordinate with 45 WS for training control tower operators on the Cooperative Weather Watch Program. ATC personnel should inform the 45 WS duty forecaster of:

7.5.8.1. Any observed difference between present weather and the official observation.

7.5.8.2. A tower visibility different from the prevailing surface visibility.

7.5.8.3. Any significant increase or decrease in visibility and/or low cloud ceiling height.

7.5.8.4. The formation of fog, thunderstorms (any observed lightning or thunder), funnel clouds or tornadoes, hail, and volcanic ash.

7.5.8.5. The beginning or ending of precipitation.

7.5.8.6. Any obstruction to vision not previously reported.

7.5.9. Assist in obtaining PIREPs/AIREPS, workload permitting. PIREPs/AIREPS will be solicited from the first available aircraft when requested by 45 WS personnel. Pass PIREPs/AIREPS received to the duty forecaster not later than 5 minutes after receipt.

7.5.10. Report significant weather changes observed on ATC radar to the duty forecaster.

7.5.11. Provide 45 WS with flight operation schedules (PPR logs).

7.5.12. Provide an orientation tour of ATC towers for weather personnel upon request.

7.5.13. When the prevailing visibility is 1 mile or less, or the RVR is 6,000 ft or less, report changes in the High Intensity Runway Light (HIRL) setting to the duty forecaster. This ensures the RVR is representative based on the correct HIRL.

7.5.14. Change the AN/FMQ-19 sensor to the appropriate sensor upon implementing a runway change and notify the duty forecaster of the change.

7.6. 45LRS/OSM – Maintenance Operations Flight. Maintenance Operations Flight will:

7.6.1. Maintain PSFB, CCSFS, and KSC airfield weather observing equipment. In the event of equipment outages, response times and restoral priority will be IAW the current version of the SLD 45 Operations Letter, *Radar, Airfield, and Weather Systems (RAWS) Management: Mission Critical Circuits Maintenance, Auxiliary Power Maintenance and Restoral Priorities of Air Traffic Control Equipment and Navigational Aids.*

7.7. 45th Communication & Information Flight (45 SC): 45 SC will:

7.7.1. Establish trouble reporting and restoral procedures and priorities for all government-furnished weather longline and infrastructure communication facilities terminating at PSFB.

7.7.2. Ensure that a chaff countermeasures message is produced and disseminated at the beginning of each month.

7.7.3. Provide Range communication and weather instrumentation operations and maintenance via the LISC contractor. The ER communication network provides transmission and relay of weather data as required by MDOC and Range users.

7.8. KSC.

7.8.1. KSC will provide a weekly input of the weather-sensitive ground operations to 45 WS via 0800L daily telecon hosted by Spaceport Integration Office. Provide the location, duration and limiting weather parameters (for example: winds, precipitation, lightning, and desired lead-times, etc.) as part of the schedule. Prior coordination is necessary so additional manpower can be scheduled, if available. Verify all schedule inputs changed within 24 hours of the required support by direct verbal communication between the KSC DO and the MDOC duty forecaster.

7.8.2. The KSC Weather Office will provide training and informational materials to 45 WS when weather LLCC are changed to ensure the 45 WS understands the operational reasons and technical basis for the LLCC.

7.8.3. KSC Center Planning and Development (AD) and/or the KSC Weather Office will coordinate the agreement development for engineering upgrades and installation of all US Space Force meteorological equipment on KSC. KSC Spaceport Integration will coordinate the radio frequency management with all KSC Spaceport users.

7.8.4. The KSC DO or EOC will notify the duty forecaster at the MDOC of any KSC aircraft mishap, as well as any weather-related damage as soon as possible.

7.8.5. KSC MARSS users shall not change, alter, or delete any meteorological data without prior coordination with the MDOC.

7.8.6. The KSC Weather Office will provide documentation for NASA equipment furnished to the US Space Force to develop training materials.

7.8.7. KSC institutional support and information technology contractors will coordinate all power and communication outages that will affect meteorological instrumentation, systems or facilities with 45 WS and LISC personnel.

7.8.8. The Applied Meteorology Unit (AMU) is a NASA-funded team of contractors and atmospheric scientists created to provide weather support enhancements that safely increase spaceflight launch and landing opportunities, increase productivity of associated ground processing operations and decrease weather support system life-cycle costs. The AMU operates in the MOC and supports three participating organizations: National Weather Service, NASA and United States Air Force.

KRISTIN L. PANZENHAGEN
Brigadier General, USSF
Commander, Space Launch Delta 45

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

SLD 4515E-2-2, KCA-1354, Rev D-1, *Memorandum of Agreement between the Space Launch Delta 45 (SLD 45) and the National Aeronautics and Space Administration John F. Kennedy Space Center (NASA-KSC) for Joint Operations, Support, and Cooperation*, 27 March 2023.

