2024

UNIFIRE

FlameRanger

Autonomously Extinguishes Fires in Seconds

and allows remote control at all times from anywhere in the world

Made in Sweden

UNIFIRE

Advanced, Swedish Robotic Nozzle Technologies™

v. 05-09-2023

FlameRanger™

Revolutionary, Fully Autonomous Fire Detection & Suppression System

Welcome to the age of Robots!

Unifire's FlameRanger is the first-and-only of its kind fully autonomous robotic fire suppression system, keeping people and property safe 24/7/365.

FlameRanger™

The World's First & Most Flexible Fully Autonomous Robotic Fire Suppression System

The Problem

Fire grows exponentially quickly. Therefore, in order to effectively extinguish a fire and minimize damage, extinguishing must commence immediately when fire breaks out. Traditional fire fighting methods, including sprinkler systems and first responders, are typically very slow to respond, resulting in giant fires before suppression even begins. By that time, fire can lead to catastrophic loss to property and life and may be out of control.

The Solution

Rapid fire detection, coupled with immediate, accurately-targeted, high-flow suppression, is the key to maximizing the chances of successfully fighting a fire—before it spreads out of control.

Enter Unifire's FlameRanger...

Unifire's FlameRanger constantly detects for the presence of flames, 24/7/365. Any fire that breaks out is detected almost instantaneously. Unifire's sophisticated computing and software technology guide its advanced robotic nozzles with precision to aim a high volume of water or foam to directly suppress the fire (or fires) at its source. Fire suppression commences in as little as 5 seconds, long before it gets out of control.

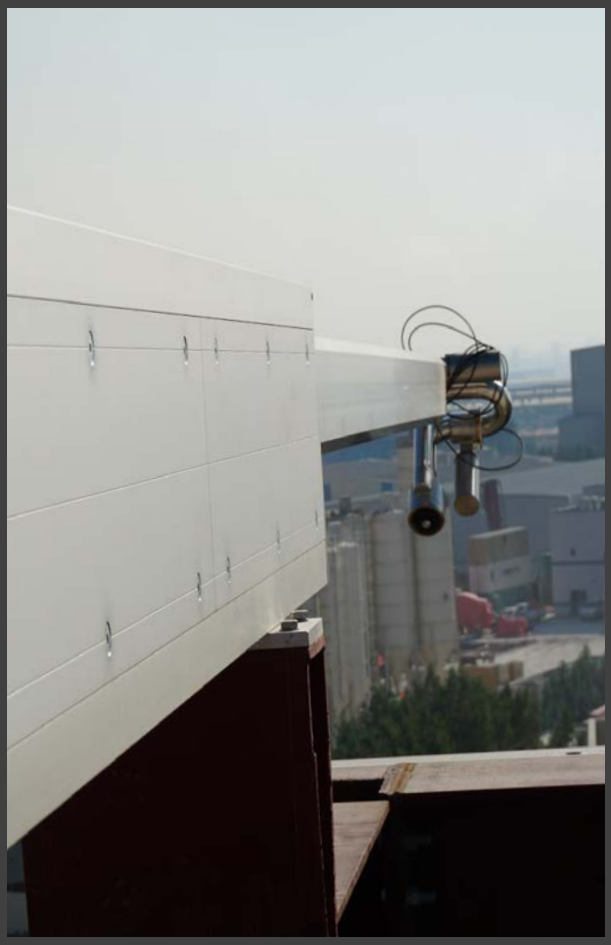
Problem Solved!

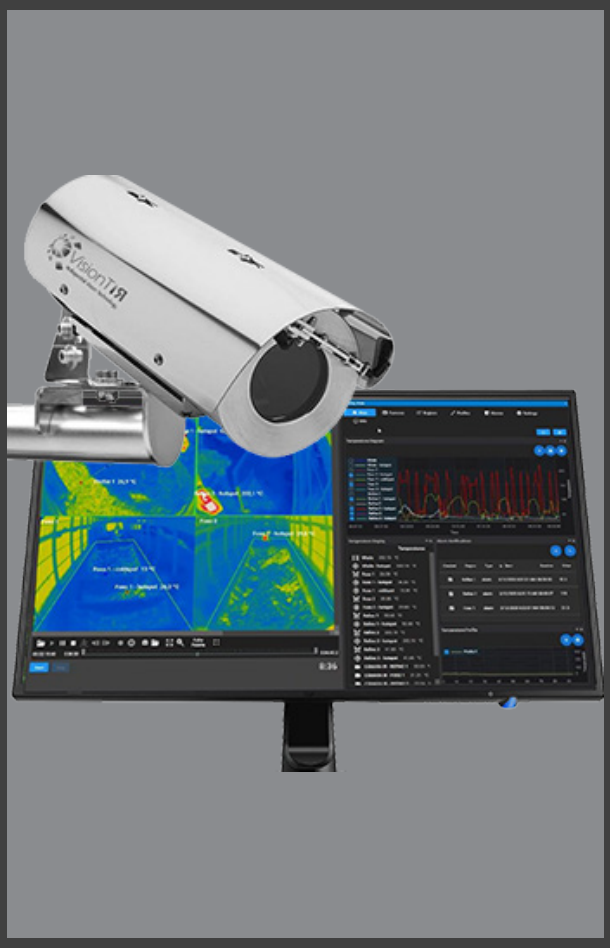
FlameRanger suppresses fires in seconds from ignition, 24/7/365, without any human intervention.

