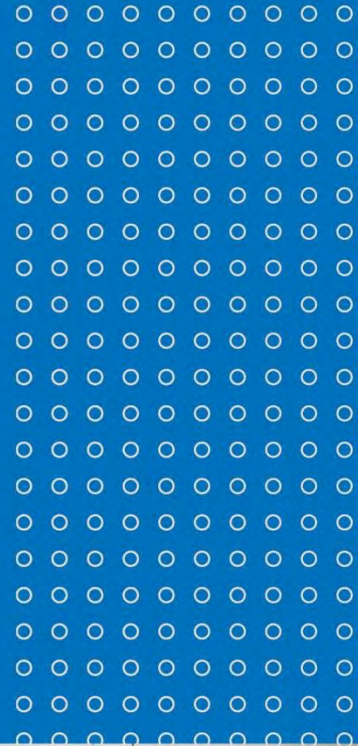


HUB Risk Services

Weather Preparedness Toolkit for Live Events





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Section 2

[Weather Preparedness Plan](#)

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Weather Monitoring Services: WeatherOps® powered by DTN

ANSI ES1.7-2021 Event Safety Requirements: Weather Preparedness



Weather Preparedness for Live Events

Severe weather can significantly impact live events, often leading to delays, cancellations or potentially dangerous situations. Here are some notable examples:

- **Lollapalooza Festival (2012):** Torrential rain, lightning, and wind speeds over 70 mph in Chicago, IL led to a 2.5-hour delay. Fortunately, proper planning ensured that over 60,000 concertgoers were directed to shelters, avoiding injuries.
- **Boardmasters Music Festival (2019):** High winds led to the last-minute cancellation of this three-day festival in Cornwall, England,
- **Elton John Concert (2023):** Torrential rain and floods in Auckland, New Zealand forced the cancellation of this show.
- **Ed Sheeran Concert (2023):** Seventeen fans were hospitalized due to heat illness at a concert in Pittsburgh, PA.

These examples highlight the importance of planning and adapting to severe weather conditions to ensure the safety of attendees, employees, volunteers, vendors, performers/participants, etc.

Types of Severe Weather

The most common types of severe weather that could impact a live event include:

- **Severe Thunderstorms:** Strong winds, heavy rainfall and possible hail.
- **Flash Flood:** Floods caused by excessive rainfall in a brief period of time.
- **Lightning:** Lightning can result in serious injuries or death and significant property/equipment damage.
- **Hail:** Large hail can cause injuries and considerable damage to the venue.
- **Tornadoes:** Tornadoes are incredibly powerful and destructive weather events that can lead to loss of property and life.
- **Extreme Heat:** Heat is the leading weather-related cause of death in the United States.
- **High Winds:** Winds can lead to damage to the venue including stage and tent collapse.

Planning Considerations

Items to consider while planning a live event should include, but are not limited to, the following:

- **Site Selection:** Where will the event be held? What is the climate profile of the site?
- **Communication:** How will the production team communicate with attendees, employees, volunteers, performers/participants before, during, and after a weather event?
- **Weather Forecasting and Monitoring:** How will the event producers monitor the weather?
- **Organizational Structure:** How will decisions be made ahead of potential severe weather? Who has the overall show stop authority?
- **Event Interruption:** What is the procedure to delay or cancel the event when faced with severe weather? What is the procedure to resume normal event operations when the danger has passed?



Getting Started

This toolkit has been developed by the HUB International Risk Services Division to help our clients plan and prepare for severe weather at their events. The toolkit contains several templates and other helpful resources; however, it is critical that event producers do their research, establish a plan and communicate the plan with all stakeholders.

Weather Preparedness Plan

A written weather preparedness plan should be developed as part of the overall event planning process. This plan should be site/venue specific, consider the time of year the event is taking place, and anticipate potential weather events that might impact the event. It also includes details on steps to be taken before, during, and after a weather event. This plan should be communicated with all stakeholders prior to the event

Weather Trigger Chart

A Weather Trigger Chart should be developed to outline actions that need to be taken when severe weather is imminent. Many event producers prominently display the event's Weather Trigger Charts backstage, in command centers, and other production areas.

Weather Monitoring Services

Forecasts using weather applications on mobile devices are simply not accurate enough for the production team to make informed decisions on whether to cancel, postpone, and/or resume the event. Consideration should be given to contracting with a meteorologist or weather monitoring service like DTN to provide comprehensive forecasting and to assist the production team with real-time decision making.

ANSI ES1.7-2021 Event Safety Requirements – Weather Preparedness

Entertainment Services and Technology Association (ESTA) developed ANSI Standard ES1.7-2021 to “provide guidance on identifying weather-related hazards, monitoring technologies, and the basic requirements necessary to develop and implement risk mitigation actions associated with weather”. Event producers are highly encouraged to review this standard.

ENTERTAINMENT & SPORTS

Weather Preparedness for

A planning toolkit to help event organizers prepare for and respond to severe weather.

This Weather Preparedness Toolkit was developed to protect life safety and property against severe weather that may impact _____ .

The toolkit provides management planning protocols and protective actions to be taken before, during and after severe weather events and applies to event management and personnel, attendees, vendors and performers/participants. A plan for all _____ locations is detailed, including the event venue, parking areas, _____, _____ and _____ that are covered by the plan.

Life safety is the highest priority of this plan.

How to use this weather preparedness toolkit

This toolkit is designed to help event organizers think through severe weather planning before an event. It provides a structured starting point to help guide your response protocols and communication strategy.

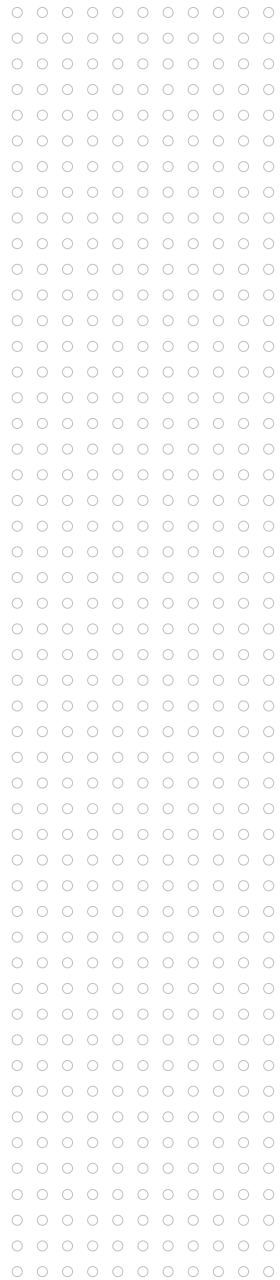
While it does not cover every scenario, it outlines essential components to strengthen preparedness. For a more comprehensive plan, we recommend reviewing this document with your HUB advisor.

Prepared By: _____

Date Prepared: _____

Reviewed with HUB Advisor: Yes No

HUB Advisor Name: _____



Advance planning is critical

Before the event, _____ should evaluate the event site for availability of egress and evacuation pathways. Additionally, the site should be evaluated for areas to shelter-in-place during severe weather. Keep in mind that shelter areas may be off-site and require coordination with property owners/managers in advance.

CLIMATOLOGICAL PROFILE

_____ should also develop a climatological profile for the event site. This should include consideration for the time of year and historical wind, temperature, precipitation and lightning conditions within _____ radius of the event site.

_____ will determine the need for remote monitoring, professional meteorologists or other forecasting services. If these services are deemed necessary, _____ will include them in the event planning process.

Necessary weather risk assessments

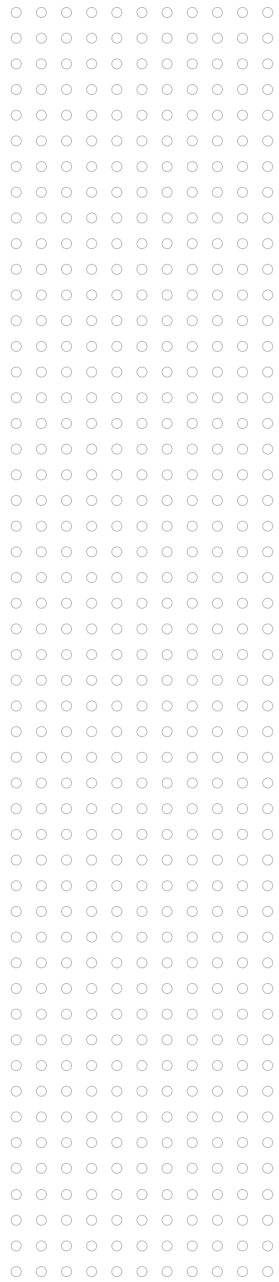
The possibility of severe weather may exist at any time, especially during _____ months in _____.

For this event, _____ radius from the perimeter of the event will be used for monitoring, alerting and triggering of weather-related hazard mitigation actions.

_____ will develop an event-specific evaluation and assessment of the minimum time required to execute any mitigation actions, up to and including show-stop and site evacuation.

Hazard Mitigation Activity	Alert & Activation Time (min)	+	Hazard Mitigation Action (min)	X	25% Safety Factor	=	Total Time Needed (min)
Evacuation		+		X	1.25	=	
Shelter in Place		+		X	1.25	=	
Other: _____		+		X	1.25	=	
Other: _____		+		X	1.25	=	
Other: _____		+		X	1.25	=	

* Note: The timing formula above is just an example and may not apply to every scenario.



Organizational roles bring structure and clarity

- **Designated Administrator:** _____ is the Designated Administrator of the Event who has the authority to cancel, postpone and resume all activities associated with the event due to severe weather. If severe weather occurs during the event, the Designated Administrator will instruct event personnel to begin life safety and property protection mitigation efforts as detailed in the weather trigger chart.

Designated Administrator Name: _____

Email: _____

Phone: _____

- **Alternate Designated Administrator:** If the Designated Administrator cannot be reached, _____ will be designated as the Alternate Designated Administrator to perform these duties.

Alternate Designated Administrator Name: _____

Email: _____

Phone: _____

- **Designated Weather Monitor:** _____ is the Designated Weather Monitor and will begin to monitor weather conditions at least one week before the event and report any weather-related concerns to the Designated Administrator.

Designated Weather Monitor Name: _____

Email: _____

Phone: _____

- The Designated Weather Monitor will monitor the [National Weather Service](#) and _____ for up-to-date weather-related information.
- The Designated Weather Monitor will reference the local _____ website for severe weather plans and emergency preparedness tips.

- **Weather Monitoring Services:** This event has contracted with _____, a professional weather monitoring service. At a minimum, the Designated Weather Monitor will communicate with the Weather Monitoring Service during the planning phase of the event, at least one week prior to the event and at least _____ during the event.

