

InoPower Storm Detection system

Current situation of growers:

Growers in possession of a hail control gun decide, based on the weather predictions or on site perception, when to use their machine.

A hail control gun must be operational about 20 minutes before the storm in order to counteract hail formation. It is not always easy to make the correct decision about when to enable the gun.

Objectives for the growers:

It would be really useful for the grower if he/she where could see how far the storm is removed from the company. The grower would also like to know where the storm is located and in what direction the storm is travelling. An indication of the size of the storm would also be interesting.

Action of InoPower:

Because of this, InoPower offers a storm detection system with the following added value:

- You can follow the storm live. (Other information sources such as buienradar, meteox, KMI (Belgium) often have a delay of 15 minutes or more.)
- You will be able to see how far the storm is removed from your weather station. (This could provide a better or more precise indication of when you have to enable the gun.)
- You can see when a storm suddenly forms above the grower's company.
- The grower can determine when a storm has passed. (Purpose: reduce unnecessary operation of the gun)
- You can consult your storm detection system online using a password and login details. You can therefore check the weather situation on the move, without installing extra software.
- The station can be consulted by numerous (external) persons if they are given this access.
- The system owner will be informed when his weather station has no power or internet connection. (This guarantees 24/7 up-time.)
- All measurements are saved on the computer and on the InoPower server. Afterwards we can replay the measurements from here. (This can be useful to indicate why you have made the gun operational.)

In short you can view all information on the current weather situation at a single glance. You can enable or disable the gun at the correct time, which better regulates the expenses, the use and fuel consumption.

Result of InoPower:

Inopower has an observation system solution, which operates independent from the gun. The grower must personally take action to enable the gun.

This system may also be useful for growers cultivating a crop out in the open, such as salad, strawberries, grapes, ... crops sensitive to hail.

It is therefore important that the device can also be used in other sectors.

The system is only available with PC and measurement devices combined.

For the following reasons:

- Inopower only supports own stations and we try to keep the machines as uniform as possible with regard to hardware. (processor, hard disc, motherboard, ...) This ensures that we can control our own machines optimally. (If we were to allow external PC's, the maintenance and problem solving would take up a great deal of time and effort.)
- If we use existing PC's, these mostly contain an accounting program or other sensitive information and, for safety reasons, we would like to keep this separated.
- We control these PC's remotely (maintenance, software-upgrades, installation of new applications ...).
- Extra safety with lightning.
(After all it is a device for lightning registration, which is why it is best to isolate the system)
- The PC is only intended for Inopower, Teamviewer, nextstorm en EMF-100 programmes and we would like to keep it like this for maintenance.

There won't be any licenses with regard to software. We control the licenses for the users. This for both Nextstorm and Teamviewer.

Customized Software:

If the user wants an extra specific functionality in combination with the Inopower Services, this is obviously possible. Inopower offers customized software, but this is accompanied by extra expenses.

To consult the PC or the weather station, we can surf to a Teamviewer website. Once the user has logged in, he will only have consulting rights. (He cannot click on anything, this is not intended for adjusting settings etc.)

Only the owner of the device and Inopower have the necessary full access rights. The device can be consulted by various users within the same region or city.

