



WEATHER SAFETY WARMUP

WEBINAR SERIES

POLL QUESTION



What is your favorite season?

LET'S GET STARTED! BUT FIRST – HOUSE KEEPING NOTES

- This webinar is being recorded and will be sent out shortly after the webinar
- Have a question? Use the chat box and we will get to the question at the end of the session
- Want to learn more? We have additional sessions every month!
- You can also provide feedback, suggest a topic or ask a question by emailing us at info@earthnetworks.com



4 SECRETS TO AN EFFECTIVE LIGHTNING ALERT RESPONSE

AGENDA

- Lightning overview – the threat and how it forms
- Types of lightning strikes and the danger zone
- 4 secrets to an effective lightning alert response
 - Verify
 - Communicate & evacuate
 - Shelter & monitor
 - All clear
- Conclusion

PRESENTER

JEFF LAPIERRE

*Lightning Scientist at
Earth Networks*

WE ALL KNOW ABOUT THE THREAT OF LIGHTNING

Quotes From National Oceanic And Atmospheric Administration



Over the last 30 years in the U.S., about **500 people** are struck by lightning every year. Of those, about 10% of them are killed.

About **two-thirds of all lightning deaths** in the U.S. are associated with **outdoor sports and recreational activities**.

The most vulnerable time to be struck by lightning is between **4 pm and 8 pm**, which coincides with most outdoor sports and recreational events.

HERE IS A QUICK RECAP...

WHAT IS LIGHTNING

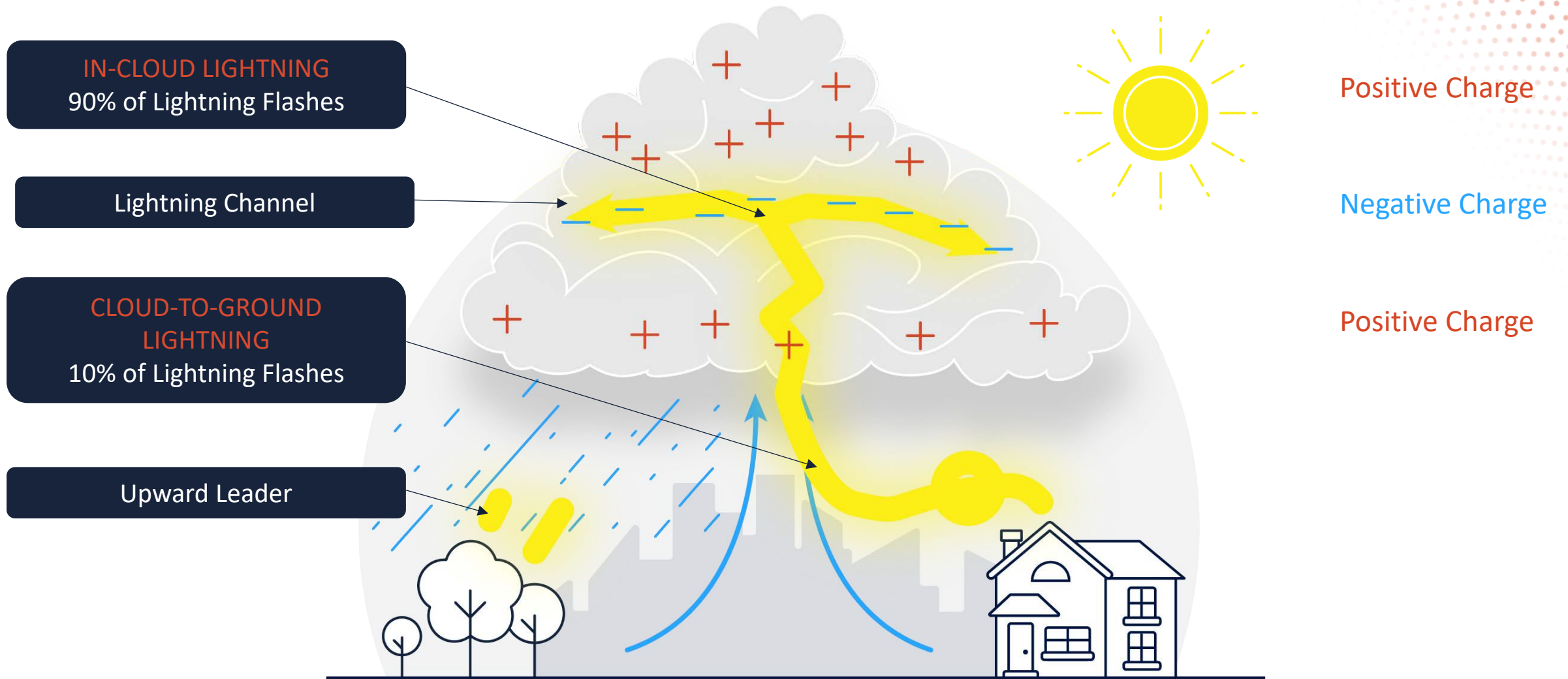
An atmospheric discharge of electricity when positively-charged particles in one area meet negatively-charged particles in another area.