Weather Monitoring Services: _____

Contact Name: _____

Email: _____

Phone: _____

- **Authorities Having Jurisdiction (AHJs):** The local fire chief, police chief or other AHJs also have the authority to cancel event activities that may threaten public safety due to severe weather. The Police Chief, Fire Chief or other AHJs will contact the Designated Administrator to direct the closure of events.

- **Police department:**

Local Liaison Name: _____
Email: _____
Phone: _____

- **Fire department:**

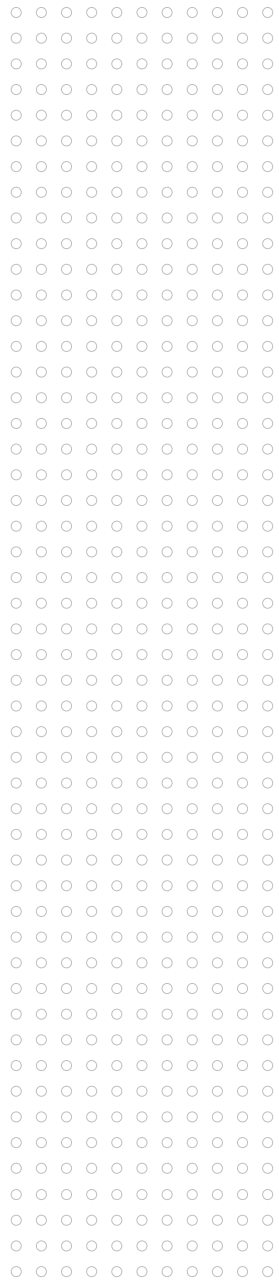
Local Liaison Name: _____
Email: _____
Phone: _____

- **Other AJH:**

Local Liaison Name: _____
Email: _____
Phone: _____

- **Other AJH:**

Local Liaison Name: _____
Email: _____
Phone: _____



Clear communication is paramount

Internal Communication: The following communication devices will be used for internal communications:

- _____
- _____
- _____
- _____
- _____
- _____

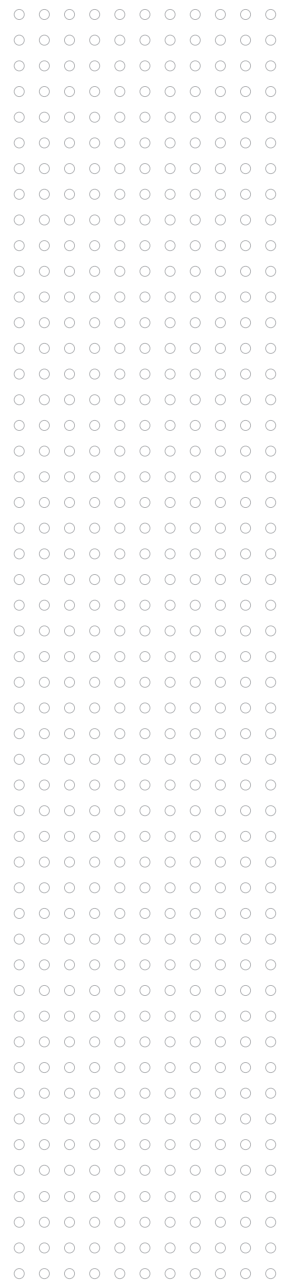
Public Information & Communication:

- Before the event:** If severe weather is anticipated during the event, _____ will determine the appropriate course of action (delaying, canceling, or rescheduling). _____ will notify vendors, event personnel, performers/participants and the public via:

- _____
- _____
- _____
- _____
- _____
- _____

- During the event:** If severe weather occurs during the event, _____ will make life safety announcements to those in attendance through:

- _____
- _____
- _____
- _____
- _____
- _____



MESSAGE TEMPLATES

The messages below are intended as templated examples only. _____ must determine site-specific instructions the public is to follow for each potential weather hazard and how these messages will be communicated.

Severe Thunderstorm Warning

If a Severe Thunderstorm Warning is issued for the area, the following announcement will be made:

A Severe Thunderstorm Warning is in effect for the _____ area. For your safety, _____ is _____ until the severe weather threat has passed. Please leave the area as soon as possible and take shelter at a designated shelter location(s).

Designated shelter location(s):

_____: Located at _____
_____: Located at _____
_____: Located at _____

Check _____, _____, _____ for information regarding the event status and when it is safe to return.

Tornado Watch

If a Tornado Watch is issued for the area, the following announcement will be made:

A Tornado Watch is in effect for the _____ area. For your safety, the _____ is canceled until the severe weather threat has passed. Please leave the area as soon as possible and take shelter at the designated shelter location.

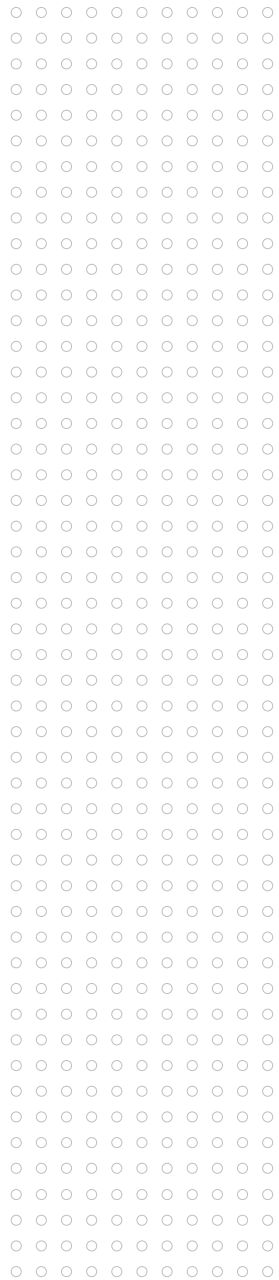
Designated shelter location(s):

_____: Located at _____
_____: Located at _____
_____: Located at _____

Check _____, _____, _____ for information regarding the event status and when it is safe to return.

Other Severe Weather

Announcements should be crafted for other potential severe weather conditions such as high winds, lightning, heat, hail, etc.



Importance of weather forecasting & monitoring

Extended forecasting (3-5 days), short range forecasting (day of) and nowcasting (0-3 hours) will be used during the event planning process to help determine risk mitigation, event delay or cancellation.

Forecasting resources:

- U.S. National Weather Service
- _____
- _____

ON-SITE WEATHER MONITORING DEVICES WILL BE REQUIRED AT THIS EVENT.

- 1. Lightning:** High precision lightning monitoring equipment set for the event radius boundaries specified above will be required.

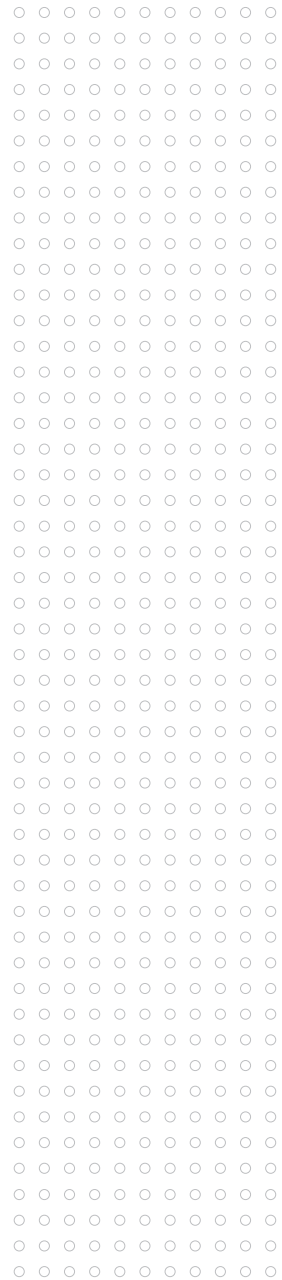
Lightning monitoring device/system:

- 2. Wind:** Anemometers will be used to measure wind and will be positioned in accordance with manufacturers' instructions or as directed by a qualified person.

Location of anemometer(s):

_____: Located at _____
_____: Located at _____

- 3. Weather Monitoring Service:** _____ has been contracted for this event. Communication with this service is described above.



Weather Safety Decision Trigger Chart

_____ will use the Weather Safety Decision Trigger Chart to determine risk mitigation actions that will be taken to prepare for impending severe weather. The Weather Trigger Chart will be posted in visible locations in multiple production areas such as backstage, sound booths and production offices.

THREAT	ALERT METHOD	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP	GROUP
WINDS > 40 MPH; Hail > 3/4 inch; Lightning; Tornado Warning; WBGT > 90°F		IMMEDIATE RETREAT TO DESIGNATED SHELTERS.						
WINDS > MPH								
LIGHTNING > miles/min								
HAIL > miles/min								
WBGT > 88°F								
WINDS > MPH								
LIGHTNING > miles/min								
HAIL > miles/min								
RAIN > miles/min								
WBGT: 85-88°F								
ALL CLEAR		WEATHER IS ALL CLEAR. ALL AREAS CAN RESUME NORMAL ACTIVITIES.						

Event Interruption

Weather-related conditions that will result in day-of-event delay, cancellation or show stop will be determined by the Designated Administrator and Event Management Team. Show stop conditions will require coordination with the Event Crowd Management Plan.

Temporary weather-related show stops made with the intent to resume normal show operations will only be considered only when weather conditions are continuously monitored and assessed by a professional meteorologist or Weather Monitoring Services.

Resuming Normal Event Operations

1. After delays due to wind, normal event operations will not resume until wind speeds have reduced below the wind speed thresholds in the trigger chart for not less than _____ minutes or upon approval from a professional meteorologist.
2. After delays due to lightning, normal event operations will not resume until after _____ minutes have passed with no new strikes within the alert radius or upon approval by a professional meteorologist.
3. Prior to resuming normal event operations, the Event Management Team will:
 - Inspect all event locations including the event grounds, parking areas, stages, towers, vendor installations, roads/trails leading to the event, other affiliated locations, etc. to ensure the site is safe before the public is allowed back and the event recommences.
 - Event Management Team, in consultation with the Fire Department, Police Department, Weather Monitoring Services and _____, has the authority to deem the event locations safe enough for public re-entry and event activities to commence.
4. If the event locations are too damaged to commence normal activities, the Designated Administrator and Event Management Team will make the determination to cancel the event and all other associated activities including _____ and _____.
5. If vendor or event property becomes damaged due to severe weather, _____ will complete an incident report detailing the damages. At a minimum, the incident report will include description of the damages, videos, pictures, witness statements, etc. _____ will notify the event insurance broker or insurance carrier as soon a possible.

Approvals

This document is the initial Severe Weather Plan for _____ and may be updated or amended as required.

