UNIFIRE

Swedish Nozzle Specialists

Since 1969

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UNFIRE FLAMERANGER -
Advanced, Fully Automatic
Fire Detection & Extinguishing Systems
Utilizing Robotic Nozzles

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Today’s Presentation

I. What is the problem? And is this the solution?

II. Applications other than preventing exterior high rise facade fires

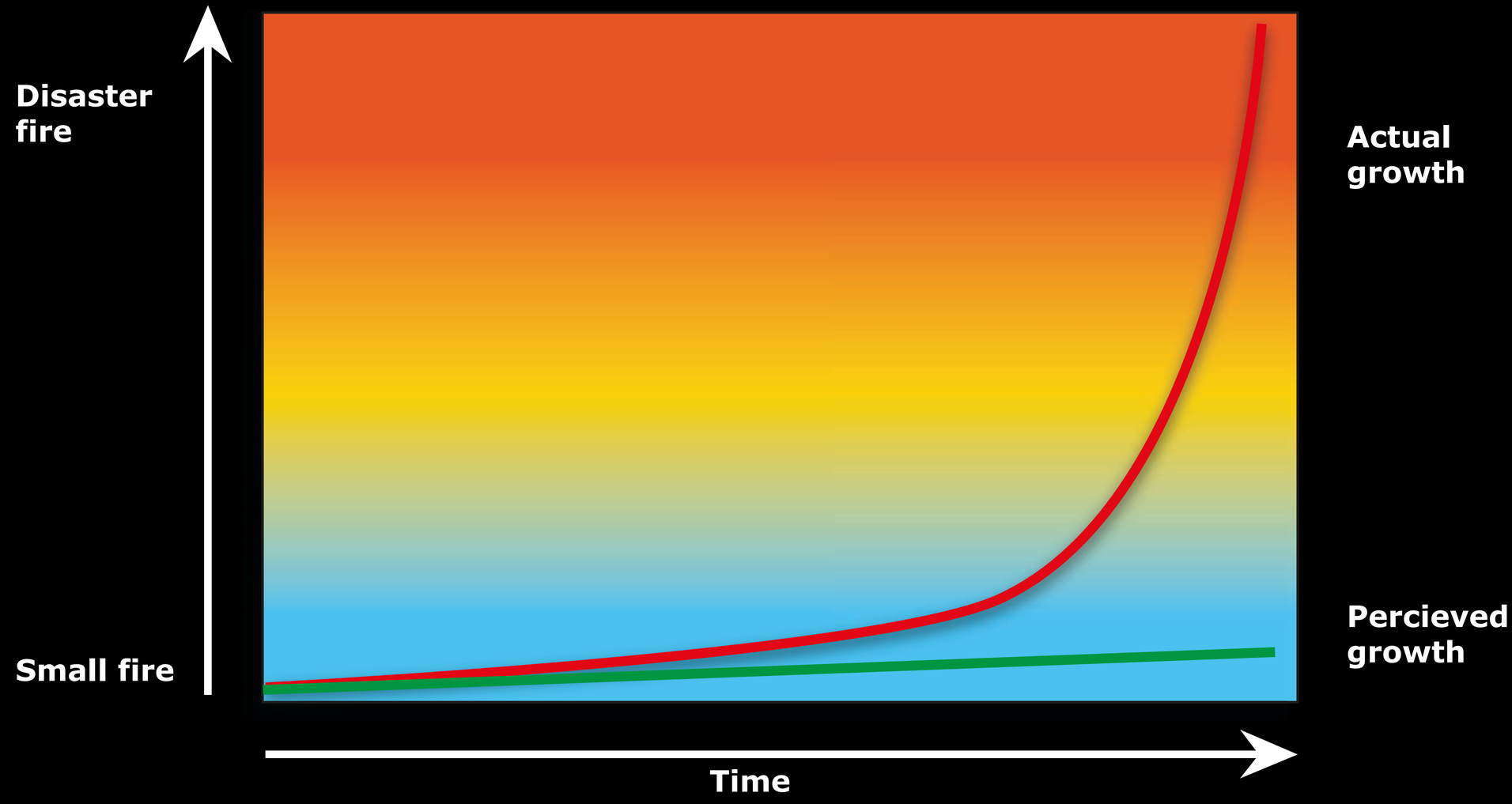
III. 3-min video presenting the FLAMERANGER XT

IV. Testing by U.S. Naval Research Lab & Jensen Hughes

V. System components. Technical overview.

VI. Conclusions

FIRE grows exponentially.



