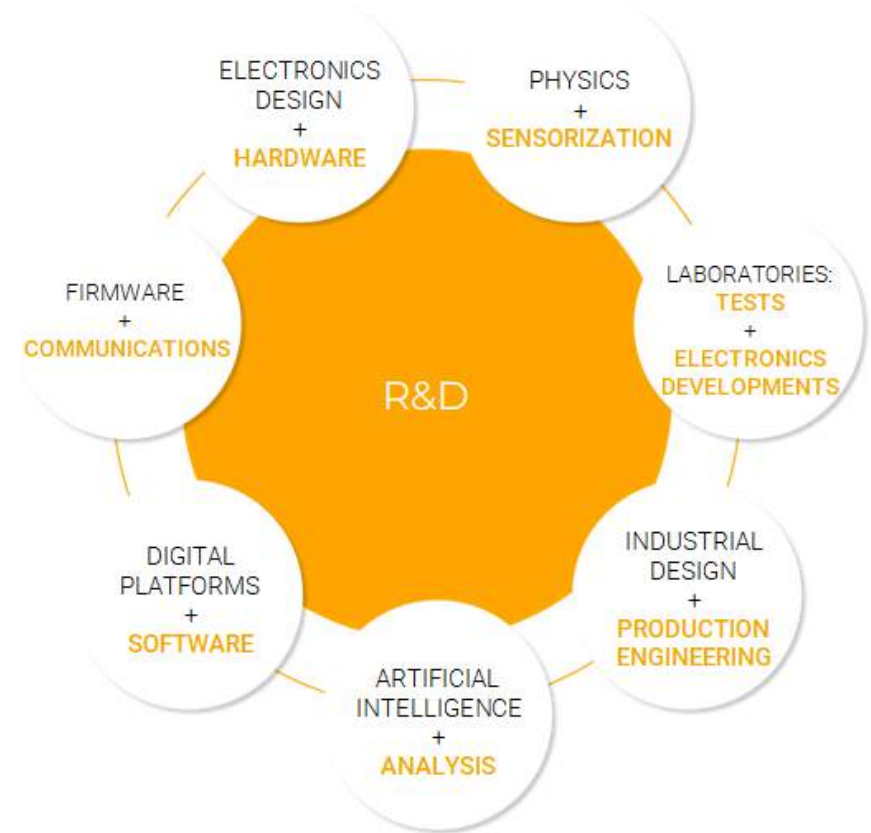
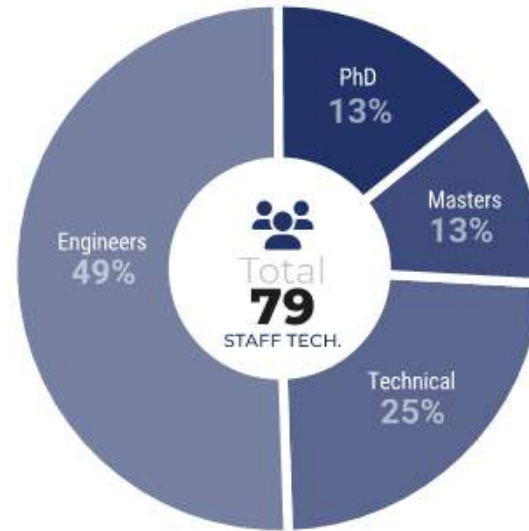




- 
- > **Founded in 1986, +35 years of industry expertise**
 - > **Specialist Manufacturers - Earthing & Lightning Solutions**
 - > **Industry Leaders in advanced technology**
 - > **Offices in Spain, Portugal, Brazil, UAE, Caribbean**
 - > **Global partner distribution network**
 - > **+100,000 projects completed +80 countries**

The continuous development of new products, services and processes is an inseparable part of Aplicaciones Tecnológicas' DNA. Because quality customer service begins by offering innovative solutions that meet their needs

This commitment to R+D manifests in a specific department comprised by more than 50 professionals (representing 20% of our workforce) and +10% of annual turnover invested over the last decade.





R&D

Aplicaciones Tecnológicas has its own laboratory with state-of-the-art technology & equipment which allows to develop and test our products under the most strict criteria.

- Current pulse generator up to 300kA with combined 8/20 μ s wa ve.
- Current pulse generator up to 250kA with combined 10/350 μ s wa ve.
- Voltage pulse generator up to 1000kV.
- Climate Chambers.

