



Bandweaver



CASE STUDY

Security system for PV Solar Farm Zone based Perimeter Intrusion Detection System (PIDS)



The Scenario

Solar Power is increasingly becoming one of the leading sources of renewable energy. Sites are also growing in size and are often based in remote areas. Both solar panels and the associated batteries can command significant prices on the black market and as a result Solar crime is fast becoming a real issue with criminal organisation targeting solar farms.

The solar site detailed in this case study is one of the largest in Greece with the overall site perimeter length at approximately 8km and the site is split up over five separate fields with perimeter length varying from 700m to 2100m. New Alert was tasked by the operator to design and install a Perimeter Intrusion Detection System (PIDS) to monitor and protect the sites.

Monitored | Secured | Safe

Client Requirements

The client was looking for a system to provide rapid response in the event of an intrusion attempt. The security system needed to monitor the entire fence perimeter of the plant and it is segmented into zones according to the topography of the area and the layout of the plant. Because the topography of the site was quite hilly, the technology needs to consider potential line of site issues (e.g., radar, beam and CCTV all require line of site to function).

The operator also incorporated a CCTV system utilising PTZ cameras. Both the PIDS and CCTV system needed to be integrated into a central control room. In deciding which system to utilize for protecting the site, the user had the following requirements:

- Simple installation – no infield power
- No line of site issues
- Cable immune to Radio Frequency or Electro Magnetic Interference
- Location of event to within a user defined zone
- Custom configuration of zone sensitivity – minimise nuisance alarms
- Simple integration with CCTV software and Security Panels
- Low ongoing maintenance costs

After initial technology evaluation it became clear that a fiber optic based PIDS system met all of the criteria. The fiber was attached to the fence along the entire length of the perimeter. Below is a plan view of one of the 5 fields.

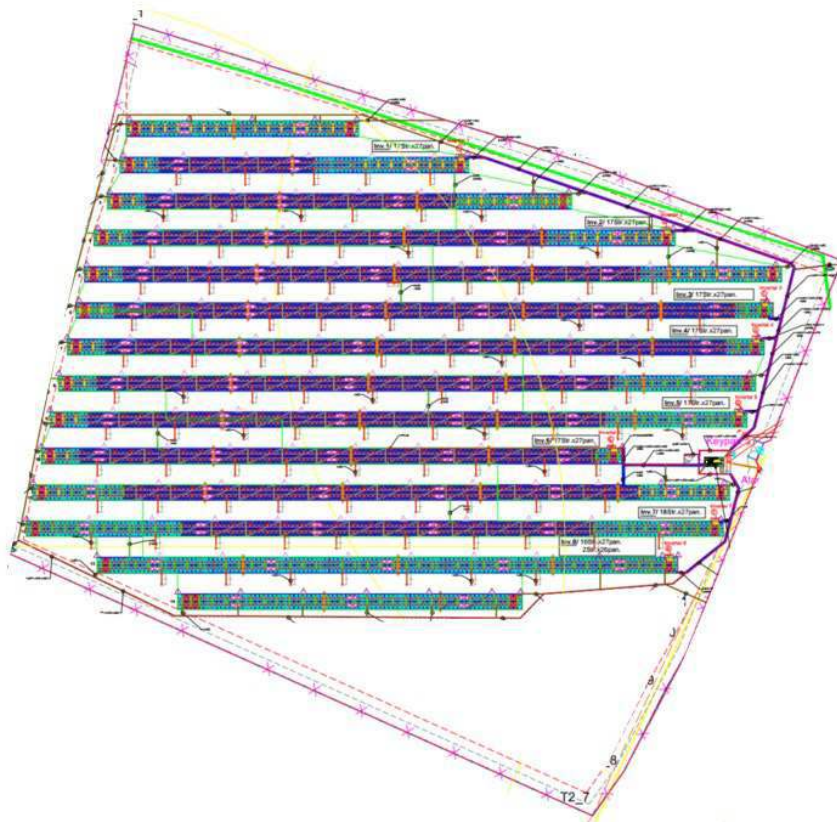


Figure 1 -Plan view of field #2



What Did We Do?

New Alert worked with the operator and the system design consultant to propose a robust security system with a focus on having a low level of false alarms. Key to achieving this is having the ability to tune each specific zone according to the environmental conditions of that area.

