

Severe Weather Detection Technologies Take the Worry Out of Safety Planning for Outdoor Athletic Events

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Lightning strikes killed more than 300 people from 2006-2015, according to the National Weather Service. Most of the deaths happened while people were participating in outdoor activities such as sporting events. When severe weather approaches your area of play, will you be prepared? Severe weather monitoring technology eliminates the stressful decision-making process and allows athletic administrators, coaches and campus security directors to focus on the safety of athletes and spectators alike.

Dangerous Thunderstorm Alerts, powered by the Earth Networks Total Lightning Network®, are as much as 50 percent faster than other severe weather alerts when storms are threatening, offering athletic administrators more time to implement a Lightning Safety Plan.

The Outdoor Alerting Solution, designed by Earth Networks to automatically sound a horn when severe storms are nearby, aids in safety planning. Large crowds and supersized venues make thunder and lightning detection more difficult. Cheers drown out the clap of thunder and barriers block views. If you miss the warning signs, it's likely that danger is fast approaching. Your spectators, athletes and coaches lack time to make it to safety. The Outdoor Alerting Solution offers real-time monitoring of hyperlocal conditions and lets the organization know when it's safe to return to play.

Earth Networks' weather-detection solutions allow you to create venue-specific plans for your facilities that vary based on the type of sport being played and the design of the field or stadium.

Lightning Safety Plans, as suggested by the National Federation of State High School Associations and the National Collegiate Athletic Association, are a fundamental part of school-wide Emergency Action Plans and the most effective way to prevent lightning-related injuries or deaths. Utilizing technology to monitor weather conditions improves every aspect of the plan.

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AN INSIDE LOOK AT SEVERE STORMS

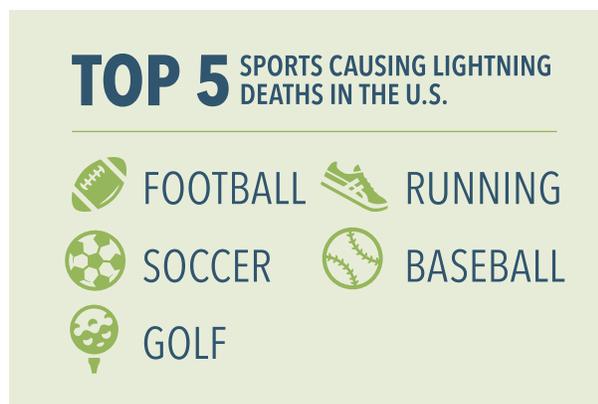
Oftentimes, high school and intercollegiate athletic activities are canceled in advance if heavy rain is expected, but researchers say very few are canceled in advance because of potential thunder and lightning.⁴

The same can be said for team practices, outdoor events and recreational activities.

“Being outdoors any time a thunderstorm is in the area is dangerous,” said John Jensenius, lightning safety specialist at the National Weather Service. “However, some activities cause people to be more vulnerable to a lightning strike, and, in particular, a direct lightning strike. Direct strikes are a greater threat to people in open areas such as sports fields or on the water.”

From 2006-2015, the National Weather Service counted 313 deaths due to lightning strikes in the United States.⁴ About two-thirds of those deaths occurred while citizens were engaged in outdoor activities.⁴

Throughout the 10-year period, the National Weather Service reported 30 lightning deaths during sports-related activities (about 10 percent of total lightning fatalities).⁴ A majority of the cases occurred while playing soccer, followed by golfing, running, baseball, football and disc golfing.⁴



Source: John S. Jensenius, Jr., National Weather Service, National Oceanic and Atmospheric Administration

“Based on the media reports of the fatal incidents, many victims were either headed to safety at the time of the fatal strike or were just steps away from safety,” Jensenius said. “Continued efforts are needed to convince people to get inside a safe place because the lightning threat becomes significant. For many activities, situational awareness and proper planning are essential to safety.”