TYPES OF LIGHTNING

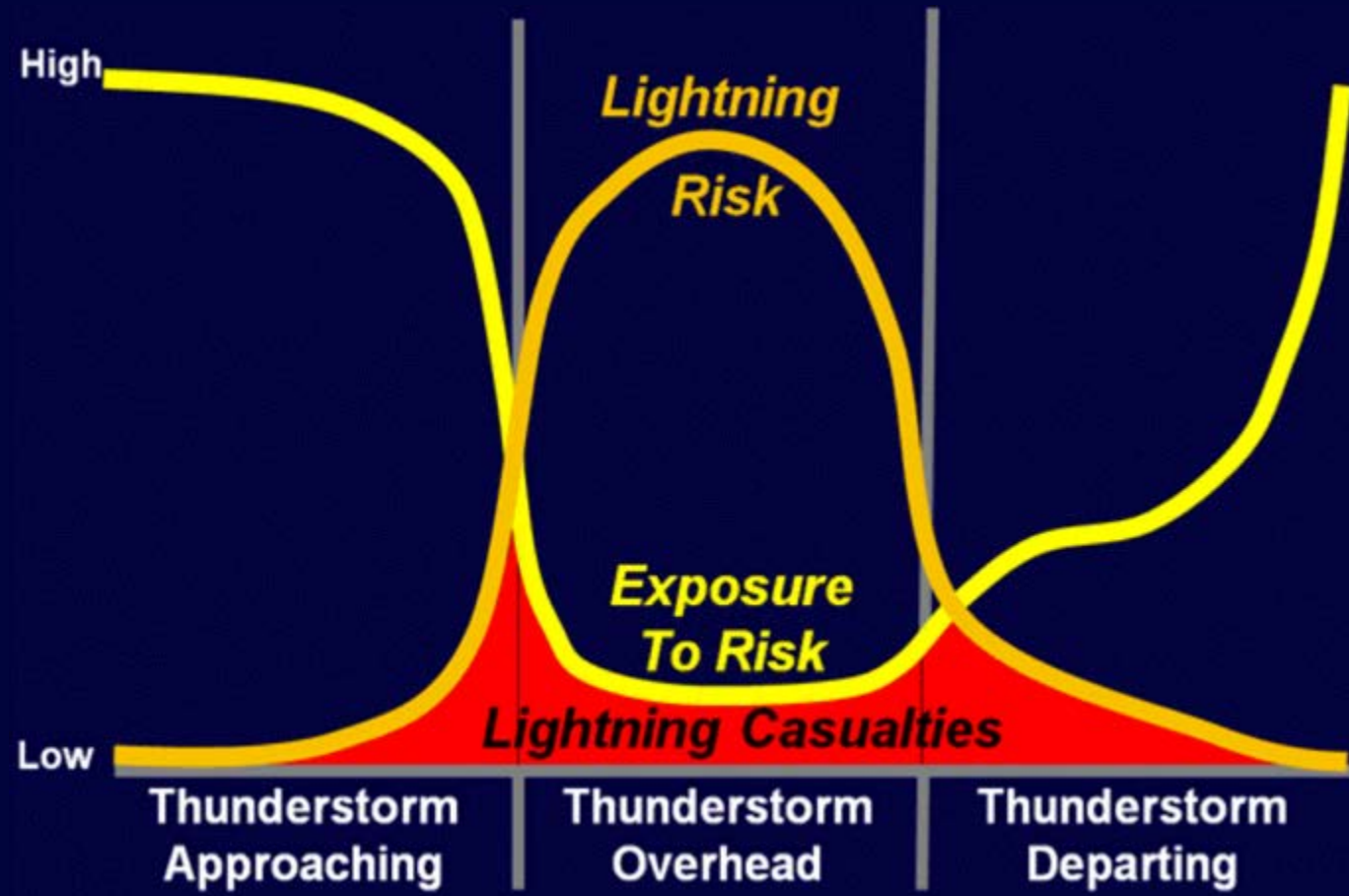
1. In-Cloud Lightning (IC)
2. Cloud-to-Ground Lightning (CG)
 - a. Bolt from the blue



HOW DOES LIGHTNING FORM



THREAT OF LIGHTNING CASUALTIES



TYPES OF LIGHTNING STRIKES & THE RANGE

- 1. Ground Current - 50% of lightning fatalities**
 - Lightning strikes the ground and travels to a nearby victim
 - Kill range: ~ 30 ft
- 2. Side Splash - 33% of lightning fatalities**
 - Lightning strikes a nearby object and travels to a victim
- 3. Upward Streamer - 10% of lightning fatalities**
 - In a lightning storm, upward current travels through victim
 - Kill range can be several miles
- 4. Direct Strike - 3% of lightning fatalities**
 - Lightning strikes a victim directly
- 5. Contact Strike - 3% of lightning fatalities**
 - Lightning strikes something the victim is touching, sometimes through a conducting path