Our **6 specialisation lines** include research and development, production and commercialisation of:



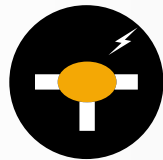
EARTHING



LIGHTNING
PROTECTION



SMART
SOLUTIONS



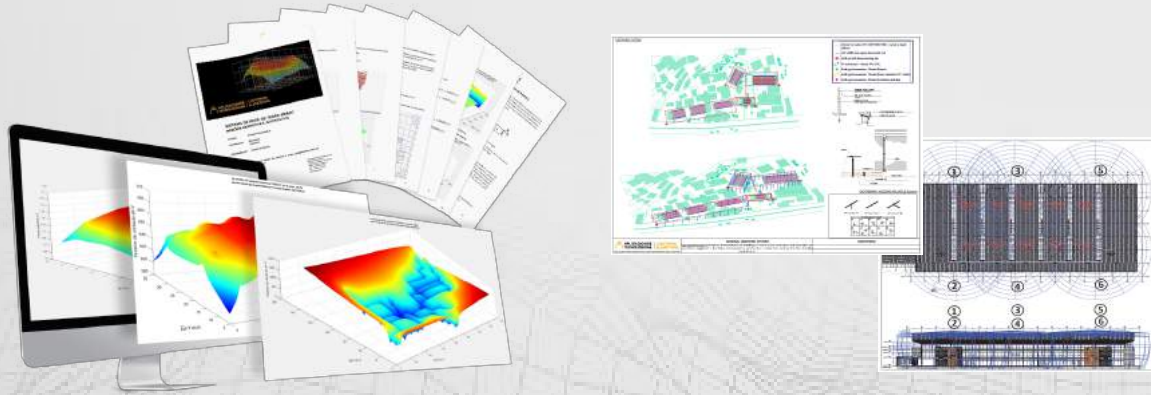
EXOTHERMIC
WELDING



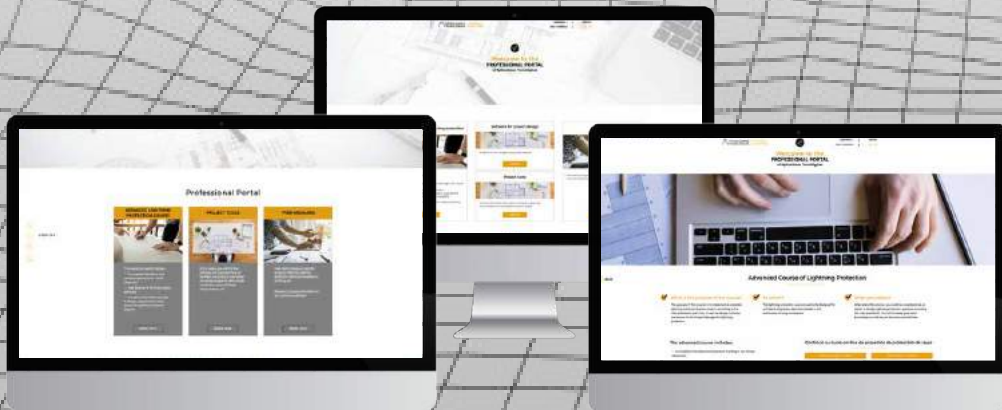
SURGE
PROTECTION
DEVICES



LOCAL STORM
DETECTION



- ▶ **Professional Portal at 3w-projects.com**
Centralises specialised training courses, webinars, tools and software resources for project design and specifications and provide a Project management platform



Design service: Lightning Protection System monitoring with IoT technology.

- Evaluation of lightning risk for external protection
- Integration of Smart Technologies for remote monitoring and verification of LPS Options to monitor lightning rods, lightning strike information continuity and resistance



Design service: Lightning Prevention Early Warning System: Remote monitoring with IoT technology:

- Evaluation of lightning risk for preventive protection
- Site specific system for localised monitoring
- Early warning alert for preventive actions before lightning strikes Remote monitoring for continuous system operation



Advanced Earthing design service:

- Remote monitoring with IoT technology for any earthing system
- Calculation of short-circuit current to earth
- Lightning strike transient analysis
- Transient short circuit analysis
- Frequency analysis
- Interaction analysis between earthing networks
- Technical and economical optimisation of the earthing grid
- Use of foundation as a part of the earthing system
- Analysis of the earth-surge protection interaction
- Evaluation of the building's down conductor system against lightning strikes

IoT PLATFORM - SMART SOLUTIONS



Equipment for the remote monitoring and data processing of earthing systems, lightning protection and prevention systems and surge protection, using M2M protocols that communicate via secure channels with redundant servers, including Tier IV Gold datacenter.

Algorithms then transform the collected data into useful information and predictive alerts for users.

This information is delivered via multiple means: private user webportal, APP for mobile devices, automated through dry contact relays or AD-HOC integration into SCADA; DCIM; BMS systems.



S SMART EARTHING MONITORING SYSTEM (SEMS)



The status and functionality of any earthing system should be guaranteed through periodic inspections, as both safety elements (protection, insulation, etc.) and functional elements (filters, measurement lines, screens, etc.) can be affected, causing serious risks to goods, equipment and people.

Earthing is the common element where structural, electrical, piping, etc are directly or indirectly connected. Any malfunction or defect generates certain activity in the earthing system that can be detected and used as an indicator of failure or degradation to anticipate risk situations, optimise maintenance, etc.

SEMS

Intelligent earthing monitoring system that measures the resistance and continuity at regular and programmable intervals, ensuring safety and continuity of service.

Identify degradation that may indicate the need for preventive or corrective maintenance or potential dangerous situations or vandalism/theft.

Optimise preventive and corrective maintenance, reducing costs and labour risks



Data sent via M2M communication to both web portal, e-mail, APP or integrated into any SCADA system.