During the same timeframe, more than 1,700 people were struck by lightning and injured in the U.S.⁸ Victims reported a vast array of injuries, including severe pain and numbness; depression, headaches and memory loss; post-traumatic stress disorder; and burn marks and swelling of the body.⁸

Excessive noise due to large capacity crowds and hefty structures, like bleachers and barriers, make detecting severe weather more difficult.⁴ A lightning strike could go unseen and a “clap” of thunder could go unheard. Metal constructions — goal posts, fencing and other sporting equipment — as well as elevated stands and watch towers, conduct electricity and heighten the threat.

Aside from thunder and lightning, athletic administrators must also prepare for hail and tornadoes — both have the ability to cause significant damage to property and personnel.

Severe weather detection technology becomes all the more important in cases where large crowds are gathered.

LIGHTNING SAFETY: HIGH SCHOOL ATHLETICS

If severe weather comes, are you prepared? The National Federation of State High School Associations (NFHS) created a default lightning safety policy for coaches and athletic directors across the nation. “If lightning is imminent or a thunderstorm is approaching, all personnel, athletes and spectators should

be evacuated to safe structures. A list of closest safe structures should be announced and displayed on placards at all venues."¹⁰

Athletic directors must have a plan in place. "A Lightning Safety Plan should be a component of the Emergency Action Plan and should be in place for every sport and facility."¹⁰ As part of a Lightning Safety Plan, the NFHS listed the following suggestions:⁷

- "Assign staff to monitor local weather conditions before and during practices and contests. 
- "Develop an evacuation plan, including identification of appropriate nearby safe areas. 
- "Develop criteria for suspension and resumption of play: 
 - When thunder is heard or a cloud-to-ground lightning bolt is seen, the leading edge of the thunderstorm is close enough to strike your location with lightning. Suspend play for 30 minutes and take shelter immediately.
 - Once play is suspended, wait at least 30 minutes after the last thunder is heard or flash of lightning is witnessed prior to resuming play.
 - A subsequent thunder or lightning after the beginning of the 30-minute count will reset the clock and another 30-minute count should begin.
- "Review annually with all administrators, coaches and game personnel. 
- "Inform student athletes of the lightning policy at the start of season." 

State high school associations across the country have adopted these suggestions and implemented Lightning Safety Plans of their

own. Athletic directors adapt and customize these plans by inserting evacuation and weather monitoring details specific to their facilities, and circulating the information to the necessary parties. This is the most effective way to prevent lightning-related injuries or deaths.

LIGHTNING SAFETY: INTERCOLLEGIATE ATHLETICS

Much like the NFHS, the National Collegiate Athletic Association (NCAA) has lightning safety guidelines in place as part of its Sport Medicine Handbook for college administrators in the U.S.

The NCAA recommends that every outdoor venue has a lightning safety plan that includes the following:⁶

- "The use of lightning safety slogans to simplify and summarize essential information and knowledge. For example, the following slogan from the National Lightning Safety Institute is an effective guide: 'If you see it, flee it; if you can hear it, clear it.' This slogan reflects the fact that upon the first sound of thunder, lightning is likely within eight to 10 miles and capable of striking your location. No punishment or retribution should be applied to someone who chooses to evacuate if perceiving that his or her life is in danger due to severe weather.
- "Designation of a person to monitor threatening weather and to notify the chain of command who can make the decision to remove a team, game personnel, television crews, and spectators from an athletics site or event. That person must have recognized and unchallengeable authority to suspend activity.
- "Planned instructions/announcements for participants and spectators,

designation of warning and all clear signals, proper signage, and designation of safer places from the lightning hazard.

- “Daily monitoring of local weather reports before any practice or event, and a reliable and accurate source of information about severe weather that may form during scheduled intercollegiate athletics events or practices. Of special note should be National Weather Service-issued thunderstorm ‘watches’ or ‘warnings,’ and the warning signs of developing thunderstorms in the area, such as high winds or darkening skies.
- “Identification of, and a mechanism for ensuring access to, the closest safer buildings, vehicles, and locations to the field or playing area, and an estimate of how long it takes to evacuate to that location for all personnel at the event.”