4 SECRETS TO AN EFFECTIVE LIGHTNING ALERT RESPONSE



VERIFY



COMMUNICATE & EVACUTE



SHELTER & MONITOR

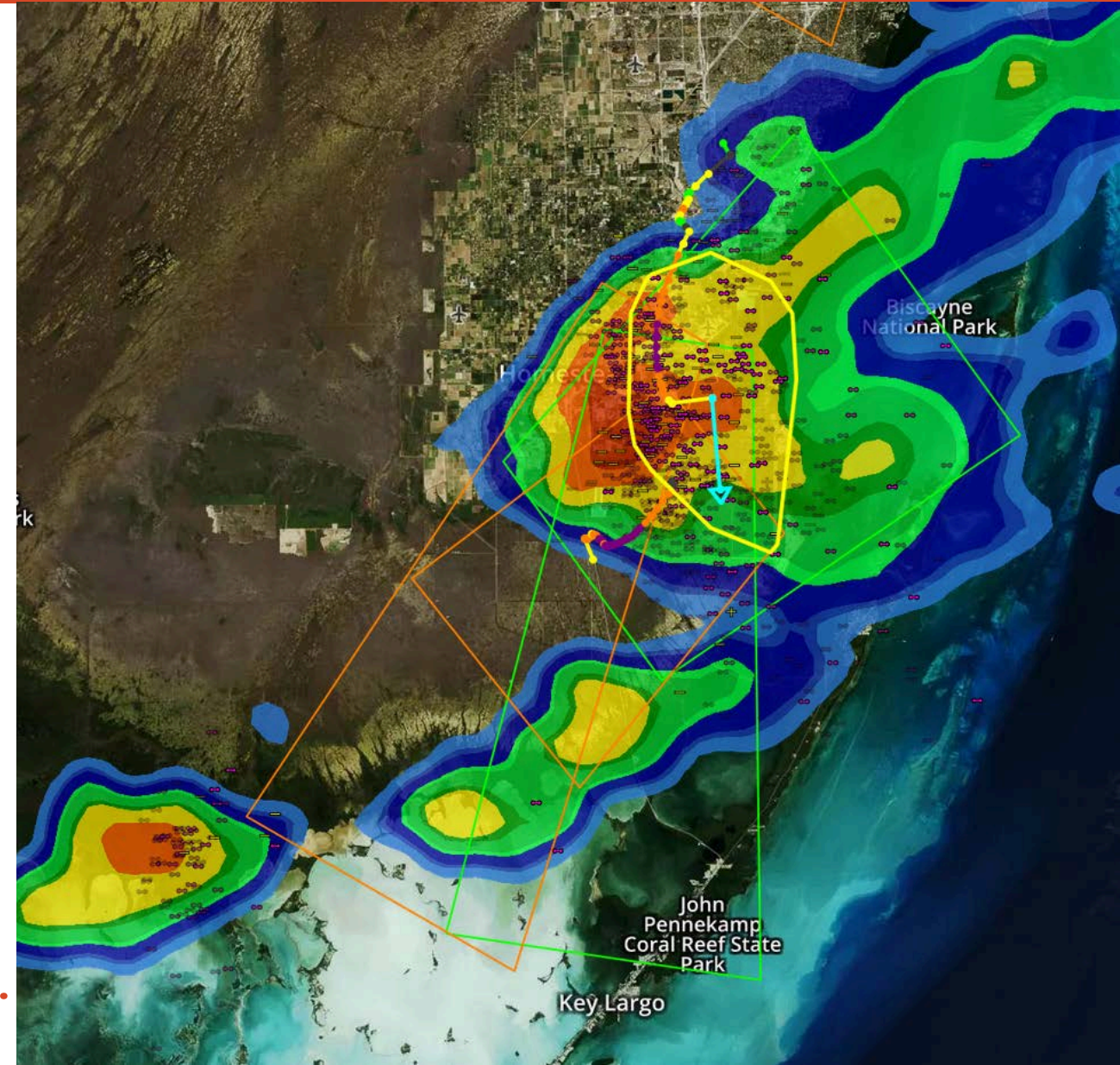


ALL CLEAR

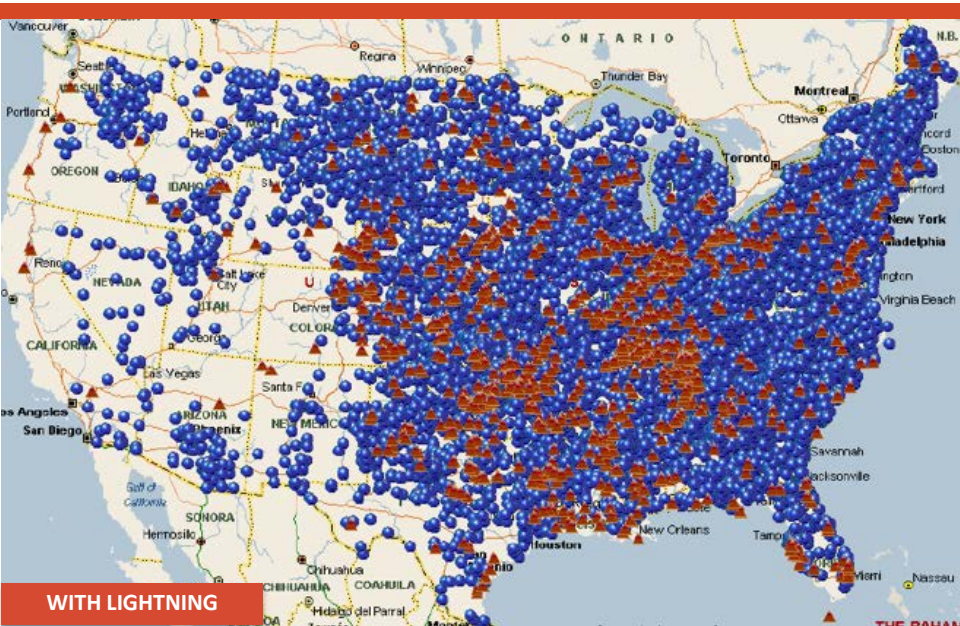
4 SECRETS TO AN EFFECTIVE LIGHTNING ALERT RESPONSE

VERIFY

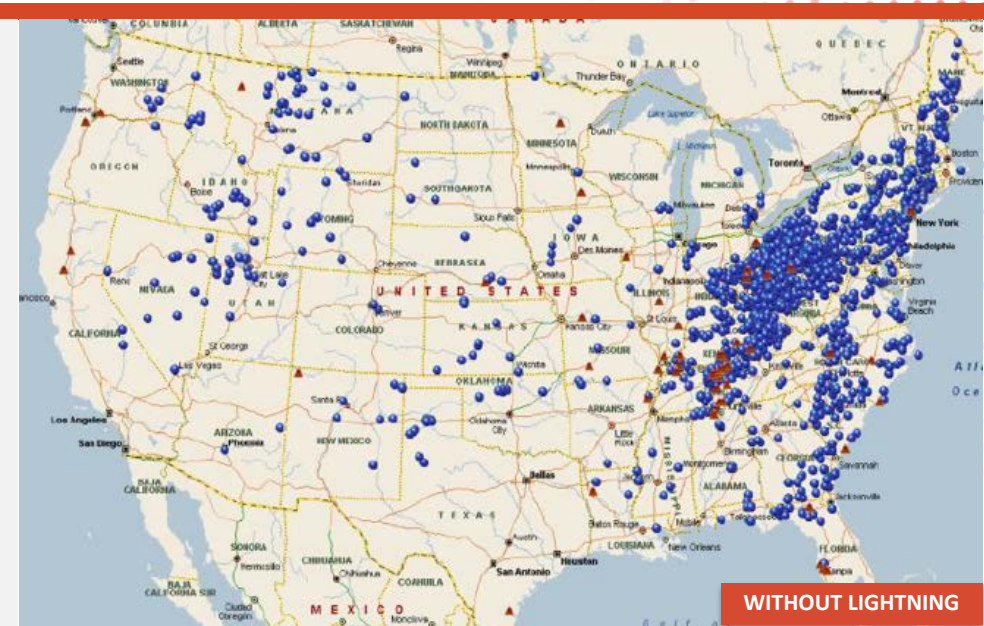
- Verify the threat
- Have a single source of truth
 - Hyperlocal
 - Network based
 - Monitors both IC & CG lightning
- Look at the severity
 - Lightning is a key indicator of severe thunderstorms
 - Other threats might be in the area like:
 - High winds
 - Hail
 - Heavy rain
 - Tornadoes
- Get a birds eye view by visualizing your weather
- Make sure shelter locations are ready to receive your stakeholders



