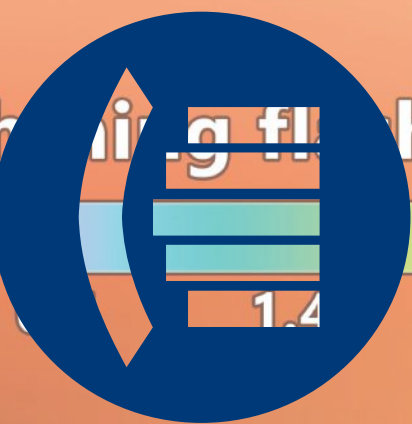
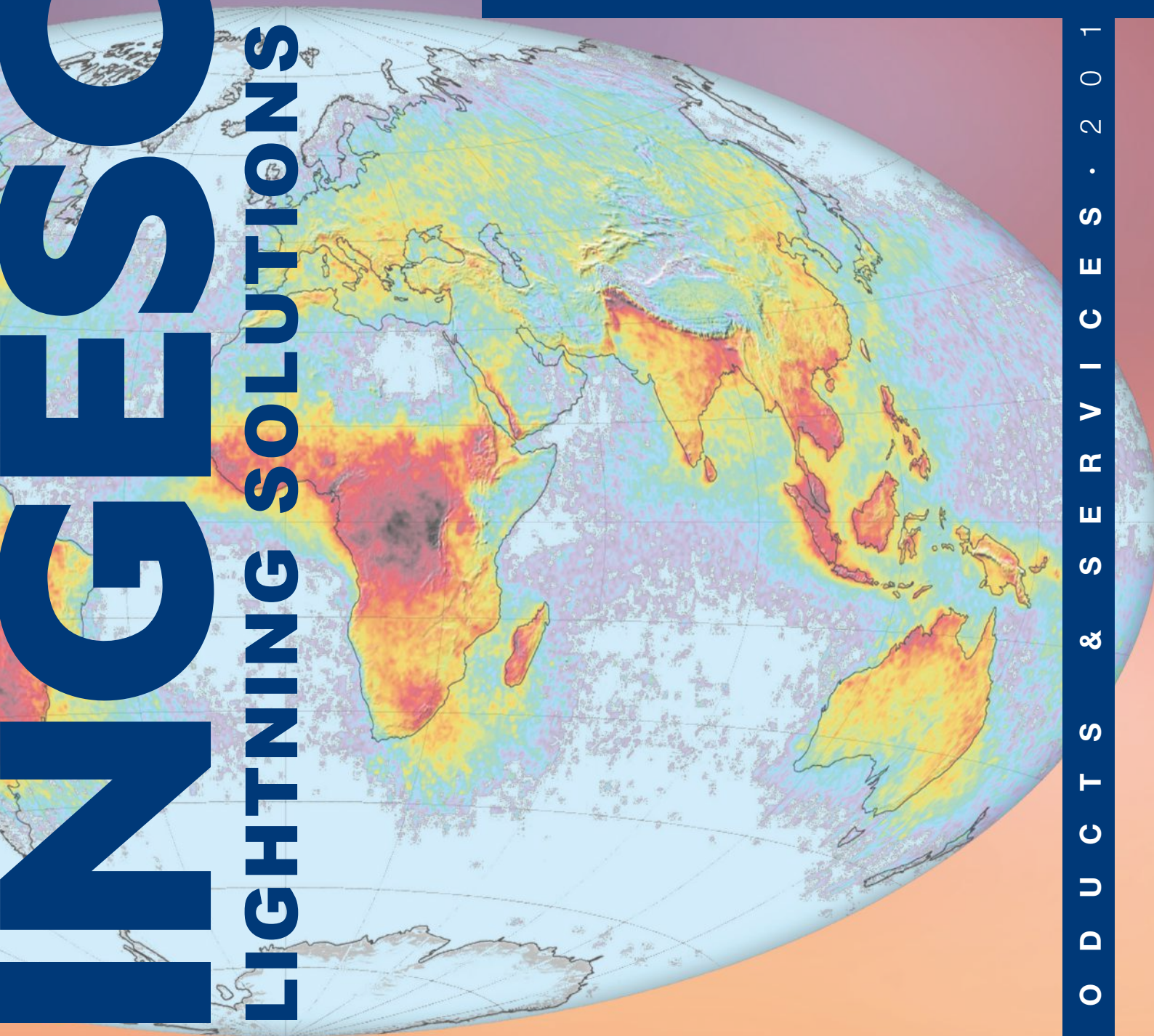