Intercollegiate athletics often involve louder and larger crowds making thunder harder to hear and a detailed evacuation plan even more critical. “For large-scale events, continuous monitoring of the weather should occur from the time pre-event activities occur throughout the event.”⁶

In 2013, the National Athletic Trainers’ Association (NATA) issued its position statement on lightning safety highlighting the importance of a well-thought-out plan for everyone involved.⁵

The NATA suggests that athletic administrators establish a lightning-specific “emergency action plan” for each outdoor venue.⁵ The plan should include “a reliable way” to monitor severe weather, safe evacuation locations, and specific requirements for suspending and resuming play.⁵

The NCAA and NFHS have similar views and all three suggest athletic professionals follow

the 30-minute rule.

“As a minimum, lightning safety experts strongly recommend that by the time the monitor observes 30 seconds between seeing the lightning flash and hearing its associated

“**Consider subscribing to a commercial, real-time lightning detection service that has been independently verified so you can determine how far away a storm is and when it is best to go inside.**”

– National Athletic Trainers’ Association

thunder or by the time the leading edge of the storm is within six miles of the venue, all individuals should have left the athletics site and be wholly within a safer structure or location,” said Latrice Sales, NCAA Sports Science Institute. “To resume athletics activities, lightning safety experts recommend waiting 30 minutes after both the last sound of thunder and the last flash of lightning is at least six miles away and moving away from the venue.”

Coaches and athletic directors can use the “Flash Bang Method” to measure the distance between the approaching storm and outdoor venue.⁹ The Flash Bang Method requires you to count the seconds between a lightning strike and the sound of thunder. Divide the number of seconds by five to calculate the distance. The table on the next page demonstrates the method.

The Flash Bang Method is a viable weather-detection tool, but it certainly has drawbacks. The method requires your personnel to stop, wait and count during a critical evacuation period.

HOW MANY MILES IS THE LIGHTNING FROM YOUR LOCATION?

The number of seconds between a lightning strike and the sound of thunder.

5 sec.	#####	1 Mile
10 sec.	#####	2 Miles
15 sec.	#####	3 Miles
20 sec.	#####	4 Miles
25 sec.	#####	5 Miles
30 sec.	#####	6 Miles
35 sec.	#####	7 Miles
40 sec.	#####	8 Miles
45 sec.	#####	9 Miles
50 sec.	#####	10 Miles

Source: Latrice Sales, MS, CSCS, NCAA Sport Science Institute

If counting isn't consistent, confusion arises making advanced technology all the more useful.

"Weather watchers, real-time weather forecasts and commercial weather-warning and lightning monitoring devices or services are all tools that can be used to aid in the monitoring, notification, and decision-making regarding stoppage of play, evacuation and return to play," Sales said.

LIGHTNING MONITORING DEVICES AT WORK

Severe weather safety should be a top priority for coaches and athletic directors across the country. If you can't guarantee the safety of your athletes and spectators, you're missing the mark.

Athletic professionals, including members of the Oklahoma State University (OSU) Emergency Management team, are turning to technology to streamline safety plans and automate procedures.

In 2014, OSU received a Hazard Mitigation Grant from the Federal Emergency Management Agency to install lightning detection and notification technologies on campus. Six devices now surround the university's outdoor facilities.³

For the last three years, OSU has used Earth Networks' Outdoor Alerting Solution all day, every day for outdoor facilities and

NCAA events.³

Earth Networks receives positive feedback from athletic directors, coaches, athletes, officials and fans alike.¹ "It has worked very well for OSU and we are extremely pleased."³

Earth Networks' Outdoor Alerting Solution provides a "turnkey safety solution" for athletic events.¹ If lightning, hail or tornadoes are imminent, horns installed around the outdoor venue will automatically sound, signaling coaches, athletes and spectators to evacuate to a safe structure.¹ Severe weather detection and alerting is automated — with no human intervention necessary. After the horns sound, the Outdoor Alerting Solution triggers a 30-minute countdown clock that determines when it is safe to resume play.¹