UNIFIRE

FLAMERANGER CAPABILITIES & BENEFITS

100% autonomous fire detection and suppression in seconds	✔
Fully autonomous, yet allows remote control at any time	✔
Time to detect visible flame or heat alarm (typically)	0-5 seconds
Time from fire ignition to fire suppression (typically)	5-15 seconds
Volume of water or foam directed accurately to/around the fire	1250-5000 lpm
Extremely low false-alarm rate	✔
Detection Technologies offered	
☑ IR3 flame detectors with video analytics to accurately locate the fire	✔
☑ IR3 IR array flame detectors with flame coordinates	✔
☑ Thermal imaging cameras with algorithms to reduce false alarms	✔
☑ Video analytics	
☑ Hybrid thermal imaging and video analytics	✔
☑ Optical fibre linear heat detection	✔
☑ Standard IR3 flame detectors	✔
☑ Sniffers	✔
☑ all other detection technologies possible	✔
Ability to combine 2 or more detection technologies	✔
Maximum number of detectors per system	10
Flame Suppression Methods	
☑ 3-dimensional fire location and suppression	✔
☑ Dynamic fire suppression (nozzle follows the flame)	✔
☑ Vector aiming with a single detector	✔
☑ Pre-defined zone responses (up to 10 zones)	✔
☑ Ability to detect multiple fires simultaneously and suppress them in the order detected	✔
Automatic control of the valve (open when fire is detected, close after it's extinguished)	✔
Graphical User Interface for easy setup and system data	✔
App for iOS/Android devices (optional)	✔
Optional ability to control the system from anywhere in the world over a secure LAN or WAN connection	✔
Ability to receive remote commissioning and remote technical support (with customer's permission and assistance) over a secure WAN connection	✔
Advanced robotic nozzles with industrial-robot-type brushless DC (BLDC) motors & extremely high-spec gears preventing loss of calibration over time	✔
Designed for extremely harsh environments (including stainless steel 316L construction of robotic nozzles)	✔
Tested by multiple accredited and renowned 3rd party testing authorities	✔
Systems in operation on 5 continents	✔
FlameRanger technology first tested and operational in:	2010





FlameRanger™

Types of Detection & Suppression Methods

Only Unifire offers complete flexibility in the type of detectors used and how the system behaves. Why is this important? Each fire detection technology has its advantages and limitations, and different risks require different solutions, Since 2010, Unifire has been testing and integrating a variety of the world's most reputable fire detection technologies in order to bring the most effective autonomous systems to the market and address any fire risk.

Unifire offers four general approaches, each of which has its own options and customizations. Briefly, they are:

1. Fully three-dimensional location, tracking and dynamic aiming: This is the most accurate system, and for this we use a pair of IR3 flame detectors with built-in video analytics. It uses 2 or more detectors, and each of them provides x,y coordinates. They are installed to provide stereo views and the system can triangulate the 3D position of the fire. The system updates the location information at 10Hz.

2. Vector aiming: One or more IR3-HD detector(s) is placed directly above the robotic nozzle to have the same view of the area to be protected. In the event of a fire, the detector sends the vector of the fire and the robotic nozzle aims at the fire and oscillates around it to contain and suppress it.

3. Zone aiming: As long as we know the area, or "zone" of an event, the system can suppress the entire zone. The system allows the programming of an aiming and spray pattern response to suppress each zone. Each FlameRanger system can be programmed to suppress up to 10 zones. Zones can be setup in 3 possible ways:

- Thermal Imaging Camera: we can use a thermal imaging camera system and set zones within its view;
- IR3-HD Flame Detector: we can use the FGD-IR3HD-UNF's video analytics to set zones; and
- Digital Inputs: we can use any of up to 10 digital inputs (from any type of detector), each of which can be associated with a pre-programmed response. Each FlameRanger system can have up to 10 inputs, each assigned a zone and a correlating response. The input is a simple digital input to the PLC, and therefore this type of zone system could be from virtually any detector, including standard IR3 flame detectors, sniffers, linear heat detectors (fibre optics), or anything else.

4. A Combination of these approaches: Unifire can combine various methods above, such as adding additional standard IR3 detectors to supplement a 3D system's potential blind spots, etc.

We work with you to design the most effective solution for your risk, ensuring complete fire detection and fire protection coverage.

FlameRanger™

Revolutionary Fire Fighting

Since 2010, Unifire has been leading the revolution in autonomous fire fighting systems.

FlameRanger is the world's first and most accurate, dependable and advanced autonomous robotic fire suppression system that detects and suppresses fires within seconds from ignition and without any human intervention.

Unifire offers its revolutionary FlameRanger systems that combine virtually any fire detection technology with our advanced, high flow robotic nozzles and our state-of-the-art electronic hardware and software.

The result? A robot fire fighter on duty 24/7/365, which reacts to fire in seconds with eerie, seemingly human-controlled movement to suppress the fire at its source, with a high volume of water (or foam) and high accurracy.

