

Earlier this year Swedish firefighting equipment manufacturer Unifire AB launched an automatic and remote-controlled fire extinguishing system comprised of water cannons aimed for high risk environments. *IFJ* spoke with Unifire’s Roger Barrett James and Andrea Hoppe from partner company ThermoTemp (Germany) about the use of intelligent foam monitors interfaced with fire detectors for automatic fire extinguishing within incineration plants.



Incineration with Force

Unifire’s Safelncinerator system consists of its Force series remote-controlled, stainless steel water/foam monitors (water cannons), the “Unifire Control System” (or “UCS”), and flame detection technologies manufactured by third party partners. The combined product is a networked system of intelligent monitors, each capable of accurately delivering up to 5,000 litres per minute (1,340 gpm) of water or foam solution directly onto a fire, within seconds of detection. The system can automatically detect, locate and extinguish fires by use of infrared cameras and other advanced fire and flame detection technologies.

Incineration plants face unique challenges due to the chemical-thermal spontaneous combustion of waste material, which is why fully automated fire prevention and fire monitoring systems have been regarded as a useful solution.

Each Force monitor in the system is controlled either from its own joystick, and/or from a central station (or central stations) placed up to 500 meters away, and/or by infrared cameras or other flame detectors. The monitors can also record spray patterns and play them back at the press of a button.

Networking the monitors with the UCS makes it is possible in large environments to easily control multiple cannons and peripheral devices, such as in another project Unifire completed recently at the new Oslo Opera House. Mr. James explains; “Traditionally, each cannon has needed its own joystick for manual control, but with an intelligent, networked system, the operator can control any monitor on the network from a single location, send any one or more of the monitors into a pre-programmed spray pattern, automatically open and close the valves to each monitor,

turn on lights and, perhaps most importantly, communicate with other advanced peripheral devices, such as cameras and detectors. Moreover, a single press of a button on the UCS can be programmed to automatically perform multiple tasks in sequence. For example, Unifire can program a system such that when the operator presses a button to engage a particular monitor, the system might first be sure that all other cannons are turned off, take them to their stow positions, then take the selected monitor to a pre-defined start position, next turn on a light and a camera, and then open the valve to commence operation.”

James says the system can also be set up to protect a grid of locations in large spaces. “Imagine a large warehouse with ceiling-mounted monitors. The area can be divided into an imaginary grid of sectors, each sector having a fire detector. The monitors can be pre-programmed to protect each sector. So, if the fire detector in sector 1 is triggered, the monitor or monitors protecting that sector are activated and deploy their pre-programmed sequence to extinguish fires in that location. The same concept applies to any object or area one wishes to protect, such as a chemical or fuel tank, an aircraft in a hangar, and so on.”

As well as automatically opening and closing the valves for their respective monitors, the Unifire Control System can also be programmed to control numerous other electronic devices. “We began developing the Force monitors at the beginning of this decade, with the goal of creating the most advanced water cannon on the market,” said James. “We now have a state-of-the-art water cannon, which we believe is the most advanced on the market, and which is well poised to take advantage of modern fire detection technologies, such as those created by ThermoTemp, for a whole new breed of fully automatic firefighting systems.”

Unifire has also designed a similar networked system for Texas company Crash Rescue Equipment Services, who produce the world-renowned ARFF product, the Snozzle. “Unifire has developed special software and control systems for our Force monitors and other peripherals on the 65’ Snozzle. This and other projects ultimately led Unifire to the Safelncinerator system, which is a truly advanced, powerful and flexible system.”

As for the risk of having automatic systems causing personnel to be hit by the water stream, James pointed out that the experience would not be life threatening, although it would knock people over and could cause injury. Indeed, Unifire’s water cannons have been mounted on riot control vehicles and ships to protect against



pirates. For this reason, the company recommends a number of precautions to be taken to avoid hitting people, such as first sounding warning and evacuation alarms, and/or requiring human confirmation prior to commencement of extinguishing.”