INGESCO

LIGHTNING SOLUTIONS

STORM DETECTORS



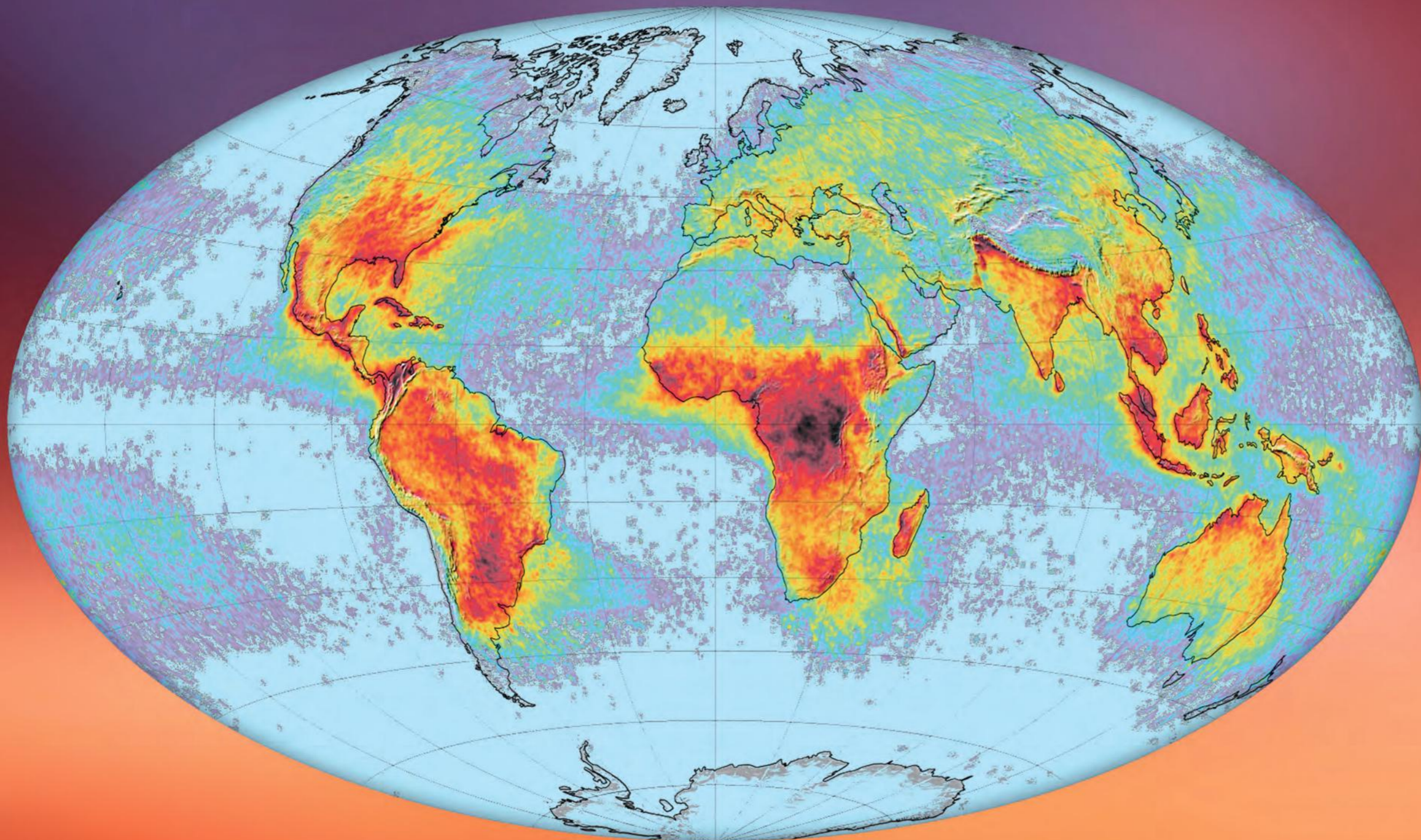
Lightning flashes (Km²/year)