So, What Is It, Exactly?

Background & Objective:

Every large fire starts as a small fire and grows exponentially. Rapid detection and suppression are crucial to successfully fighting a fire, before it has a chance to develop into a catastrophic, fully developed fire.

What FlameRanger Does:

The FlameRanger is a high capacity, fully automatic, fire detection and suppression robotic nozzle system that operates completely autonomously around the clock, while providing constant system status information and allowing human operator intervention and remote control at all times.

How Does it Work?

The system uses one or more fire detection technologies to almost instantaneously detect a fire or heat buildup.

When a fire is detected, the system guides our advanced robotic nozzles to aim at the fire and open the valve (or start the pump) when the nozzle is aimed at the target fire.

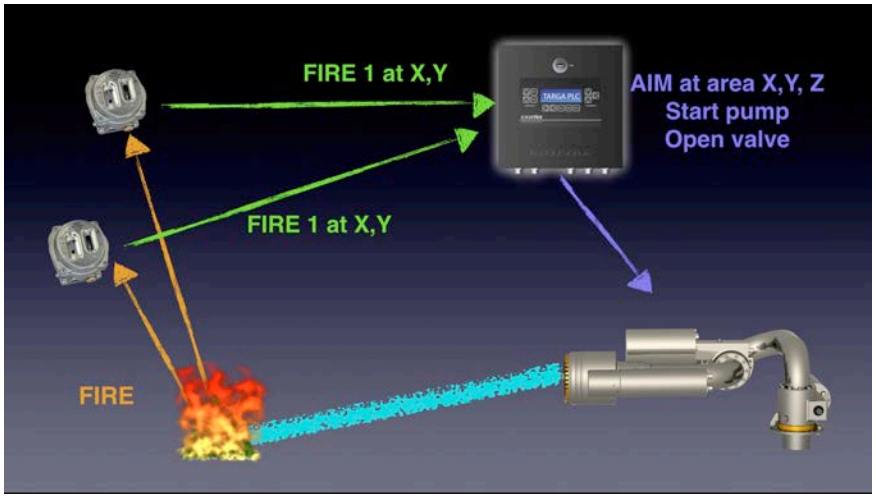
A large flow of water (or foam) is then accurately aimed directly onto the target fire (or fires). The spray angle is also automatically adjusted. The stream is intelligently guided to efficiently suppress the fire.

When fire is no longer detected, the system automatically shuts off and returns to stand-by mode, and the water supply closes automatically, takes the robotic nozzle back to stow position, and the system remains ready to reactivate should a flame reignite.

> *"Don't think of robots as replacements for humans -- think of them as things that will help make us better at tackling many of the problems we face."*
> — Eoin Treacy

FlameRanger™

1. Fully Three-Dimensional Location, Tracking & Dynamic Aiming



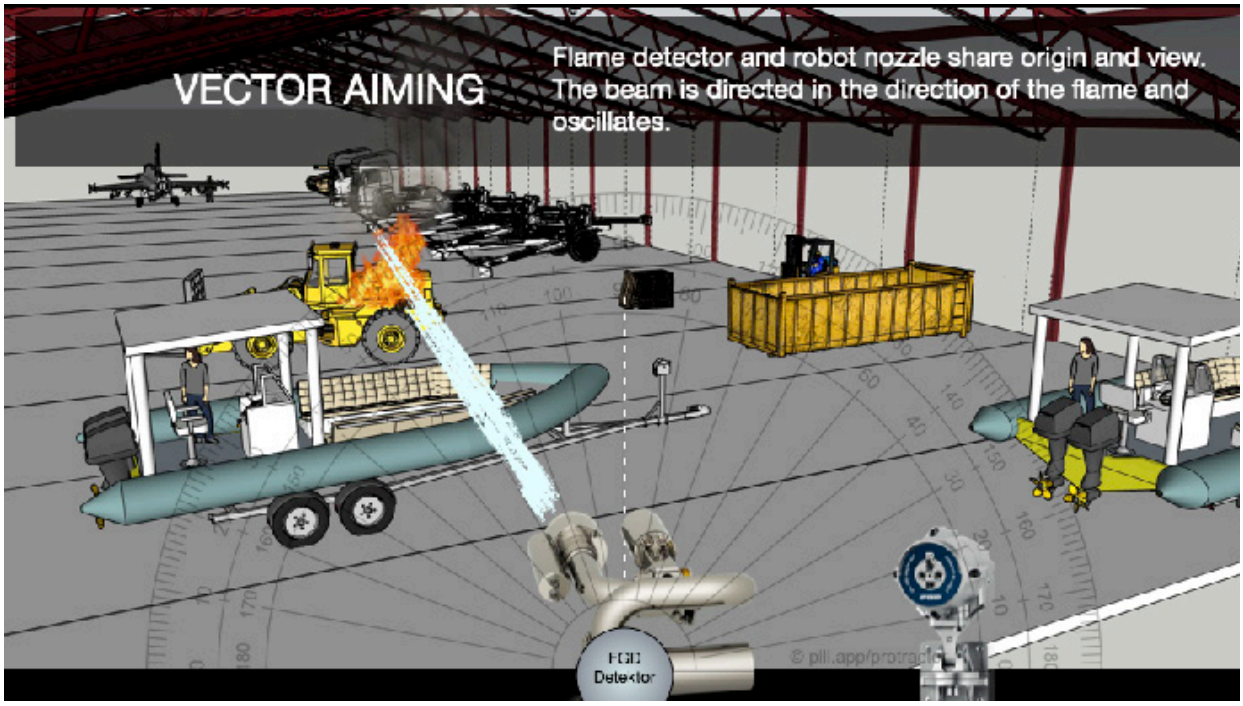
Unifire's 3D Dynamic systems use two highly specialized triple-IR (IR3) flame detectors, each of which provides the fire's x,y coordinates. The system processes the signals from the detectors and triangulates the third dimension, giving the system the exact size and position of the flame. The system tracks the fire in real-time throughout the suppression. These systems have an extremely low susceptibility to nuisance alarms, and they can detect and track up to 4 fires simultaneously and suppress them in the order in which they are detected.