System 1: Short distance measurement

EMF-100 or the Atmospheric Electric Field Monitor

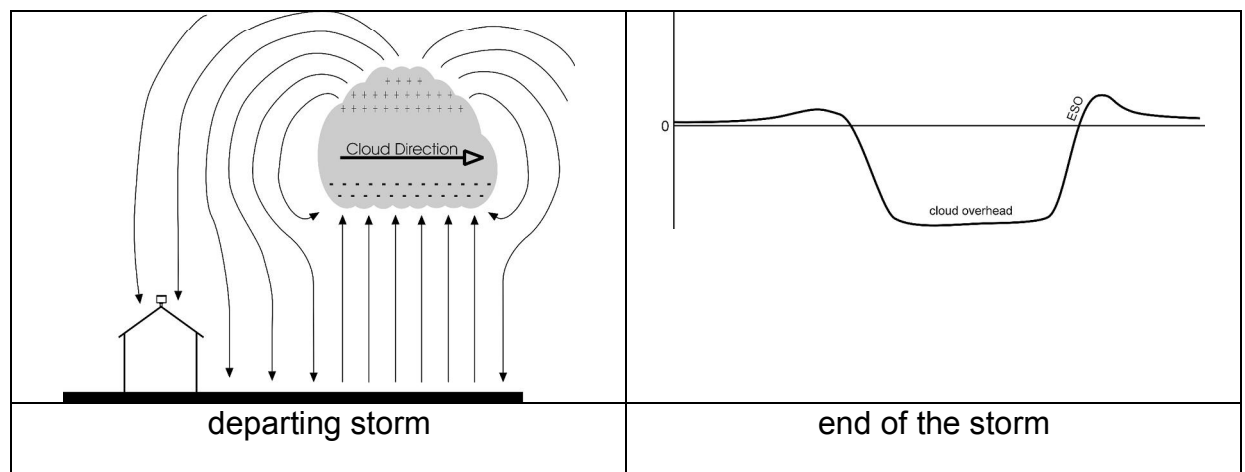
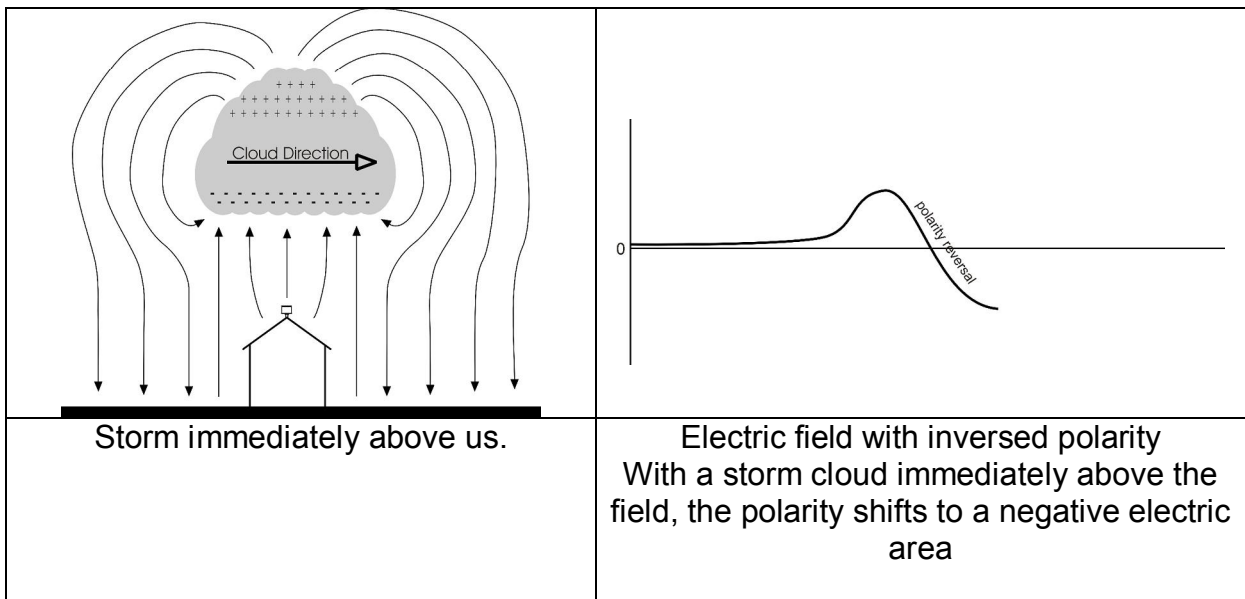
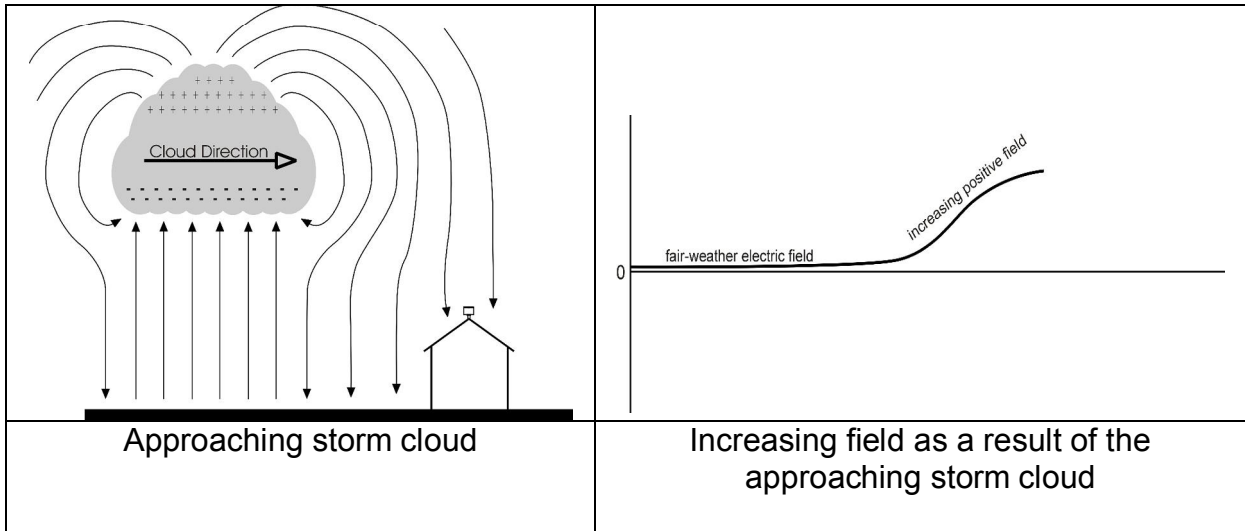