LIGHTNING: A STRONG INDICATOR OF SEVERE STORMS



- 90% of high wind reports include lightning
- 94% of tornado reports include lightning
- 99.6% of hail reports include lightning



All the tornado and high wind reports from 2013 in the United States with and without lightning

4 SECRETS TO AN EFFECTIVE LIGHTNING ALERT RESPONSE

COMMUNICATE & EVACUATE

- Activate your safety team
- Customize your communication & evacuation to your stakeholders, type of facility, and type of business
- Communicate the threat to the public
 - **Have an outdoor alerting system:** make sure your stakeholders are responding to the alert
 - **Don't have an outdoor alerting system:** alert the threat to your stakeholders
- Be transparent when communicating to your stakeholders
- Instruct everyone to head to the designated shelter location
 - Don't forget your staff!
 - Have a predetermine pathway to the shelter location
- Enforce safety policy – no excuses!



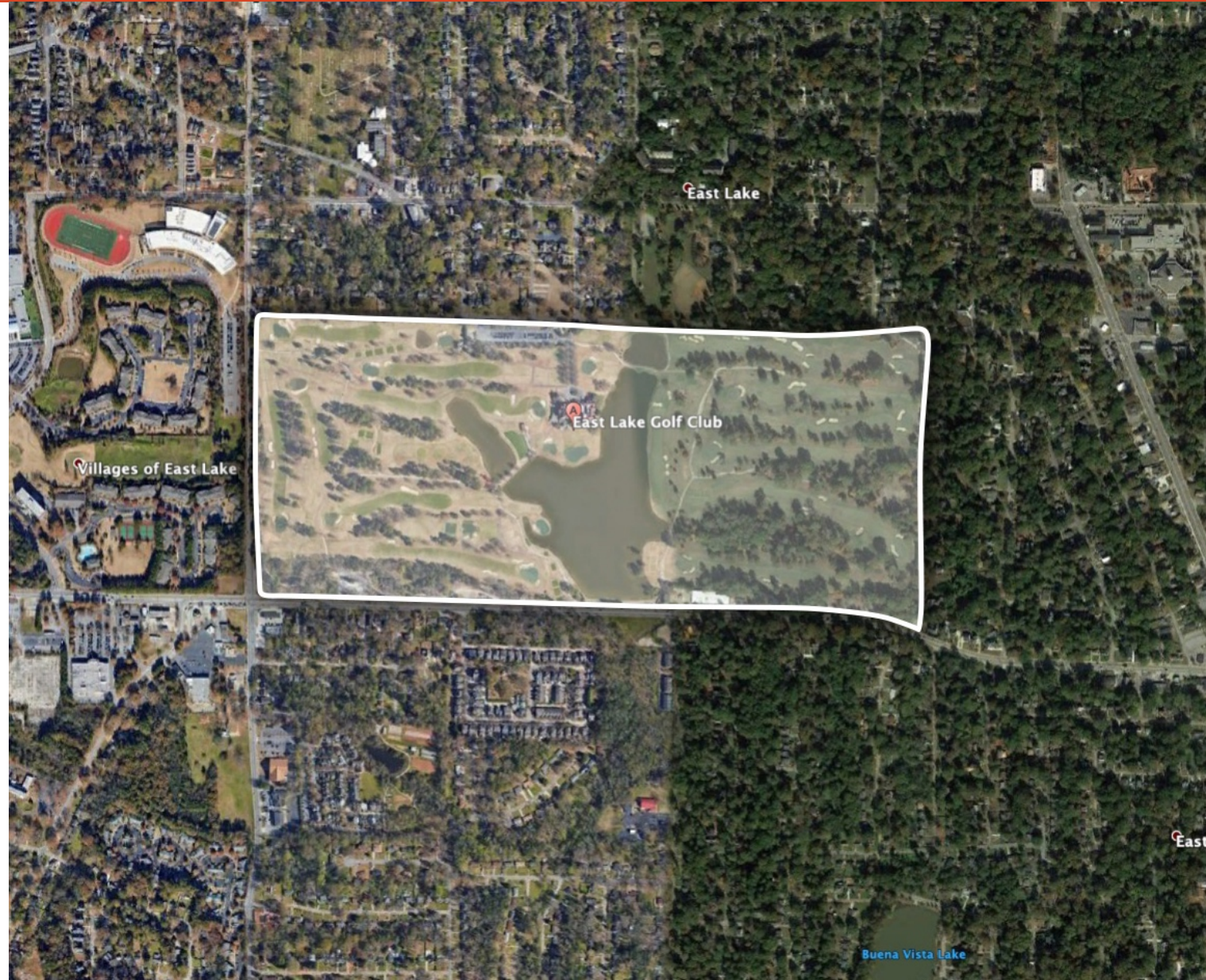
CASE STUDY - LIGHTNING SAFETY GONE WRONG?