1.4

5

20

70



Lightning flashes (Km²/year)



STORM DETECTORS

THUNDERSTORM WARNING 76

PREVISTORM 81

LINET Network 81

PREVISTORM.net 81



STORM DETECTORS: THUNDERSTORM WARNING SYSTEMS

► overview

Certain industrial and social activities are sensitive to the effects of lightning. For example, companies where hazardous activities are performed and / or work outside, telecommunications systems, power generation companies, transportation and many others. Activities such as sports, outdoor events, etc. require lightning hazard warning information.

To cover these needs, in the European Union there is the European standard **EN 50536-1: 11** and the in rest of the world, the international standard **IEC 62793**. These standards define the hazard warning system and how to implement lightning alarm systems.



Wind turbines



Industry



Leisure



Research



Communications



Sports

► PREVISTORM solutions

INGESCO offers a wide range of solutions adapted to these rules. On the one front, the **PREVISTORM STORM DETECTOR** system sets an isolated system capable of detecting the formation of storm clouds from the early stages.

Furthermore, the system **PREVISTORM.net** by detecting lightning and precise location in real time, enables the generation of alarms when the storm approaches dangerously (in areas where the network **LINET** is already operating).

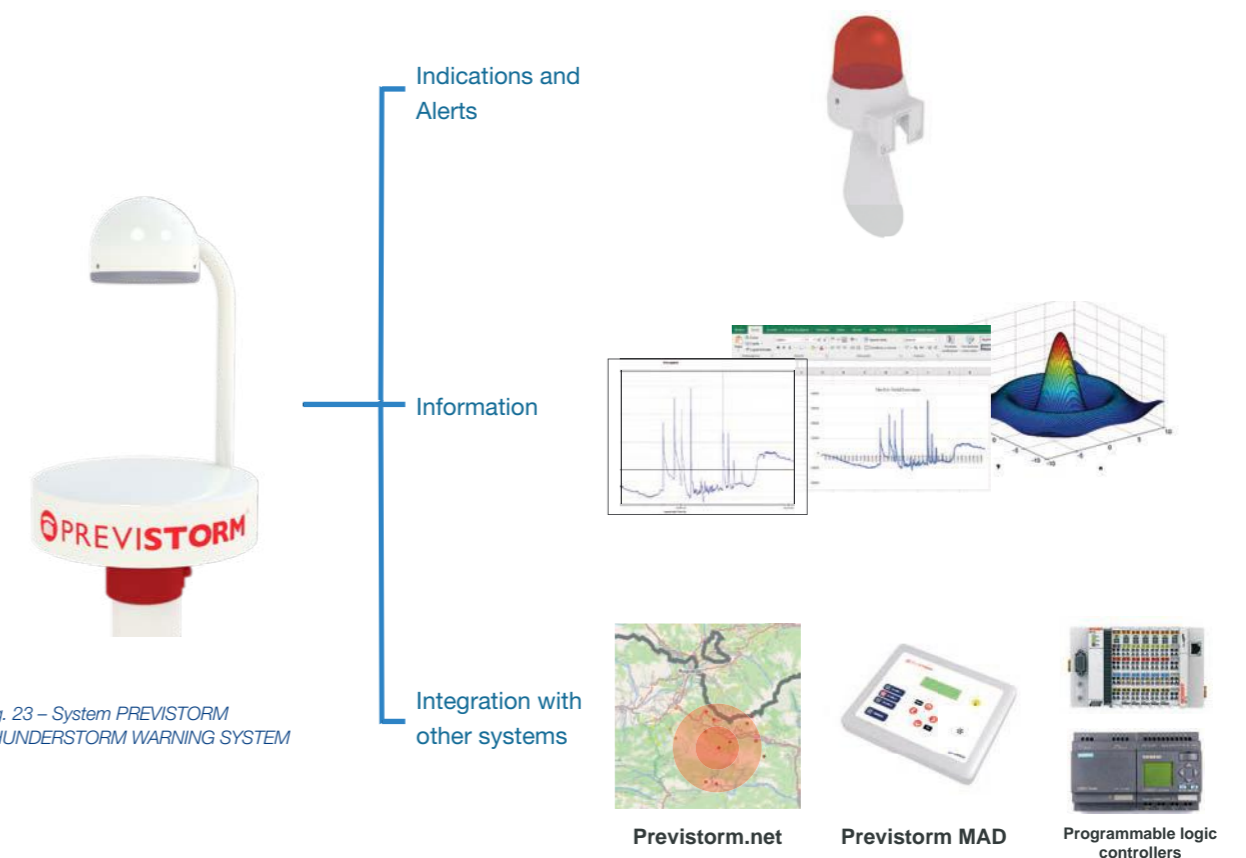
As well as the implementation of new **LINET** networks for large companies or state institutions interested in having its own network of lightning detection.