Operating theory:

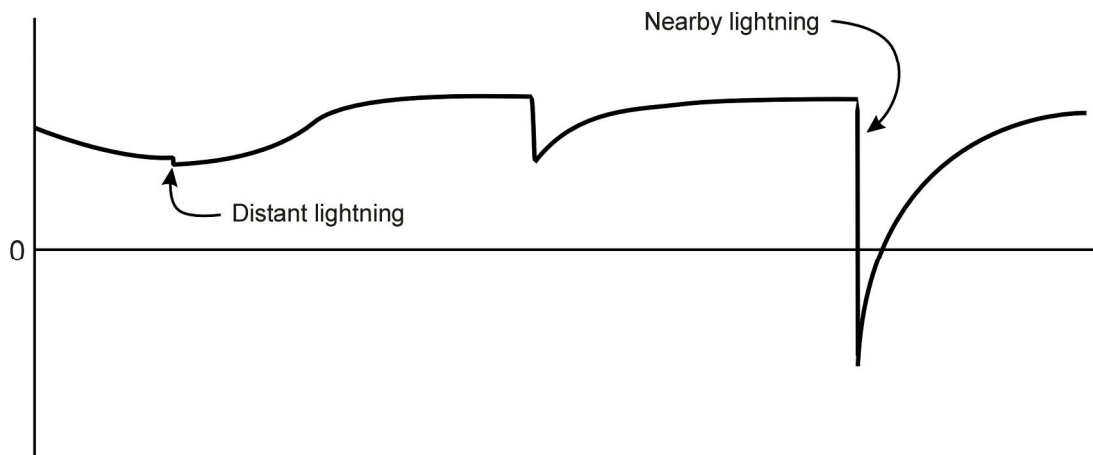
Electric fields develop a difference in electric potential. A lightning bolt can be detected as a sudden change in the electric field. The electric charge in a storm cloud also generates an electric field. This field can be measured on the ground.

Introduction:

The first indication of an approaching storm cloud is often a positive reading of the area, followed by an area change to a negative field when the cloud moves over us.