When a fire is detected, the system opens the valve and intelligently guides our advanced robotic nozzles to first surround the fire with a high volume of water to contain it by wetting and cooling its surroundings, then sweeps over and around the fire until it is extinguished. The nozzle's spray pattern is also intelligently controlled, depending on how far the fire is from the robotic nozzle. The system's intelligent behavior is based on numerous real-fire tests to determine the most effective method of containing and extinguishing fires.

Briefly after fire is no longer detected, the system automatically shuts off the valve and returns to stand-by mode, and the system remains ready to reactivate should a flame reignite.

FlameRanger™

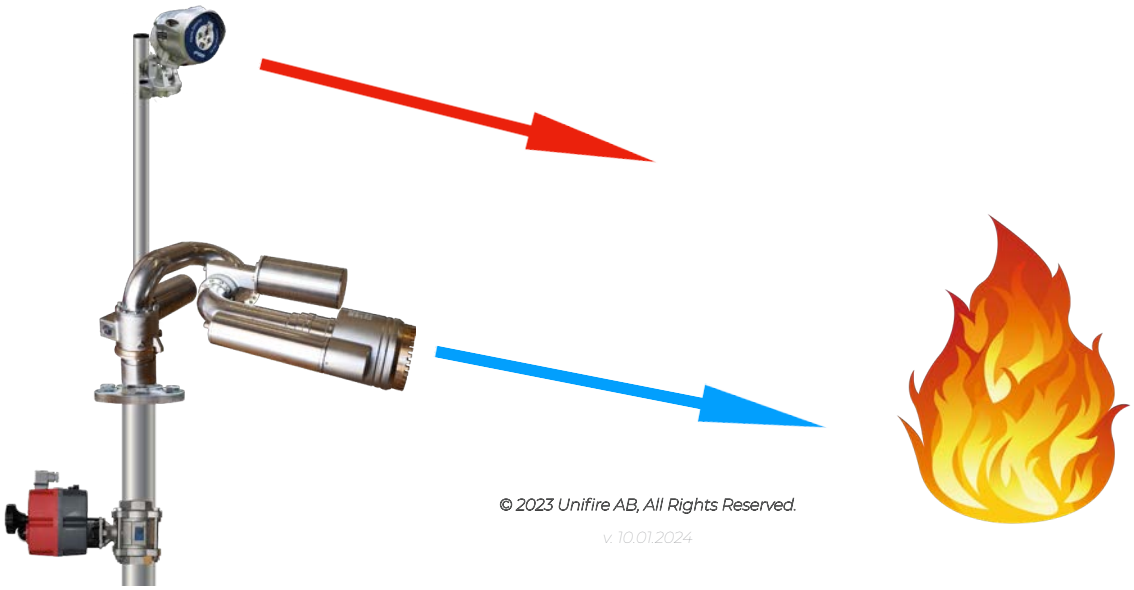
2. VECTOR Aiming Systems



Unifire's Vector aiming systems use one or more IR3-HD detector(s). These highly-specialized IR3 flame detectors have an HD camera and video analytics built in, which provide FlameRanger with the fire's location information.

One or more detectors is (are) placed directly above the robotic nozzle to have the same view of the protected area. In the event of a fire, the detector sends the vector of the fire and the robotic nozzle aims at the fire and oscillates around it to contain and suppress it.

Each detector has a viewing angle of 80° degrees, and by placing two or more detectors side-by-side, the system can have a viewing angle of 160°, 240°, 320° or 400° degrees,



