VAISALA

WHEN LIGHTNING STRIKES

Ensure safe and efficient ramp operations

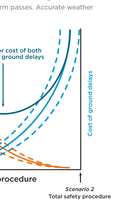
Lightning at airports are a significant hazard — risking safety and operational efficiency at every turn.

Every minute of delay is very expensive, so when it's your job to maintain safety, efficiency and on-time departures, you need to know what the next thunderstorm will bring. And when it will pass.

The key is having real-time, accurate and reliable thunderstorm information at hand.

$12K USD
Estimated cost per minute of delay

$6.2M
Estimated potential savings per year from a 10-minute improvement in lightning delays at Chicago O'Hare International Airport[1]



Maximize safety and uptime

Lightning is a threat to worker, passenger and operational safety. It takes time for ground crew to stop operations, move to a safe area, and then resume once the storm passes. Accurate weather information is critical to keeping air traffic moving.

In the balance: The costs of maximizing safety and uptime

This graphic[2] illustrates the economic balance related to safety and ground delays caused by lightning, which shows the complexity of decision making in maintaining a cost-effective strategy.

Meet the challenges: consistent standards and warning criteria

Airport decision makers typically use lightning information, airport organization procedures, and human factors to determine the best way to maintain safety and uptime. But there are few common methods of determining risk.

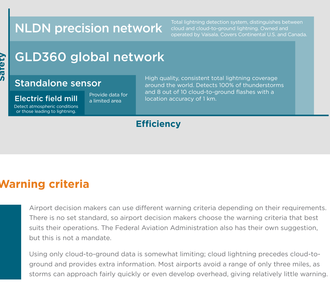
Lack of standards leads to uncertainty

Warning criteria: How dangerous is the storm?

The efficiency of a thunderstorm detection system is critical to determining warning criteria. This will help airport decision makers understand just how much time is needed to warn and prepare ground staff.

How much time to prepare for lightning?

Types of lightning



Don't be fooled: Cloud-to-ground lightning is the most dangerous to ground crew, but cloud lightning often precedes cloud-to-ground in a thunderstorm.

Your thunderstorm detection system matters

There are two key measurements for lightning detection: amount and accuracy.

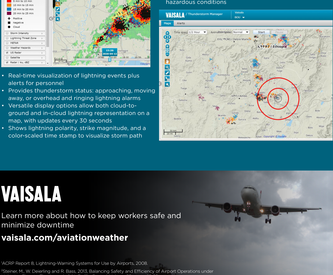
Detecting the amount of lightning in a storm is critical for safety. Any lightning strikes that go unnoticed pose additional risks for injury or even death.

High accuracy allows decision makers to more clearly define when lightning has passed, and operations can resume — saving minutes in delays and thousands in costs.

Better detection efficiency
Increased awareness and reaction to hazardous events, increasing safety.

Better system accuracy
Faster reaction time when the hazard has passed, decreasing costs.

Proximity matters



Technologies and performance

Different thunderstorm detection technologies deliver varying performance for unique uses.

Warning criteria

Airport decision makers can use different warning criteria depending on their requirements. There is no set standard, so airport decision makers choose the warning criteria that best suits their operations. The Federal Aviation Administration also has their own suggestion, but this is not a mandate.

Using only cloud-to-ground data is somewhat limiting; cloud lightning precedes cloud-to-ground and provides extra information. Most airports avoid a range of only three miles, as storms can approach fairly quickly or even develop overhead, giving relatively little warning.

Priority	Lightning type	Evacuation alert ring radius	Evacuation alert ring expiration
Maximize operational efficiency	Cloud-to-ground	3 mi / 5 km	10 minutes
Maximize safety	Total lightning	5 mi / 8 km	30 minutes
FAA suggestions	Total lightning	5 mi / 8 km	10 minutes

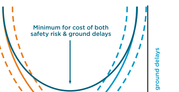
Vaisala Thunderstorm Manager for aviation

Vaisala Thunderstorm Manager is a web-based lightning threat management system designed to increase certainty. Built on the most trusted lightning detection networks in the world, Thunderstorm Manager detects all lightning activity in real time and activates alerts within the Lightning Threat Zone.

This level of consistent, reliable situational awareness enables airport safety personnel to make faster, safer determinations on when to stop and then safely resume operations.

- Real-time visualization of lightning events plus alerts for personnel
- Provides thunderstorm status: approaching, moving away, or overhead and ringing lightning alarms
- Versatile display options allow both cloud-to-ground and in-cloud lightning representation on a map, with updates every 30 seconds
- Shows lightning polarity, strike magnitude, and a color-scaled time stamp to visualize storm path

- Maximizes worker safety, minimizes operational downtime
- **Lightning Threat Zone** provides a one-hour forecast of lightning potential in 10-minute increments, including storm trajectory, cell velocity, speed, and direction
- **Alerting functionality** easily integrates with web-to-audio and visual solutions to quickly alert outdoor workers of hazardous conditions



VAISALA

Learn more about how to keep workers safe and minimize downtime

vaisala.com/aviationweather

[1]ACRP Report 9: Lightning-Warning Systems for Use by Airports, 2008.

[2]Steiner M., W. Deierling and R. Bass, 2013, Balancing Safety and Efficiency of Airport Operations under Lightning Threats, The Journal of Air Traffic Control, Volume 55, pages 16-22.

Statista–Global air traffic - number of flights 2004-2021, June 10, 2021.

Steiner M., W. Deierling, J. Kuhlen, M. Robinson, A. Mann, J. Bowley and R. Bass, 2016, Air Traffic Impacts Caused by Lightning Safety Procedures, American Institute of Aeronautics and Astronautics.

Ref: B212161/A Vaisala 2020