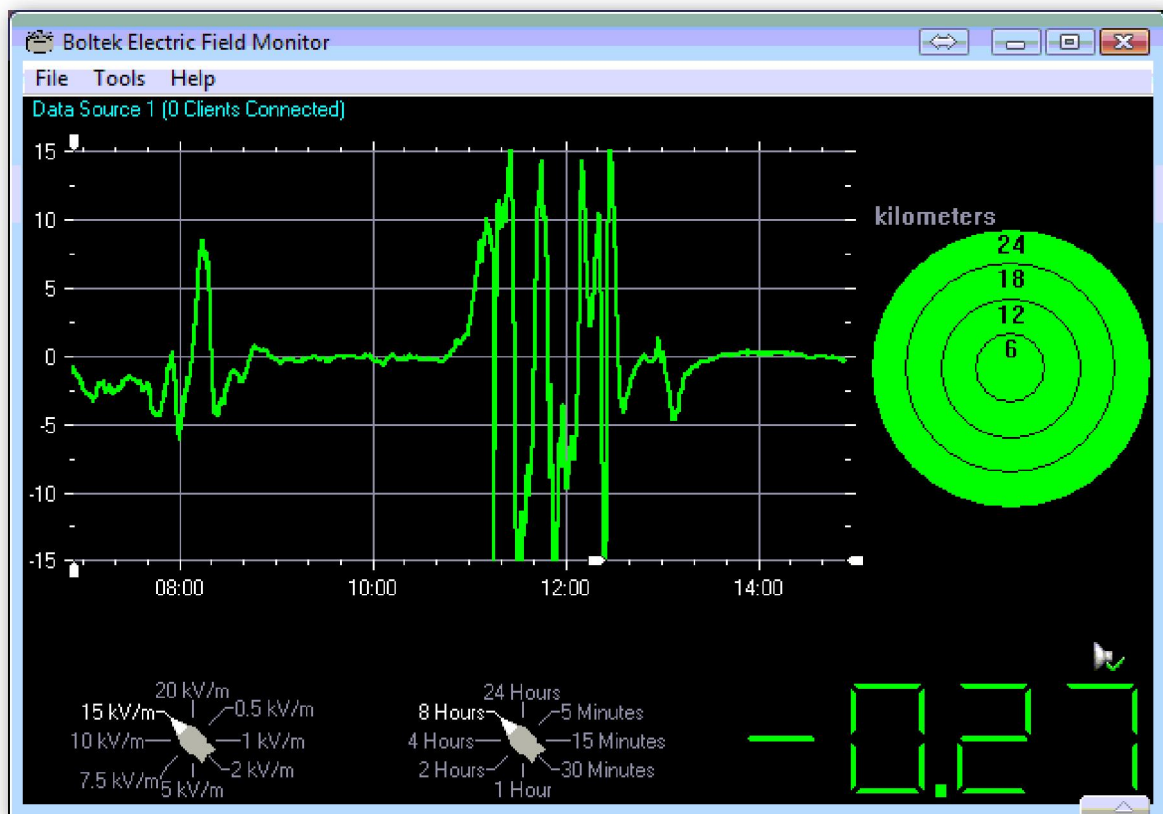
As soon as the cloud has passed, the field returns to the positive reading. A normal electric field of approximately 0,1 kV / m will be registered.