► PREVISTORM THUNDERSTORM WARNING SYSTEM:

Electric field sensor for early warnings and alerts generation.

Electrostatic field measurement system to know in-situ when the lightning risk has increased. It acts in a localized way, allowing to know in advance the possibility of lightning strikes in a location.

It is not necessary a lightning strike to detect the storm activity.



PREVISTORM THUNDERSTORM WARNING SYSTEM is composed of:

- An external sensor PREVISTORM R-Field Sensor that allows to measure the electrostatic field evolution.
- An indoor connection box:
 - Protection of data lines and sensor power.
 - Connection of external automation and signaling devices.
 - Connection to a computer.
- A management software that provides MCE sensor remote control functions, display functions, historical data, analysis of the evolution of the electrostatic field and alarm configuration by the user.

STORM DETECTORS: THUNDERSTORM WARNING SYSTEMS

► LINET: High precision lightning detection network

An unique system of extraordinary efficiency for detecting lightning that allows customers to purchase and operate their own independent network with highly reliable lightning location. A network focused on the needs of businesses for quality of prevention against lightning.

This system detects both intra-cloud as well as cloud to ground lightning, and records the characteristics of each of the lightning strikes.



Fig. 24 – LINET field antenna sensor.

• Who benefits from LINET systems?

Large companies or public institutions interested in having its own network of lightning detection, as LINET systems deliver more lightning data more accurately than those obtained from commercial networks. Lightning information is easily visualized with exclusive applications.

Energy companies, from controlling pipelines to electricity distribution networks or wind power generation parks in places where there is no quality lightning information available.

National meteorological services, airport systems or military prefer to have their own lightning and detection systems and use LINET systems.

• LINET System advantages:

- High detection efficiency.
- Great location accuracy (accuracy < 100m).
- 3D detection.
- Continuous real-time operation.
- Easy installation.