Effective Date

THIS PLAN HAS BEEN REVIEWED AND APPROVED BY THE FOLLOWING:

_____	_____
Designated Administrator	Date
_____	_____
Chief, Fire Department	Date
_____	_____
Chief, Police Department	Date
_____	_____
	Date

COPIES OF THIS PLAN WILL BE SUBMITTED TO:

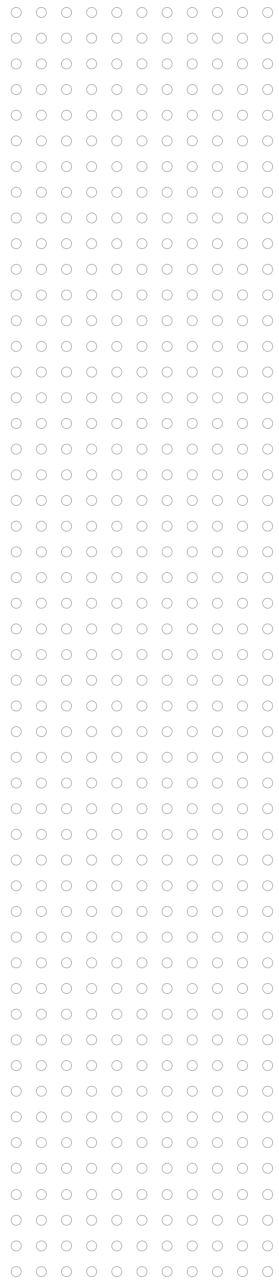
Event Management

Fire Department

Police Department

Other: _____

Other: _____



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Event Production Weather Monitoring Services

* DTN Proprietary Information

www.dtn.com

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The Challenge

At DTN, we take weather safety seriously and want to thank you for the opportunity to earn your business. Weather risk mitigation for the entertainment industry is our specialty. Helping you protect your crews, talent, and fans is our top priority. You have enough to be concerned with, let us handle the weather via our industry-leading technology, 24/7 forecaster support, and the only service specifically tailored to your industry.

The “show go” guys

This document provides an overview of the products and features of our service, as well as details about how each component works together seamlessly to ensure a complete weather solution. Remember, we’re the “Show Go” guys and it’s our job to take into consideration not only safety, but your bottom line. We’ll provide you the information necessary to alter your plan, adjust your timing, and more often than not, allow the show to go on.

How we do it

DTN delivers turnkey solutions that meet complex needs. Our WeatherOps team directly supports artist tours, festivals, venues, staging companies, film productions and others, varying the information disseminated based on the specific need of each client. Forecasts and alerts are provided via Internet, email, mobile push alerts, and direct phone access to a WeatherOps staff meteorologist, 24/7/365. WeatherOps meteorologists have access to the best datasets and highest resolution weather models in the industry, backed by a driven team of experts, with many holding Masters to PhD level credentials. We do not mess around!

Our proposal

We propose to you, a tried-and-true package customized by your industry using our experience supporting thousands of productions around the globe. Please let us know if you have questions about our service. Ever had a meteorologist on your crew? You do now! Go relax.

The Proposed Solution

All active events and locations included will receive the following:

- *WeatherOps admin portal to set up users, locations, and to set up service for upcoming events
- *WeatherOps mobile app access for personnel
- *Interactive weather display for all events and location
- *High precision lightning alerting via email and mobile app for active location
- *NWS Watches Warnings & Advisories via email and mobile app
- *Site-specific Daily Planner and Weather Check forecasts via email and mobile app
- *Forecaster generated alerts via email and mobile app for active locations
- *24/7 live meteorologist phone support

(See Service and product Examples on following pages)



Executive Summary & Daily Threat

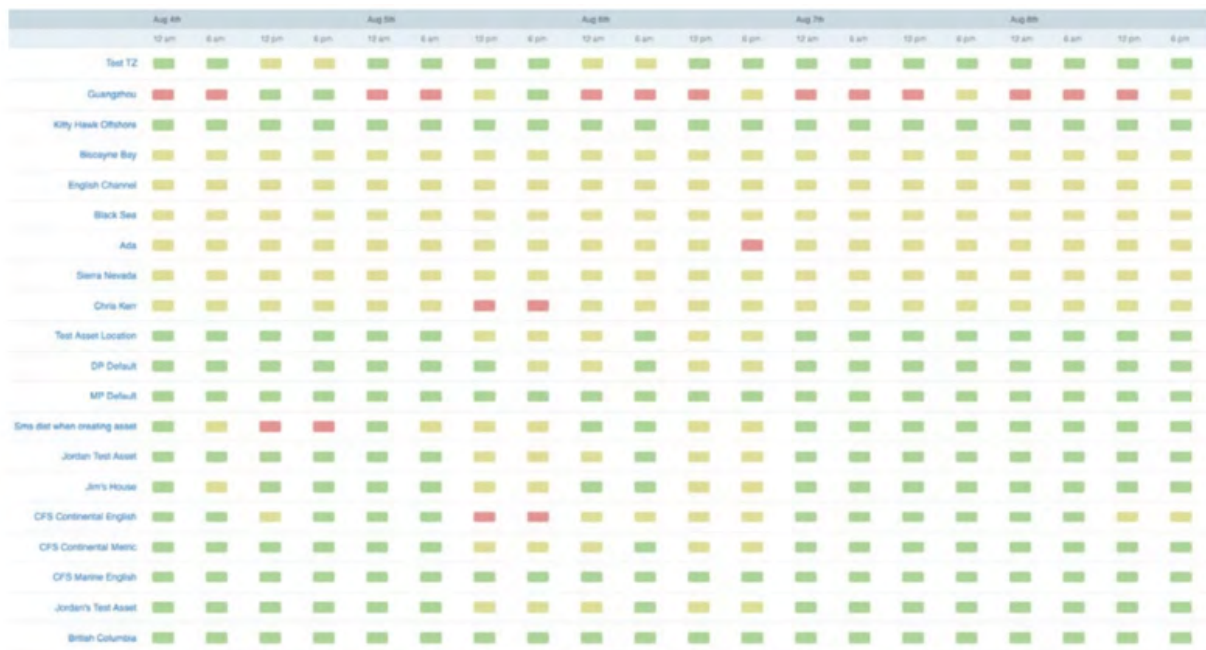
Easily identify weather risks for all of your locations in one simple graphic, with a colour-coded threat matrix showing all of your locations and the weather threats by colour (green=low risk, yellow=mod risk, red=high risk) for each shown for a chosen period (1, 2, 6, 12, & 24-hour period).

Executive Summary

We've taken our threat matrix and compressed it so you can see all of your assets in one place simultaneously. At a glance, you can quickly identify assets that may require focus in the following days. The temporal resolution in this report is customizable just like the dynamic planners. (Available in the online portal and mobile app)

Daily Threat Report

We want to help you by providing a "Management by Exception" solution. In this report, decision makers see only assets with a parameter "triggered" during the following ten days. Daily Threat is available within Commander and the WeatherOps mobile app for each asset. Know only the threats that matter.



Site-Specific Alerts

WeatherOps Forecaster Issued Alerts

WeatherOps meteorologists continuously monitor 24/7 weather conditions at customer assets for the possibility of a significant or severe weather event that could be hazardous to the asset. When it is determined severe weather could be a threat to the asset, the following actions are taken:

Severe weather alerts are issued by meteorologists utilizing WeatherOps proprietary Alerting System. Color-coded (based on the severity) alerts of imminent hazardous weather that could affect the site within 0-3 hours are targeted. These include (but are not limited to) severe thunderstorms, tornadoes, waterspouts, strong winds, heavy snow, ice storms, excessive heat, fog, frontal passages and weather related to tropical cyclones. Other weather events can be included upon request.

WeatherOps meteorologists provide severe weather alerts to assets when severe weather is determined to be a threat. Alerts will include the time of arrival, duration of and time of departure of the event. Information will be depicted on the Interactive Map, sent via email and phoned directly to an asset if requested.

WeatherOps
powered by DTN

Waverly, VA
WeatherOps Hazardous Thunderstorm Watch, expires at Monday, November 30, 2020 6:55 pm EST

A WeatherOps Forecaster has issued a WeatherOps Hazardous Thunderstorm Watch for WDT Inc's Waverly, VA at Monday, November 30, 2020 1:10 pm EST through Monday, November 30, 2020 6:55 pm EST. [Monitor in real-time on WeatherOps Map for WDT Inc.](#)

Hazardous Thunderstorm Watch for This Afternoon

Threat Time: Through 5pm

Primary Impacts
Tornado/Waterspout Threat: Moderate
Wind Gusts: In Excess of 50 mph Likely
Heavy Rain: Likely
Hail: Small hail possible
Frequent Lightning

Discussion: Isolated to scattered thunderstorms have begun to develop along a cold front and will continue to push eastward while becoming more organized in nature. Any storms that develop could produce damaging wind gusts and a few tornadoes. Activity will push off to the east this evening.

DTN's WeatherOps Meteorologists provide alerts for any given location, worldwide. Alert types included:

Outlook

- Excessive Rainfall Outlook
- Severe Weather Outlook
- Extended Outlook Days 2—7

Thunderstorm

- Thunderstorm Watch
- Hazardous Thunderstorm Warning
- Particularly Hazardous Thunderstorm Warning

Heat

- Heat Index Warning

Tropical

- Hurricane Warning
- Hurricane Watch
- Tropical Storm Watch
- Tropical Storm Warning