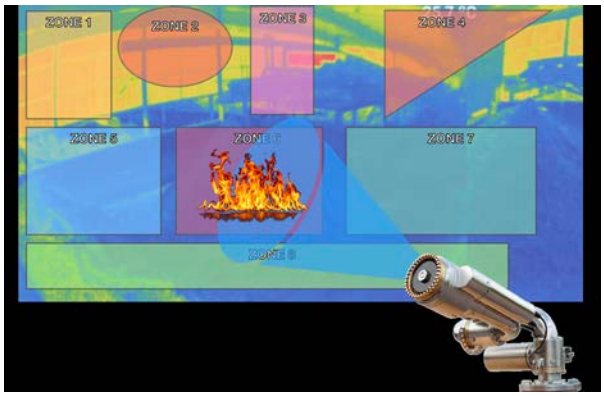
FlameRanger™

3. ZONE Aiming Systems

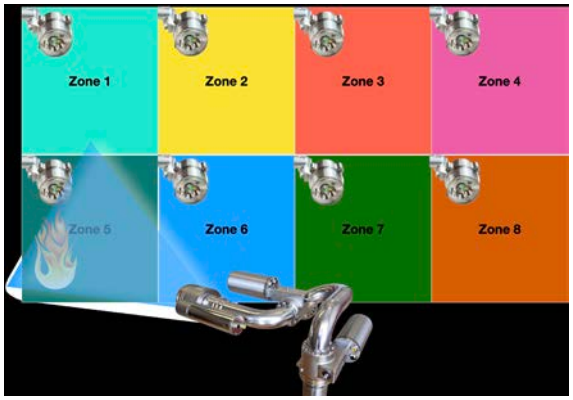
Unifire's Zone aiming systems provide inputs for up to 10 zones. The inputs can be from a thermal imaging camera system or any other type of detector.

During set up, using Unifire's intuitive Ammolite Graphical User Interface, a custom aiming response is programmed to protect each zone individually.

When an alarm is triggerd in a zone, the system opens the valve and deployes the programmed aiming response set for that zone.



Example Thermal Imaging Camera Zone System



Example IR3 flame detector Zone System

Zones can be setup in 4 possible ways:

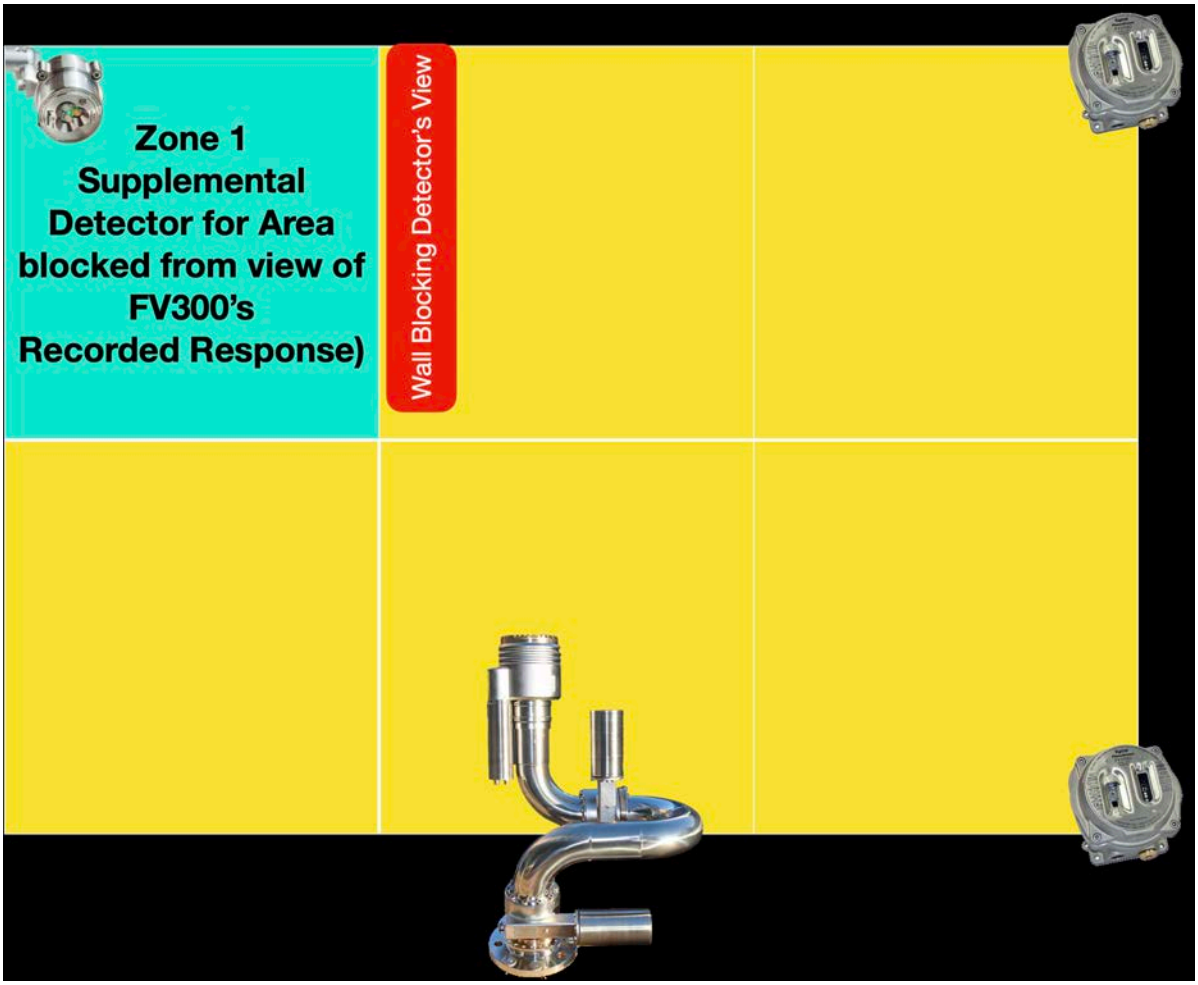
- Thermal Imaging Camera: we can use a thermal imaging camera system and set zones within its view;
- IR3-HD Flame Detector: we can use IR3-HD flame detectors with built-in video analytics to set zones; and
- Digital Inputs: any type of detector, including standard flame detectors, can provide an alarm input to one of of up to 10 digital inputs. These inputs can supplement both of the systems above. This allows the placement of additional detectors in a system to protect special objects or other areas hidden from the view of the primary detection system.
- A combination of the above and/or in combination with the 3D Dynamic systems and Vector systems describe previously.