DATE: August 24th, 2019

LOCATION: East Lake Golf Club in Atlanta, GA

DETAILS

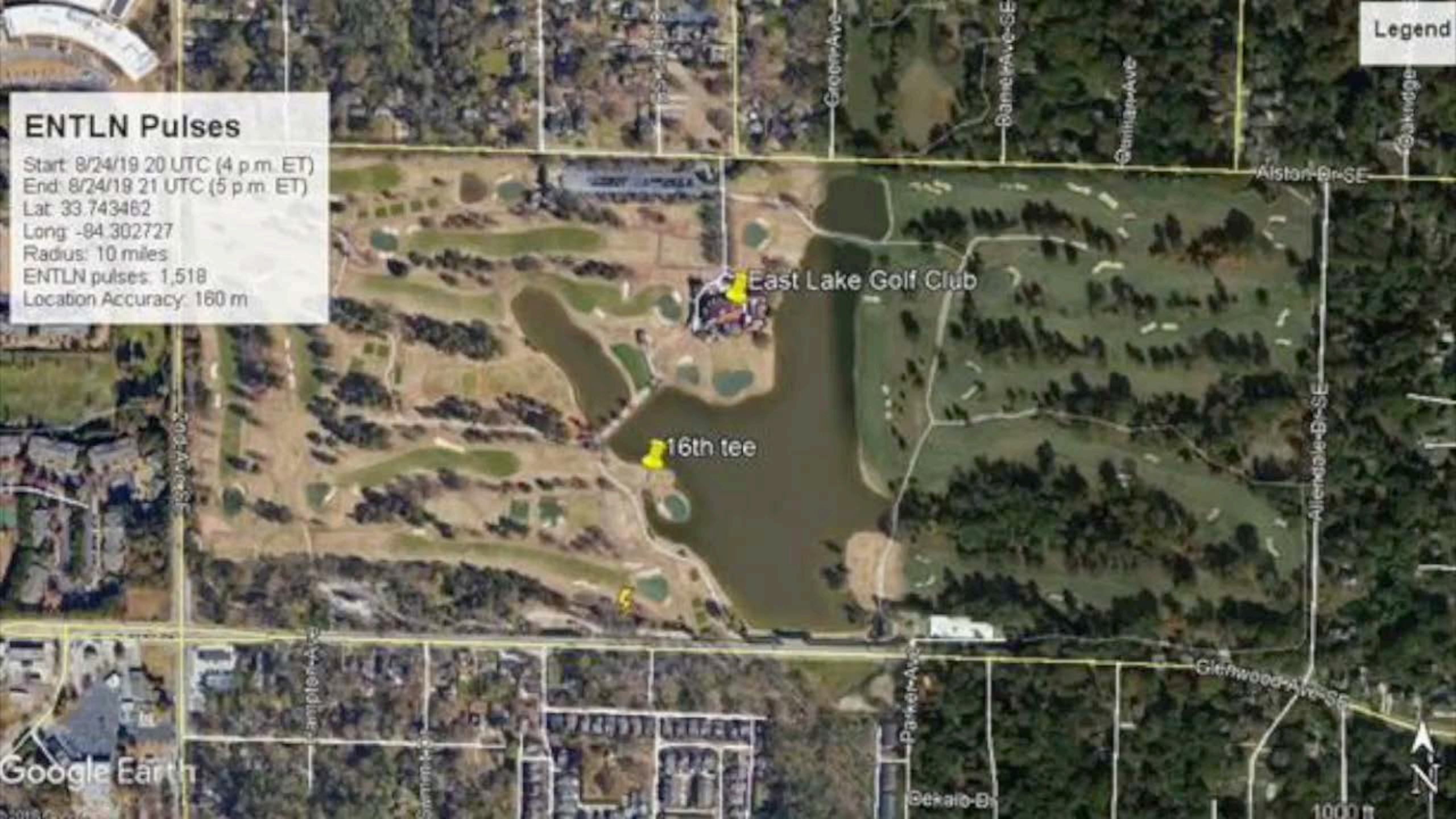
- Lightning injured 6 spectators at a PGA Tour Championship event
- The CG strike hit a tree causing the debris to injure the victims
- The club issued an alert but failed to get a response from some spectators
- A quote from a spectator: “All the spectators were walking about like the tournament was still going on”



Let's take a closer look using
Earth Networks Total Lightning Network

Legend

ENTLN Pulses
Start: 8/24/19 20 UTC (4 p.m. ET)
End: 8/24/19 21 UTC (5 p.m. ET)
Lat: 33.743462
Long: -84.302727
Radius: 10 miles
ENTLN pulses: 1,518
Location Accuracy: 160 m