45 SW 15E-2-16, KCA-1458, Rev, *Memorandum of Understanding (MOU) among the 45th Space Wing (45 SW), the National Aeronautics and Space Administration's John F. Kennedy Space Center (NASA/JFKSC) and the Brevard County Office of Emergency Management (BCOEM) for the Risk Assessment Center, Rev* D, 24 May 2018

SLD 45 15E-2-27, KCA-4441, Rev A, *Memorandum of Agreement between the Space Launch Delta 45/45th Weather Squadron (SLD/45 WS) and Range Management (SLD/RM) and the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service (NWS) for the Operation of the Applied Meteorology Unit (AMU)*, 5 July 2023.

SLD 45 IEMP 10-2, *Installation Emergency Management Plan*, 02 Nov 2023

AFMAN 10-206_AFSPCSUP, *Operational Reporting (OPREP)*, 05 Mar 2019

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

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

DAFMAN 15-129, *Air and Space Weather Operations*, 07 Sep 2023

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

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

KCA-1645, *Agreement between the DoD and NASA, Regarding Management of the Atlantic Missile Range of DoD and the Merritt Island Launch Area of NASA*, 17 January 1963 (Webb-McNamara Agreement)

KDP-KSC-P-3006, *Tropical Storm and Hurricane Preparation*, Rev E-2

KNPR 8715.2, *Kennedy NASA Procedural Requirements, Comprehensive Emergency Management Plan (CEMP)*, Rev B, 10 Feb 2020

KNPR 8715.3, *KSC Safety Procedural Requirements*, Rev K

SLD 45 Operations Letter, *Radar, Airfield, and Weather Systems (RAWS) Management: Mission Critical Circuits Maintenance, Auxiliary Power Maintenance and Restoral Priorities of Air Traffic Control Equipment and Navigational Aids*, 1 September 2023.

SSCMAN 91-710, Vol 6, *Range Safety User Requirements Manual - Ground And Launch Personnel, Equipment, Systems, And Material Operations Safety Requirements*, 27 Dec 2022

USSPACECOM Operations Orders 20-06, *DoD Human Space Flight Support (HSFS) to NASA Commercial Crew Program (CCP) Operations*, 13 Mar 2020

Adopted Form

AF Form 847, *Recommendation for Change of Publication*

Abbreviations and Acronyms

AFAS—Airfield Automation Systems

45 WS—45th Weather Squadron

45 WS/DO—45 WS Director of Operations

AFI—Air Force Instruction

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AMPS—Automated Meteorological Profiling System

ASOS—Automated Surface Observing Systems

ATC—Air Traffic Control

AMU—Applied Meteorological Unit

CC—Commander

CCSFS—Cape Canaveral Space Force Station

CWW—Cooperative Weather Watch

DoD—Department of Defense

DSN—Defense Switched Network

EDT—Emergency Decision Team

EOC—Emergency Operations Center

ER—Eastern Range

FLIP—Flight Information Publication

FSS—Force Support Squadron

FWA—Forecast Weather Advisory

HIRL—High Intensity Runway Light

HURCON—Hurricane Condition

IAW—In Accordance With

ICAO—International Civil Aviation Organization

ICG—Icing

JET—Joint Environmental Toolkit

JDMTA—Jonathon Dickenson Missile Tracking Annex

JOSA—Joint Operating and Support Agreement

KCOF/COF—International Identifier for PSFB

KSC—Kennedy Space Center

KT(S)—Knot(s)

