



# THUNDERSTORM WARNING SYSTEM THUNDERBALL

The Saab thunderstorm warning system, ThunderBall, improves safety and operational efficiency at airports. It uses real-time lightning data and local atmospheric electrostatic data to provide early warning of thunderstorms and lightning. The system also monitors and displays the direction and speed of a thunderstorm.

## Reducing the impact of thunderstorms

ThunderBall helps reduce the risk of a thunderstorm approaching unexpectedly while refuelling. It also informs controllers once the risk of lightning has receded and a thunderstorm has moved past. This information reduces the stop time for refuelling services, both before and after a storm. ThunderBall also gives Air Traffic Controllers valuable information for air traffic services.

## Lightning detection

The lightning detector is based on a proven avionics lightning detection processor and was designed to meet the need for thunderstorm detection at airports and terminal

areas in safety critical operations such as refueling, planning of flight operations, weather briefing for aviation and air traffic control.

The lightning detector gives omni-directional thunderstorm detection, monitors the thunderstorm cell development and gives indication of severity and storm path.

## Atmospheric electric field sensor

The Electric Field Mill (EFM) is an important part of Thunderball, since no lightning detector can generate warnings before the first lightning occurs.

If a thunderstorm develops over the airport, this can lead to the dangerous situation that the first lightning strike may occur on site without warning.

The EFM detector indicates if a thunderstorm develops over the airport and its vicinity, by measuring the static electric field. An increase in the atmospheric electric field at ground level indicates a potential for lightning strikes.

The combination of EFM and lightning detector increases the probability to receive timely warning of lightning discharges.

## Information for several airports

Several airports can share information from the lightning detectors, since they maintain a high degree of accuracy over large areas.

The Field Mills sensor at the airport monitors potential development of lightning and an alarm is activated when conditions are ideal for lightning to occur.

## Intuitive user interface

Information from the sensors is displayed on a scalable map with the airport in the centre. An intuitive HMI allows the user, with a simple glance at the display, to get thunderstorm information facilitating operational decisions. Acoustic and visual alarms can be activated automatically, based on locally agreed parameters.

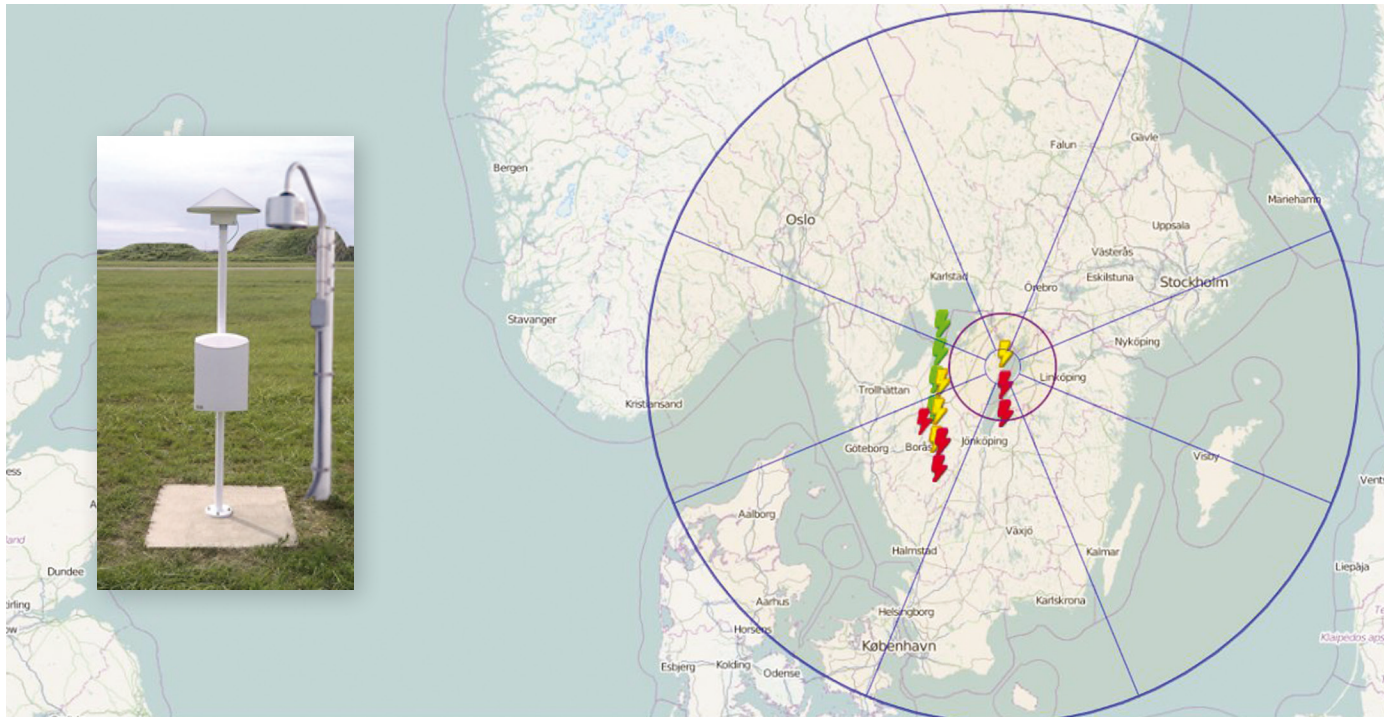
ThunderBall can be used as a stand-alone system or be integrated in other systems.

## Web-based application

Through the web-based system solution, it is easy to share information about the lightning situation to various executives and organizations both inside and outside the airport.



# SAAB



## VERSIONS

- Stand alone system
- ThunderBall can be integrated in the following systems from Saab: AWOS (Automated Weather Observation System), MetView (MET Display for ATC) and IRIS (combined weather and AIS system)

## NOTIFICATION OF WARNINGS

- Acoustic and visual alarm in the work stations
- E-mail
- SMS
- External acoustic and visual alarm

## THUNDERBALL SENSORS

### Lightning Detector:

- Range: 360 km and 360 degrees
- Update rate: 1 second
- Detected strike types: Intra cloud, cloud to cloud, cloud to ground
- Data format: Azimuth and range
- Azimuth:  $\pm 1$  degree
- Time synchronization: GPS

### Electric Field Mill:

- Range:  $\pm 20$  kV/m
- Accuracy:  $\pm 5\%$
- Resolution: 0,01 kV/m
- Response time: 0,1
- Range: 0 to 38 km
- Output: Digital

## SYSTEM COMPONENTS

A complete ThunderBall System consists of:

- One Lightning sensor
- One Standard PC
- One Standard PC (local)
- One Atmospheric Electrostatic Field Monitor
- Software package
- Electronic map (background)

Specifications subject to change without notice

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