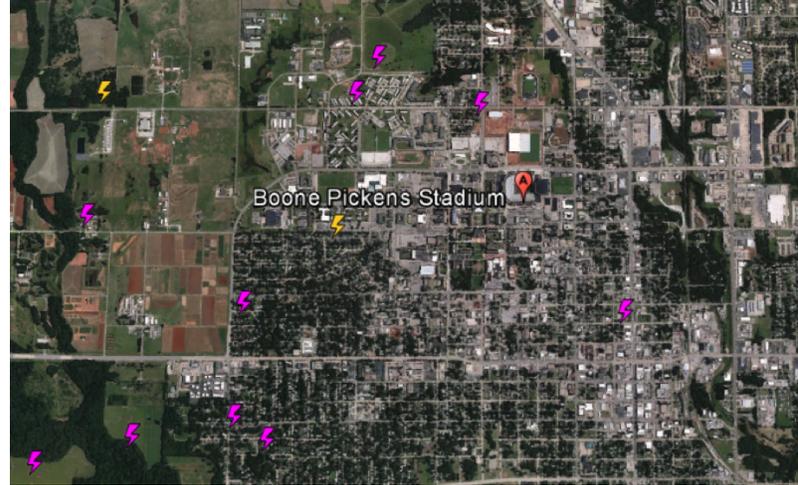
At OSU, the safety system is almost entirely automated. Athletic administrators, safety managers, coaches and staff are no longer required to monitor incoming weather during practice and play.⁶ Football, soccer, baseball and softball coaches, athletic trainers and operations staff are set to receive warnings from the Outdoor Alerting Solution during practices and games.³

On September 17, 2016, a lightning delay was issued during the fourth quarter of a football game between Oklahoma State and Pittsburgh at Boone Pickens Stadium. Thanks to the technology provided by Earth Networks, OSU was able to take the

necessary safety precautions and move people to safety.³

The alerts were timely and the school received “live information” about the storm’s progress.³

Earth Networks sent the first alert at 22:41 UTC when an in-cloud lightning strike was recorded 4.6 miles from the Stillwater, Oklahoma, field.¹ At 23:29 UTC another alert was sent when the company recorded a cloud-to-ground strike .75 miles from the stadium.¹ In total, Earth Networks sent 34 alerts to



After receiving information from Earth Networks about lightning strikes in the area, Oklahoma State University successfully issued a game delay providing ample time to take the necessary safety precautions. Source: Earth Networks



OSU personnel and recorded about 20,000 lightning strikes in the area.¹

The Outdoor Alerting Solution continued to monitor severe weather in Stillwater until it was safe to resume play. The service made emergency management more efficient and OSU was extremely pleased with the experience on game day.³

Sports organizations across the country are taking note.

In the same month, the New York State Public High School Athletic Association named Earth Networks its “Official Weather Information Provider.”² By partnering with Earth Networks, the association and its

member schools have access to real-time severe weather data and key information to make safety decisions without hesitation.