KTTS—International Identifier for KSC SLF

KXMR—International Identifier for CCSFS's Skid Strip

L—Local—weather observation

LCC—Launch Commit Criteria

LLCC—Lightning Launch Commit Criteria

LISC—Launch and Test Range System, Integrated Support Contract

LPLWS—Launch Pad Lightning Warning System

LWO—Launch Weather Officer

MARSS—Meteorological and Range Safety Support System

MDOC—Multi-Domain Operations Center

MEF—Mission Execution Forecast

METAR—Meteorological Terminal Aviation Routine

METWATCH—Meteorological Watch

MOC—Morrell Operations Center

MWP—Mission Weather Product

NAOC—National Airborne Operations Center

NASA—National Aeronautics and Space Administration

NHC—National Hurricane Center

nm—Nautical Miles

NOTU—Naval Ordnance Test Unit

OPR—Office of Primary Responsibility

OWA—Observed Weather Advisory

OWS—Operational Weather Squadron

PSFB—Patrick Space Force Base

PIREP—Pilot Report

PMSV—Pilot to Metro Service

ROPS—Range Operations Squadron

RAWS—Radar, Airfield, and Weather Systems

RVR—Runway Visual Range

SCS—Space Communications Squadron

SFB—Space Force Base

SFC—Surface

SPECI—Special weather observation

SWAP—Severe Weather Action Procedures

SLD 45—Space Launch Delta 45

SLF—Shuttle Landing Facility

TAF—Terminal Aerodrome Forecast

TURBC—Turbulence

UDS—Universal Documentation System

USSF—United States Space Force

SSCMAN—Space Systems Command Manual

WW—Weather Warning

WWA—Watch, Warning, Advisory

Attachment 2

EXAMPLE PSFB TAF

Table A2.1. Example Forecast for PSFB.

TAF KCOF 091000Z 0910/1016 13010G15KT 9999 FEW250 QNH3013INS BECMG 0917/0918 14012G18KT 9999 FEW030 SCT250 QNH3011INS BECMG 1013/1014 15012G18KT 9999 SCT025 BKN200 QNH3010INS TX29/0918Z TN23/0910Z=

Table A2.2. Example Forecast Amendment/Correction for PSFB.

TAF AMD KCOF 091245Z 0912/1016 13015G25KT 9999 FEW250 QNH3013INS BECMG 0917/0918 14012G18KT 9999 FEW030 SCT250 QNH3011INS BECMG 1013/1014 15012G18KT 9999 SCT025 BKN200 QNH3010INS TX29/0918Z TN23/0910Z AMD 091245=

Attachment 3

24-HOUR FORECAST

Figure A3.1. Example 24-Hour Forecast.

24 Hour Forecast

Cape Canaveral Space Force Station & Kennedy Space Center (CCSFS and KSC)

Wednesday, December 27, 2023

FORECAST	Wednesday 1200L-1600L	Wednesday 1600L-2000L	Wednesday 2000L-2400L	Thursday 0000L-0400L	Thursday 0400L-0800L	Thursday 0800L-1200L
Sky Condition	Mostly Cloudy	Mostly Cloudy	Mostly Cloudy	Cloudy	Cloudy	Cloudy
Precipitation Probability	20%	30%	100%	100%	100%	100%
Lightning Probability	0%	0%	0%	0%	0%	0%
Prevailing Winds (30-60' in Knots)	W 10	W 10	W 10	NW 10 G 15	NW 10 G 15	NW 10 G 15
Temperature	67F - 75F	75F - 66F	66F - 62F	62F - 58F	58F - 54F	54F - 65F
Remarks (Weather expected SFC-60')						
Severe Weather Potential	None	None	None	None	None	None

(Severe Weather is defined as Tornadoes, Wind ≥ to 50KTS, and/or Hail ≥ to 3/4")

Percentages refer to the probability of an event occuring within the Spaceport and not area or temporal coverage

Prepared by: BHH MF

MDOC, CCSFS

DSN 467-8485

Sunrise(Z): 1213

Sunset(Z): 2234

Attachment 4

WEEKLY PLANNING FORECAST

Figure A4.1. Example Weekly Planning Forecast.

Weekly Planning Forecast

Cape Canaveral Space Force Station & Kennedy Space Center (CCSFS and KSC)

(Posted by 08L Daily)

Wednesday, December 27, 2023

FORECAST PERIOD		Thursday	Friday	Saturday	Sunday	Monday	Tuesday
	DATE	28-December	29-December	30-December	31-December	1-January	2-January
Sky Condition	AM	Mostly Cloudy	Mostly Cloudy	Partly Cloudy	Partly Cloudy	Partly Cloudy	Mostly Cloudy
	PM	Mostly Cloudy	Partly Cloudy	Partly Cloudy	Partly Cloudy	Mostly Cloudy	Partly Cloudy
Precipitation Probability	AM	100%	20%	0%	0%	10%	60%
	PM	100%	0%	0%	0%	40%	20%
Lightning Probability	AM	10%	0%	0%	0%	0%	10%
	PM	10%	0%	0%	0%	10%	0%
Prevailing Winds (30-60' in Knots)	AM	NW 10 G 15	W 12 G 18	NW 10 G 15	W 10	SW 10 G 15	NW 12 G 20
	PM	SW 10 G 15	W 12 G 18	W 10 G 15	W 8	SW 10 G 15	N 10 G 15
Temperature	MIN	54F	48F	45F	40F	46F	49F
	MAX	73F	65F	61F	60F	64F	67F
Remarks (Weather expected SFC-60')					TEMPERATURES ≤ 40F BUT >32F EXPECTED		
Severe Weather Potential		None	None	None	None	None	None

(Severe Weather is Defined as Tornadoes, Wind ≥ to 50KTS, and/or Hail ≥ to 3/4")

Percentages refer to the probability of an event occuring within the Spaceport and not area or temporal coverage.

