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# We have started to protect **your** **world**

Don't let things fall apart. Act before it's too late. Passion in what we do.

**Grupo SPAG**, the leading. Company in the manufacture, sale and distribution of **frost** and **hail** protection systems.

The company is present in the main sectors: **Agriculture, automotive, Aeronautics and Energy.**

Providing specific solutions for each one. Active in the market for **50 years**, **Grupo SPAG** has established itself as one of the leading providers of protection against frost and hail and boasts a highly-qualified team of professionals entrusted with a significant volume business in **29 countries.**

THE WORLD HAS EVOLVED, AND SO HAVE WE

# Get to know our History.

<b>01</b> The first modern shockwave device is developed.	<b>02</b> They see a need to design and create a radar capable of detecting hail.	<b>03</b> Marketing and distribution of antifreeze systems	<b>04</b> Grupo SPAG acquires the EOLE brand, a world leader with European manufacturing
 <p>1972</p>	 <p>1985</p>	 <p>1989</p>	 <p>2016</p>

**50 years** of experience endorse us as the world's leading company in the manufacture and distribution of Anti-frost and Anti-hail Systems.

# Present in **29 countries**



## **Two headquarters**

Located in Spain and France



## **50 years of experience**

Innovation & Technology



## **29 Countries**

Protection against frost and hail in 29 countries



An environmental plan  
**At the global level**

# Where do we stand out?

## Environment



### Eco-sustainable Systems

We design eco-sustainable systems run exclusively on renewable energy.



### Environment-friendly

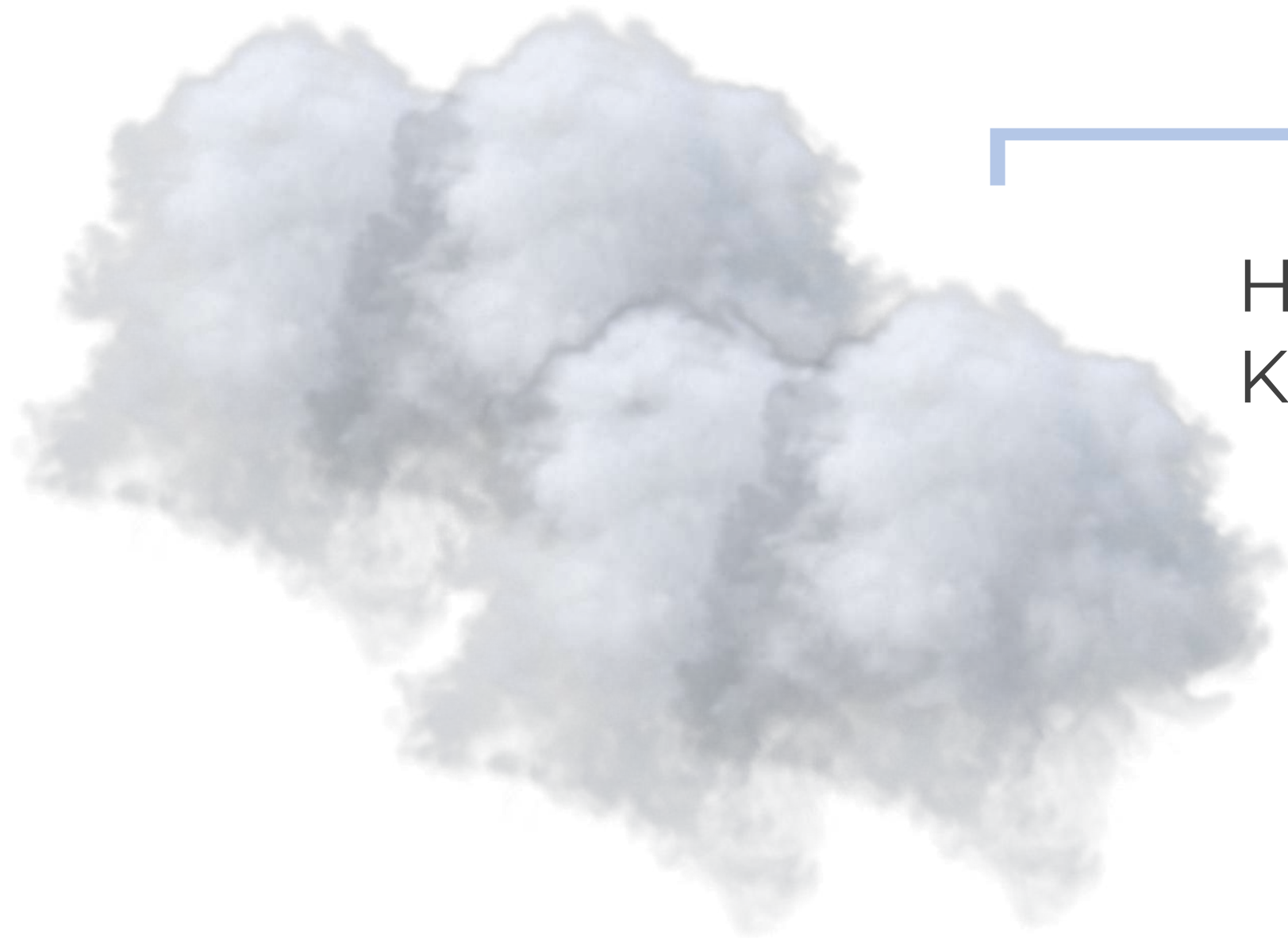
The systems do not emit any harmful products into the environment. They also respect the fauna, birdlife and flora



### Water cycle-friendly

None of the Systems alters the clouds water cycle and they have no influence on rainfall.

# What is **Hail?**

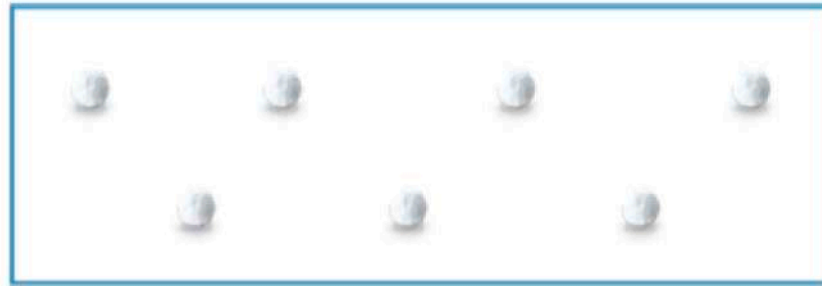


Hail storms form in clouds  
Known as “Cumulonimbus”