Google Earth

1000 ft

CASE STUDY - LET'S TAKE A CLOSER LOOK

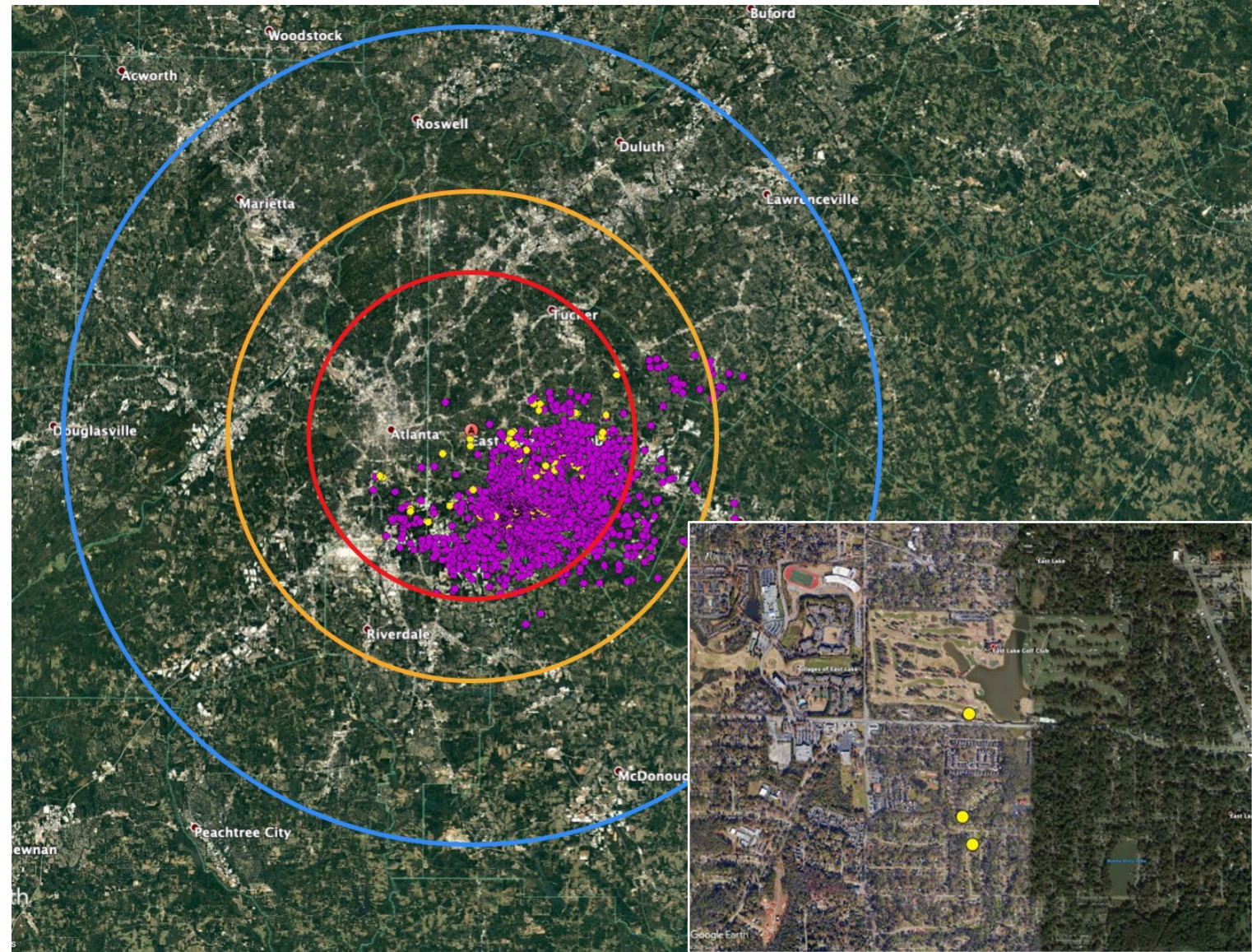
25 miles 15 miles 10 miles IC lightning CG lightning

TIME: A look at the actual event between 4:00 – 5pm local time

WHAT: 10 mile radius search from East Lake Golf Club using Earth Networks Total Lightning Network

RESULTS

- 1,516 pulses during that time frame
 - 87 CG lightning strikes
 - 1,431 IC lightning strikes
- CG strike occurred at 4:45 pm ET
- First IC detected **32 minutes** before the actual strike
- Why did a few spectators not seek shelter when play was halted?



4 SECRETS TO AN EFFECTIVE LIGHTNING ALERT RESPONSE

SHELTER & MONITOR

- Characteristics of a safe shelter location
 - Sturdy
 - Fully enclosed
 - Well-grounded structure
 - Has lightning protection
 - Metal vehicles are a safe last resort alternative
- Things to avoid when indoors
 - Water & plumbing
 - Any conductor connected to the outside
 - Corded phones
 - Windows and doors
 - Electrical equipment
- Monitor the weather and keep your stakeholders informed



CASE STUDY - LIGHTNING SAFETY SHELTERING GONE WRONG?

DATE: September 18th, 2018

LOCATION: Central Middle School, Charlotte County, VA

DETAILS

- A student was struck by lightning while in class
- Incident happened between 3:00pm – 3:30pm
- There was severe weather activity in the area
- The mother of the student said that her child wasn't aware of the threat of lightning and was just instructed to stay on campus