MONTHLY AVERAGES	RAIN	LIGHTNING	TEMPERATURE LOW	TEMPERATURE HIGH
	30%	5%	52	70

Prepared by DLP MB

MDOC, CCSFS

COMM 853-8485

DSN 467-8485

Attachment 5

DAY-OF-LAUNCH FORECAST

Figure A5.1. Example Launch Operations Forecast.

Launch Mission Execution Forecast

Mission: Falcon 9 PACE
Issued: 4 Feb 2024 / 1100L (1600Z)
Valid: 6 Feb 2024 / 0125 – 0136L (0625 – 0636Z)

Forecast Discussion: A complex weather pattern is unfolding today as a potent upper-level low digs into the Southeastern US. A surface low has developed in the eastern Gulf of Mexico due to strong divergence aloft. Widespread showers are moving from west to east across the Florida peninsula as the low continues to deepen and its associated fronts push through the area. Due to the upper-level pattern and the increasing low-level wind field, there is the potential for any embedded storms to become strong to severe. After the initial wave of showers and storms push through this afternoon, there will be a break in the action this evening into tomorrow morning as a dry slot filters in around the center of low pressure.

Tomorrow, the surface low will slowly push off to the east and will be centered off the Atlantic coast by the launch window Monday night/early Tuesday morning. There will likely be a tightening of the pressure gradient around the northwest side of the low, causing an increase in moisture and northerly winds funneling down the Florida coastline. The main concerns for the primary launch day are the Cumulus Cloud Rule due to coastal showers, the Thick Cloud Layers Rule from any lingering mid to upper-level cloud cover, and Liftoff Winds due to the tightening pressure gradient.

Conditions look to be marginally more favorable for the backup window early Wednesday morning as the low continues to push off to the east. Northerly winds will peak during the day on Tuesday, but will begin to decrease during the overnight hours. Drier air will also continue to move in. Thus, the POV is lower for the backup window with the primary concerns being the Cumulus Cloud Rule and Liftoff Winds.

Launch Day

Probability of Violating Weather Constraints[1]

60% — **Primary Concerns**: Cumulus Cloud Rule, Liftoff Winds, Thick Cloud Layers Rule

Weather Conditions		Clouds				Additional Risk Criteria[2]	
		Type	Coverage	Base (ft)	Tops (ft)		
Weather/Visibility:	Sct Showers / 7 mi.					**Upper-Level Wind Shear**:	Low
Temp/Humidity:	59°F / 85%	Cumulus	Scattered	3,000	12,000	**Booster Recovery Weather**:	N/A
Liftoff Winds (200'):	330° 25 - 33 mph	Cirrostratus	Broken	20,000	24,000	**Solar Activity**:	Low

24-Hour Delay

Probability of Violating Weather Constraints

40% — **Primary Concerns**: Liftoff Winds, Cumulus Cloud Rule

Weather Conditions		Clouds				Additional Risk Criteria	
		Type	Coverage	Base (ft)	Tops (ft)		
Weather/Visibility:	Isold Showers / 7 mi.					**Upper-Level Wind Shear**:	Low-Mod
Temp/Humidity:	61°F / 70%	Cumulus	Scattered	3,000	7,000	**Booster Recovery Weather**:	N/A
Liftoff Winds (200'):	360° 24 - 32 mph					**Solar Activity**:	Low

Notes

1. *The Probability of Violation (PoV) is the chance of a local safety or customer constraint violation occuring any random time during the launch window.*
2. *Additional Risk Criteria, which are not included in the PoV, are mission-specific constraints that may not include all phenomena within each risk factor.*

See https://www.patrick.spaceforce.mil/Portals/14/Weather/LaunchFAQ.pdf for more information

Next Forecast Will Be Issued | 5 Feb 2024

Attachment 6

AVON PARK TRAINING AREA AND DROP ZONES

Figure A6.1. Avon Park Training Area.