- Tropical Weather Outlook
- Tropical Early Warning

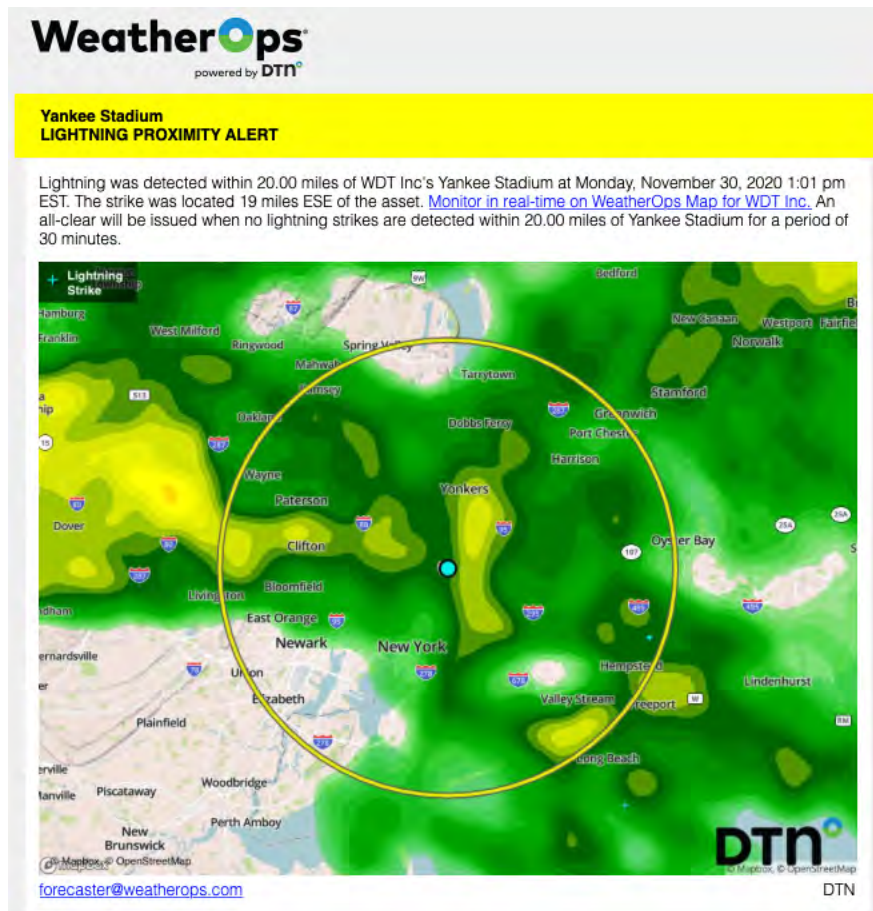
Wind

- High Wind Watch
- High Wind Warning

Lightning Proximity Alerting

DTN's automated systems and data streams provide real-time lightning proximity alerting including "all-clear" notifications for those locations where operations are sensitive to lightning risk. This system detects and distributes lightning alerts via email, SMS text, and push notification through the WeatherOps mobile app; in the WeatherOps Display (audible and visual). DTN utilizes global high precision lightning networks for all of our lightning services, ensure maximum lightning coverage anywhere on the planet.

- Issued once strike is detected within up to three selected proximity rings
- An all clear will be issued when no lightning has been detected within the selected radius for a specified number of minutes (customizable by location)





24/7 Site-Specific Global Monitoring

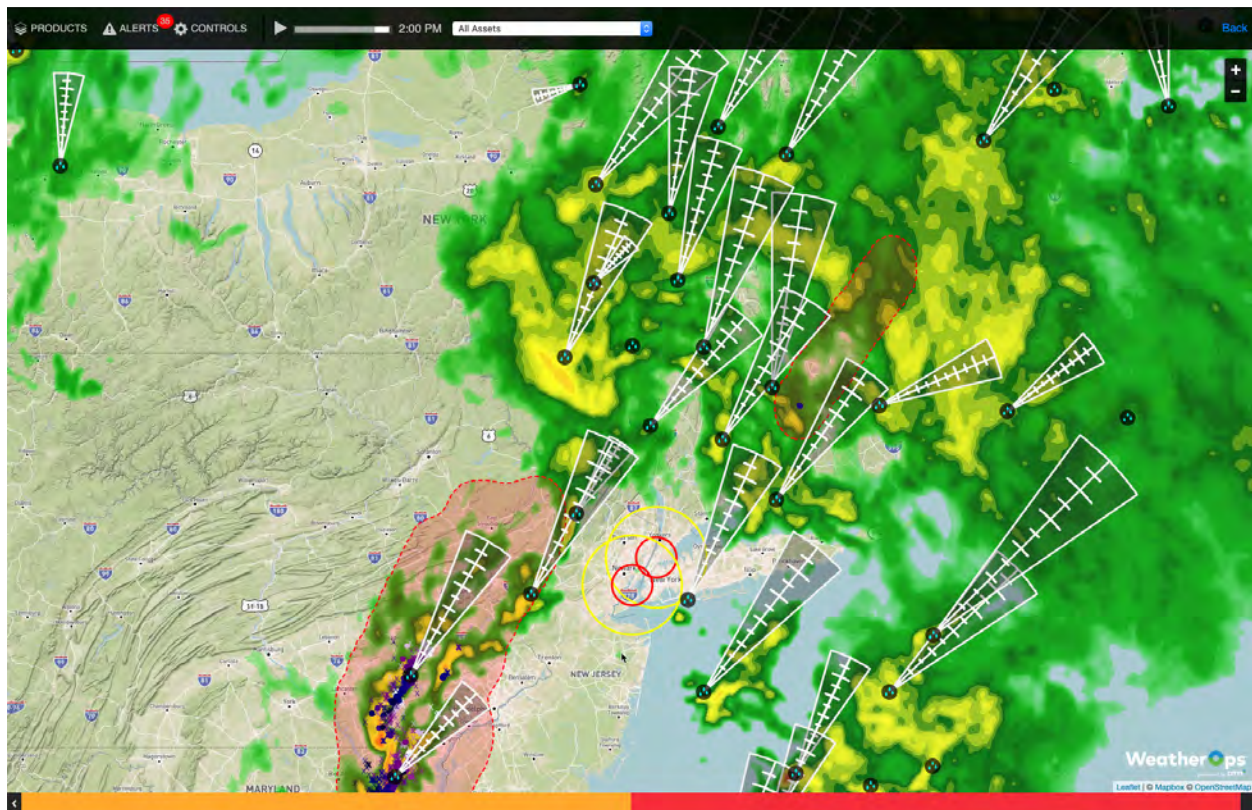
WeatherOps Forecaster 24/7 Accessibility

DTN WeatherOps forecast team provides decision-level managers and directors the ability to quickly establish one-on-one communication with the WeatherOps forecast desk via a direct phone line. We understand you may need additional information regarding a high-impact weather event and its potential impact on operations as a situation evolves. Our meteorologists will interact with you in a clear and concise manner, offering additional clarification beyond the weather forecasts and alerts contained within the WeatherOps Display (which is suitable for display for situation room monitors). WeatherOps meteorologists on the forecast desk are available 24/7/365.

During large scale or extreme events, DTN provides detailed conference calls with our impacted clients. Our clients' decision makers and executives leverage these calls with our senior meteorologists to understand how the weather event will impact their operations. During Hurricanes Harvey, Irma, and Maria in 2017 our WeatherOps team hosted over 200 video/voice conferences with senior management/executive teams of our customers with extremely positive feedback.

Visualization, Lightning, Radar & More

The WeatherOps Interactive Map is a web-based, cloud-delivered interactive display that provides complete weather decision support. The Interactive Map displays a plethora of weather data and decision analytic layers, overlaid on a global map. Functions within include: advanced severe weather tracking, site-specific alerting, and tropical storm tracking, all in one concise display. There is simply no better way to supplement your adverse weather plan than with the technology offered within this enterprise level product.



Asset Monitoring & Alerting Features

- The Interactive Map system delivers asset threats to you visually and audibly
- Advanced severe weather tracking designed for use by those with any level of weather knowledge
- Site-specific lightning alerting and monitoring and reporting technologies
- Track severe weather threats for specific locations
- Automatic warning dissemination for predetermined weather parameters specific to your needs
- Alerts include hazards defined by you and provided by our WeatherOps meteorologists

High Resolution Radar

- Radar imagery at the highest spatial resolution available in the weather industry
- Street-level radar products for pinpoint accuracy
- Animation of all-time sequenced layers (satellite, radar and lightning)

Satellite, Tropical & Storm Data

- Auto-updating of Hurricane Forecasts, Tracks and Models (both DTN & National Hurricane Center generated)
- Infrared (IR) satellite product shows clouds by their temperature
- Visible satellite

Severe Weather & Storm Cell Attributes

- Severe weather indices contours
- Interactive Watches & Warnings
- WeatherOps Forecaster Issued Watches/Warnings/Advisories
- WeatherOps Forecaster Outlooks

Precipitation

1 and 24-hour precipitation amounts

Additional Features

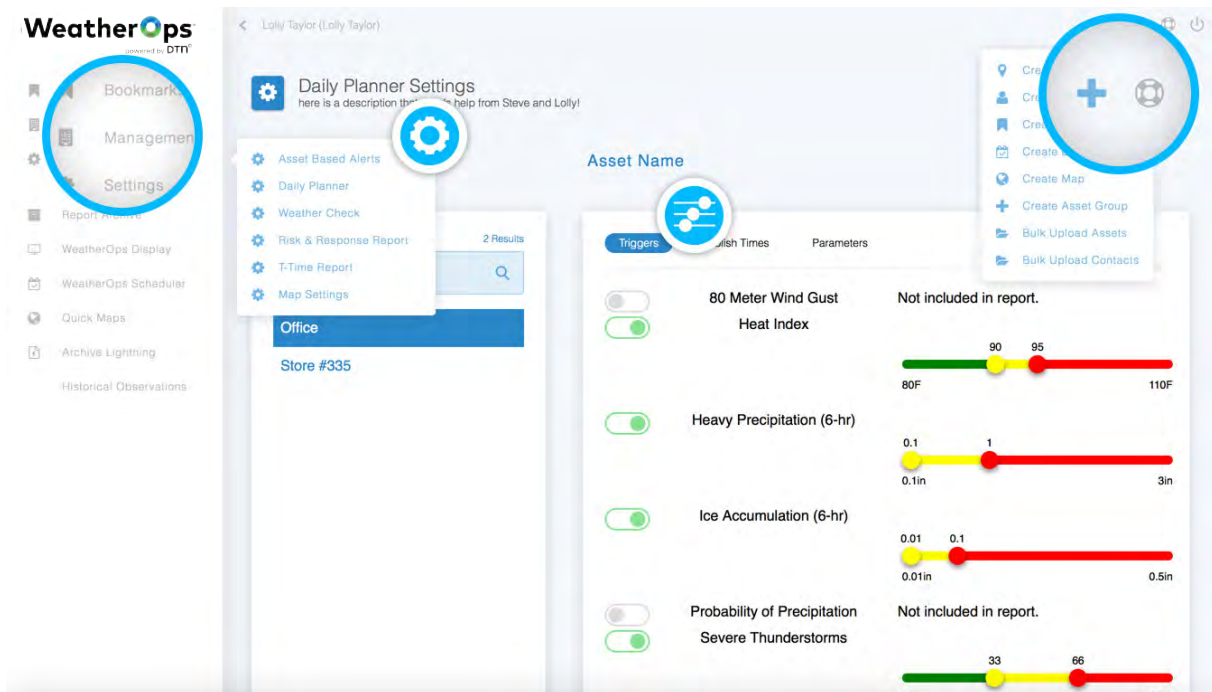
Web Based Platform

The WeatherOps Commander portal includes unlimited access and allows our customers to view real-time weather information via our interactive map WeatherOps Display and access all products offered in the WeatherOps product suite.

- User account management is also provided, allowing users to add (or remove) users and coordinate who receives our products and alerts.
- Company Admin – complete access to Commander and the ability to create/edit/delete assets, users and all product settings
- Basic User – access to Commander for viewing the interactive map and all archive products, as well as edit their password

24 hour “help-desk” for all technical issues or questions via phone or email.