CASE STUDY - LET'S TAKE A CLOSER LOOK

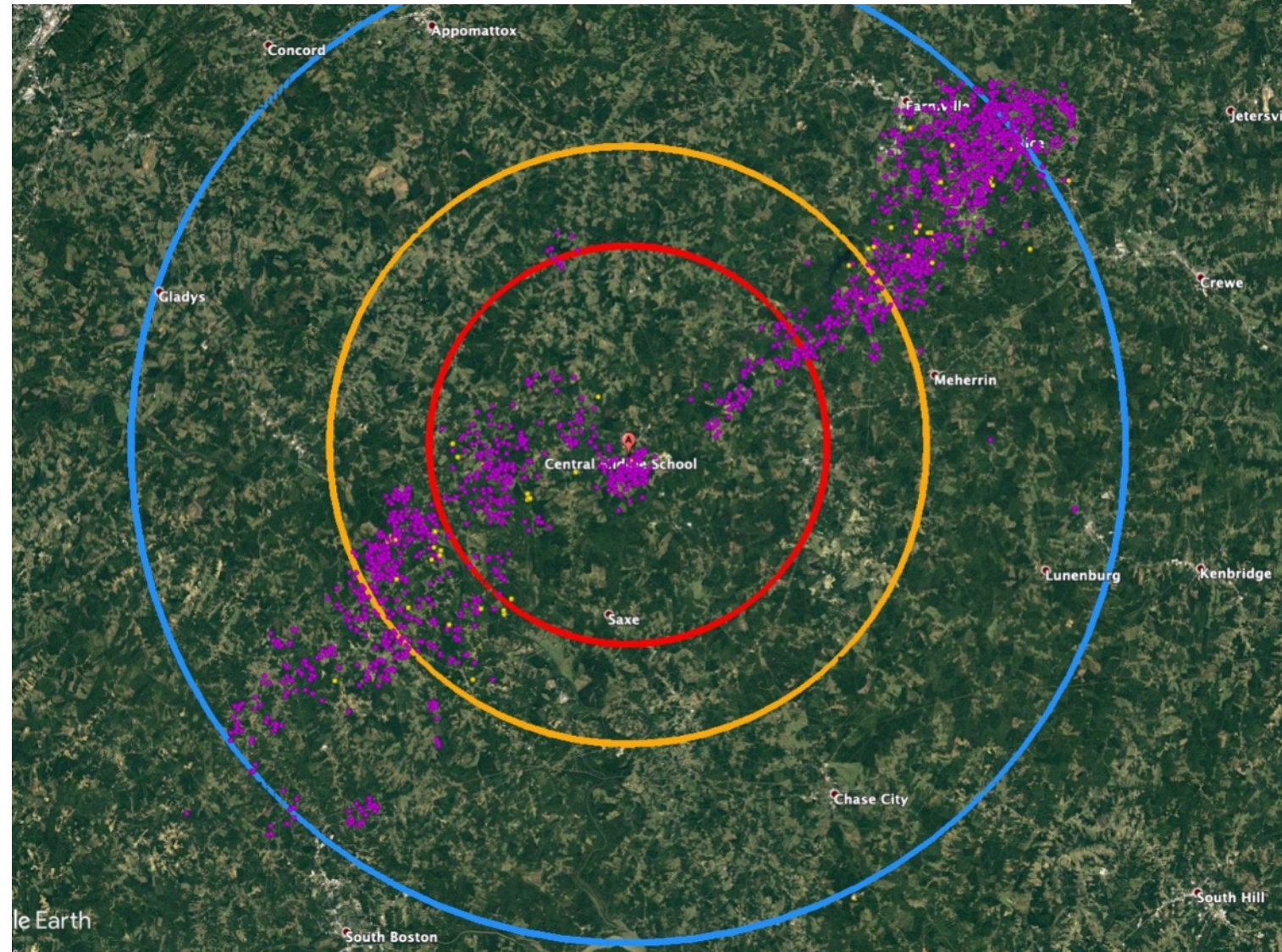
TIME: A look at the 2hrs leading up to the event between 1-3pm local time

WHAT: 25 mile radius search from the school with Earth Networks Total Lightning Network

RESULTS

- 1,805 in-cloud (IC) lightning pulses detected and 55 cloud-to-ground (CG)
- There was a tornado warning issued in the area

25 miles 15 miles 10 miles IC lightning CG lightning



CASE STUDY - LET'S TAKE A CLOSER LOOK

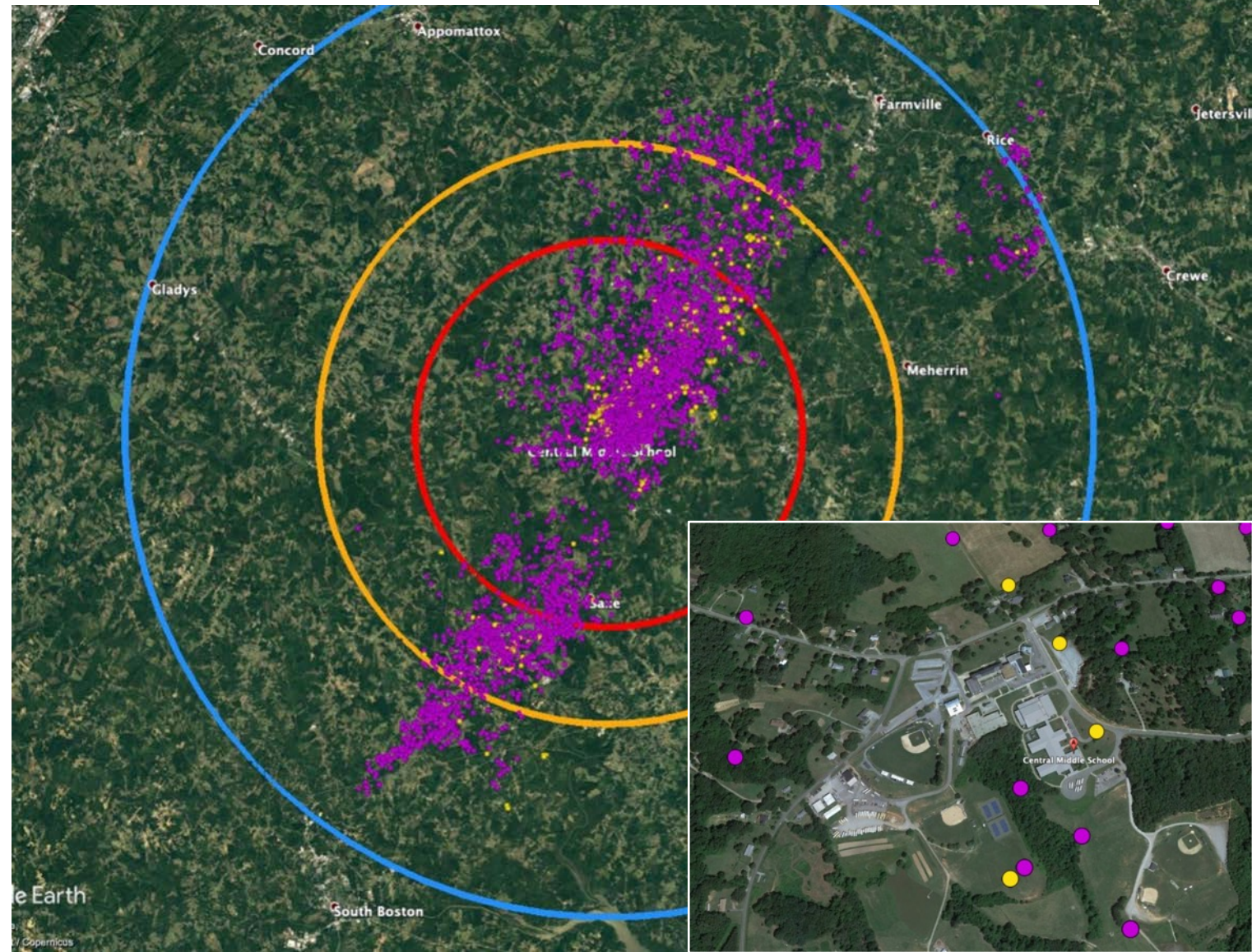
25 miles 15 miles 10 miles IC lightning CG lightning