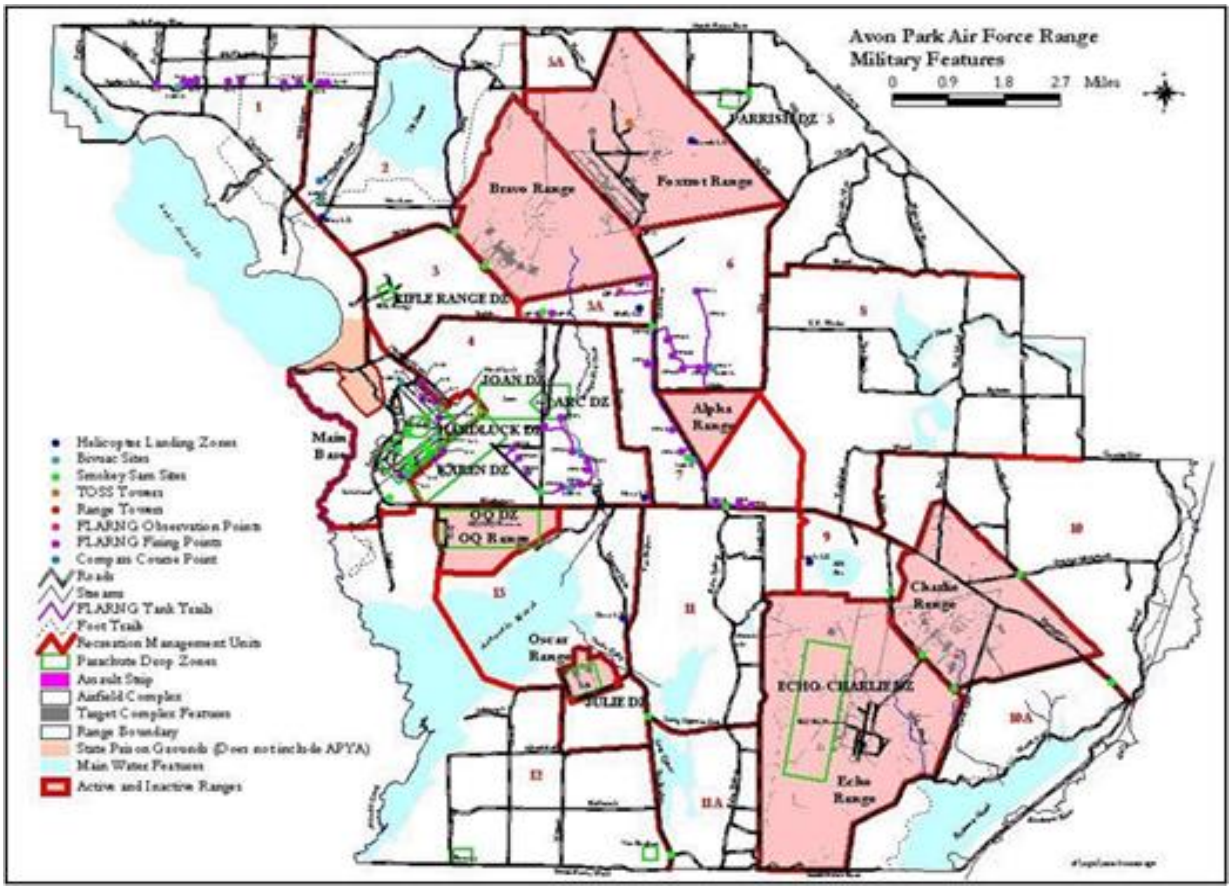
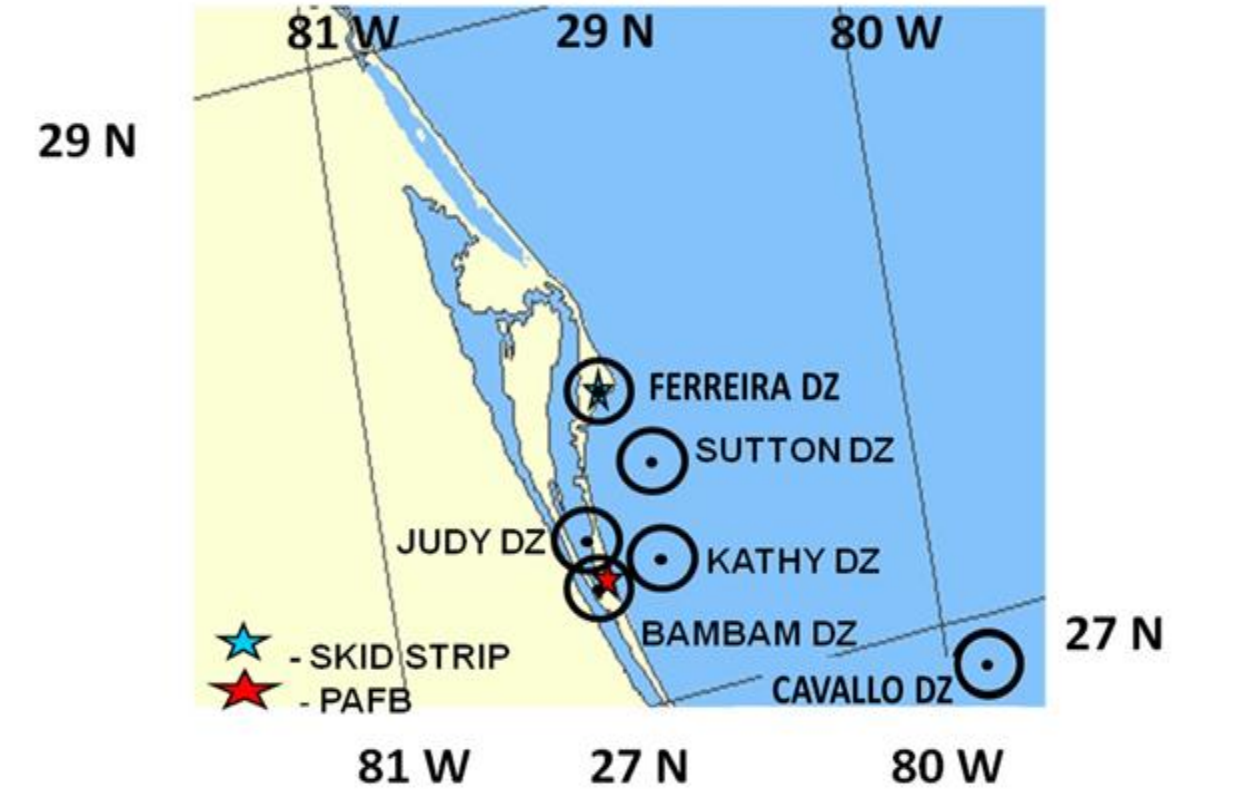