SMART EARTHING MONITORING SYSTEM

- ▶ **Real-time determination of earthing system values**
 - Logistical and operational optimization of periodic verifications
- ▶ **Verification of asset-to-earthing connections**
 - Identification of both asset non-connection as well as unrequired connection to the earthing system
- ▶ **Evaluation of earthing continuity**
 - Real-time alerts related to conductor breakage, acts of vandalism or theft
- ▶ **Evaluation of noise level present in ground conductor**
 - Its presence may be due to a defect in other elements connected to ground or by couplings on the monitored earthing system.
 - In some sectors, electrical noise can condition the correct functioning of various sensitive equipment
- ▶ **Excessive leakage currents (insulation faults)**
 - The detection of abnormal leakage current is normally linked to insulation degradation in the assets connected to the earthing system
- ▶ **Evaluation of current ground flow related with abnormal electrical activity in the facility**
 - Identification of the presence of harmonics' (50,100,150Hz...) in the earthing system to determine possible causes of failure
- ▶ **Monitoring of earthing system corrosion level**
 - Signal decomposition analysis that allows for the identification of very slow trends associated with the oxidation phenomenon





SMART EARTHING MONITORING SYSTEM



- ▶ **Battery**
 - 5Ah as power backup
 - 10Ah for solar power applications
- ▶ **Power supply**
 - Mains power supply
 - Direct from 48V batteries
 - Autonomous supply via solar panel
- ▶ **Visualisation**
 - Optional 2.4" TFT screen for local operation
- ▶ **Communication**
 - 2G/3G network
 - IoT bands 4G (LTE-M, NB-IoT)
 - LAN port Communication
- ▶ **Enclosure**
 - Indoor use, wall or DIN rail mounting
 - IP 65 outdoors weatherproof enclosure