# What is Hail?

## PHASE 1

Formed hailstones

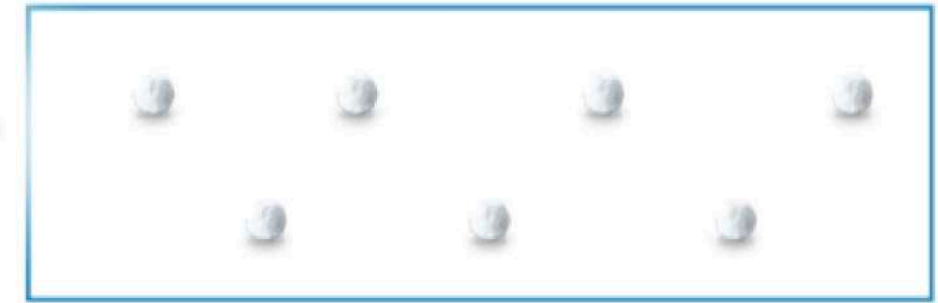


Pockets of condensation  
super-cooled water



## PHASE 2

Formed hailstones



Currents of air



Currents of air



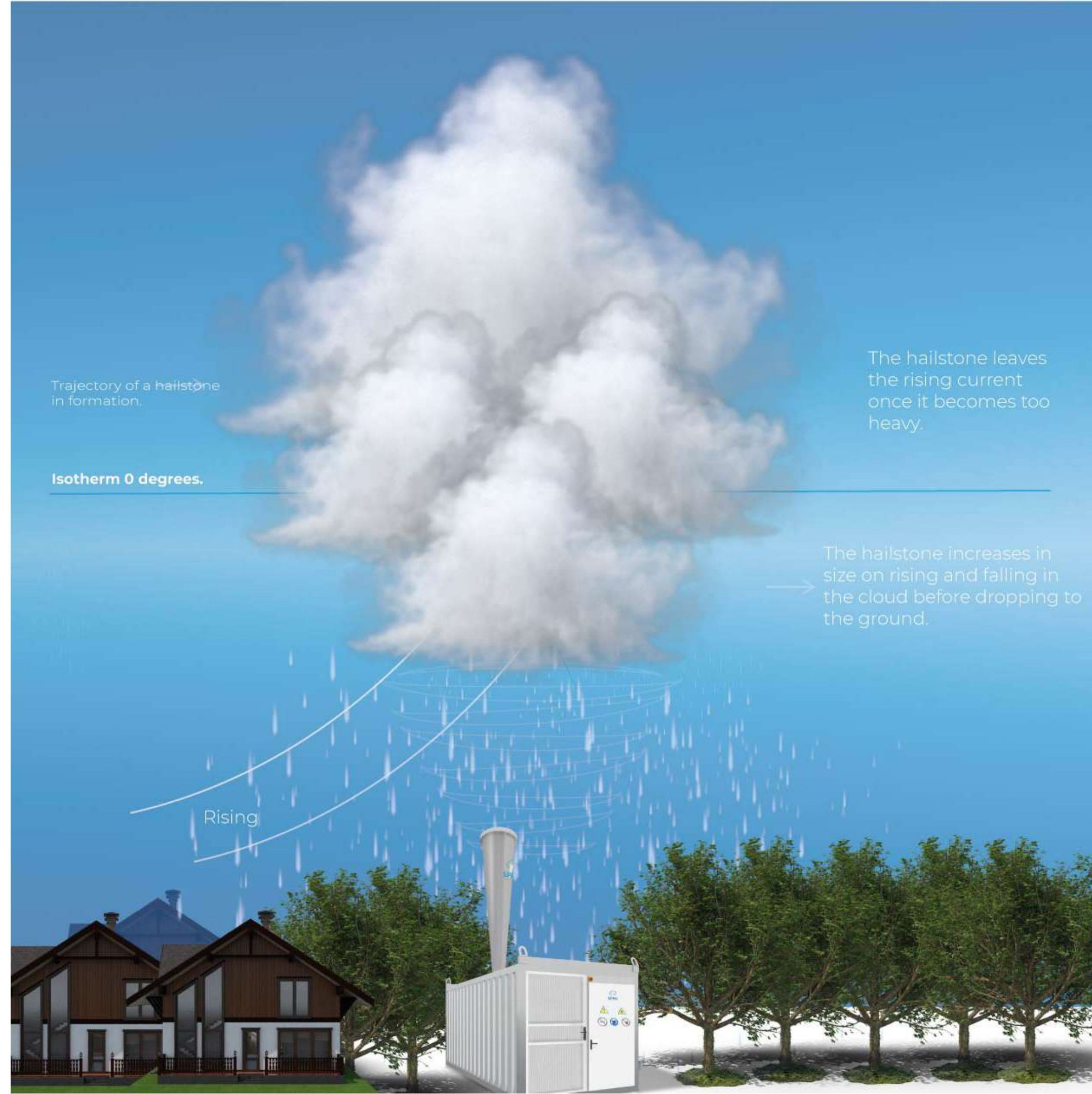
Hailstone precipitation



# That is Hail?

**Hail** is precipitation in the form of globules of ice that develop in heavy cumulonimbus clouds and then **crash to the ground**.

Hail forms in heavy vertical clouds (**cumulonimbus**) and can appear at **any time of the year**. The formation of hail requires the presence of strong ascending currents, its size, in addition to the number of layers, depends on the time it remains in the cumulonimbus clouds.





# Grupo SPAG

## Anti-hail system



The **anti hail system** works by sending **shocks waves** against the hail stone. It acts against hail chamase using physics without the use of any chemical or polluting product that could harm crops or the environment. The result produced by the Anti-hail System causes the hail to falls in an unstructured way, normally in the form of water r frost, without causing any damage to crops.