Figure A6.2. Drop Zones.



Attachment 7

DD FORM 175-1 EXAMPLE

Figure A7.1. Example DD Form 175-1.

FLIGHT WEATHER BRIEFING

PART I - TAKEOFF DATA

1. DATE	2. ACFT TYPE/NO.	3. DEP PT/ETD	4. RWY TEMP	5. DEWPOINT	6. TEMP DEV	7. PRES ALT	8. DENSITY ALT
		Z	°C	°C	N/A	FT	N/A FT

9. SFC WIND	10. CLIMB WINDS	11. LOCAL WEATHER WATCH/WARNING/ADVISORY	12. RSC/RCR
M T			

13. REMARKS/TAKEOFF ALTN FCST
BWC:

PART II - ENROUTE & MISSION DATA

14. FLT LEVEL/WINDS/TEMP — SEE ATTACHED

15. SPACE WEATHER	NO IMPACT	MARGINAL	SEVERE
FREQ			
GPS			
RAD			

16. SOLAR/LUNAR		LOCATION	
BMNT	Z		
SR	Z	MR	Z
SS	Z	MS	Z
EENT	Z	ILLUM	%

17. CLOUDS AT FLT LEVEL: YES / NO / IN AND OUT

18. OBSCURATIONS AT FLT LEVEL RESTRICTING VISIBILITY: YES / NO / TYPE

19. MINIMUM CEILING - LOCATION	20. MAXIMUM CLOUD TOPS - LOCATION	21. MINIMUM FREEZING LVL - LOCATION
FT AGL	FT MSL	FT MSL

22. THUNDERSTORMS

CHART

	NONE	AREA	LINE
ISOLATED 1-2%			
FEW 3-15%			
SCATTERED 16-45%			
NUMEROUS - MORE THAN 45%			

HAIL, SEVERE TURBULENCE & ICING, HEAVY PRECIPITATION, LIGHTNING & WIND SHEAR EXPECTED IN AND NEAR THUNDERSTORMS.

23. TURBULENCE

CHART

	NONE	IN CLEAR	IN CLOUD
LIGHT			
MODERATE			
SEVERE			
EXTREME			

LEVELS

LOCATION

24. ICING

CHART

	NONE	RIME	MIXED	CLEAR
TRACE				
LIGHT				
MODERATE				
SEVERE				

LEVELS

LOCATION

25. PRECIPITATION

CHART

	NONE	DRIZZLE	RAIN	SNOW	PELLET
LIGHT					
MODERATE					
HEAVY					
SHOWERS					
FREEZING					

LOCATION

PART III - AERODROME FORECASTS

26.	27. VALID TIME	28. SFC WIND	29. VSBY/WEA	30. CLOUD LAYERS	31. ALTIMETER	RWY TEMP	PRES ALT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT
DEST/ALTN	Z TO Z	M T			INS	°C	FT