External protection

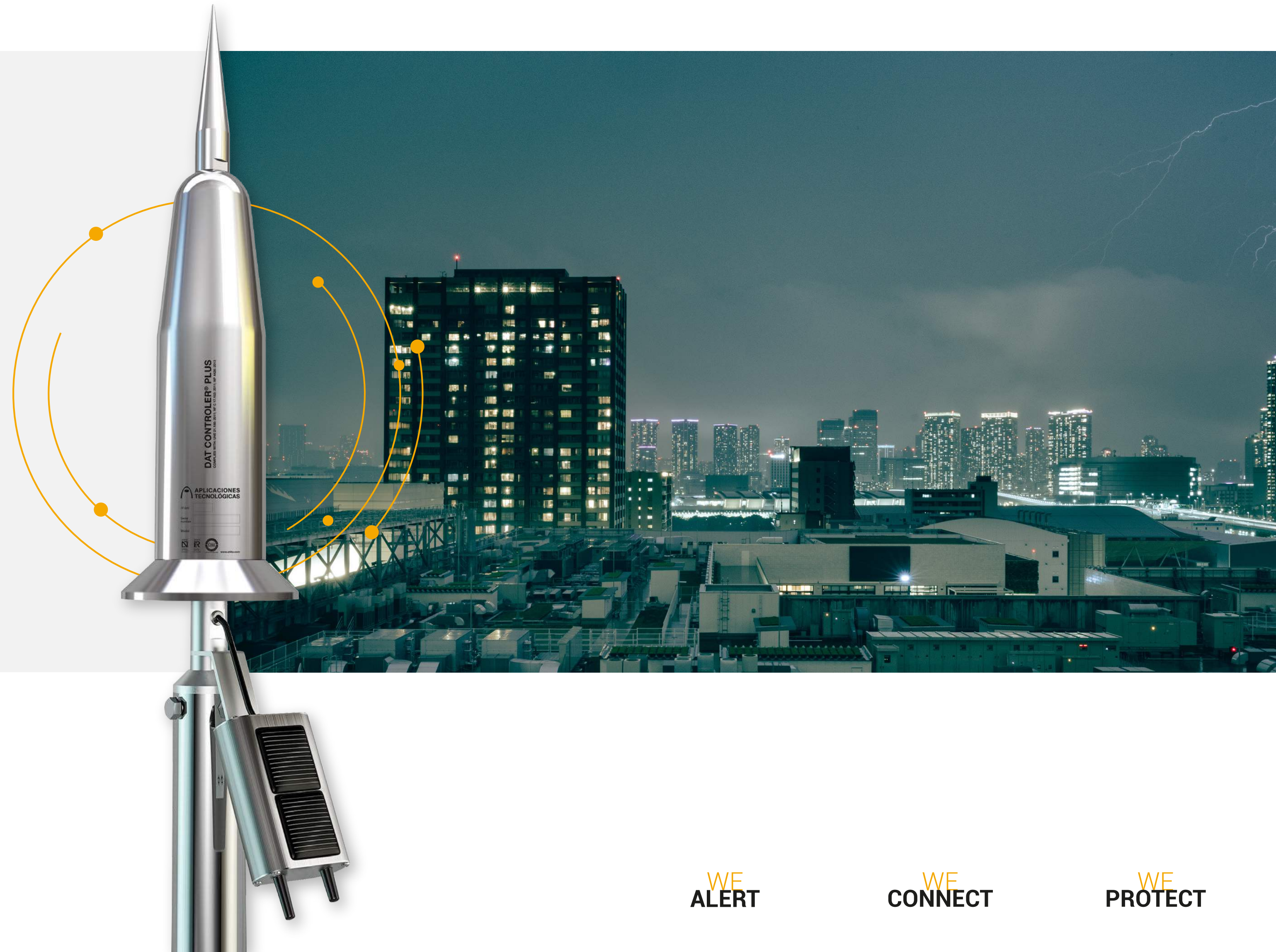


DAT CONTROLER® REMOTE ESE Air Terminal

An ESE air terminal is an external protection system that captures lightning at a controlled point, driving it to ground safely. Lightning rods are installed and not verified regularly due to access difficulty or costs. The continuous and remote monitoring of the lightning protection system optimizes verification and maintenance. Monitoring of the system at a fraction of routine maintenance costs.

DAT CONTROLER® REMOTE bases its functioning on the electrical characteristics of the approximation of lightning to earth, providing a controlled discharge point within its protection radius.

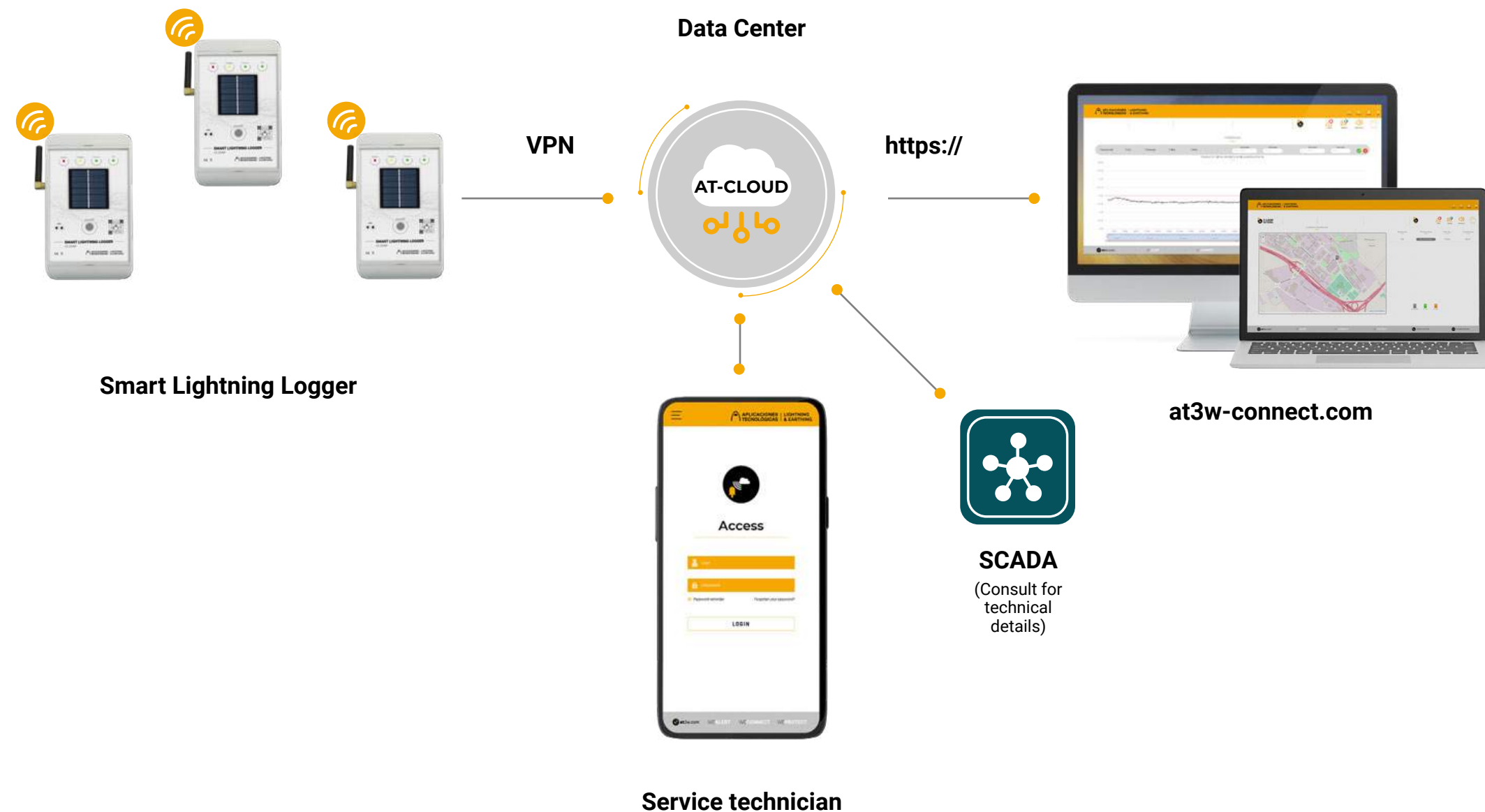
The standardised characteristics that determine the protection radius of an ESE Air Terminal is the advance time parameter (how quickly it acts to capture lightning), coupled with the height at which it is installed above the structure it is protecting.