Onboarding and training provided by a dedicated Customer Success Manager

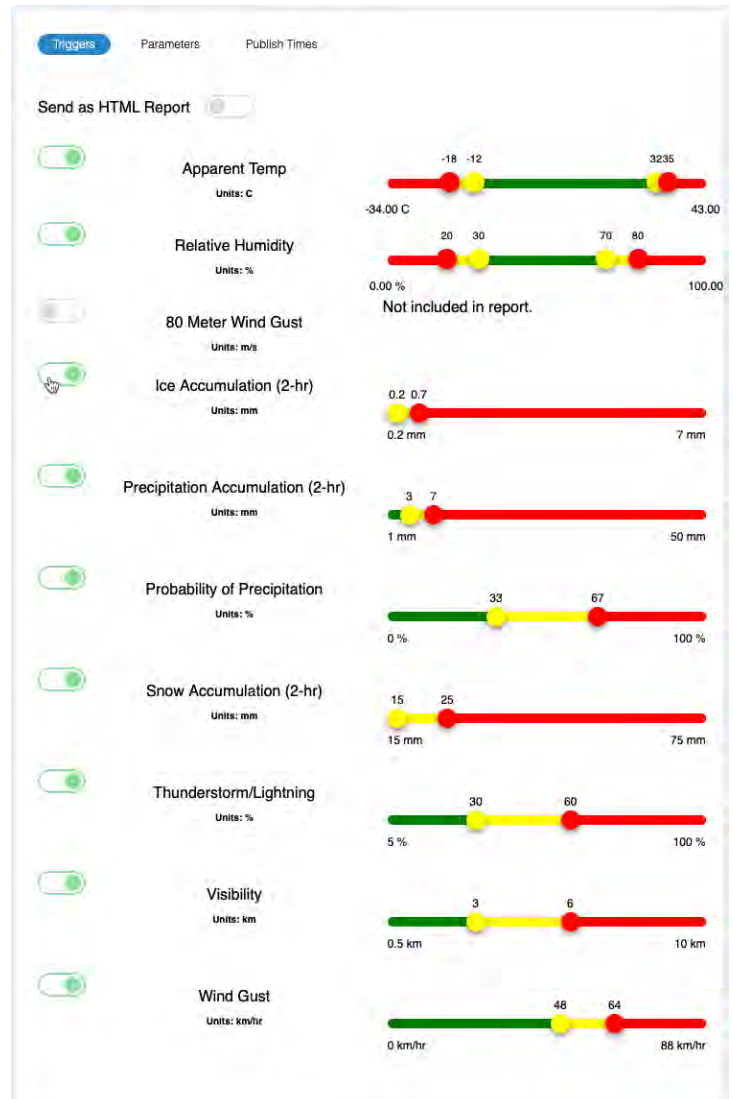


Customizable Thresholds

DTN weather forecasts allow Company Admins to customize certain weather parameter thresholds within the Daily Planner or Weather Check forecasts. The colour-coded thresholds are based on the following general assumptions:

- Acceptable working conditions are depicted as clear or green
- Marginal working conditions and/or medium threat level are depicted in yellow
- Poor working conditions and/or high threat level are depicted in red.

This allows customization of the parameter thresholds based on your specific operating conditions. A quick glance at the forecast will reveal when these customized conditions exist.



Companion Mobile App

Patented Alerting Engine: WeatherOps provides more accurate alerts than those offered by typical consumer alerting services. Patent #8519860

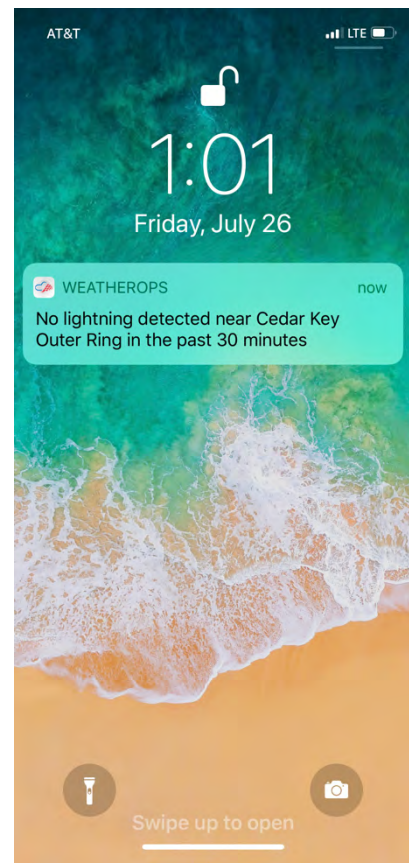
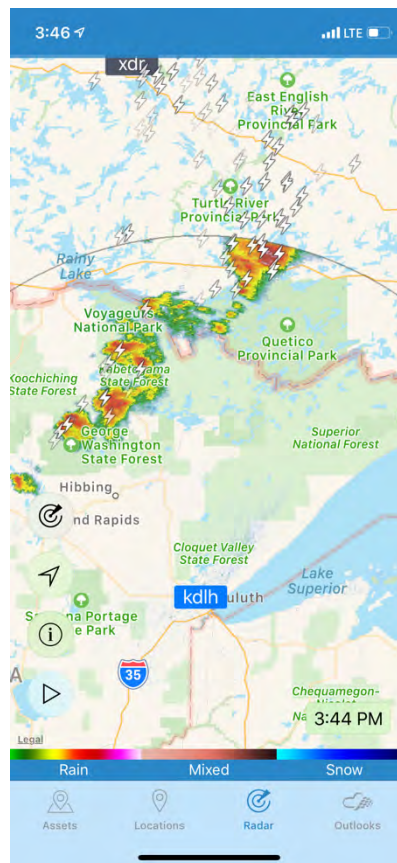
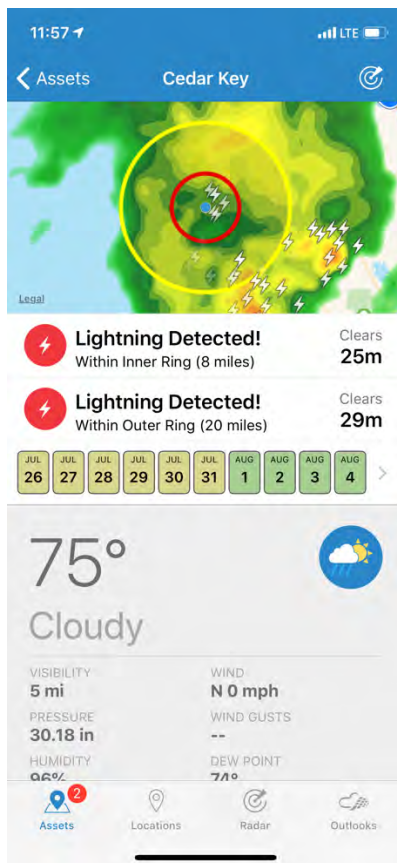
Custom Alerts: Receive push notifications from WeatherOps meteorologists who are monitoring your assets

Follow Me: WeatherOps will automatically alert you if you are in an area when a watch/warning is issued

Audio: WeatherOps provides audio alerts in the form of beeps followed by a brief description of the alert type

Radar: Quickly reference where you are in relation to adverse weather utilizing the in-app radar mapping capability featuring watch and warning overlays.

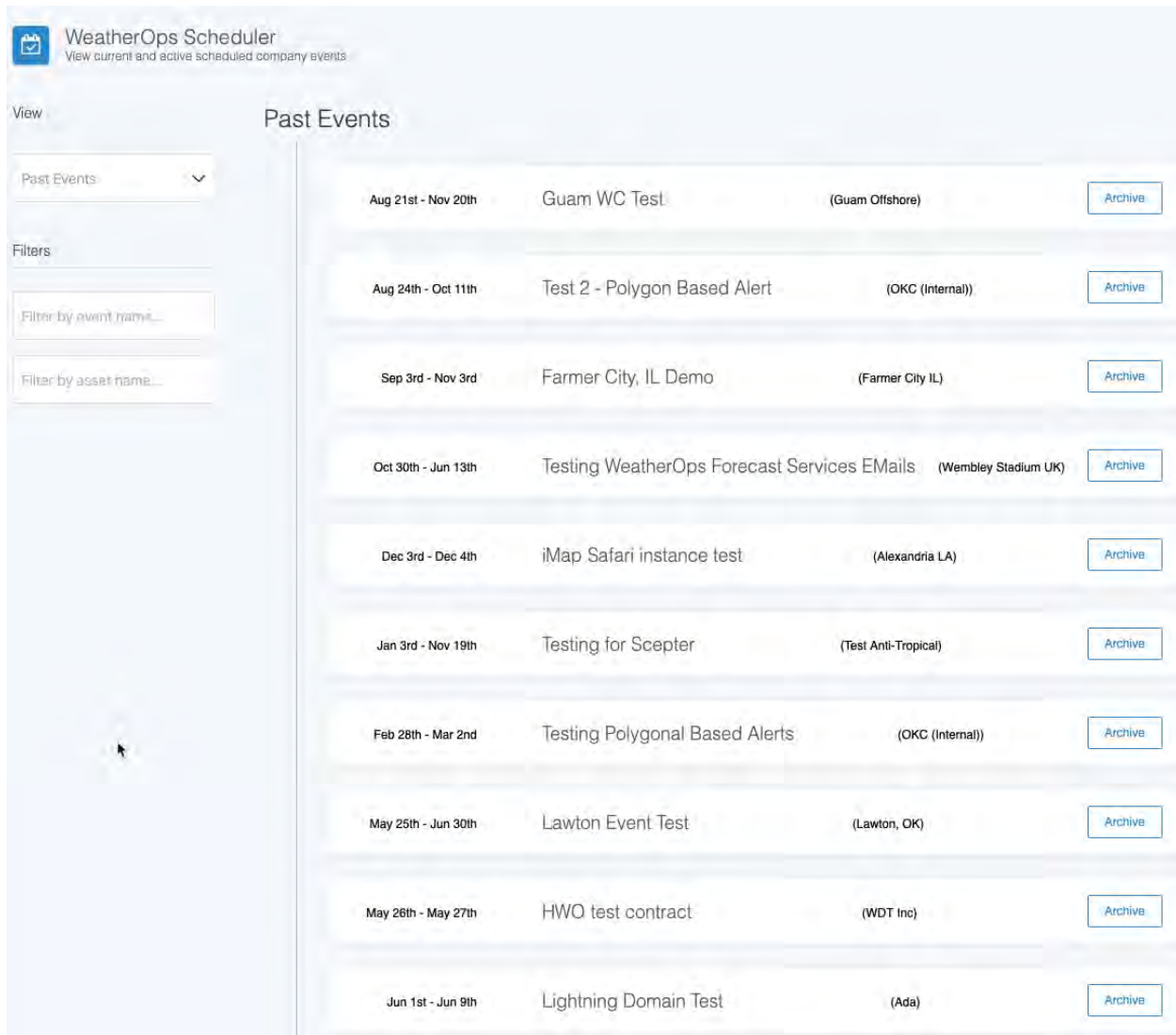
Quick Forecast: Access current and forecast WeatherOps information for all locations from a single screen



Event Scheduler

We made setting up multiple assets in different areas and on different schedules – easy!