FlameRanger™

Combined Approaches

FlameRanger is the most flexible system on the market, and when the risk demands flexibility or a combination of detection methods is desired, Unifire offes systems that combine the above detection and suppression methods.

For example, a 3D system can be supplemented with additional detectors to monitor special hazards or areas out of view of the stereoscopic IR3 detectors. This is true also of zone systems with a thermal imaging camera system.



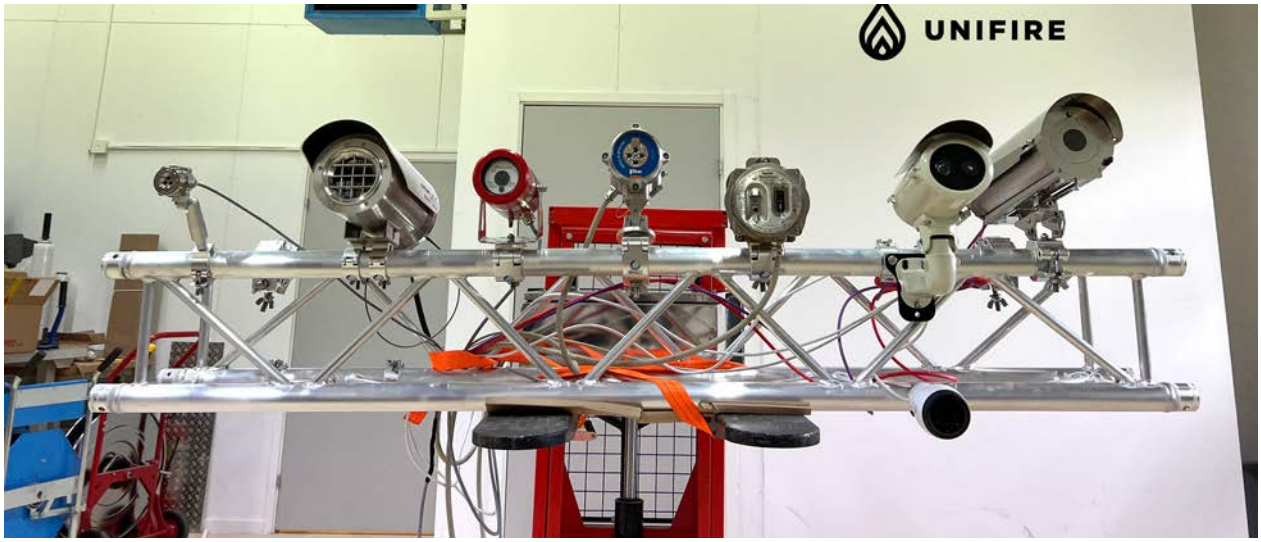
"Don't think of robots as replacements for humans -- think of them as things that will help make us better at tackling many of the problems we face."
— Eoin Treacy

FlameRanger™

Remote Control at Any Time

Unifire's FlameRanger autonomous systems can be controlled by a human operator at any time, regardless of whether the system has activated autonomously or not. So you have all of the benefits of an extremely fast-acting system operating 24/7/365 and a remote control fire monitor for use at any time. Remote control devices include CANbus joystick and/or wireless radio remote and/or our ONE App for iOS & Android devices, or by computer over a secure WAN connection from anywhere in the world.

Numerous Fire Detection Options

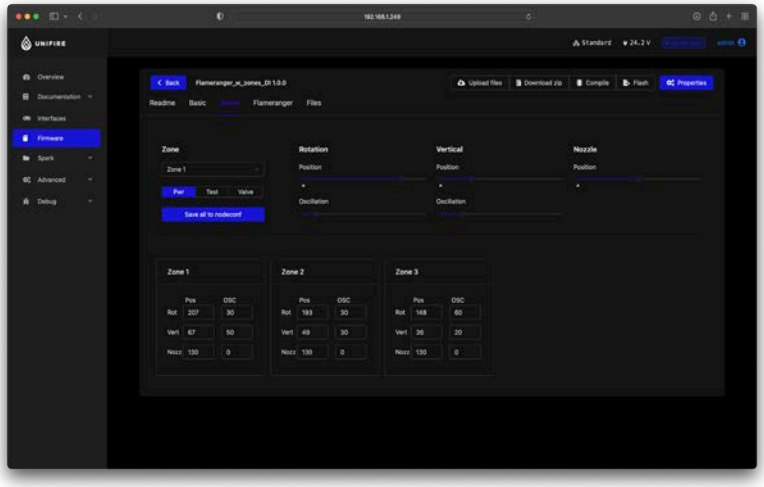


FlameRanger is unequivocally the world's most sophisticated and flexible autonomous robotic nozzle system. With systems since 2010 and protecting facilities around the clock on 5 continents, trust Unifire's FlameRanger to save lives and your facilities.