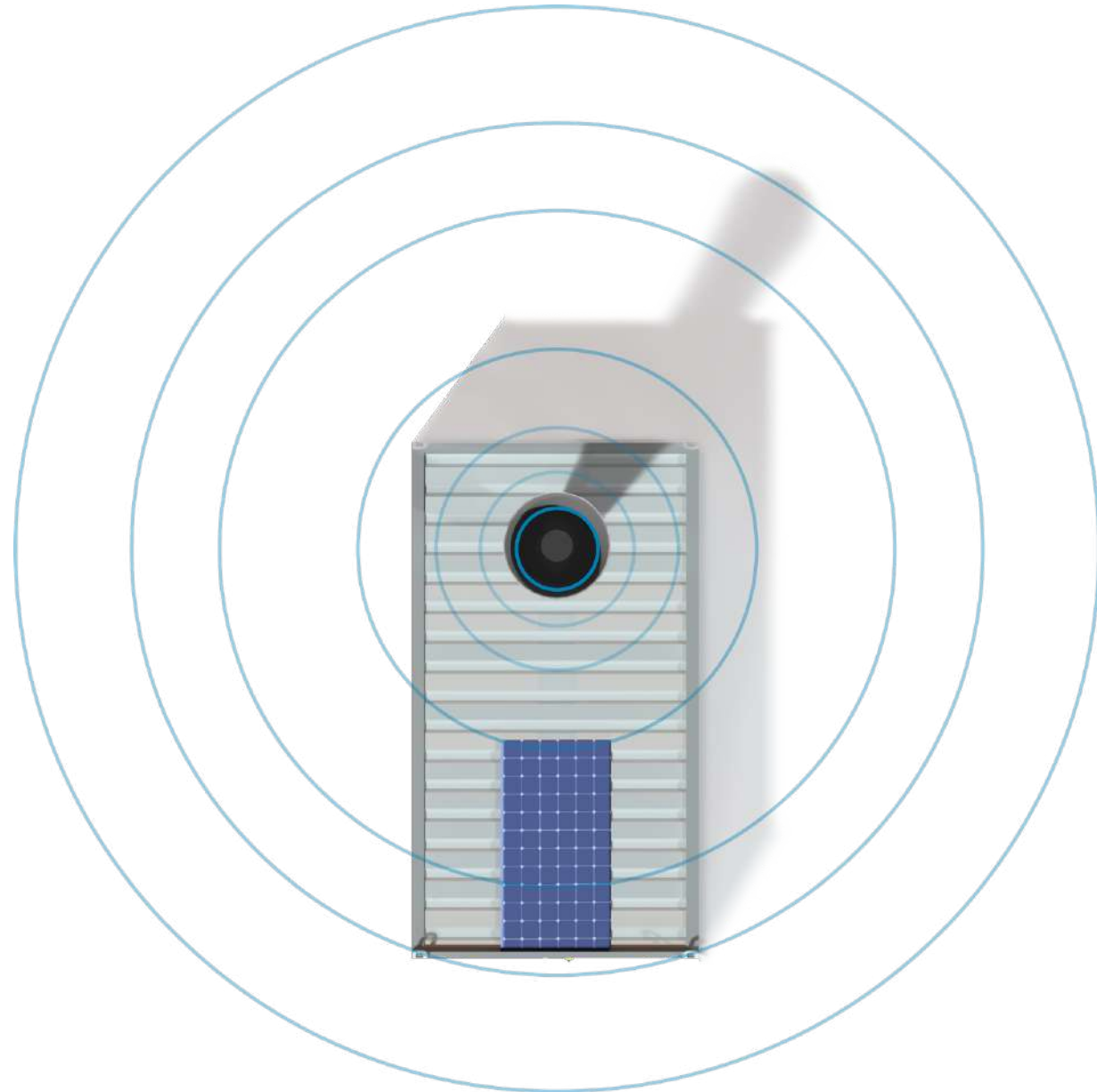
**100%**

Protection against hail  
95% in the case of  
catastrophic hail

**80 ha**

Of protection  
Area protected against  
hail. The circumference  
os a diameter os 1km

# How the system works



Protection 80 hectares, a 500- meter radius  
And a 1-kilometer diameter.

**1** Acetylene gas is injected into a combustion chamber

**2** A controlled combustion process causes a shock wave that is emitted into the atmosphere

**3** A software program manages the cycle and generates the wave

**4** A shock wave is emitted into the atmosphere every 7 seconds, producing a sequence.

**5** The shock waves act on the structure of the different layers of the hail.

**6** Accelerating the natural thawing process on the hailstone.

**7** The degraded hail falls in the area protected via the SPAG System in the form of water or slush, without causing any damage to crops, vehicles or aircraft.

# Components Of the **system.**

## Cone

The cone is made of hot-dip galvanized steel and its specific conical shape enables the waves to expand.

## Photovoltaic energy

Providing clean energy for each system, taking constant care of the planet.

## Acetylene gas rack

An essential non-polluting and harmless component for the generation of waves.



## Automation and monitoring

Artificial intelligence detects the hail cloud and starts up the system automatically.

## Management and control system

The hardware then controls the entire operating cycle of the equipment, ensuring it provides the correct protection.

## Combustion chamber

An essential part of the system in which the shock wave is generated in a controlled manner at the appropriate power and frequency.

# Mobile Anti-hail system.

## Cone

The cone is made of hot-dip galvanized steel and its specific conical shape enables the waves to expand.

## Photovoltaic energy

Providing clean energy for each system, taking constant care of the planet.

## Acetylene gas rack

An essential non-polluting and harmless component for the generation of waves.



## Automation and monitoring

Artificial intelligence detects the hail cloud and starts up the system automatically.

## Management and control system

The hardware then controls the entire operating cycle of the equipment, ensuring it provides the correct protection.

## Combustion chamber

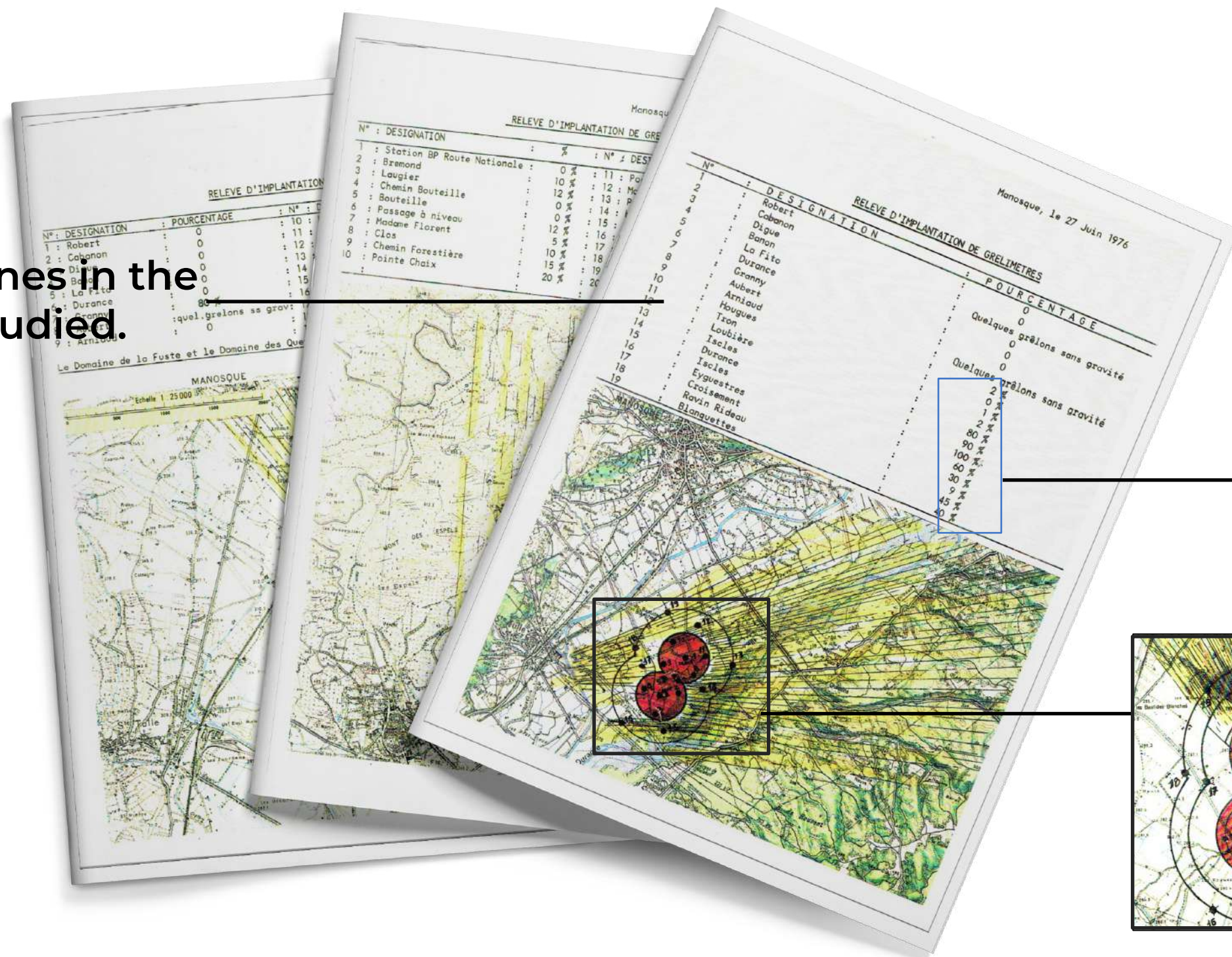
An essential part of the system in which the shock wave is generated in a controlled manner at the appropriate power and frequency.