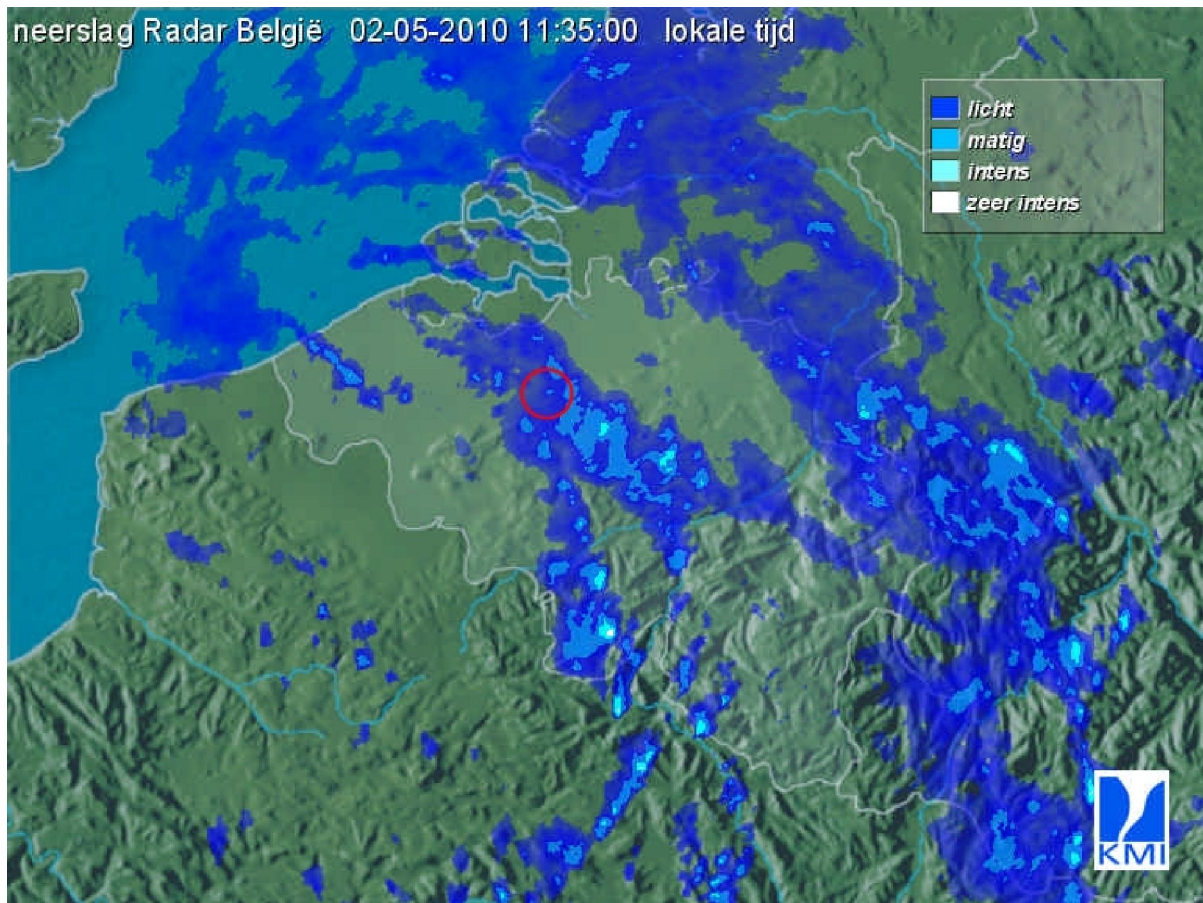
Graph of changes in field size indicate lightning.

The EFM-100 can detect lightning from a maximum distance of 30 mile or 48 km.

An example measurement on an EFM device in practice (location Dendermonde)



The red circle is the location of the measurement. (Dendermonde)