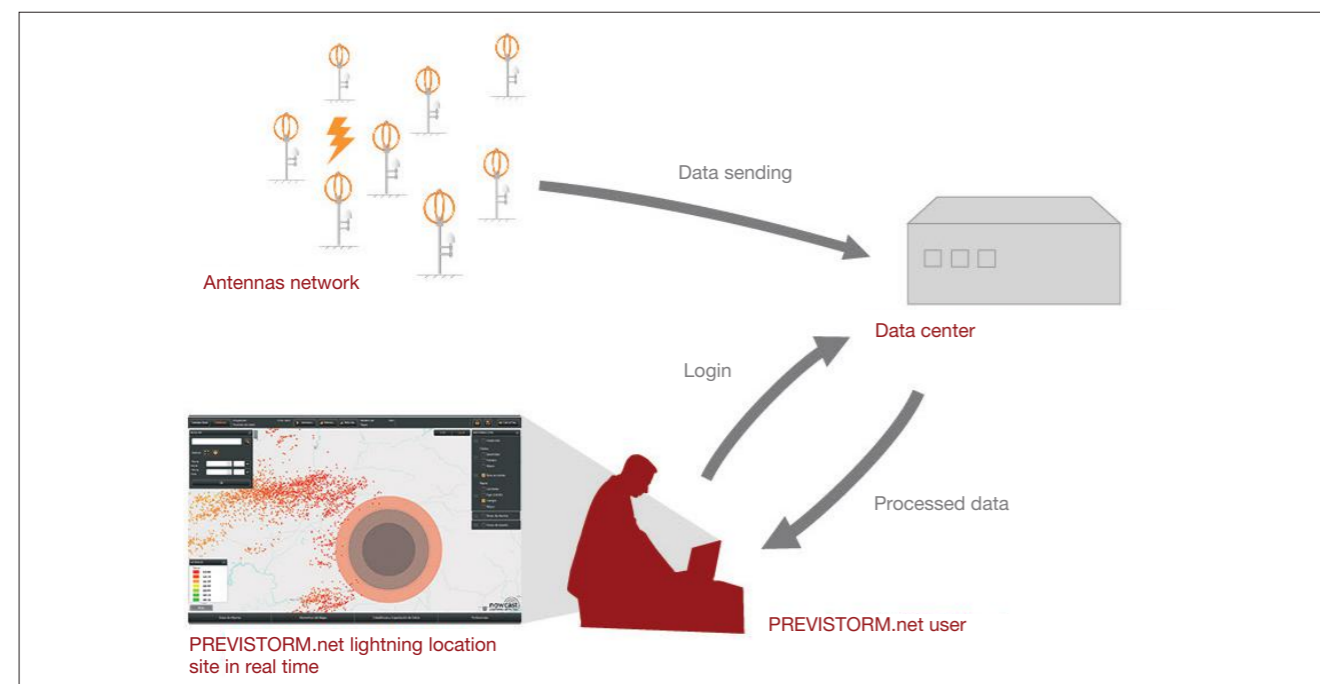


Fig. 25 – LINET network.

► PREVISTORM.net

Lightning information can be stored in databases. Each strike is characterized by: Date, Time, Latitude, Longitude, polarity, current, lightning type (cloud-to-ground, or intra-cloud) and height (in case of intra-cloud). However, the user has applications that allow access to information in a more accessible manner with applications such as:

PREVISTORM.net: the professional application that allows a global view on the current situation of thunderstorm activity, visualizing the present and historical lightning strikes. There are defined alarm areas around the points / areas of interest (you can insert any form) and the operator can receive early risk warnings of the approach of a storm. The main features are:

- Warning of nearby storms through SMS and e-mail.
- Monitoring and analysis of detected lightning.
- Automatic list of lightning in areas of interest.
- Statistics
- Online access from any computer.
- Ability to export data in text format to Google Earth.
- Grouping and prediction of lightning storm cells.
- Auto alarm settings.
- Generating predictive cells.
- Alarm log file.



Fig. 26 – PREVISTORM.net display image

STORM DETECTORS: THUNDERSTORM WARNING SYSTEMS



Preventive detection of storms standard, **IEC 62793:2016** (Protection against lightning storm warning systems) was published in May 2016, in order to avoid risks for humans and property involved in this destructive atmospheric phenomenon.

Each year, due to the direct or indirect effects of lightning strikes, property damage occurs, affecting the continuity of service in the public and private sectors. Also, lightning causes injury or serious human deaths worldwide throughout the year.