STUDIES CONDUCTED.

# Efficacy of the System.

Studies carried out in France between 1973 and 1976 attested to the efficacy of the system for protection against the effects of hail.

Control zones in the Area studied.



Damage caused by hail in the area protected by system

There is no hail damage in the area protected by the SPAG system.

Close-up of the points measured.

Area protected by the SPAG system.

STUDIES CONDUCTED

# Efficacy of the **System**

Estudos realizados em Schurch entre 1980 e 1983 mostram o número de impactos do granizo sobre as placas de alumínio instaladas.

Aluminum plates with the number of blows from Hailstones collected during the study period.

## Efficacy of the system in the protected area.

It was ascertained that the aluminum plates installed in the protection area suffered no damage.

SPAG Anti-hail protection system installed.

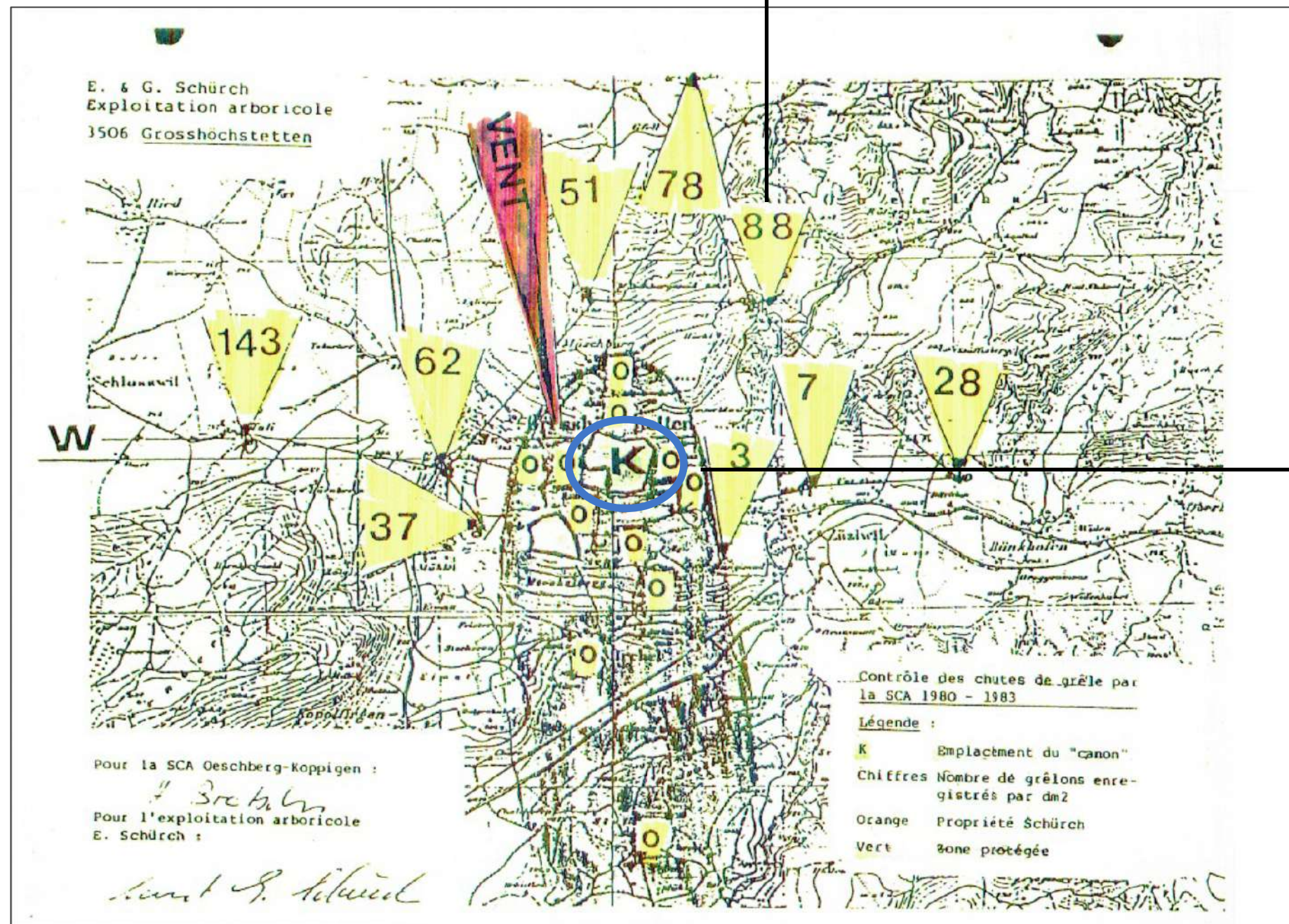


Image of the blows to the aluminum plate installed for the test.