Accessed from the WeatherOps Commander, the Scheduler is used to set up event locations, assign products, select start/end times as well as forecast/alert distribution. While it sounds complicated, we've made it easy to get everything set up in just a few moments.



The screenshot displays the WeatherOps Scheduler interface. At the top left, there is a calendar icon and the text "WeatherOps Scheduler" with a subtitle "View current and active scheduled company events". Below this, a "View" dropdown menu is set to "Past Events". A "Filters" section contains two input fields: "Filter by event name..." and "Filter by asset name...". The main area, titled "Past Events", lists ten events in a table-like format. Each row includes a date range, an event name, a location, and an "Archive" button.

Date Range	Event Name	Location	Action
Aug 21st - Nov 20th	Guam WC Test	(Guam Offshore)	Archive
Aug 24th - Oct 11th	Test 2 - Polygon Based Alert	(OKC (Internal))	Archive
Sep 3rd - Nov 3rd	Farmer City, IL Demo	(Farmer City IL)	Archive
Oct 30th - Jun 13th	Testing WeatherOps Forecast Services Emails	(Wembley Stadium UK)	Archive
Dec 3rd - Dec 4th	iMap Safari instance test	(Alexandria LA)	Archive
Jan 3rd - Nov 19th	Testing for Scepter	(Test Anti-Tropical)	Archive
Feb 28th - Mar 2nd	Testing Polygonal Based Alerts	(OKC (Internal))	Archive
May 25th - Jun 30th	Lawton Event Test	(Lawton, OK)	Archive
May 26th - May 27th	HWO test contract	(WDT Inc)	Archive
Jun 1st - Jun 9th	Lightning Domain Test	(Ada)	Archive

Onboarding & Training

Customers are assigned a dedicated Customer Success Manager (CSM). Customer Success Managers oversee our customers throughout their lifecycle, including onboarding new accounts, presenting DTN products to customer users for training, and strategizing with decision makers to determine how DTN can make their teams as efficient as possible.

In addition, an online Commander Academy is available with live chat capability. You will find articles about creating and managing your content, configuring your settings, and product descriptions of each feature available in WeatherOps Commander.

Why DTN?

DTN is the independent, trusted source of actionable insights for 60,000 customers focused on feeding, protecting, and fueling the world. Customer-centric and employee-driven, DTN focuses on empowering agriculture, oil and gas, trading, and weather-sensitive industries through continuous, leading-edge innovation. DTN is based in Minneapolis, with offices globally.

Our Company

The weather operations division of DTN was first organized as Weather Services Corporation (WSC) in 1946, the country's original commercial forecasting and meteorological consulting firm. This makes us the most experienced private meteorological company in the United States. The friendly acquisition by Telvent in 2008 brought our company into the global market, with a focus on sustainability through efficient IT solutions. The friendly acquisition by Schneider Electric in September 2011 infused our organization with global resources to expand our weather services both geographically and through R&D to create continuous improvements to our weather service offerings.

In 2017 are now again DTN, backed by TBG. In 2018, we acquired WDT, a global leader in offshore weather forecast services. The acquisition further solidifies and enhances DTN weather technology platform and supports the company's commitment to providing the highest quality and most accurate weather forecasts and insights. Adding WDT to DTN brings together expert meteorological teams and industry-leading technology platforms that will deliver actionable insights to support weather-based decisions.

Our Vision

To be the independent, trusted source of insights to our customers who feed, protect and fuel the world.

Our Mission

Empower our customers with intelligent and actionable insights that exceed their expectations and enable their success on a daily basis.



Our Values

Customer Centric: We consider our customers in all that we do. We strive to provide an experience greater than their expectations. Our aspiration is to delight our customers every day to help make them successful.

Colleague Focus: We empower, inspire and energize our colleagues treating one another as partners. We endeavor to develop and recruit best-in-class talent to balance our strong historical experience with a view toward the future. We recognize and reward colleagues for their achievements.

Innovation: We encourage a continuous flow of ideas and creativity to offer valuable solutions to our customers driven by innovation. We listen to our customers and embrace an entrepreneurial spirit to help them succeed. We embody an atmosphere that encourages risk taking, speed and agility.

Teamwork: We work together as one team to achieve our goals and serve our customers. Each of us is given the opportunity to have a positive impact on our collective success. We promote and support a diverse, yet unified team.

Education: We are committed to ongoing educational development to accelerate career growth. We promote an environment conducive to learning that drives personal and company excellence to benefit our customers.

Integrity: We act with integrity each and every day employing the highest ethical standards. We treat everyone with the utmost level of respect, and we are accountable for our actions. We make clear commitments and we keep them.

DTN invests millions of dollars every year in research and development to provide new and better ways to help business clients manage weather related risks. We serve clients in the surface transportation, aviation, energy, marine, public safety, turf, construction, recreation, and government communities.

Our vision for the future is to continue to develop the highest quality weather products using leading, proven technology and industry expertise to meet the goals of our mission statement while making our weather information more convenient, more immediate and more valuable to our customers.

Accuracy

Accuracy of forecasts can be measured and used as a KPI. DTN performs many varied types of accuracy measurements. DTN also verifies its overall forecast accuracy by submitting its forecasts to an independent third party, ForecastWatch, Inc., who compares its forecasts to others available on the free internet. The result is that for the past eleven years, DTN has been judged to have the highest forecast accuracy of all providers measured.

Reliability

Reliability is often assumed and not measured, but it is among the most important measures of a weather provider. Weather information must be available at all times without fail. The information that is provided must be free of errors or omissions. These parameters are easily measured with statistics such as uptime and are an essential performance indicator.

Timeliness

Timeliness of weather information is almost as important as reliability. Weather information, especially forecasts, have a very short shelf life, so information that is late or old is of little value. Timeliness can be measured in terms of latency and can also be judged by comparison to independent sources.



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ANSI ES1.7 - 2021, Event Safety Requirements - Weather Preparedness

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ES/2019-20010r2

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The ESTA Technical Standards Program

The ESTA Technical Standards Program was created to serve the ESTA membership and the entertainment industry in technical standards related matters. The goal of the Program is to take a leading role regarding technology within the entertainment industry by creating recommended practices and standards, monitoring standards issues around the world on behalf of our members, and improving communications and safety within the industry. ESTA works closely with the technical standards efforts of other organizations within our industry, including ESA, USITT and VPLT, as well as representing the interests of ESTA members to ANSI, ICC, UL, and the NFPA. The Technical Standards Program is accredited by the American National Standards Institute.

The Technical Standards Council (TSC) was established by ESTA to oversee and coordinate the Technical Standards Program. Made up of individuals experienced in standards-making work from throughout our industry, the Committee approves all projects undertaken and assigns them to the appropriate working group. The Technical Standards Committee employs a Technical Standards Manager to coordinate the work of the Committee and its working groups as well as maintain a “Standards Watch” on behalf of members. Working groups include: Control Protocols, Electrical Power, Event Safety, Floors, Fog and Smoke, Followspot Positions, Photometrics, Rigging, and Stage Lifts.

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The Event Safety Working Group, which authored this (set of) Standards, consists of a cross section of entertainment industry professionals representing a diversity of interests related to event production, insurance and legal matters, rigging and stage machinery for theatrical events. ESTA is committed to developing consensus-based standards and recommended practices in an open setting. Future Event Safety Working Group projects will include updating this publication as changes in technology and experience warrant, as well as developing new standards and recommended practices for the benefit of the entertainment industry.

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Foreword

The Event Safety Guide was first published by the Event Safety Alliance in 2014, as a guideline for discourse regarding the many aspects of special event safety. It originated in the UK Health and Safety Executive's HSG195 "The event safety guide (Second edition) A guide to health, safety and welfare at music and similar events." where its purple cover subsequently led to its reference as, simply, "The Purple Guide". In 2016 the Event Safety Working Group was established within ESTA's Technical Standards Program for the purpose of converting the Event Safety Guide chapters into formally recognized, consensus-based standards that could be universally referenced across special events organizers, producers, enforcement agencies and user-groups. This document is part of a compilation of many such chapters, intended to be used in conjunction with each other, as a collection of standards, which are used to establish a reasonable standards for care and public safety for special events. Because event technology and requirements constantly evolve, so too will this collection of standards change and evolve to accommodate industry needs.

It has been assumed in the drafting of this standard that the execution of any design provision is entrusted to appropriately qualified and experienced people, and that any fabrication and use provision is carried out by qualified and suitably experienced people and organizations.

This standard presents a coordinated set of rules that may serve as a guide to government and other regulatory bodies and municipal authorities responsible for the guarding and inspection of the equipment within its scope. The suggestions leading to accident prevention are given both as mandatory and advisory provisions; compliance with both types may be required by employers of their employees.

Compliance with this standard does not of itself confer immunity from legal obligations.

This document uses annex notes to provide additional reference information about certain specific section requirements, concepts, or intent. Subject matter with a corresponding annex note reference is identified by the asterisk (*) symbol, and the associated reference text is found in Appendix A, Commentary, identified with the referring text section number – e.g. an annex note to section 3.2 will be identified in Appendix A, Commentary as A.3.2. The annex notes are informational only, and do not add or subtract from the mandatory requirements of this standard.

Introduction

All events are impacted in some way by weather. Managing the hazards associated with weather are critically important, and can only be effectively addressed with appropriate planning and execution of mitigation actions. At their web page on *Weather Safety at Venues and Public Gatherings*¹, the American Meteorological Society stresses the importance of venue operators and event organizers being situationally aware of every weather risk that can occur, and of proactively planning to mitigate those risks.

Using technologies readily available to the consumer, general weather forecasts across large areas can be predicted with a reasonably high degree of accuracy. As the overall area of effect decreases, so too does the accuracy and reliability of these consumer technologies. Broad areas of coverage – over square miles, for example – can be captured within the scope of multiple radar or other monitoring systems. When considering that an outdoor event may encompass an area of only a few thousand square feet, it should be apparent that the accuracy necessary to pinpoint potential conditions over such a small area is quite challenging, but not impossible. However, demanding predictions within such a small area may be an unreasonable expectation, when reliance on such a thing may inherently place event participant in a reactive mode. Usually, it is prudent to monitor weather activities over a larger area, so that the time required to perform actions necessary for mitigation does not force a reactive response.

