



APPLICATION STORY



Solar farm surveillance enhanced with thermal imaging cameras

The number of solar parks in Europe is increasing as the demand for renewable energy is rising. Many of these solar parks are in remote locations, so protecting them properly can be a challenge. One of the security companies that have come up with an answer to this challenge is Reading, UK, based Westronics Fire & Security Ltd. To ensure good visibility of intruders in the surveillance system, even at night or in adverse weather conditions, Westronics includes thermal imaging cameras in its solar park protection systems.

"We have been installing closed circuit television (CCTV) systems ever since the technology was released to the public in the early '80s but CCTV cameras run into severe limitations when it comes to nighttime operation and certain weather conditions", explains Westronics' Managing Director Graham Miller. "Thermal imaging cameras are sensitive to electromagnetic radiation in the infrared spectrum, which is emitted by all matter as a function of its temperature. They need no light whatsoever to function, making them perfect for nighttime surveillance".

Based on the recorded intensity of infrared radiation they produce clear, high contrast images, regardless of lighting conditions. Sun glare, shadows, smoke, rain, fog, all

of these factors can render CCTV cameras useless, but FLIR thermal imaging cameras are not hampered by these conditions. They can be used to see in complete darkness, through smoke and light fog.

Thermal imaging: an obvious choice

According to Miller the choice for FLIR thermal imaging cameras was obvious. "These sites need to be protected day and night. Since they are in remote locations there is no street lighting present, so for CCTV cameras to be effective during the night we would have to install additional lighting. This would not only increase the energy consumption of the security system, which obviously needs to be avoided, especially at a solar power plant, but would also have an unacceptable impact on the local wildlife,

The FLIR PT-313 thermal imaging camera system provides crisp high contrast thermal images regardless of lighting and weather conditions.



When the microwave intruder detection system is triggered the nearest FLIR PT-313 thermal imaging camera is automatically pointed towards the location where the alarm was triggered to verify the alarm.

as these are protected green belt areas. FLIR thermal imaging cameras provide very high quality imagery, without the need for lighting. That is why we selected the FLIR PT-313 thermal imaging camera system for several recent solar farm protection projects. These particular camera models are very easy to incorporate in our security systems, as they are compatible with the standard TCP/IP protocols we use for our systems network designs."



"The FLIR PT-313 thermal imaging camera system contains both a thermal imaging camera and a visual CCD camera", continues Miller. "At first we mainly used the thermal imaging camera for nighttime surveillance, but we discovered that these thermal imaging cameras also enhanced the surveillance during the day. Whilst the visual CCD camera included in these multi-sensor camera systems is excellent, we soon found that apart from limitations like sun glare and fog, obscurants like the foliage of undergrowth can also hide intruders from view. Tests showed, however, that the foliage does not entirely camouflage the body heat of intruders from the thermal imaging camera. This allows the control room operators to track the movements of intruders even if they try to hide in the bushes."

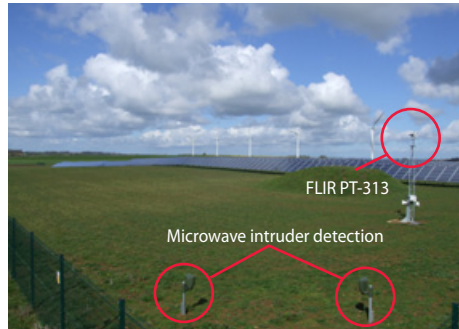
FLIR PT-313 thermal imaging camera system

The thermal imaging camera included in the FLIR PT-313 thermal imaging camera system contains an uncooled Vanadium Oxide (VOx) microbolometer detector that produces crisp thermal images of 320 x 240 pixels. The FLIR PT-313 thermal imaging camera can be used to detect a man-sized target from a distance of up to 880 meters, ensuring that no intruder will go unseen. The pan and tilt platform allows the user to rotate the camera 360° continuously and to tilt it +90° or -90° and with its extremely rugged housing, which meets IP66 requirements, the thermal imaging camera's vital core is well protected against both dust and water ingress.

The FLIR PT-313 thermal imaging camera systems are installed at three solar parks, one in Wiltshire and two in Cornwall. The security systems at these locations have three layers of defense. "The first layer of defense is a standard fence", explains Miller. "Apart from deterring intruders this fence keeps out wildlife, to limit the unwanted alarms." The



The FLIR PT-313 camera system contains both a lowlight color CCD camera and a thermal imaging camera for continuous surveillance, day and night, in all weather conditions.



An intruder that climbs the fence will trigger the microwave intruder detection system. The live thermal video footage from the FLIR PT-313 thermal imaging camera system allows the control room personnel to quickly assess the situation.

second layer is an invisible virtual fence of microwave detection between the actual fence and the solar panels. The third layer consists of the thermal imaging cameras, which are installed in strategic locations on four metre high posts, covering the entire area.

Triggering the alarm

"If an intruder climbs over the fence and enters the area between the microwave transmitter and receiver a difference will be detected in the beam, which triggers an alarm", continues Miller. "The alarm is sent to the corresponding Alarm Receiving Center (ARC). Simultaneously the thermal imaging cameras are automatically pointed towards the area where the intrusion was detected, proving a wide angle view of the area."

The thermal and visual footage from the FLIR PT-313 thermal imaging camera systems is recorded by a standard hard disc recorder and simultaneously shared with the ARC through a secure broadband connection. "The operators of the ARC can remotely operate the cameras to provide the best view of the possible intrusion, switching between day and thermal cameras as the weather and lighting conditions dictate", continues Miller. "The ARC staff can warn off would be intruders with the on-site public address (PA) system which provides an audible deterrent to casual intruders. If



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appropriate, the ARC staff can also deploy a mobile patrol or report the incident to the police. The footage recorded on the digital video recorder can be passed on to the police as evidence."

Visual confirmation is crucial

Although the microwave intruder detection system can be excellent for intruder detection, according to Miller it is also notoriously susceptible to unwanted alarms caused by large animals or certain weather conditions. "For that reason a visual confirmation of alarms is crucial to provide a robust security solution. The FLIR PT-313 thermal imaging cameras provide exactly that. They allow the ARC to accurately distinguish between an alarm triggered by animals or a true security breach by intruders, regardless of lighting and weather conditions."

The thermal imaging equipment for this installation was supplied by the FLIR Platinum level distribution partner CCTV Center. "Westronic's system design and strategic placement of the FLIR thermal PTZ cameras has created a benchmark solution for both perimeter protection and measured area surveillance within the site; day and night, and under all weather conditions", adds CCTV Center's Technical Director Tim Cocks. "Their solution has been rightly recognised by the industry and serves as a 'best practice' model for similar sites within the energy and utilities sector."

For more information about thermal imaging cameras or about this application, please contact:

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