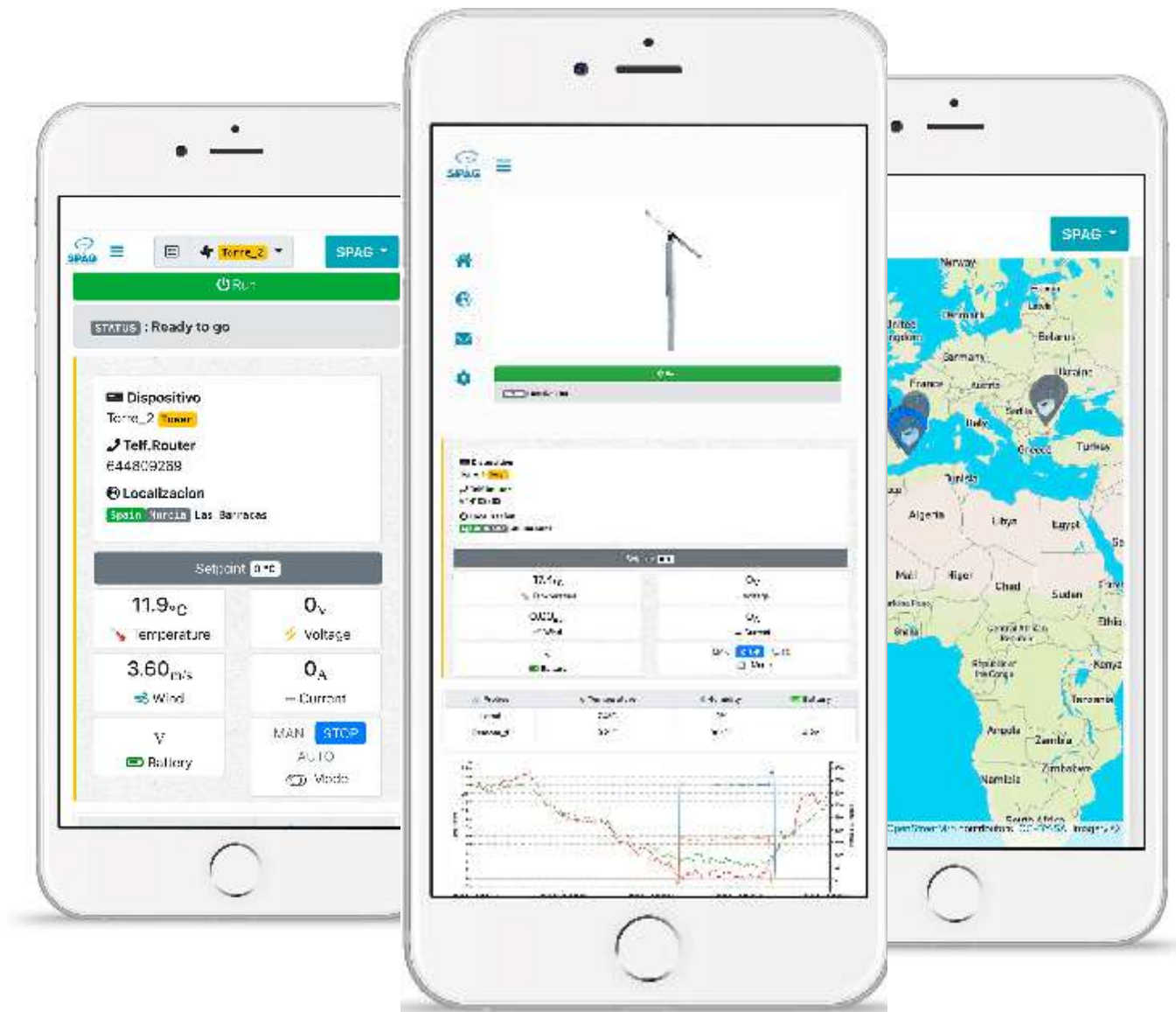
# Work at full capacity.

This service will be included for the first year, once this period is over, the cost of this service will be € 120 per year per system.

**01** Full control.  
**Automation and Monitoring.**

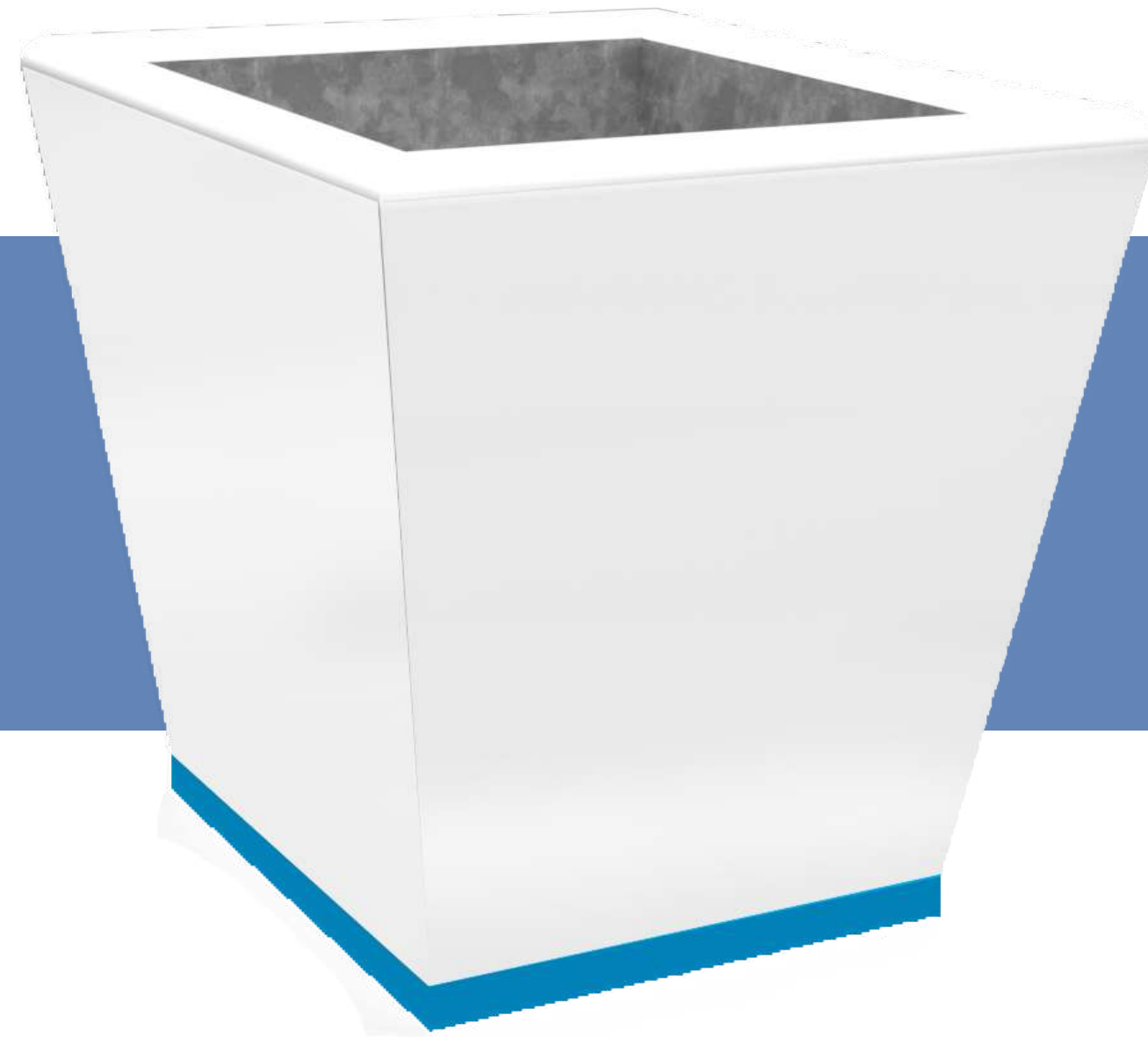
**02** Commissioning  
**Wherever you may be.**