Smart Lightning Logger



Continuously monitors the electrical activity associated with lightning in a grounding conductor. The data that characterizes the detected current pulse is sent remotely through IoT communication.



Monitoring the electrical activity of the down conductor makes it possible to optimize maintenance operations.



- ▶ Stores the total number of impacts in a facility.
- ▶ Characterizes the current pulse in amplitude, polarity, duration, charge and energy.
- ▶ Identifies the exact moment of event occurrence (date and time).
- ▶ Determines the point of impact in interconnected facilities (ie high voltage towers).
- ▶ Optimizes verification and preventive maintenance operations.
- ▶ Receives information through the user portal and the APP.

Advantages:

- ▶ Remotely configurable and operable.
- ▶ Local storage of the measurement history, for greater security.
- ▶ Configurable warning and alarm.
- ▶ Compact size. Easily installed on any down conductor.
- ▶ Autonomous power: Long-life batteries + Solar panel (optional)
Rechargeable via USB port.

External protection

SMART DAT CONTROLER[®] SUPERVISOR

We apply smart technologies and AI to lightning protection, optimizing the reliability, safety and efficiency of the systems. Incorporating sensorization, communication and digital platforms in lightning protection, revolutionizes the management, maintenance and global control of installed systems.

Continuous remote monitoring and IoT (Internet of Things) connectivity allows for self-diagnosis, configuration and remote operation of devices with real time data, continuous improvements and automatic updates. Corrective and predictive maintenance operations are thus optimized, minimizing costs and requirements associated with verifications.

SMART DAT CONTROLER[®] SUPERVISOR integrates the ESE air terminal, downconductors and earthing systems with different intelligent sensors monitoring key installation parameters, logging data and characteristics of lightning strikes that have been captured. Incorporating a communication system and digital control platform, it is the most advanced lightning protection system on the market.



Transformation through innovation

Remote monitoring using smart sensors and IoT technology provides the following information:

▶ System operating status auto-diagnosis:

- ESE air terminal
- Earthing resistance
- Down-conductor continuity
- Lightning event counter

▶ Full verification of the system after a lightning strike.

Real-time alert report.

▶ Lightning strike information:

- Date and time
- Magnitude
- Polarity
- Charge
- Specific energy

▶ Down-conductor theft and vandalism, degradation and accidental breakage detection alert.