PREVISTORM

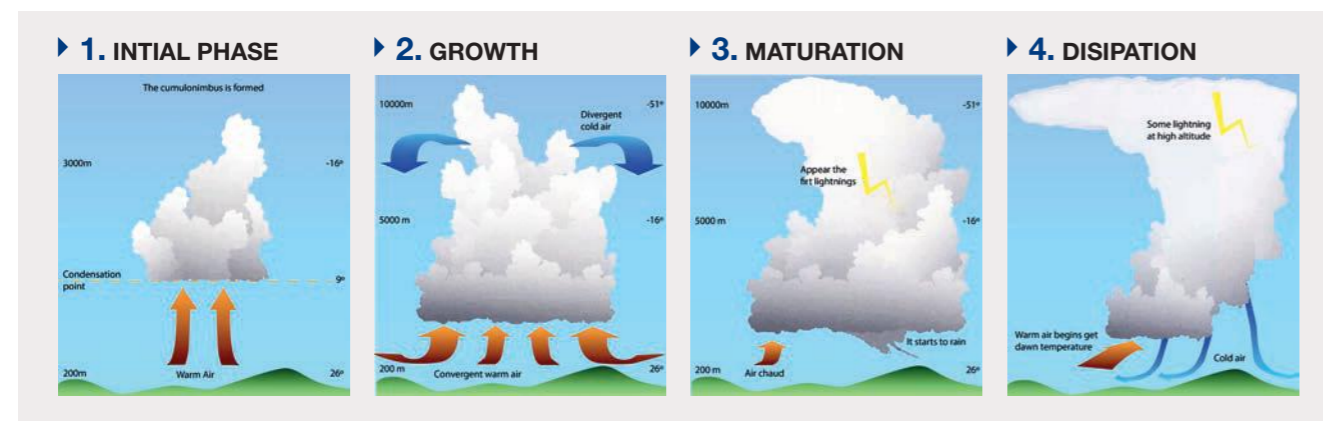
RED LINET

PREVISTORM.net

EN 50536-1:2011

IEC 62793:2016

► storm phases



► storm detectors classification (IEC 62793:2016)

- **Class A:** Detects the storm throughout its life cycle (Phase 1 through 4).
- **Class B:** Detects IC (cloud-to-cloud) and CG (cloud-to-ground) lightning (Phase 2 through 4).
- **Class C:** Detects CG (cloud-to-ground) lightning (Phase 3 to 4).
- **Class D:** Detects CG (cloud-to-ground) lightning (Phase 3) and other electromagnetic sources with limited efficiency.

► PREVISTORM solutions

- Storm and possible lightning strike warning systems to end users by way of **electrostatic field sensors** (immediate response time).
- Storm and possible lightning strike warning systems to end users in an area of 30 km by **web application**.
- **Real-time** service.

PREVISTORM STORM DETECTOR

Storm detector, electrostatic field sensor.
Class A (IEC 62793: 2016) storm detector.

| Modelo | Ref. |
|---|--------|
| Previstorm PVS 24S Low power consumption | 700031 |
| Previstorm PVS 48S Heaters for de-icing | 700032 |



LINET NETWORK

High-precision detection network. Storm detector Class II (EN 50536-1: 2011).

Projects for the implementation of detection networks. It is necessary to conduct an implementation study, the installation of at least five sensors (antennae) located about 200 km for another sensor being necessary.

For data of smaller areas please consult.

In countries where the LINET network is already operating, lightning information can be only be provided (PREVISTORM.NET) without installing sensors.

Check LINET countries with active networks.

| Model | Ref. |
|-----------------------|--------|
| LINET Network project | 700906 |



PREVISTORM.net

Lightning location system, real-time display and record. Storm detector Class II (EN 50536-1: 2011).

Via internet connection. Does not require the installation of any sensor equipment. Information of lightning in an area of 30km radius, centered on the chosen location.

Setting of alarms and warnings via SMS or e-mail. PREVISTORM.net operates throughout Europe. Please consult for other countries.

| Model | Ref. |
|--------------------|--------|
| PREVISTORM.net SLR | 700907 |
| PREVISTORM.net AR | 700907 |
| PREVISTORM.net SLR | 700907 |



- ▶▶ **LEADERS IN LIGHTNING PROTECTION SINCE 1973**
- ▶▶ **PRESENT IN MORE THAN 40 COUNTRIES**
- ▶▶ **PRODUCTS MANUFACTURED IN SPAIN**
- ▶▶ **DESING OF PREVENTIVE PROTECTION PROJECTS**
- ▶▶ **PRODUCTS NATURAL FIELD TESTED AND CERTIFIED**
- ▶▶ **ON-LINE RISK CALCULATION SOFTWARE**



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