UNIFIRE

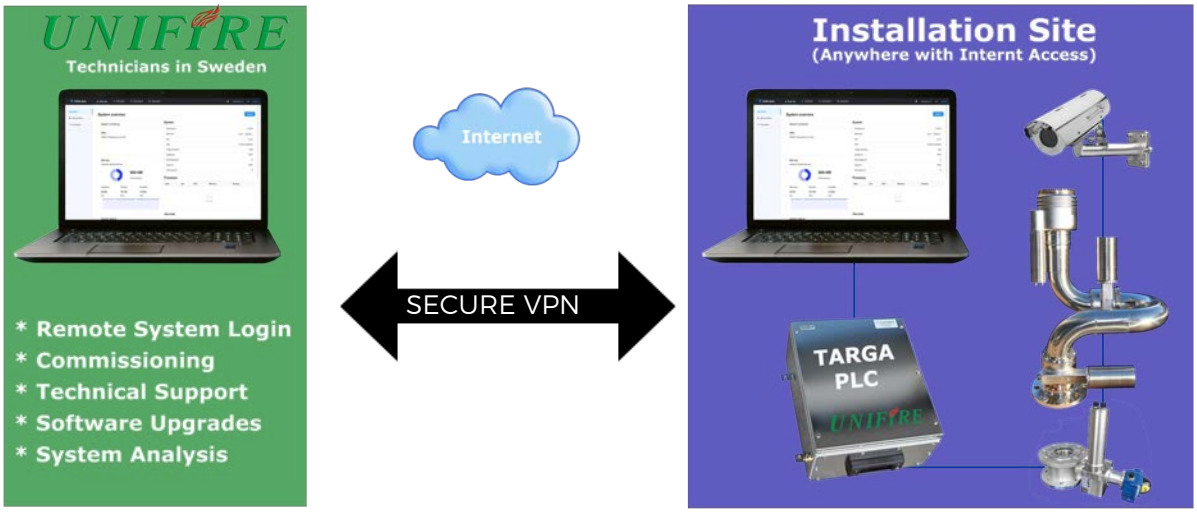
FlameRanger™

Easy Setup with Ammolite



Ammolite is Unifire's powerful and intuitive Graphical User Interface (GUI), providing easy setup and system information and configuration.

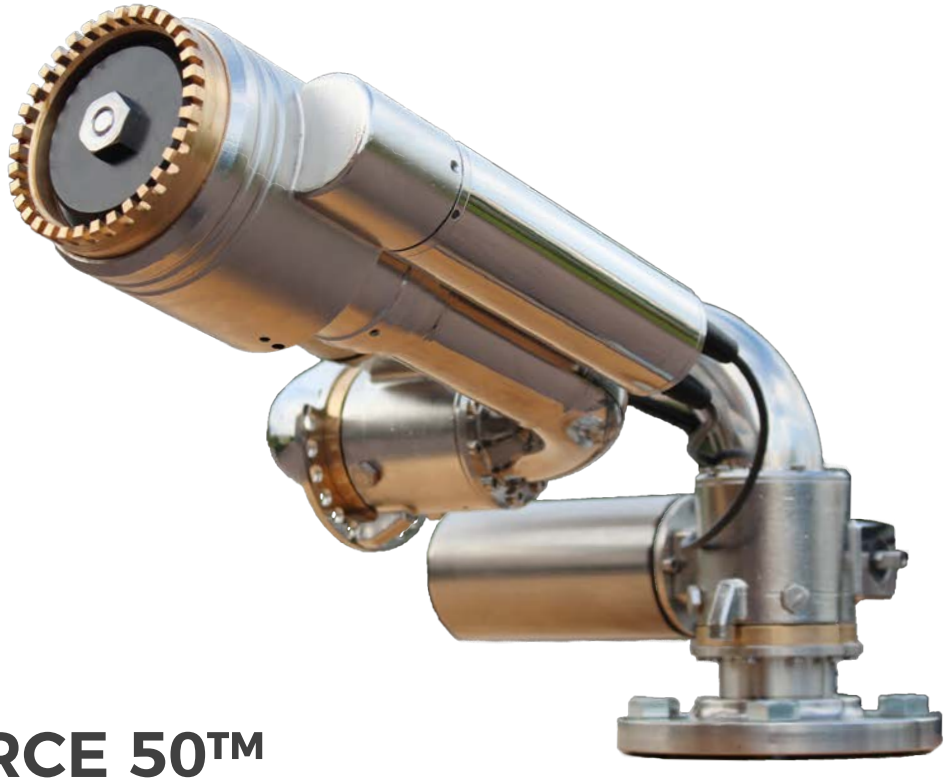
World-Wide Remote Commissioning & Technical Support



Unifire provides world-wide remote commissioning and technical support over a secure VPN connection upon your request and with your assitance. Using a secure VPN connection facilitied by you, our technicians can perform a comprehensive system status review, check and adjust settings to your needs, provide full-function technical support and even remote commissioning of our systems.