TIME: A look at the actual event between 3:00 – 3:30pm local time

WHAT: 25 mile radius search from the school with Earth Networks Total Lightning Network

RESULTS

- 3,476 in-cloud (IC) lightning pulses detected and 250 cloud-to-ground (CG)
- Lightning hits the ground, travels through the plumbing
- Student was washing his hands when struck



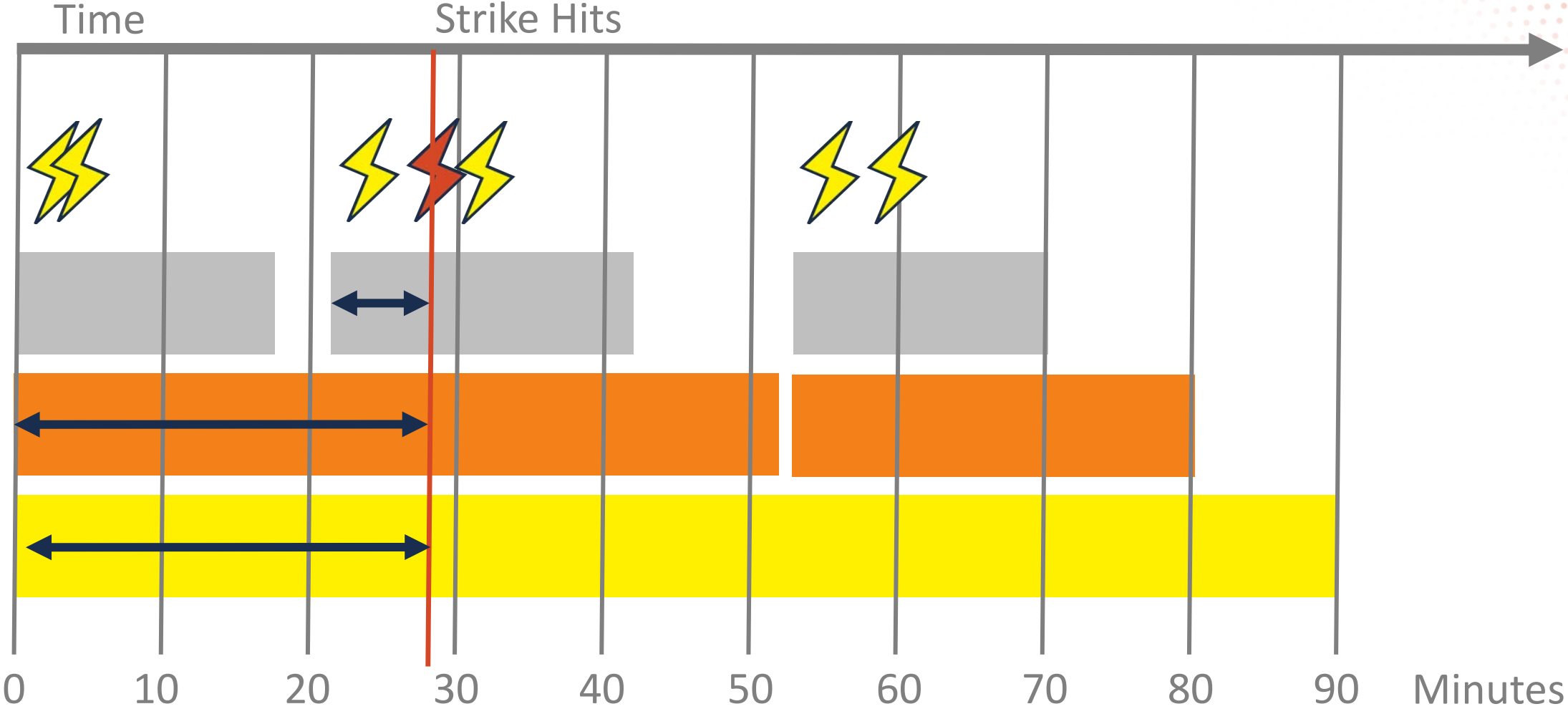
4 SECRETS TO AN EFFECTIVE LIGHTNING ALERT RESPONSE

ALL CLEAR

- NOAA recommendation: Wait 30mins after the last lightning strike
- What happens when you lower the all clear time?
 - Higher false alarm rate
 - Higher risk of an incident
 - Shorter lead time
 - Higher number of evacuations



ALL CLEAR TIME AND STORM DURATION



UTILIZE A SYSTEM WITH AN AUTOMATED COUNTDOWN CLOCK



Automate the process to ensure accuracy and safety

REMEMBER – ONE SIZE DOESN'T FIT ALL

Need help? Consult a weather safety expert

FACTORS TO CONSIDER WHEN PLANNING YOUR RESPONSE

- Climate
- Geography
- Stakeholders
- Type of business

- Monitoring solution
- Alerting solution
- Size of facility
- Available shelter locations

POLL QUESTION



Would you like to have a 1 on 1 conversation with an expert about your lightning safety solution and process?



THANK YOU

QUESTIONS AND COMMENTS?

Contact us at info@earthnetworks.com