FlameRanger™

The World's Most Advanced Autonomous Robotic Fire Suppression System. Period.

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THE PROBLEM

When fire strikes, seconds matter. FlameRanger™ responds in under 15.

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Autonomous Robotic Fire Suppression That Saves Lives, Assets, and the Environment

Fires grow exponentially. A small flame can escalate into an inferno in a few short minutes. Delayed response leads to:

- Loss of life and property
- Toxic environmental runoff
- Major business interruption

Traditional systems are slow—sprinklers, deluge zones, and fire brigades often take 5–20 minutes or more to respond. By then it's too late.

THE SOLUTION

FlameRanger™ changes everything

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Engineered to autonomously detect, locate, and suppress fires within seconds of ignition, FlameRanger™ protects:

- People
- Facilities
- The environment

Using high-performance detection and robotic control, it targets and suppresses fires before they spread, typically within 15 seconds.

The National Waste & Recycling Association (NWRA) estimates there are 5,000+ fires per year at recycling facilities, and the rate of catastrophic losses has risen by 41% over the last five years. Source: NWRA

HOW IT WORKS

How FlameRanger Works

1. Instant Fire Detection

FlameRanger™ **instantly detects fire within seconds** using some of the most advanced detection technologies available. Unifire integrates and can combine top-tier fire detectors—IR3, thermal imaging, video analytics, and more—for unmatched speed and reliability.

2. Precise Fire Localization

The system pinpoints the exact three-dimensional position and size of the fire. This spatial awareness ensures that suppression efforts are targeted with **pinpoint accuracy**.

3. Intelligent Nozzle Response

A high-precision robotic water/foam nozzle rapidly aims at the source, first cooling the surrounding area to prevent spread, then sweeping over the flames to extinguish the fire. Suppression typically begins **within 15 seconds of ignition**.

4. Autonomous Reset & Readiness

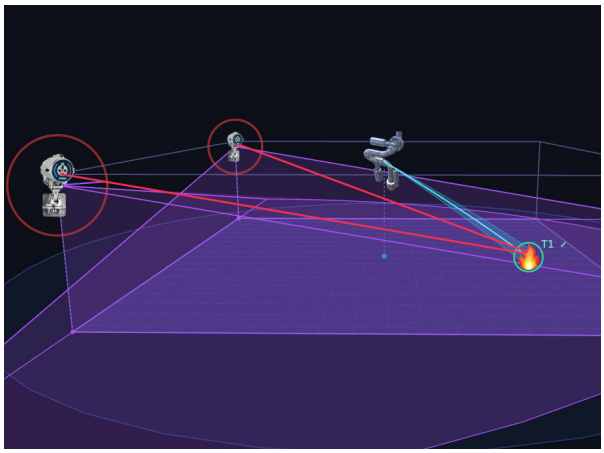
Once the fire is extinguished, the system **automatically shuts down** and remains on standby—ready to instantly respond should a new fire break out.

Key System Features

* Fully Autonomous
* Extremely rapid, reliable detection
* Minimal False Alarms
* Intelligent aiming honed by years of R&D
* Highly customizable & fully programmable
* Works with all detection technologies
* Seemless integration with other systems
* Remote control from anywhere
* Built-in web server allows for remote commissioning & tech support
* Built for the harshest environments
* Proven effectiveness around the globe
* Operates 24/7—no humans required
* No recurring fees

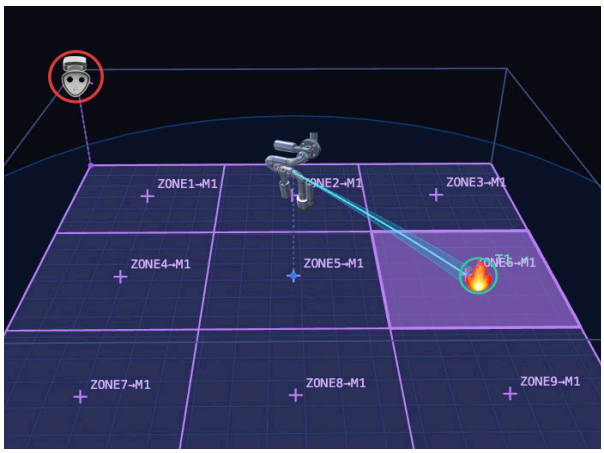
Intelligent Detection
Four Ways to Locate a Fire

1. 3D DYNAMIC DETECTION



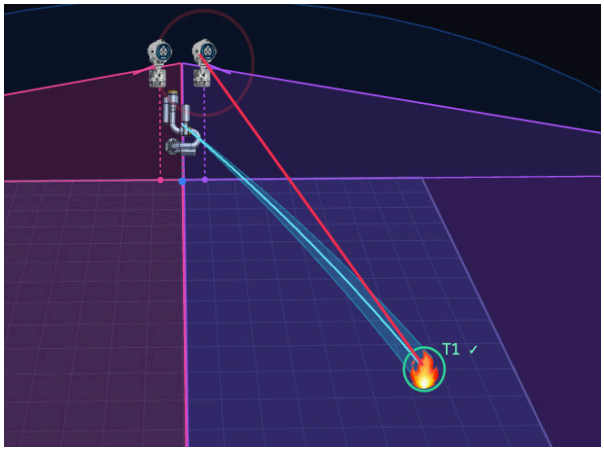
Uses stereoscopic detector pairs (IR3 flame detectors or thermal imaging cameras) to calculate the precised three-dimensional position and size of the flame. Continuously tracks the fire at 10 times per second for extremely accurate suppression.