UNIFIRE

FlameRanger™
Robotic Nozzle Options:

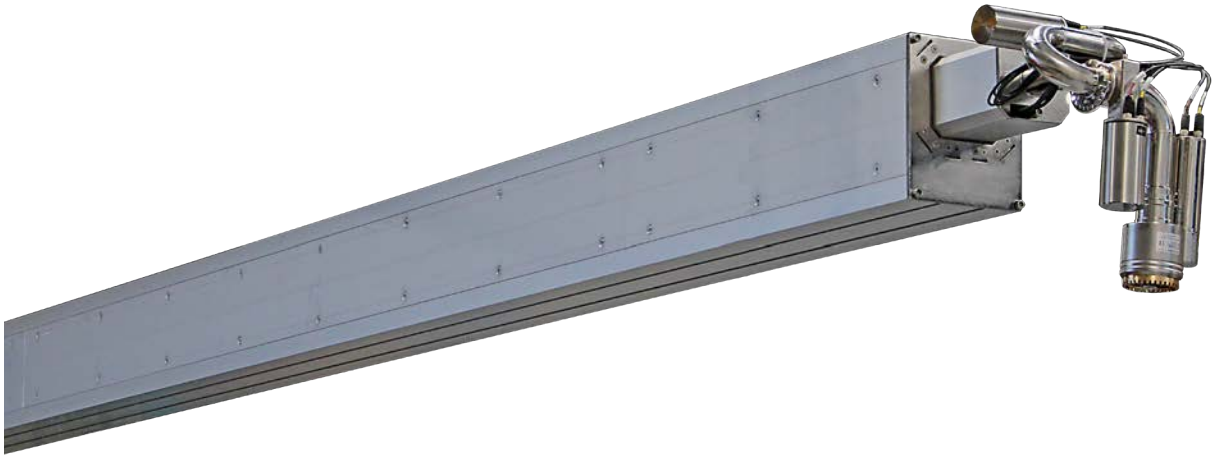


FORCE 50™

2” High Quality, Heavy Duty, Stainless Steel, Robotic Nozzle

Type:	Remote Controlled	
Material:	Stainless Steel 316L	
Range of Motion:	360° rotation / 180° vertical movement	
Base Connection:	2” Male BSP or flange (ANSI, DIN, JIS)	
Nozzle Tip Connection:	2” Male BSP	
Motor Type:	24V Brushless DC (BLDC)	
Certificates:	CE Marked / Manufactured at ISO 9001:2015 Certified Facilities	
	Metric	**Imperial**
Int. Pipe Diameter:	50 mm	2” inches
Dimensions (w/ Integ nozzle):	25 x 35 x 58 cm	9.8” x 13.8” x 22.8” inches
Weight (approx. w/ Integ nozzle):	19 kg	42 lbs
Max. Flow:	2 100 lpm	555 gpm
Max. Reach:	65 meters	71 yards
Max. Working Pressure:	12 bar	174 psi
Nominal Operating Pressure:	10 bar	145 psi

FlameRanger™
Robotic Nozzle Options:



FlameRanger XT™

Extend Your Force 50 Robotic Nozzle by 4 Meters

The F50-XT is designed to extend the Unifire Force 50 by up to 4 meters in only 6 seconds, in order to reach an ideal position for suppression. The F50 Boom can be mounted to extend the robotic nozzle vertically (up or down) or horizontally.

Ideal for exterior building façade protection (our FlameRanger XT™), where the entire unit is concealed in the building and pops out in the event of a fire, but it has many other applications as well. It is made of high strength, heavy duty extruded aluminium profile. The mechanics, transmission and motors are protected from dust (IP55). Electromechanical transmission with 400W AC Servo motor provides smooth and quiet operation. Simple, quick installation with multi-connector cables to the control cabinet.

FlameRanger™
Robotic Nozzle Options:

FORCE 80™

3” High Quality, Heavy Duty, Stainless Steel, Robotic Nozzle

Type:	Remote Controlled	
Material:	Stainless Steel 316L	
Range of Motion:	360° rotation / 180° vertical movement	
Base Connection:	3” Male BSP or flange (ANSI, DIN, JIS)	
Nozzle Tip Connection:	3” Male BSP	
Motor Type:	24V Brushless DC (BLDC)	
Certificates:	CE Marked / Manufactured at ISO 9001:2015 & ISO 14001:2015 Certified Facilities	
	Metric	**Imperial**
Int. Pipe Diameter:	80 mm	3” inches
Dimensions (with nozzle):	34 x 48 x 75 cm	13.4” x 18.9” x 29.5” inches
Weight (approx.):	30 kg	66 lbs
Max. Flow:	5 500 lpm	1 453 gpm
Max. Reach:	80 meters	87 yards
Max. Working Pressure:	12 bars	175 psi
Nominal Operating Pressure:	10 bar	145 psi

v. 10.01.2024

UNIFIRE

Advanced, Swedish Robotic Nozzle Technologies™

Bultgatan 40B | SE 442 45 Kungalv | Sweden
Unifire.com
Sales @ Unifire.com

v. 10.01.2024