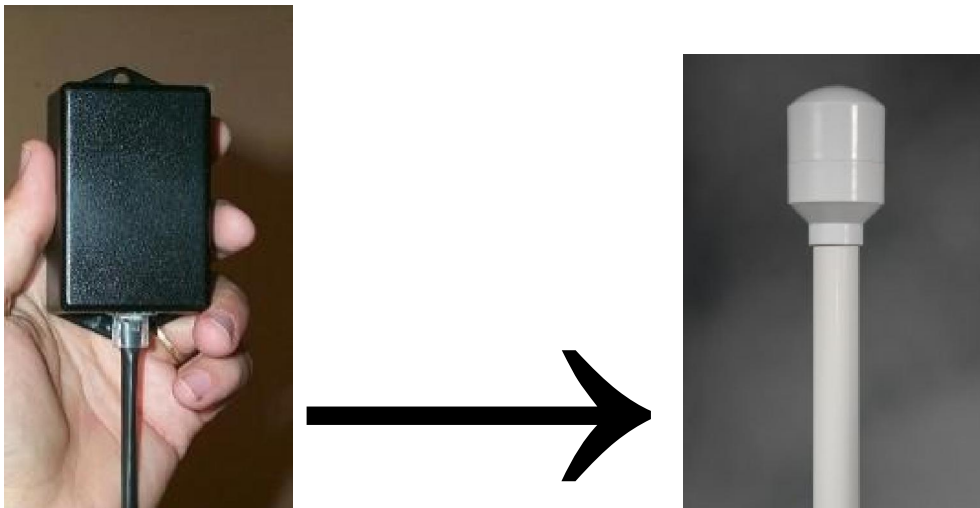


System 2: Long distance measurement

The StormTracker is an add-on for your PC that doesn't only tell you when the lightning is in the vicinity, but also where the lightning is. StormTracker detects lightning up to 300 mile or 480 km distance and indicates this in real time on an area map.

StormTracker will also save the received details. Using this you will be able to replay a few hours of events in accelerated time. You can also see the location of the storm immediately as well as the direction in which it is heading.

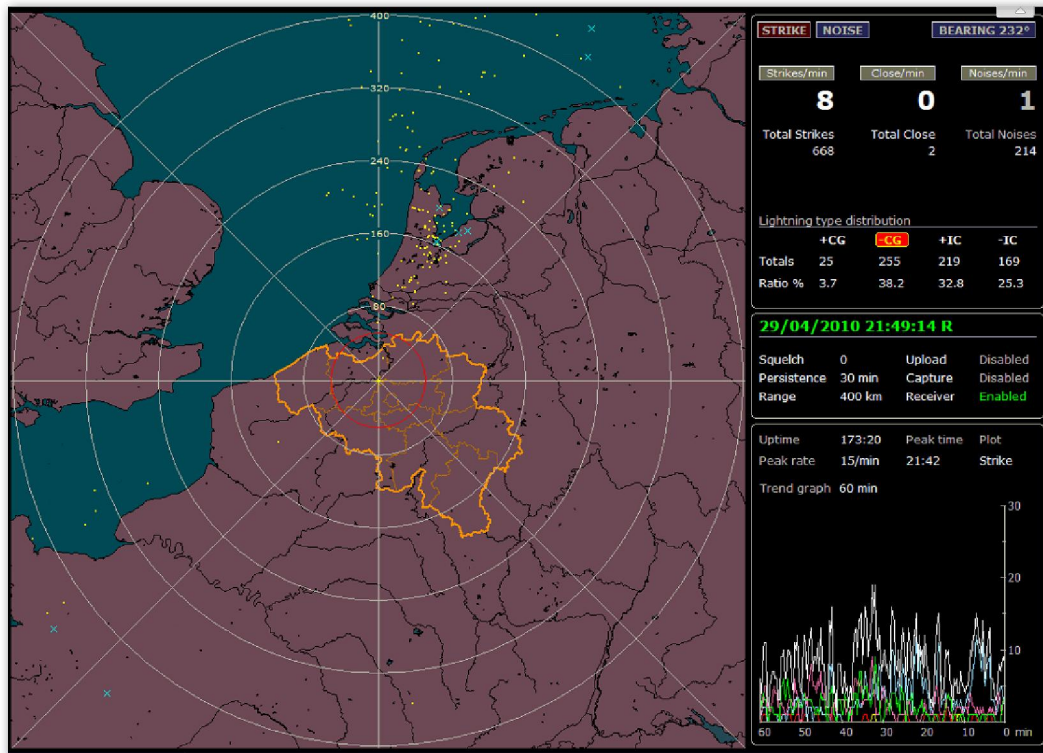




We install this StormTracker in a protective housing.

The StormTracker must be installed as high as possible so that it doesn't suffer any loss of sight caused by surrounding buildings or trees. (recommended height is 20 meter)

This is an example of a storm:



The yellow dots are indications of a lightning bolt older than 1 minute.

The blue crosses are lightning bolts less than a minute old.

There are 4 types of lightning bolts:

- Cloud - Cloud - Positive
- Cloud - Cloud - Negative
- Cloud - Ground - Positive
- Cloud - Ground - Negative

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