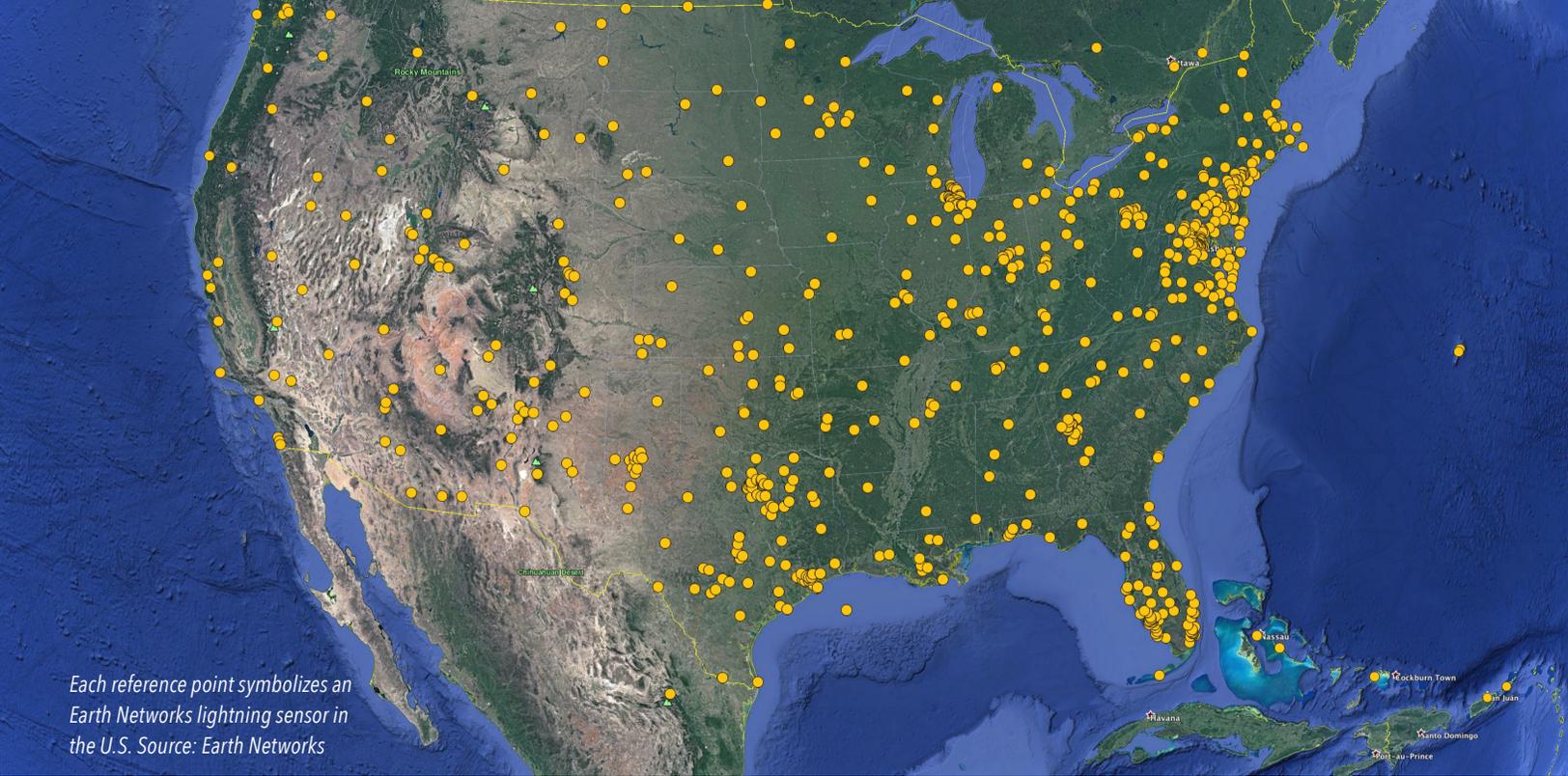
The New York State Public High School Athletic Association can rely on Earth Networks for information about 27 weather factors that are critical to safety planning at the high school level.²

Since 1993, Earth Networks’ mission has been to have the largest and most timely network of weather observations in the U.S. The goal is to provide hyperlocal weather information to the public to avoid weather-related dangers.¹ Earth Networks Total Lightning Network (ENTLN) makes that possible.

ENTLN is the largest lightning detection network in the world with more than 700 lightning sensors across the globe.² The technology is critical for the advanced forecasting of tornados, heavy rain, damaging winds, lightning strikes and more.²

Earth Networks uses the data from the lightning network to issue Dangerous Thunderstorm Alerts (DTAs) that provide warnings for severe weather approaching your area. On average, Earth Networks’ DTAs are up to 50 percent faster than other severe weather alerts.²

The alerts are hyperlocal based on your location. You choose the mile radius and



Each reference point symbolizes an Earth Networks lightning sensor in the U.S. Source: Earth Networks

you will be notified — via phone, email and audible alerts — when lightning breaches.¹ Visuals are included in the alerts so you know exactly where the lightning is striking.¹ Hyperlocal alerts take the subjectivity out of safety planning and help ensure that your staff is on the same page during severe weather events.¹ Similar alerts can be established to warn of hail and approaching tornadoes.

Hyperlocal alerts aren't just for lightning. Earth Networks can send alerts to your staff for 120 different weather conditions and each member can receive different alerts.¹ For example, a tennis coach can request alerts when wind speeds reach 20 miles per hour, whereas a baseball coach can request only rain and lightning alerts.