**03** Diagnosis.  
**Monitors every aspect of Your system.**



3D VIEW

# Soundproofing of the system.

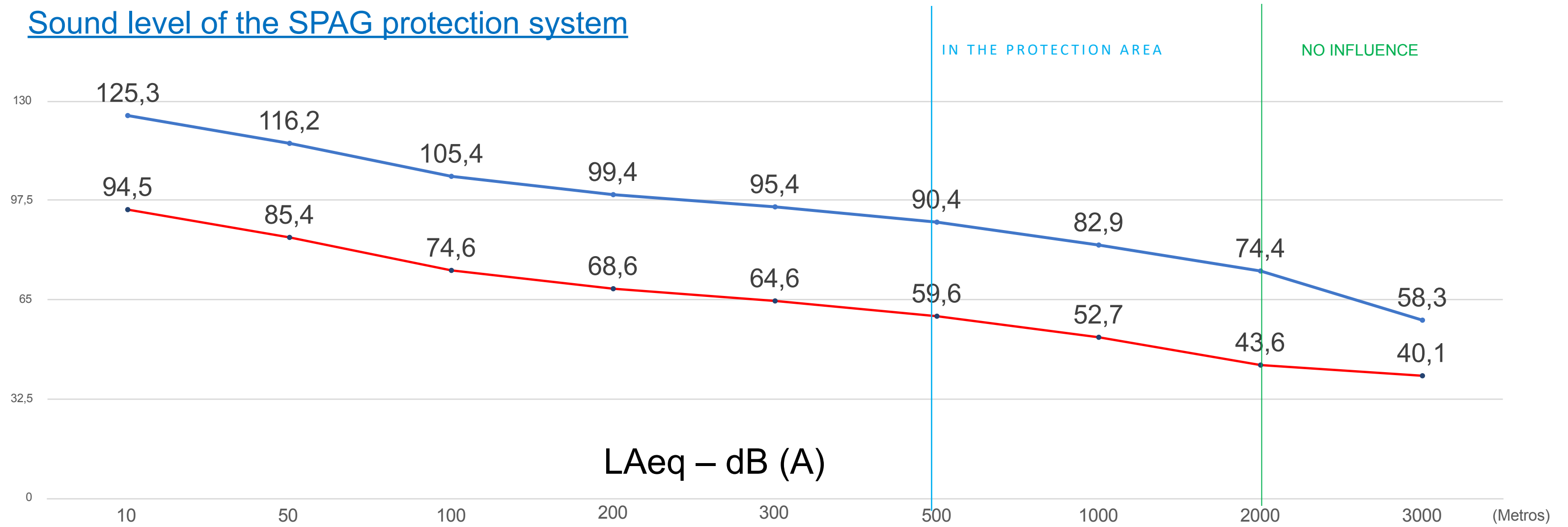




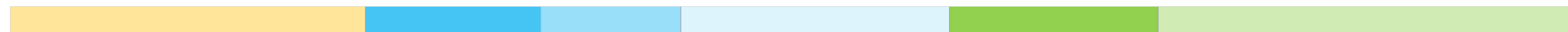
# Soundproofing of the system.