PART IV - COMMENTS/REMARKS

32. BRIEFED RSC/RCR		YES		NOT AVAILABLE	33. PMSV 344.6	34. ATTACHMENTS		YES		NO

35. REMARKS Please call the 45th WS for updates prior to departure and return MEF Bebrief Form.

For updates at your destination, contact the following:
15th OWS - DSN 576-9755/COM (618) 256-9755 | 25th OWS - DSN 228-6598/COM (877) 451-8367 | 26th OWS - DSN 781-4775/COM (866) 233-9328
28th OWS - DSN 965-0939/COM (877) 297-4129 | 45th WS - DSN 467-8485/COM (321) 853-8485

PART V - BRIEFING RECORD

36. WX BRIEFED TIME	37. FLIMSY BRIEFING NO.	38. FORECASTER'S INITIALS	39. NAME OF PERSON RECEIVING BRIEFING
Z			

40. VOID TIME	41. EXTENDED TO/INITIALS	42. WX REBRIEF TIME/INITIALS	43. WX DEBRIEF TIME/INITIALS
Z	Z	Z	Z

DD FORM 175-1, OCT 2002 PREVIOUS EDITION MAY BE USED.

Attachment 8

MISSION EXECUTION FORECAST (MEF) EXAMPLE

Figure A8.1. Example MEF.

45 WS MISSION EXECUTION FORECAST

DEPARTURE STATION / ETD: KCOF / 1700 Z | DATE: 12-Jan-20 | TYPE AIRCRAFT / CALL SIGN: C130 / GUMP60

VALID TIME	WIND (M /)	VIS	WEATHER	TMP °C	DP °C	SKY CONDITION	ALSTG	PA
12/1600 Z 12/1800	15010G15	10SM	VCSH	+25	+22	SCT020 X-WIND RWY 02/20: 11 11/29: 10 KTS	3027	-313 FT

CLIMB WINDS: 15020KT (SFC-020) | WATCHES / WARNINGS / ADVISORIES: CONTACT LOCAL WX STATION | RCR / RSC: DRY | BIRD WATCH CONDITION: N/A

REMARKS (TSTMS IMPLY LLWS):

ENROUTE DATA

FLIGHT LEVELS WIND / TEMPERATURE °C: FL: 020/220 [X] SEE ATTACHED

FREEZING LEVELS / LOCATION: 12,000FT / KMXF

SPACE WEATHER	AFW-WEBS	NO IMPACT	MARGINAL	SVR
HF COMM		X		
UHF SATCOM		X		
GPS ERROR		X		

LIGHT / NVG DATA	KMXF			
BMNT	12/1151 Z	MR	13/0115 Z	
SR	12/1248 Z	MS	12/1426 Z	
SS	12/2300 Z	ILLUM	98 %	
EENT	12/2357 Z			

THUNDERSTORMS: MWA / WW NO: 26OWS 12/18Z-12/21Z | NONE [ ] AREA [ ] LINE [ ]

[X]	ISOLATED 1 - 2% 460
	FEW 3 - 15%
	SCATTERED 16 - 45%
	NUMEROUS - MORE THAN 45%

HAIL, SEVERE TURBULENCE, ICING, HEAVY PRECIPITATION, LIGHTNING, WIND SHEAR EXPECTED IN/NEAR THUNDERSTORMS

LOCATION(S): N. FL

TURBULENCE: CAT ADVISORY: 26OWS 12/18Z-12/21Z | [X] NONE [ ] IN CLEAR [ ] IN CLOUD

LIGHT	
MODERATE	
SEVERE	
EXTREME	

LEVEL(S):

LOCATION(S):

ICING: NONE | 26OWS 12/18Z-12/21Z

	RIME	MIXED	CLEAR
TRACE			
LIGHT			
MODERATE			
SEVERE			

LEVEL(S):

LOCATION(S):

PRECIPITATION: NONE | FCST / RADAR

	DRIZ	RAIN	SNOW	ICE PELLETS
LIGHT				
MODERATE				
HEAVY				
SHOWERS				
FREEZING				

LOCATION(S):

AIR REFUELING / ORBIT / LOW LEVEL ROUTE FORECAST

LOCATION / FLIGHT LEVEL	CLOUDS	VIS	WEATHER	WINDS	VALID TIME
		IC OC			Z
		IC OC			Z

DROP / LANDING ZONE FORECAST

DROP ZONE / ALTITUDE	CLOUDS / VISIBILITY / WEATHER	WIND / TEMPERATURE °C: SURFACE	WIND / TEMPERATURE °C: DROP ALTITUDE	ALSTG	VALID TIME
					Z
					Z