Earth Networks' weather-detection solutions also allow you to create venue-specific plans for your facilities that vary based on the type of athletic event and the design of your outdoor space.

Automation is key. Not only does technology take the worry out of safety planning, it helps to make outdoor athletic venues safer for athletes and attendees alike when evacuation is necessary.

CONCLUSION

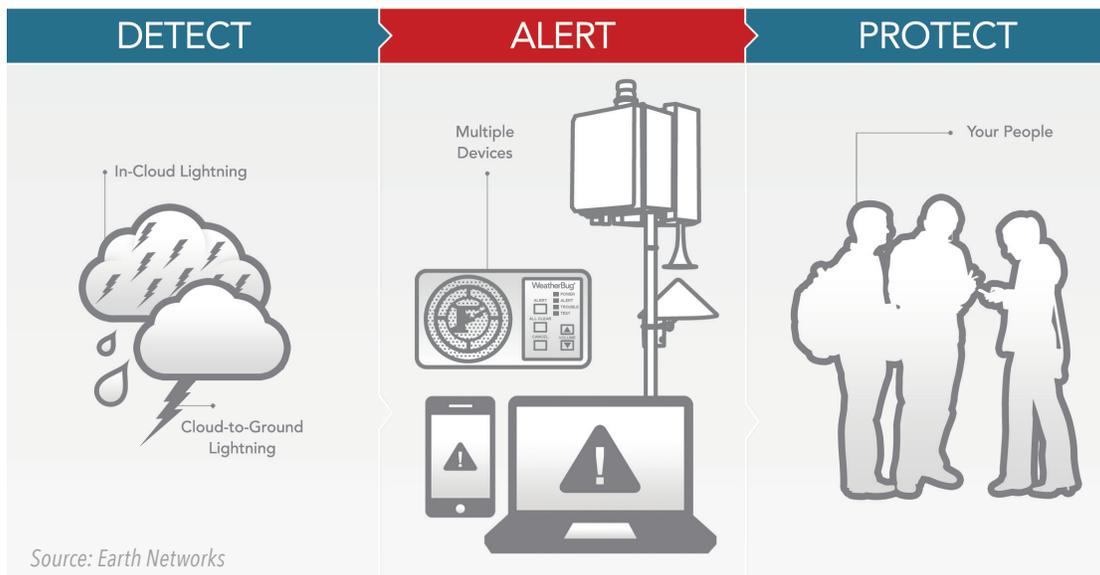
Over the past 10 years, more than 300 deaths due to lightning strike have been reported in the U.S. Thirty of those occurred during sports-related activities.

High school and intercollegiate athletic activities are canceled in advance if substantial rain is expected. Do you cancel events in advance because of potential thunder and lightning? Researchers say no.⁴

As the National Collegiate Athletic Association and the National Federation of State High School Associations put greater emphasis on athlete and spectator safety, concrete severe weather safety plans and the proper execution of those plans becomes increasingly important. Before you finalize your school-specific plan, take a moment to consider technology and how it can improve safety plans and procedures.

When large crowds are gathered, lightning detection technology is critical. Earth Networks has created a series of severe weather tools to streamline safety planning and automate procedures. Athletic directors, coaches, athletes, officials and fans alike have

HOW IT WORKS



benefitted from the following technologies:

Earth Networks Total Lightning Network® is the largest lightning detection network in the world with more than 700 lightning sensors across the globe. The technology is critical for advance forecasting.

Outdoor Alerting Solution is an automated “turnkey safety solution” for athletic events. As severe weather approaches, horns sound to encourage evacuation. The solution continues communication until it is safe to resume play.

Dangerous Thunderstorm Alerts provide warnings when severe weather is approaching your area. The alerts are as much as 50 percent faster than other severe weather alerts.

Don't hesitate to use technology to improve every aspect of your outdoor athletics safety plan. For more information about Earth Networks' product and services, contact the Coach and Athletic Director staff or visit www.earthnetworks.com.

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