— With no soundproofing system  
 — With a soundproofing system

## Sound level of the SPAG protection system



Equivalências



Aspiradora



Tráfico



Conversación Fuerte



Conversación Normal

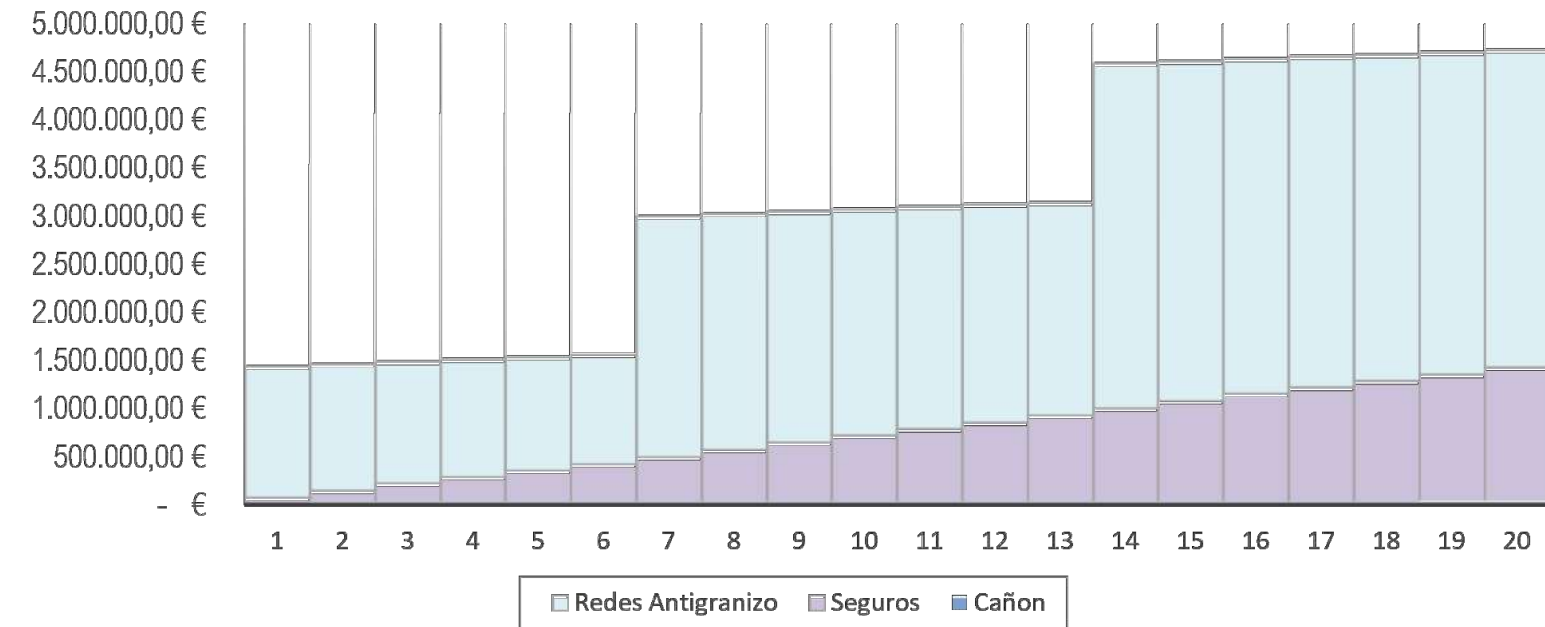


Ambiente Oficina



Biblioteca

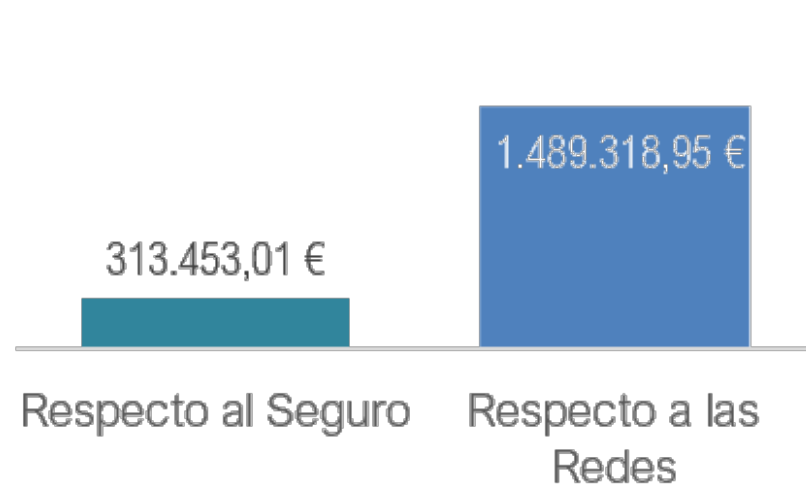
# Profitability Of the **system**



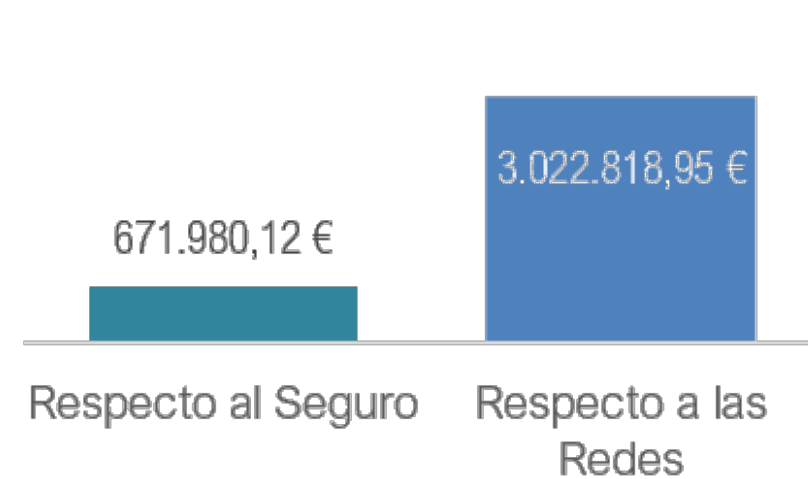
## Total gasto diferentes alternativas

	5 años	10 años	20 años
Total Gasto Sistemas SPAG	46.681,05 €	49.181,05 €	54.181,05 €
Total Gasto Seguro Agrario	360.134,06 €	721.161,17 €	1.433.958,62 €
Total Gasto Redes Antigranizo	1.536.000,00 €	3.072.000,00 €	4.728.000,00 €

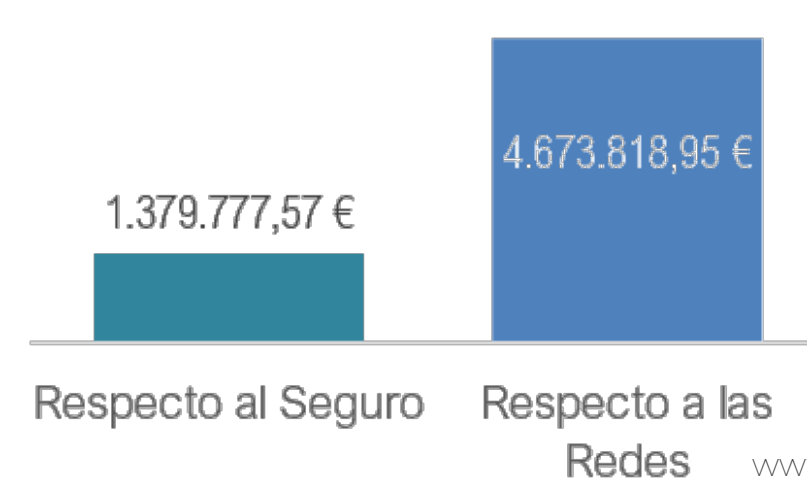
### Ahorro con el sistema SPAG a 5 años



### Ahorro con el sistema SPAG a 10 años



### Ahorro con el sistema SPAG a 20 años



# Sectors in which we are **present**



# Some of our Clients.



06

# Success stories

Innovation and **disruptive**  
technology

6000+

Sistemas  
Distribuídos em 28  
países

Youtube [www.youtube.com/c/GrupoSPAG](https://www.youtube.com/c/GrupoSPAG)

99,9%

Satisfaction

# Our Services.



## 01. **Technical support**

Our department will inform you, advise you and be right by your side at all times.



## 02. **Technical service**

Our technical team will assist you at all times, both remotely and in-person.



## 03. **Mobile application**

Monitor the status of your system in real time on your cell phone, with access to all kinds of information.



## 04. **Financing**

Our financial team will advise you and find the conditions best-suited for you to acquire the system.

# Our Services.

## PROYECTO

Juan Miret, Fraga.

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P180506070

Fecha: 05/06/2018

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**Juan Miret - Alcarrás**

ET180506S001  
Fecha: 05/06/2018






www.spag-web.com  
962 05 71 92  
spag@spag-web.com

Technical study

Economic study

### 1 PROYECTO



**CONTACTO**

Dirección  
Calle Velezquez, 198  
46018 Valencia  
España


Teléfono  
+34 962 057 192  
+34 929 042 440

Correo  
spag@spag-web.com

Web  
www.spag-web.com

**Juan Miret**  
ET180506S001  
Fecha: 05/06/2018

### 4 OPORTUNIDAD



Nº PRO: ET180506S001  
FECHA: 05/06/2018  
Juan Miret  
UD.

US: Cañón anti granizo e  
• Tubo generador de  
• Armario electrónico  
• Incorpora los nuevos  
• Cuadro de control c  
• Panel solar fotovolta  
• Batería  
• SSIM para la comuni  
2 años de garantía  
CERTIFICADO C.E. F

US: Contenedor:  
• 4m x 2,40m con se  
normas de seguridad  
• Puerta de gas y de

Observaciones:  
Oferta Valida para 30 días des

### 6 FINANCIACIÓN

Amortización 10 años

**10.723,45**  
al año

Para cubrir sus  
45,02 hectáreas

“Usted ya debe de saber que la adquisición de sistemas SPAG para la protección del granizo, es una inversión a largo plazo ofreciéndole un coste interesante. Hemos realizado este estudio basándonos en una amortización de 10 años pero sabiendo que la útil de los sistemas SPAG son de más de 45 años aun le puede salir los datos económicos más interesantes.”

Servicio de financiación adaptado a sus necesidades

La aceptación final de las condiciones de financiación se realizará en función de BBVA Finanzas.

Todas las operaciones de financiación sujetas a información y documentación

SPAG.  
Sociedad Protección Anti Granizo.  
spag@spag-web.com  
Tel: 962 057 192

### 7 MÁS INFORMACIÓN

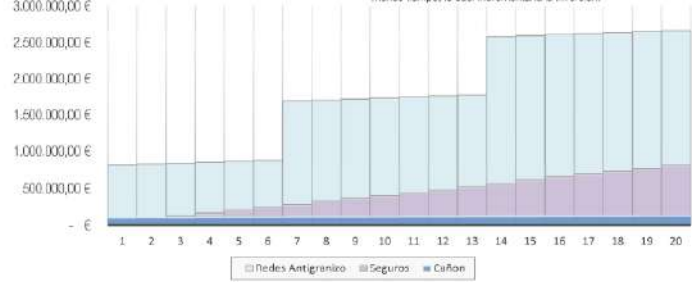
www.spag-web.com

**Su inversión es de 107.234,52€**

Vamos a comparar la inversión que realizara con otras alternativas al sistema SPAG como son las los seguros y las redes anti granizo.