2. ZONE DETECTION



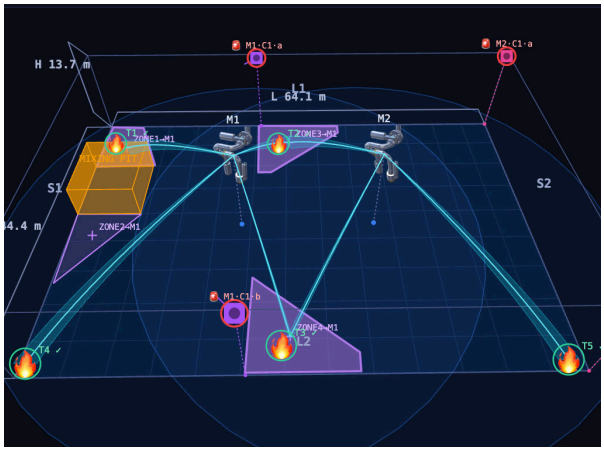
The protected area is divided into programmable suppression zones. When a detector activates an alarm in a zone, FlameRanger automatically executes the programmed suppression pattern to suppress the entire zone.

3. VECTOR DETECTION



One or more directional detectors (IR3 flame detectors or thermal imaging cameras) provides the bearing to the fire. The robotic nozzle aligns to the same vector and performs an intillegent suppression pattern that copensates for the unknown distance.

4. COMBINED DETECTION

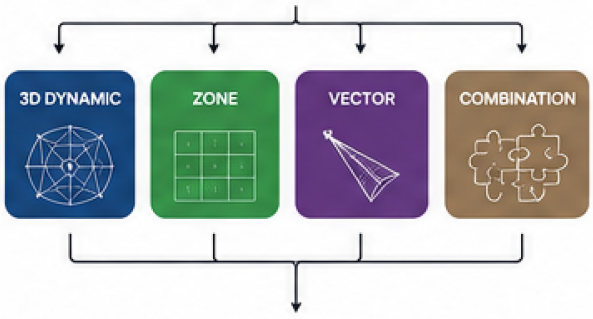


FlameRanger systems can combine each of the detection methods, providing extreme flexibility to ensure full coverage of the risk area and reduce the risk of false alarms to an absolutely minimum.

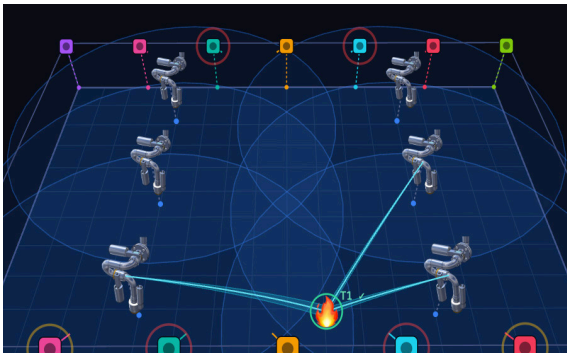
One System.
Endless Possibilities.

DETECTION LAYER

FlameRanger Analyzes & Executes Response Strategy



Networked FlameRanger Systems



MULTIPLE MONITORS, MAXIMUM EFFECTIVENESS

Multiple robotic nozzles coordinate automatically to engage the fire from the most effective positions.

BUILT-IN REDUNDANCY

Automatic backup ensures continuous protection even if a device is offline.

DISTRIBUTED INTELLIGENCE

Fire location and response decisions are shared across the network for maximum resilience.

NO SINGLE POINT OF FAILURE

A resiliant system architecture delivers reliable protection when it matters most.

FULLY PROGRAMMABLE

Priorities, water availability and response strategies are tailored to your risk, operations and infrastructure.

EASILY SCALABLE

From a single nozzle to a network across entire facilities - scalable to your needs.

WHY UNIFIRE?

Pioneering Fire Safety Through Robotics and Autonomy

Unifire has a proud history of Swedish innovation in firefighting nozzle technologies, dating back to 1969. But while our heritage runs deep, our focus today is sharper than ever: **we are dedicated almost exclusively to advancing autonomous robotic fire suppression technology**.

Unlike other smart monitor suppliers with broad product lines, Unifire—as both an originator and global leader in this space—stands virtually alone in concentrating so intently on autonomous robotic fire detection and suppression.

For more than two decades, we have focused relentlessly on our proprietary electronics, software, and robotics—driving continuous innovation and pushing the boundaries of what's possible through constant upgrades and state-of-the-art advancements. This unwavering focus has resulted in the world's most advanced autonomous robotic fire suppression system: FlameRanger™. Introduced in 2010 as the world's first commercially available solution of its kind, FlameRanger™ has been redefining fire protection across industries worldwide ever since.