While rain, snow and lightning each represent unique hazards, the single largest hazard for outdoor events and temporary structures has proven to be wind. Due to its dynamically fluid nature, wind is also a difficult hazard to precisely predict, especially within a small area of effect.

This standard gives guidance on how to plan for and mitigate against weather-related hazards associated with special events.

1 Scope, purpose and application

The scope of this standard covers the consideration, development and use of event planning strategies that mitigate weather-related risks associated with live events, and with their associated temporary special event structures. Its scope includes both indoor and outdoor events, because each have considerations for the event participants. Its scope includes only public-access events, and private events where jurisdictional permits are required.

1.1 Purpose

The purpose of this document is to provide guidance on identifying weather-related hazards, monitoring technologies, and the basic requirements necessary to develop and implement risk mitigation actions associated with weather.

1.2 Intent

This document is intended for use by event producers, and by enforcement officials, in order to help establish and maintain reasonable standards for care and safety for special events.

1.3 Application

This document is one part of a larger collection of standards relating to special event safety. The requirements of the complete collection shall be considered in relation to the application of this standard, where necessary to coordinate and correlate all related requirements into the scope of a special event. Where an approved standard does not exist, the current edition of the *Event Safety Guide* shall be used as a reference for guidance. Other resources may be used, based on the relevance of the subject matter.

1.4 Normative references

The following documents contain requirements relating to the scope of this standard. They are provided for guidance only, unless otherwise referenced specifically elsewhere within this standard. Where a specific version is not given, the version applicable to the event jurisdiction shall be used.

International Fire Code
International Building Code

1 <https://www.ametsoc.org/index.cfm/ams/about-ams/ams-statements/statements-of-the-ams-in-force/weather-safety-at-venues-and-public-gatherings/>

NFPA 101 *Life Safety Code, 2015 edition*

ANSI E1.21, (current edition), *Entertainment Technology - Temporary Structures Used for Technical Production of Outdoor Entertainment Events*

National Oceanic and Atmospheric Administration (NOAA), *Lightning Safety Toolkit for Outdoor Venues Event Safety Guide (ESG)**, © 2014 *Event Safety Alliance of USA, Inc*, specifically these chapters:

ESG Chapter 2, Planning and Management (ref from section 3)

ESG Chapter 5, Medical, Ambulance and First-aid Management (ref from section 9)

ESG Chapter 6, Communication (ref from section 5)

ESG Chapter 7, Weather Preparedness (ref from Annex B)

ESG Chapter 8, Venue and Site Design (ref from section 3)

2 Definitions

2.1 Forecast. The gathering, evaluation, assessment, and use of weather-related data for prediction purposes.

2.2 Forecast, extended. A forecast of weather conditions for a period extending beyond three or more days from the day of issuance.*

2.3 forecasting, short-range. A weather forecast made for a time period up to 48 hours.*

2.4 Nowcast. A short-term weather forecast, generally for the next few hours.*

2.5 On-site monitoring. The gathering of weather-related data using equipment located on the event site, or using remote technologies for the purpose of monitoring and predicting weather hazards at or near the event site.

2.6 shall: denotes a mandatory requirement.

2.7 should: denotes a recommendation.

3 Advance planning and site selection*

Event planners shall determine if a formal weather preparedness plan is necessary for the event. Event size, location, number and demographic of anticipated attendees, availability of infrastructure shall all be considered in this determination. When formal weather preparedness plans are deemed necessary, they shall meet the requirements of this standard. Where they are not deemed necessary, this standard shall be used as a guideline, with all reasonable effort taken to meet the requirements herein.

Site selection shall be done in accordance with Chapter 2, Planning and management, and Chapter 8, Venue and site design of the *Event Safety Guide*. Site locations shall be evaluated on the basis of any localized or unique weather conditions reasonably foreseeable or known to occur due to geographic location, terrain, presence of surrounding structures and other local conditions.

3.1 Site location

Sites shall be evaluated based on location, size and availability of egress and evacuation pathways, where weather conditions may require evacuation of the site or structure(s), or where the operations management plan requires actions to be taken based on weather conditions.

3.2 Site climate profile.

Weather planning shall consider acquiring and documenting a site climatological profile, comprised of what weather conditions can be expected for a specific location and time of year. History of winds, temperatures, precipitation, and lightning within an event radius of not less than 8 miles shall be gathered as part of the site climate profile evaluation.

3.3 Determination of services required.

The need for remote monitoring, professional meteorologists or other forecasting services shall be identified and evaluated in the event planning phase. A professional meteorologist should be included in the evaluation process.

3.3.1. Basic requirements for services shall include a weather information source, or service, with the ability to provide long-range forecasting, short-range forecasting and nowcasting information for weather events, such as temperatures, winds, lightning, thunderstorms, rain, and snow.

3.3.2. The use of multiple technologies for public announcements is recommended. Such technologies may include mobile apps, SMS alerts and visual displays.

3.4 Operations management plan requirements for weather

Requirements for mitigating weather-related risks shall be included in the event's management plan.

3.4.1 Weather preparedness plan required. A written weather preparedness plan shall be developed as part of the event planning processes. The weather preparedness plan shall be specific to the event, relative to the event site and the site's specific weather patterns. The plan shall include the site climate profile information, if required by section 3.2.

3.4.2 Coordination with remote forecasting services. If remote forecasting services are deemed necessary to achieve the intended weather preparedness goals, such services shall provide forecasting products capable of meeting the event's specific weather preparedness plan requirements and triggering action thresholds. The weather preparedness plan shall be coordinated with the remote forecasting services.

3.4.3 Coordination with other hazard management systems. Where weather hazards present human comfort-related risks, the operations management plan shall include those risks, and associated response actions.

3.5 Event-specific weather risk assessment*

Weather planning shall include an event-specific evaluation and assessment of the minimum time required to execute any mitigation action, and shall determine the maximum permissible time to complete any such action.

3.5.1 The weather risk assessment shall consider the total amount of time required to complete any sequence of mitigation actions, up to and including show-stop and site evacuation.

3.5.2 The weather risk assessment shall consider what circumstances will permit a change in mitigation sequence, up to and including an escalation of the sequence to a show-stop and site evacuation.

3.5.3 The weather risk assessment shall consider site-specific criteria, such as infrastructure, terrain, and prevailing weather patterns.

3.5.4* The weather risk assessment shall determine the radius boundaries from the event site center, to be used for monitoring, alerting, and triggering of weather-related hazard mitigation actions. Multiple boundaries shall be permitted, where a single boundary conflicts with the risk assessment of multiple hazards. Radius boundaries shall be coordinated and used in conjunction with time-dependent thresholds, based on the time required to perform actual mitigation actions.

4 Organizational structure.*

Life safety is the highest priority of this standard. Live event producers shall establish a clearly defined organizational decision-making process for all actions relating to life safety.

4.1 Designated person required.

The organizational structure for life-safety decisions shall clearly identify the individual(s) responsible for weather hazard response decisions, and shall clearly identify their roles and responsibilities within the organizational decision making process.

4.2 Multiple designated persons permitted.

Multiple onsite designated persons shall be permitted if all of them are in direct communication with each other, and can jointly effect immediate response to imminent weather threats.

4.2.1 If the weather preparedness plan includes remote (off-site) forecasting and alerting, primary points-of-contact shall be designated for each remote service.

4.2.2 Multiple remote points of contact shall communicate with the same onsite designated person, who receives forecasts and alerting communications as determined by the requirements of section 4.1. If a weather threat becomes imminent, on-site or remote consulting meteorologists shall communicate in accordance with the planned communication structure.

4.2.3 Direct communication line required. Real-time communication methods shall be used to notify designated persons of potential and imminent weather threats.

5 Communication*

Live event producers shall define communications systems, protocols and sequences in accordance with Chapter 6 of the Event Safety Guide.

5.1 Emergency communication systems required.

Live event producers shall identify all methods of communication required for use as part of the weather preparedness plan, by and between those individuals identified by the administrative requirements of section 7.

5.2 Communication redundancy required.

Communication systems shall be designed and installed with redundancy to ensure that failure of one communication element does not disable the remaining emergency communication system elements.

5.2.1 Exceptions.

Communication redundancy is not required where all event participants are within earshot, and emergency communications can be quickly and reliably delivered to all event participants using unaided voice communication.

5.3 Extent of communication system coverage.

Communication systems used for weather hazard plan activation and response shall extend to include all personnel and attendees of the event.

5.4 Communication sequence.

The sequence of communication shall be established in accordance with section 4, Organizational structure, but shall not be restricted by a sequence that delays public communication of weather hazards. Security and crowd management personnel shall be notified prior to public notification.

5.5 Testing and verification.

Communication systems used for weather hazard plan activation and response shall be tested and verified prior to the event site being opened to public access.

5.6 Public address system requirements.

The communication system shall clearly define the method of communication, and individuals responsible for public address announcements, of any weather hazard mitigation procedure requiring attendee action.

5.6.1 Announcements. Public announcements regarding weather hazard plan actions required shall be accurate and unambiguous.

5.6.2 Announcement duration. Public announcements regarding severe weather actions required shall continue throughout the implementation of any such action. All weather information must be consistent through all communication channels.

5.7 Trained personnel.

Personnel shall be trained to use the communication equipment, and shall be trained to execute the plans and processes within their assigned roles and responsibilities.

6 Forecasting and monitoring requirements

Weather forecasting and on-site monitoring of actual conditions shall be required. Monitoring data used for forecasting purposes shall only be assessed by professional meteorologists.

6.1 General forecasting requirements.

Weather forecasting shall meet the requirements of this section. Nowcasting and on-site monitoring shall be synchronized to provide interactive and comparative reports.

6.1.1 Extended forecasting. Extended forecasting should be used during the event planning process, as part of the event's management plan regarding delay or cancellation of the event due to weather-related circumstances.

6.1.2 Short-range forecasting. Short-range forecasting shall be used in the event planning process, as part of the event's management plan regarding risk mitigation, event delay or cancellation due to weather-related hazards.

6.1.3 Nowcasting. Nowcasting should include interactive weather maps.

6.2 Monitoring requirements.

6.2.1* On-site monitoring. Onsite weather monitoring shall be required.

6.2.1.1* Lightning. Weather monitoring shall include high-precision lightning monitoring, reported for the radius boundaries as designated in the weather preparedness plan.

6.2.1.2 Wind. Anemometers shall be located in accordance with ANSI E1.21 (current edition). Where the event has no production structures, the anemometer shall be located in accordance with the manufacturer's instructions, or as directed by a qualified person.

6.2.2 Off-site monitoring

Off-site monitoring shall require direct and real-time communication with on-site monitoring personnel.