It soon became apparent that a fiber optic based PIDS system was optimal for such a site. New Alert review both plastic and glass-based fiber optic systems and decided that due to the higher performance and longer range they chose a glass-based fiber optic-based system.

New Alert and the design consultant chose to deploy a single ZoneSentry unit for each field. The ZoneSentry come in either a 4 or 8 zone format and so allowed the operator to divide each field into 4 or 8 configurable zones. Below shows an example of the cable attached to the fence. As can be seen, the cable was attached at the midway point on the fence and was secured using cable tie wraps.

Cable and equipment installation



Figure 2 - Fiber optic sensing cable position on Fence



In addition to standard fence panels the customer also wanted to monitor gates for intrusion. Below, is an example of how New Alert installed the ZoneSentry cable on the gate so that there was full monitoring capability but without preventing the operation of the gates.



Figure 3 - Example of sensing cable installation on gate

It is very simple to configure each of the zones within each perimeter and this is achieved using a zone activation unit (an optical coupler) which is housed in a waterproof splice housing. These housings can either be covertly buried underground or can be mounted above ground. They do not require any additional power and so are easy to configure, extremely robust and have design lives of greater than 30 years.

The image (right) shows an example of a splice housing mounted to the fence post. In this scenario the splice unit contains both the zone activation unit for Zone 2 as well as a splice to complete the loop in Zone 1.

Figure 4 In field splice housing



As this was a very remote site, there is no on-site control room but a small equipment enclosure which is not climate controlled. The ZoneSentry units are rated to 70°C and so can survive in even the harshest conditions. The image (right) shows details of the remote equipment enclosure on site.

Figure 5 -Equipment enclosure cabinet



System Integration

The operator wanted to have a fully integrated system and so the PIDS system is integrated with the NVR of the CCTV subsystem as well as the security panels located to each one of the solar farms that cover the substation areas. The photo below shows an example of one of the PTZ cameras installed within the compound. Each of the zones can be configured to a different camera pre-set and so in the event of an intrusion event the camera will automatically slew to the pre-determined position for each zone.



Figure 6 - Example of PTZ camera

As space within the equipment is limited, New Alert combined the same splice tray to incorporate the ZoneSentry cables as for the CCTV



Figure 7 - Fiber optics PIDS and CCTV cabling within cabinet



Benefits to the Client

The operator was extremely satisfied with New Alert and the Bandweaver fiber optic based PIDS system. Some of the key following benefits and advantages to the end user include:

- **Early detection of intrusion events:** The cable provides complete coverage and detects intrusion events within 2 seconds and so wherever the intrusion occurs on the perimeter it will be detected and reported rapidly so that action can be taken quickly.
- **Low levels of false alarms:** Because each zone is configured separately, the system can be tuned according to the specific environments of that area and the optimum balance can be achieved between maximising sensitivity of the system but minimising false alarms.
- **Low Cost of Ownership:** Fiber optic cables are completely passive and have no moving parts, they are non-corrosive and immune to electromagnetic interference and typically have lifetimes in excess of 30 years and so carry a very low cost of ownership and require almost no maintenance
- **Immune to Electrical Interference:** The system is immune to electromagnetic interference and so is not affected either by other electrical equipment or lightning strikes.
- **Simple installation:** The installation consists of simply attaching the cable to the fence and there is no need for infield power or burying of any cables

About Bandweaver Technologies

With an installed base of over 60,000km and 8,000 systems installed worldwide, Bandweaver's vision is to be the first choice for integrated distributed fiber optic sensing solutions across the globe. Since 2002, Bandweaver has been committed to delivering reliable, innovative, client-centric and value-added products and services, via a dedicated and talented team of people.

Bandweaver manufactures and distributes advanced fiber optic monitoring sensors and integrated technologies, enabling customers to monitor, secure and keep personnel and critical assets safe.

With quality and excellence as fundamental elements of Bandweaver's portfolio, the business is continuously developing its range of technologies, including Distributed Temperature Sensors (DTS), Distributed Acoustic Sensors (DAS) and integrated smart intelligent software solutions.

Utilising the latest technologies, Bandweaver provides solutions for Security, Fire, Power and Pipelines. For further information please contact our global team at info@bandweaver.com