Preventive protection

ATSTORM® System

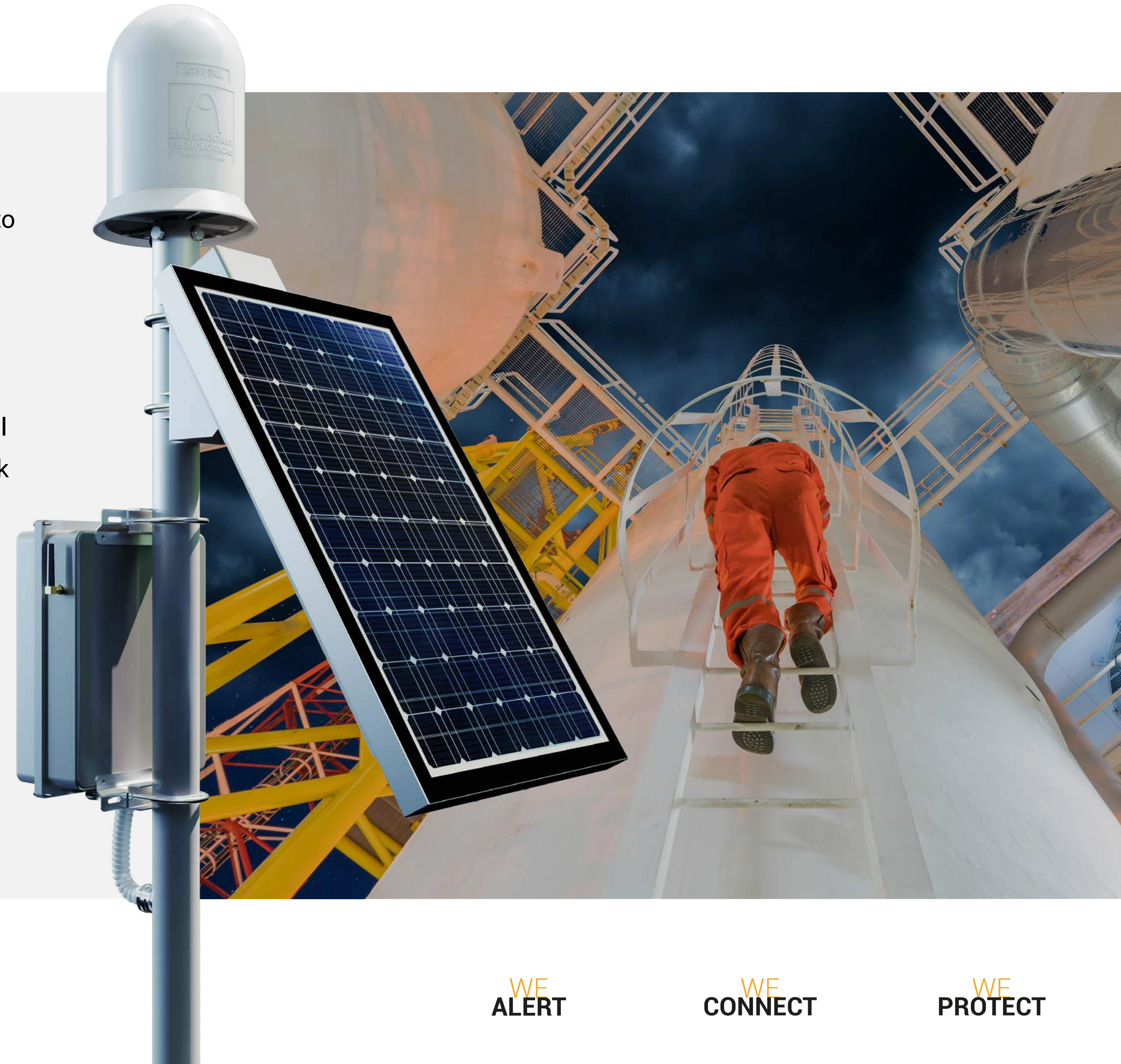


The main purpose of a Lightning Warning System is to identify, with the maximum anticipation, the risk posed by both forming and incoming lightning storms and to be able to launch preventive measures in time.

ATSTORM® focuses on what matters most: your site.

Monitoring the localised electrostatic field is the only real objective and measurable natural phenomena which enables, under any circumstance, to anticipate the lightning strike risk and allow for the implementation of preventive measures and optimise downtime.

- ▶ Prevention of occupational hazards
- ▶ Suspend work or outdoor activities
- ▶ Suspend or postpone dangerous operations
- ▶ Disconnect electrical or sensitive equipment
- ▶ Activate auxiliary power systems
- ▶ People evacuation



Preventive protection

ATSTORM® System

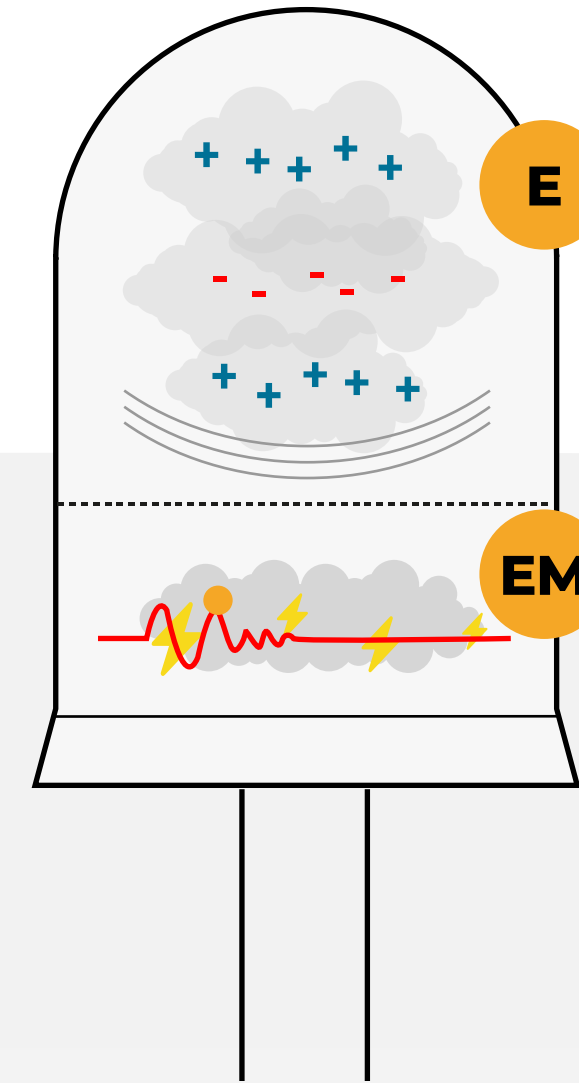


Electrostatic field sensor

Lightning formation above site:
Actual local site conditions monitored for early alert warnings before any first strike.

Electromagnetic sensor

Detection of lightning storm approaching site:
60 km radius.



- ▶ **Detection during all phases of a thunderstorm**
We monitor both the electrostatic and electromagnetic fields, enabling the maximum anticipation in the risk of a lightning event.
- ▶ **Fully electronic, with no moving parts**
Our equipment does not use moving mechanical parts, preventing blockages, wear and failures.
- ▶ **Remotely Monitored through Internet of Things (IoT)**
The system is remotely monitored ensuring its correct operation at all times.
- ▶ **Expert self-learning system**
System gradually adapts to the monitored local characteristics.
- ▶ **Risk alerts via multiple channels**
Our customers receive the risk alerts through multiple means: smartphone, tablet, private web portal, emails, remote activation of alert devices and AD-HOC system integration.
- ▶ **Ad-hoc projects**
We study each location and determine the best system configuration in terms of number and positioning of the detection units.