7 Administrative requirements*

The requirements of this standard shall be fully coordinated with the event's management plan, and with the event's emergency response procedures.

7.1 Organizational structure.

Event producers shall establish an organizational hierarchy for management, communication, and execution of weather preparedness activities.

7.1.1 The organizational hierarchy shall identify specific person(s) in responsible charge, their respective capacities and responsibilities within the weather preparedness plan administration.

7.1.2 The administrative requirements shall include a risk assessment of reasonably foreseeable weather hazards, and the actions required in response to each hazard.

7.1.3 The administrative requirements shall include an assessment of the time required to perform mitigation actions, relative to any triggering thresholds that may be established.

8 Interruption of show

Weather-related conditions that will result in day-of-show delay or cancellation, or show-stop during an event, shall be coordinated with the event's management plan, and with the event's emergency response plan. show-stop conditions shall require coordination with the event crowd management plan.

8.1 Show stop with delay.

Temporary weather-related show stops, made with intent to resume normal show operations, shall only be considered in circumstances where weather conditions are continuously monitored and assessed by a professional meteorologist, during the show stop period.

8.2 Resuming normal show operations.

When a show stop due to weather-related risks occurs, normal show operations shall only commence with approval from the professional meteorologist actively monitoring the current weather conditions.

8.2.1 Delays due to wind. When a show stop occurs as a result of wind conditions, normal show operations shall not resume until wind speeds have reduced below the wind speed triggering thresholds for not less than thirty minutes, or upon approval from a professional meteorologist.

8.2.2 Delays due to lightning. When a show stop occurs as a result of lightning, normal show operations shall not resume until after 30 minutes have passed with no new strikes within the alert radius, or upon approval by a professional meteorologist using guidance for resuming the event from NOAA's *Lighting Safety Toolkit for Outdoor Venues*.*

9 Other Weather Hazards

Other weather-related hazards shall be identified and evaluated in accordance with section 3.5.

9.1 Heatstroke.

Heatstroke hazards shall be evaluated using the WBGT hazard table in Annex C.

9.2 Dehydration

Dehydration risks shall be evaluated using the WBGT hazard table in Annex C

Annex A – Explanatory information

A1.4 Normative references. This standard currently references chapters from the *Event Safety Guide*, but intends to update those references to their corresponding ANSI ES1 standards once approved.

A2.2 Extended forecast. The U.S. National Weather Service issues extended forecasts for the three- to five-day period ahead.

A2.3 Short-range forecast. The U.S. National Weather Service issues short-range forecasts by part of the day, for example, today, tonight, etc.

A2.4 Nowcast. The U.S. National Weather Service specifies zero to three hours, though up to six hours may be used by some.

A3 Advance planning and site selection. The nature and complexity of the plan will be unique for each event. The weather preparedness plan should incorporate event size, event location, the number and demographic of anticipated attendees, the vulnerability of permanent and/or temporary structures (e.g. stages, inflatables, tents, seating areas, etc.), availability and proximity of infrastructure for refuge, availability and proximity of transportation, etc.)

A3.5 Event-specific weather risk assessment. In the context of this standard, “assessment of risk” implies risk evaluation and reduction. It is important to fully assess the amount of time required to execute weather hazard mitigation actions, relative to the available time allowed by their respective forecasting, monitoring, and triggering thresholds. Evacuation time will be dependent on crowd size, crowd demographic and mobility, and distance to refuge. Likewise, the speed of the weather hazard as it moves toward the venue must be taken into account. The weather preparedness plan should be flexible so as to set a safe radius which will serve as a trigger for the weather evacuation decision. Weather forecasting and monitoring should then be aligned with the specific safe radius as determined by the weather preparedness plan for the event. Refer to ANSI E1.21 and the Event Safety Guide for additional information.

A3.5.4

A7.1.3 The time needed to execute the mitigation actions is generally constant, but the radius is variable based on factors such as lightning strike count, or the speed and direction of high winds along the approaching gust front. Storm speed should be monitored and the radius distance adjusted accordingly. Alternatively, an assessment or forecast of the arrival time of the hazard at a fixed radius (i.e. 8 miles or more) should be obtained.

Multiple boundaries can be very useful if the outermost boundary is used as a mitigation action triggering threshold based on distance, with innermost boundaries demarcating the boundary for when mitigation actions must be complete, based on rate of travel between the outermost boundary to the innermost boundary.

Time needed to execute the mitigation actions must also consider crowd demographics and event site layout, including the distance to refuge areas, if applicable.

A4 Organizational structure. The individual responsible for making decisions in response to a weather threat must be designated, and must be clearly understood by all parties relevant to execution of weather-related actions. The authority of this individual should be final.

Having good communication channels is key and must be arranged before any event. In the event of weather hazards, a primary point of contact must be available to contact a designated weather organization or professional meteorologist.

A5 Communication. During severe or adverse weather conditions, communication by and between venue staff needs to be efficient, accurate and targeted. The communication response must be correlated to appropriate trigger criteria and actions defined in the weather preparedness plan. As time is of the essence during a weather hazard situation, all communication should, as much as possible, be rehearsed during training and exercises.

The sequence of communication needs to be considered, allowing technical departments, security and event staff and food and beverage/merchandising to make preparations before the audience is advised.

Performers can be of great value in calmly asking guests to take action, assuming that they are willing and able to relay this important information. They should not be solely relied upon to communicate this important information, but should be asked to do so if their special connection with audience members could make the process smoother.

A6.2.1 Onsite monitoring. Onsite monitoring is useless without proper interpretation of data. Onsite monitoring of wind speeds can result in a reactive mode response if no plan exists, if an existing plan is ignored, or if triggering thresholds are unrealistic given the time it may take to perform mitigation actions. This is also a communication and risk assessment topic.

A6.2.1.1 Many lightning monitoring services and applications are available, and should be used.

A7 Administrative requirements. Refer to ANSI E1.21, current edition for additional resources for Operations Management Plan examples.

A8.2.2 This reference can be found online here: <https://www.weather.gov/safety/lightning-toolkits>

Annex B - Example Weather Action Matrix

This table is an example only, and is not intended to be all-inclusive. It is intended to give the reader a better understanding of how a risk matrix might be formatted. The actual risk matrix must consider all circumstances identified in the event-specific weather risk assessment (Section 3.5). This example uses a stadium event as a model. The matrix headings for equipment, systems, and areas may – likely will – differ for each venue or location. A different and more extensive example can be found in the *Event Safety Guide*, Chapter 7.

THREAT	ALERT METHOD	FIELD (STAGE)	PARKING	MARKETPLACE	SPECTATOR SEATING	VIDEO PRODUCTION	TICKETING
TORNADO ACTIVITY	1 long air horn blast + staff radio communication with PA announcement	IMMEDIATE RETREAT TO NEAREST DESIGNATED SHELTER AREA					
SURFACE WINDS IN EXCESS OF 40 MPH OR TORNADO WARNING	1 long air horn blast + staff radio communication with PA announcement	ORGANIZED EVACUATION IN ACCORDANCE WITH EVENT EVACUATION PLAN					
WINDS 30 MPH OR GREATER	Text, radio, PA	Move under stadium	Return to bus	Move under stadium	Move under stadium or return to vehicles	Add bracing cables or prepare to lower to floor/ground	Stay in box office
LIGHTNING PER ASSESSMENT CRITERIA	Text, radio, PA	Move under stadium	Return to bus	Move under stadium	Move under stadium or return to vehicles	N/A	Stay in box office
WINDS 26-30 MPH	Text, radio	Move under stadium	Return to bus	Move under stadium	Move under stadium or return to vehicles	Check rigging	Stay in box office
WINDS 20-25 MPH	Text	Move under stadium	Return to bus	Move under stadium	Move under stadium or return to vehicles	Check rigging	Stay in box office
STORM/LIGHTNING TRACKING TOWARDS SITE (WITHIN 20 MILES)	Text	Monitor	Monitor	Monitor	Monitor	Check rigging	Monitor
RAIN EVENT TRACKING TOWARDS SITE (WITHIN 20 MILES)	Text	Monitor	Monitor	Monitor	Monitor	N/A	Monitor
ALL CLEAR	Text, radio, PA	WEATHER IS ALL CLEAR, RESUME NORMAL SHOW ACTIVITIES					

Table note: Refer to A3.5.4 for guidance on coordinating the hazard threshold triggers with time-based limits.

Annex C – Wet bulb globe temperature risk table**Wet Bulb Globe Temperature Category Work/Rest and Water Intake**

08/07/15

Unacclimated and Acclimated Work/Rest and Water Intake Chart

Heat Risk Category		Wet Bulb Globe Temp	Light Work		Moderate Work		Heavy Work	
			Work/Rest	Water Intake (quart/hr)	Work/Rest	Water Intake (quart/hr)	Work/Rest	Water Intake (quart/hr)
No Risk	Unacclimated	78 – 79.9	50/10 min	½	40/20 min	¾	30/30 min	¾
	Acclimated	78 – 79.9	continuous	½	continuous	¾	50/10 min	¾
Low	Unacclimated	80 – 84.9	40/20 min	½	30/30 min	¾	20/40 min	1
	Acclimated	80 – 84.9	continuous	½	50/10 min	¾	40/20 min	1
Moderate	Unacclimated	85 – 87.9	30/30 min	¾	20/40 min	¾	10/50 min	1
	Acclimated	85 – 87.9	continuous	¾	40/20 min	¾	30/30 min	1
High	Unacclimated	88 – 90	20/40 min	¾	10/50 min	¾	avoid	1
	Acclimated	88 – 90	continuous	¾	30/30 min	¾	20/40 min	1
Extreme	Unacclimated	> 90	10/50 min	1	avoid	1	avoid	1
	Acclimated	> 90	50/10 min	1	20/40 min	1	10/50 min	1

Adapted from: 1) USGS Survey Manual, Management of Occupational Heat Stress, Chapter 45, Appendix A. 2) Manual of Naval Preventive Medicine, Chapter 3: Prevention of Heat and Cold Stress Injuries. 3) OSHA Technical Manual Section III: Chapter 4 Heat Stress. 4) National Weather Service Tulsa Forecast Office, Wet Bulb Globe Temperature.

The National Weather Service defines Wet Bulb Globe Temperature (WBGT) as “...a measure of the heat stress in direct sunlight, which takes into account: temperature, humidity, wind speed, sun angle and cloud cover (solar radiation). This differs from the heat index, which takes into consideration temperature and humidity and is calculated for shady areas. If you work or exercise in direct sunlight, this is a good element to monitor. Military agencies, OSHA and many nations use the WBGT as a guide to managing workload in direct sunlight.”

More information about WBGT is contained in the OSHA Technical Manual, Section III, Chapter 4, found at: https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_4.html.