By controlling every element of our technology stack—detection integration, our purpose-made electronics, intelligent software, precision-engineered robotic nozzles—**we deliver unmatched capabilities, speed, accuracy, and reliability**. Our customers trust FlameRanger™ because it is not just innovative—**it is proven, extensively tested, and has for years been protecting critical infrastructure on six continents**.

Our mission is clear: to lead the global revolution to smart, autonomous fire suppression and set a completely new standard for protecting people, property, and the environment.

PROVEN. TESTED. TRUSTED WORLDWIDE.

FlameRanger™ is not a prototype or a concept—it is a fully proven system that has already transformed fire protection at critical facilities around the globe.

Rigorously Tested By Leading Independent Authorities

FlameRanger™ has been **rigorously and independently tested** by some of the world's most respected laboratories and research institutions, including **RISE (Sweden), the U.S. Naval Research Laboratory, Jensen Hughes, Thomas Bell-Wright International Consultants, and the EU-funded LASH FIRE project**. These third-party evaluations have consistently confirmed FlameRanger's ability to rapidly detect, localize, and suppress fires with precision and reliability, even under the harshest real-world conditions.

Deployed at Scale

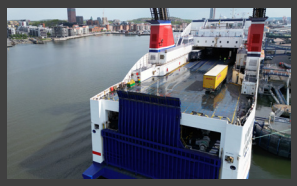
With **over 235 systems already in active service on 6 continents**, FlameRanger™ is protecting people, property, and the environment—today. Each installation demonstrates our system's ability to autonomously detect, target, and suppress fires in seconds, with minimal damage and risk. To date, we are not aware of a single system failure, underscoring FlameRanger's proven reliability in mission-critical environments.

For a comprehensive review of Unifire's Autonomous Robotic Fire Suppression System, including results of third-party testing by RISE, U.S. Naval Research Laboratory, Jensen Hughes, Thomas Bell-Wright, and the EU LASH FIRE project, see: White Paper: ARFSS Design Validation and Applications in High-Risk Environments (Sept. 2025) on Academia.edu: click here or scan the QR Code.

NUMEROUS APPLICATIONS

Waste & Recycling

Waste-toEnergy



Marine & Offshore

Warehousing

Industrial Processes

Aircraft Hangars

Defense / Military

Forestry

Buildings

... and many more

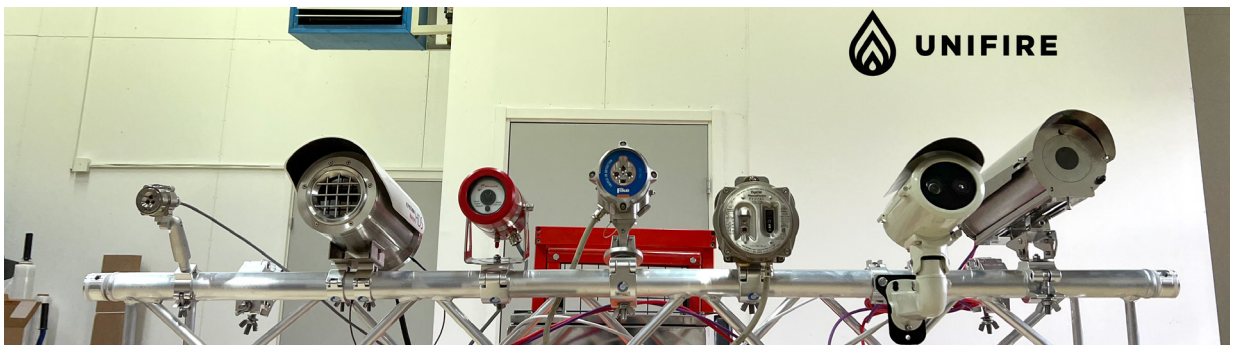
OUTPERFORMING THE REST. BY DESIGN.

Over 235 FlameRanger™ systems protecting lives & assets on 6 continents — and counting.

Just a few of the many reasons FlameRanger™ is setting the global standard in autonomous fire suppression...

Feature Comparison Chart

Feature	FlameRanger™	FireDos™	FireRover™	Sprinklers
100% Autonomous	✔	✔	✘	✘
3D triangulation with 2 x IR3 or 2 x thermal imaging cameras	✔	✘	✘	✘
Dynamic flame tracking w/2 IR3 Array flame detectors	✔	✘	✘	✘
Suppression time	<15 sec	Variable	Variable	3-20 min
Targeted, high volume stream	✔	✔	✔	✘
Compatible w/all detection technologies & combos	✔	✘	✘	✘
Monitor uses industrial robot type brushless (BLDC) motors	✔	✘	✘	✘
Auto-adjusting spray angle based on distance	✔	?	✘	✘
First to market	✔	✘	✘	*N/A*
User remote control at any time	✔	✔	✘	✘
Automatic shut off	✔	Variable	✘	✘
Stainless steel 316L robotic nozzle	✔	✘	✘	*N/A*
Requires human intervention	✘	✘	✔	✘
Recurring monthly fees after purchase	✘	?	✔	*N/A*



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