Wind Turbine Smart Lightning Logger



WIND TURBINE SMART LIGHTNING LOGGER is the smart logging device that continuously monitors electrical activity in the wind turbine blades.

Real-time lightning impact alerts for immediate inspections and early repairs, saving significant costs

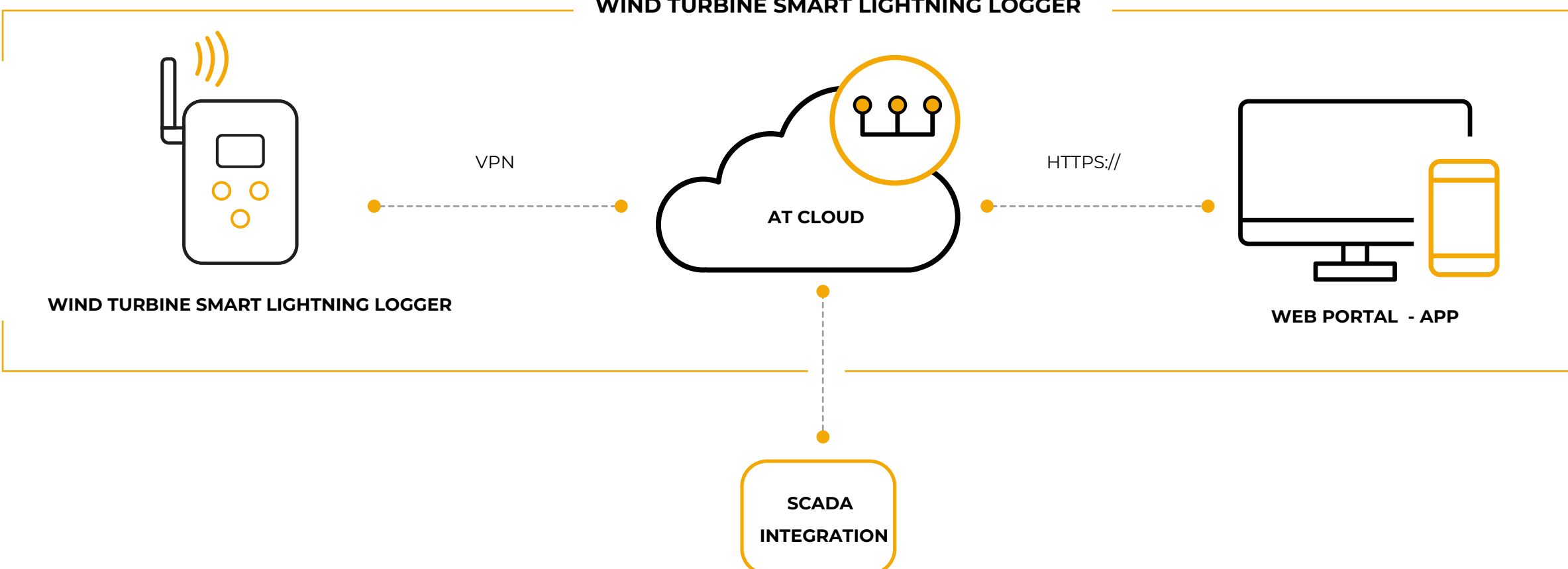
- **Immediate inspections:** real-time alerts allow inspections to be carried out on the spot and acted upon.
- **Early repairs:** repairs can be started almost immediately after damage assessment, always thanks to real-time alerts.
- **Great cost savings:** early identification of minor damage, which is extremely difficult to detect without the WIND TURBINE SMART LIGHTNING LOGGER and its timely repair prevents damage from escalating in the future.



Advanced features of WIND TURBINE SMART LIGHTNING LOGGER:

- Online lightning strike alarm. Objective criteria for shutdown and corrective maintenance.
- Real-time recording and characterisation. Amplitude, polarity, duration, load / charge, specific energy, direct current, date and time.
- IoT communication. Real-time impact data, and weekly equipment life and status signals.
- Self-diagnostics and autonomy. Automatic upgrades and updates.
- Configurable and remote operation. User portal and APP, in addition to user-defined channels.
- Compact design. Single module that includes the sensor, electronics, IoT communications system and autonomous power supply.
- Multiple Alert Channels. Permanent control of assets and centralised global monitoring
- Local storage of measurement history. Greater data security.
- Configurable alert and alarm criteria.
- Easy installation on wind turbine blades.
- Autonomus power supply. Long-lasting battery life and rechargeable via USB port with power bank.
- Robust equipment. Includes overcurrent and overvoltage limiters that ensure its operability after a lightning strike.