Infrared cameras at ASA Zistersdorf incineration plant, Austria

Andrea Hoppe of Thermotemp explained that it is not practical to install conventional smoke detectors in incineration bunkers due to the high levels of background smoke and dust present, which is why infrared cameras are used. They scan the waste in the bunkers – or in parallel applications they scan the waste that is being transported on rollers to a bunker for storage – prior to incineration. If the waste is deemed too hot to remain in the bunker, it can be picked up and incinerated immediately. “Usually what happens is there is a smouldering fire underneath the surface of the waste. The cameras register the temperature and produce comparisons on the next sweep,” said Hoppe.

The system allows the user to set the alarm to a certain temperature, for example 50 °C for a warning alarm, and 80 °C for the real thing, commented Hoppe, adding that in this environment most fires are unseen. “And if a smouldering fire is dug up, the sudden oxygen feed can worsen the situation.”

When this happens a bunker usually quickly fills with smoke, and in a matter of seconds, not even the fire, let alone the crane, is visible any more. This is when the qualities of infrared technology kicks in – it sees through the smoke, and the camera can be operated manually to locate the danger and dig up and dispose of the smoldering/burning material.

At Zistersdorf, Thermotemp installed a package of infrared cameras networked with Unifire’s Safelncinerator. “The most important aspect is getting the interface right, so that the monitors and the cameras work together.” The infrared camera system not only detects the fire, but it creates a number of grid co-ordinates which feed into the Safelncinerator system, providing the exact location of the fire.

Use of water cannons is seen as a last resort because ultimately all waste has to be incinerated, and if it is too wet it is counterproductive. “Judging whether a fire is significant enough or whether it is a false alarm is often a matter of experience, and we can advise on setting up the alarm parameters to avoid the use of water as much as possible. The ideal situation is to pick up the fire quickly and incinerate the affected waste straightaway. It is better to be preventive,” said Hoppe.

The installation of the system usually takes two to three days, mainly due to the positioning of the camera and its calibration. “Clients usually want two cameras even when advised that only one is necessary.” The system in essence analyses the camera’s images and compares them to a reference unit, and it is this constant comparison that detects any potential temperature differences. “The correct reference is crucial because if you don’t have that absolutely right the cameras will not give you the correct temperatures.”

A significant development for Thermotemp was the recent in-house design of its own camera tilt head. A previous off-the-shelf product had proved to be a weak point in the system because it had not been built for the tough environments of incineration plants, and typically they would not survive more than three years. “We’ve developed our own wireless tilt head which requires no external cables to the camera. It is stainless steel and it works with a virtually frictionless motor, ideal for dirty locations. It has resulted in no maintenance call outs for us,” concluded Hoppe.

Potential in other high risk sectors

James believes that intelligent water cannons will soon

ThermoObserver – components

- Uncooled long-wave infrared microbolometer camera (IP 67) with a long-wave range of 8-12µm with no moving components.
- Central analysis and control unit for alarm detection and activation, system failure recognition, documentation and system control.
- Display monitor and console for manual operation and system diagnosis, for installation in the crane driver’s cabin/control room.

revolutionise firefighting for many types of applications: “including in tunnels, aircraft hangars, stadiums, oil and gas facilities, refineries, warehouses, airport arrival halls, train stations, and large underground facilities, and even for non-lethal security applications, to name a few.” For example, according to James, an automatic system using Unifire monitors is currently being tested by governmental entities in Europe for extinguishing tunnel fires automatically. “Until now, there has been no system to quickly and effectively extinguish tunnel fires – nothing else on the market could accurately find and target a fire and deliver a large volume of foam solution directly onto the fire at its source, all within seconds of detection. This is exactly what Unifire, in cooperating with its partners, can now deliver. This is truly revolutionary technology. And, unlike water mist systems, there is no need to install high pressure water lines. Rather, existing water lines with typical pressures of six to twelve bars (90 to 175 psi) are highly effective,” said James.

Although the networked solution does not currently have EX approval for use in explosive environments, James commented that the company is poised to manufacture an EX approved version when the right project presents itself.

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