HAZARDS / REMARKS:

WIND (AGL) / TMP °C	040	050	060	080	100	120	150
	SFC	005	010	015	020	025	030

RECOVERY / ALTERNATE FORECAST

STATION	WIND (M/T)	VIS	WEATHER	TEMP	SKY CONDITION	PA	ALSTG	VALID TIME
KNQX	11012 T	10SM		+24	BKN025 X-WIND RWY 03/21: 12 07/25: 8 KTS	-251 FT	3020	12/1800 12/1700 - 12/1900 Z
KMXF	VRB06 T	10SM		+17	BKN020 X-WIND RWY 15/33: 6 09/1: 5 KTS	-121 FT	3024	12/2000 12/1900 - 12/2100 Z
								Z
								Z
								Z

REMARKS (TSTMS IMPLY LLWS):
For Flight Briefings at stops contact
45 WS - DSN 854-7113/ COM (321) 494-7113

PMSV LOCATION: KCOF | FREQUENCY: 225.05 | PILOT: Capt Bossey | ATTACHMENT: YES

BRIEFING DATA

BRIEFED TIME (ZULU)	INITIALS	REBRIEFED TIME (ZULU)	INITIALS
E 12/1400Z	CG		

Previous Editions May Be Used

Attachment 9

PSFB METWATCH PRODUCTS

Table A9.1. Example Weather Watch.

Weather Watch 11-A01 for Patrick SFB (KCOF) Valid 22/1700Z (22/1200L) to 22/2000Z Potential for Severe Thunderstorms is forecast for Patrick SFB. (Winds GTE 50 kts and/or Hail GTE 3/4in)

Table A9.2. Example Lightning Warning.

Weather Warning 11-A01 for Patrick SFB (KCOF) Valid 22/1700Z (22/1200L) UFN Observed Lightning is occurring within 5 nm. This is a Phase II lightning condition.

Table A9.3. Example Weather Advisory.

Weather Advisory 11-A01 for Patrick SFB (KCOF) Valid 22/1700Z (22/1200L) to 22/2000Z Forecast Winds greater than or equal to 25 but less than 35 kts. Maximum expected 25 kts. Winds expected 12015G25kts.

Attachment 10

LIGHTNING PROTECTION CIRCLE REQUIREMENTS

A10.1. Coordination with external organizations will be an integral part of the decision-making process for all lightning notification on the ER. Ultimately, the verdict concerning if or when to add, alter, or remove a lightning protection circle on the ER will be at the discretion of the 45WS. In order to justify creation and/or preservation of a lightning protection circle by the 45 WS, each worksite must satisfy and maintain the following conditions:

A10.1.1. Outdoor personnel presence of routinely no fewer than 10 people per shift in open, uncovered areas -OR.

A10.1.2. hardware processing or other sensitive electronics which may be impacted by nearby lightning (including indoor processing) AND

A10.1.3. On-site personnel must take specific actions upon Phase 2 notification (e.g. processing stops, people clear area, etc.)

A10.2. New lightning warning circles which are approved for construction sites will include a "sundown date" after which lightning notification will cease. This date MUST be negotiated with and agreed upon by 45 WS leadership.

A10.3. While sundown date extensions may be offered on a case-by-case basis, the 45 WS will not continue issuing lightning notifications until a new date has been agreed upon. All coordination for a new sundown date must be completed in advance or Phase II notification will cease and the site will have to submit a new requirement.

A10.4. For each requirement, an assessment will be made regarding the creation of a lightning hazard notification area (LHNA) - Essentially, this is a small circle which encompasses the entire worksite, airfield, launch complex, or other important structure(s). From the edge of this circle, a designated standoff distance is drawn, normally 4 nm. This ensures all resources and personnel within the LHNA are properly notified of lightning potential. Those outside the LHNA do not receive the advertised protection afforded by a Phase II notification. The existence of a *standoff distance is specifically to provide enough time and separation from incoming lightning to ensure the completion of required safety actions. Examples of ER sites with LHNAs can be found on our public webpage at **https://www.patrick.spaceforce.mil/About-Us/Weather/** under the Weather Safety section. **NOTE**: LHNAs will only be required for certain sites. If the worksite extends outward greater than 0.1 nm (~600ft) from the center, a LHNA will be required. Otherwise, it will be labelled as a "point-site" with no inner LHNA and will also be eligible for a 4 nm protection circle waiver through SLD 45/SE. There are additional caveats to obtaining a 4 nm waiver which may be obtained by working through SLD 45/SE.