WIND TURBINE SMART LIGHTNING LOGGER



Internal protection & monitoring

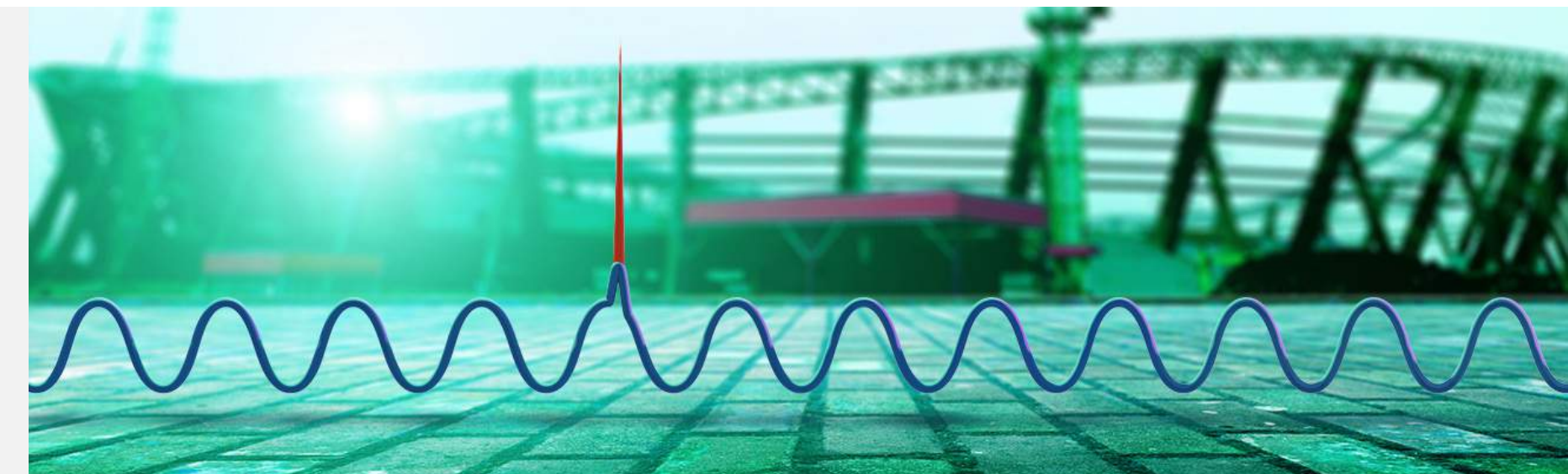
Surge protection



- ▶ Power Supply Lines
- ▶ Data Lines
- ▶ Telephone Lines

MORE
THAN 500
REFERENCES

✓ Comply with standard IEC 61643



Protection against transient surges (very short duration).

Avoid economic losses caused by the reposition of the damaged components, as well as the indirect expense caused by the disruption in service and production processes.

Extensive catalogue

Over 500 overvoltage protection solutions for electrical supply lines as well as telephone data and signal lines.



ATSHOCK
Series



ATSUB
Series



ATLAN
Series



ATCOVER
Series



ATFREQ
Series



ATFONO
Series

Internal protection & monitoring



Panel monitoring

POWER SUPPLY TESTER

- ▶ Monitors voltage on all lines.
- ▶ Measures the impedance between neutral and ground.
- ▶ Stores up to 50 alarms for each variable.
- ▶ Can be used as a portable tool.
- ▶ Configurable thresholds.
- ▶ Potential-free contact outputs to activate alarms.
- ▶ RS485 serial communication, Modbus protocol



SURGE LOGGER

- ▶ Inductive loop (fed through SPD earthing cable)
- ▶ Measures and records date and time of surge event, the peak current and distinguishes between direct and indirect lightning strikes.
- ▶ Isolated from the monitored line through battery power, thus avoiding surges.
- ▶ Internal memory able to monitor up to 110 events.
- ▶ Configurable menu on device or via mobile app.
- ▶ Modbus remote communication protocol to send data to a SCADA, BMS, DCIM or activate alarms, etc.



Internal protection & monitoring

Panel protection & monitoring



POWER SUPPLY TESTER



Monitor the following characteristics for critical lines:

▶ Voltage between phases and neutral

With the voltage measurement between phase and neutral, it is possible to detect:

- Permanent overvoltages / undervoltages in one or all phases.
- Possible voltage decompensations between phases.
- Failure of any phase.

▶ Working frequency

With the frequency measurement of the electrical signal, we detect:

- A variation in the supplied mains frequency, which can damage or cause equipment to malfunction.

▶ Ground-Neutral Loop Impedance

With the impedance measurement of the loop between neutral and ground we will detect:

- Ground fault.
- Deterioration of the ground connection, which allows us to solve the problem ahead of time.

SURGE LOGGER



- ▶ Monitor surge events through this impulse counter for discharges on surge protection devices.

SURGE PROTECTION DEVICES


- ▶ Monitor status/fault indication of SPDs on all panels through remote signal output on devices.
- ▶ Eliminate need for visual test/checks etc and provide realtime status alert.








APLICACIONES TECNOLÓGICAS S.A.

Parque Tecnológico de Valencia

 C/Nicolás Copérnico, 4 - 46980 Paterna (Valencia), ESPAÑA.

 (+34)961 318 250  atsa@at3w.com  at3w.com

NIK SWEETING

LEAD COMMERCIAL MANAGER

nswearing@at3w.com

+34 663 78 47 49