Compararemos el ahorro que dispondrá con la adquisición de nuestro sistema respecto a las alternativas a 5, 10 y 20 años.

El gasto que va teniendo cada año con las diferentes alternativas son:



Estos datos son estimativos para obtener una referencia de gasto ahorrado con nuestro sistema de protección SPAG respecto al seguro agrario y a las redes anti granizo.

Se estima para el seguro agrario que la zona asegurada es dañada por granizo cada 6 años.

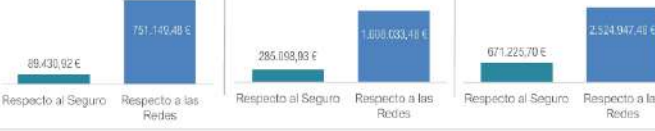
Se estima la vida útil media de las redes anti granizo de 7 años, en tener en consideración que una granizada puede dañar la red en menos tiempo, lo cual incrementará la inversión.

Total gasto diferentes alternativas	5 años	10 años	20 años
Total Gasto Sistemas SPAG	113.234,52 €	120.734,52 €	135.734,52 €
Total Gasto Seguro Agrario	202.665,44 €	405.833,45 €	806.960,21 €
Total Gasto Redes Antigranizo	894.384,00 €	1.728.768,00 €	2.660.682,00 €

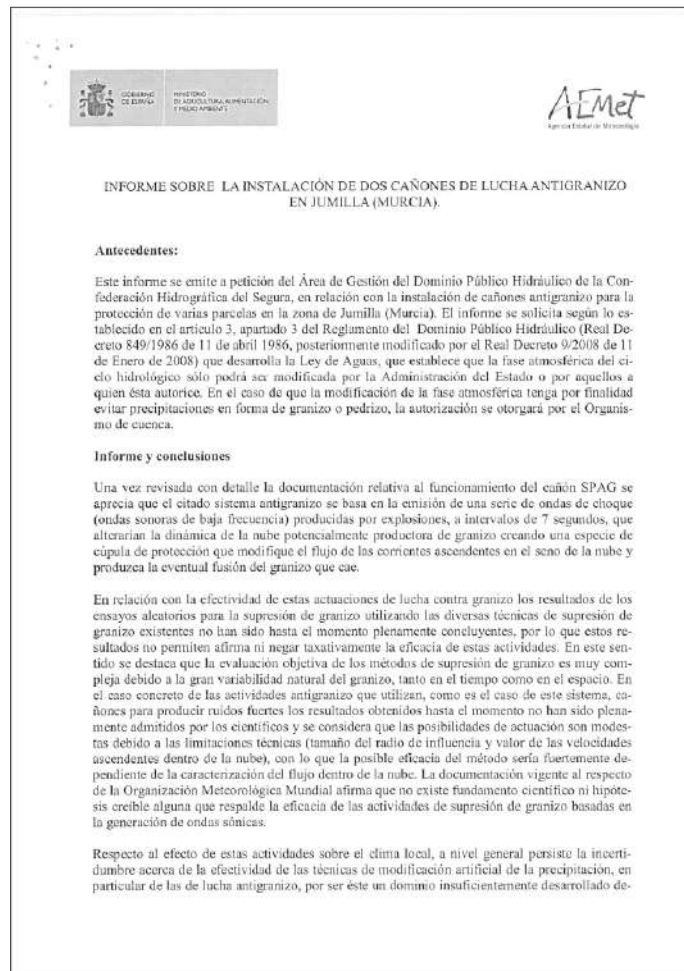
Ahorro con el sistema SPAG a 5 años

Ahorro con el sistema SPAG a 10 años

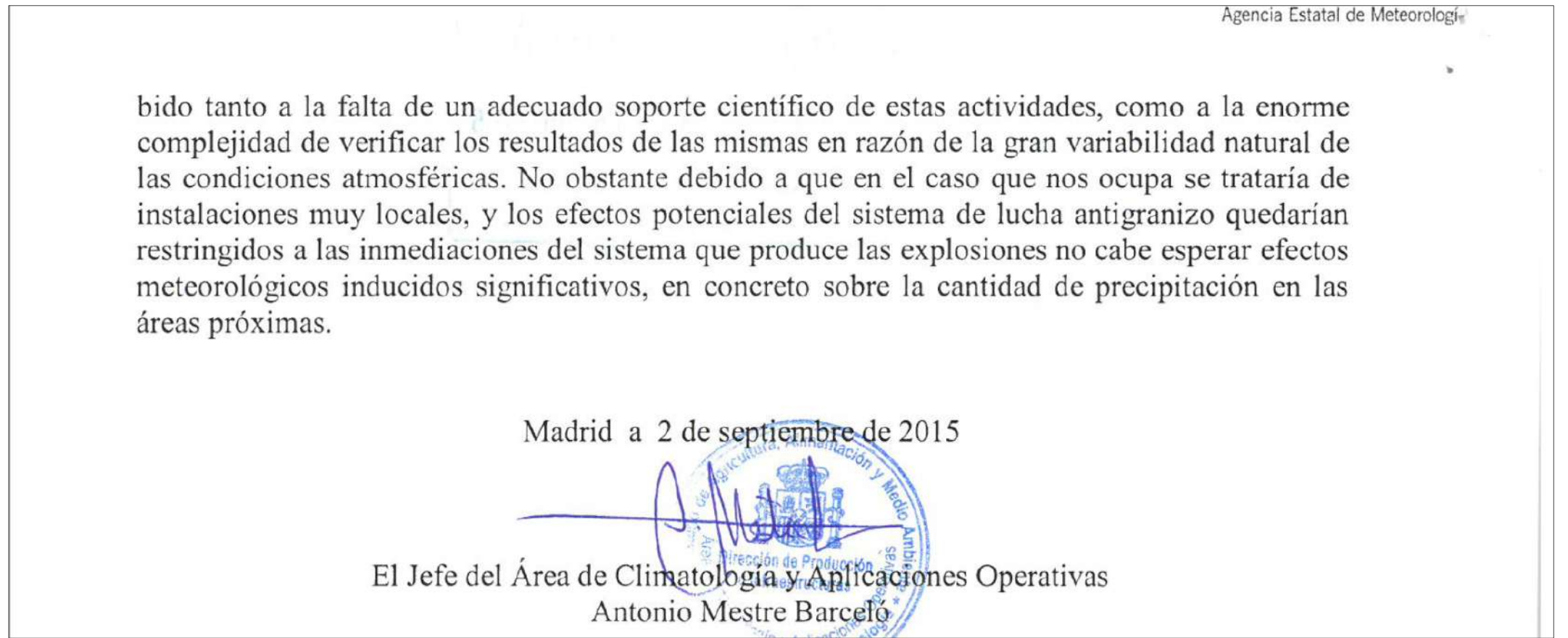
Ahorro con el sistema SPAG a 20 años



# Respectful hydrological cycle



## Report detail.







We have the solution.  
**The decision is yours.**

Innovation and technology at your fingertips.  
Frost and hail protection systems.