Time to detection + Time to extinguish

Bradford, England 1985 - 56 persons died

Fire starts

30 seconds

60 seconds

90 seconds

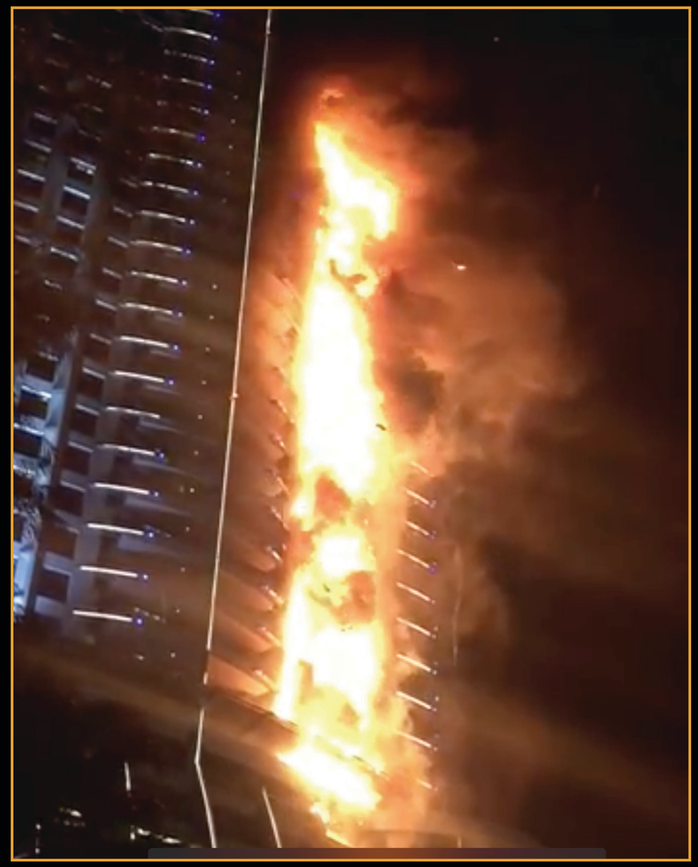
120 seconds

Fast detection + Fast extinguishing = Disaster prevented

The ADDRESS HOTEL, Dubai. Evening of Dec 31 2015

Just a few hours earlier

video start: 4 Floors on fire



80 sec : 20 Floors on fire

II. Applications

Marine Fire Protection:
Large Volume Spaces,
Helidecks, etc. on
Naval Vessels & Ships

Oil & Gas Facilities:
Targeted, high-volume foam
suppression in seconds

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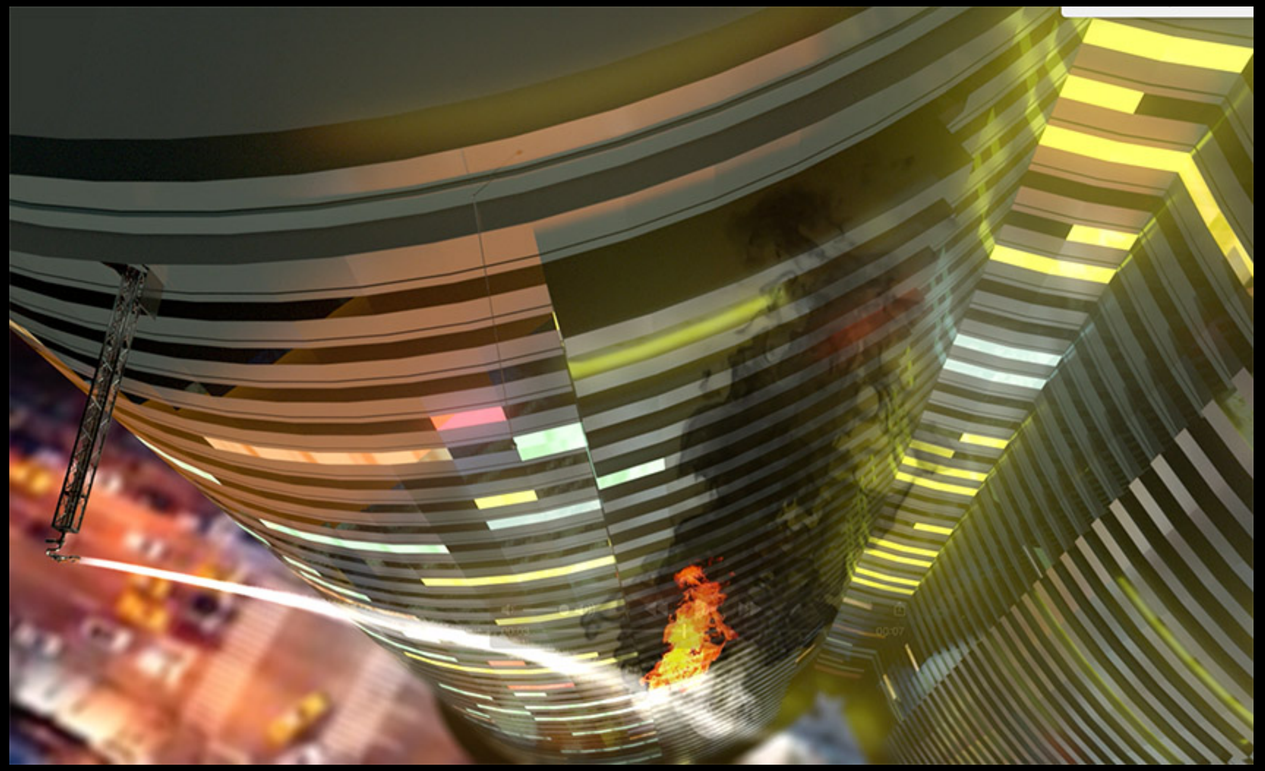

High-Rise Building Exteriors
FlameRanger XT specifically developed for this.

Tunnel Fire Protection
Fully Networked, monitors & controlled from control room and site of fire.

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Factories, Warehouses & Storage Facilities
and other large indoor & underground spaces

Aircraft Hangars
and other high-value objects

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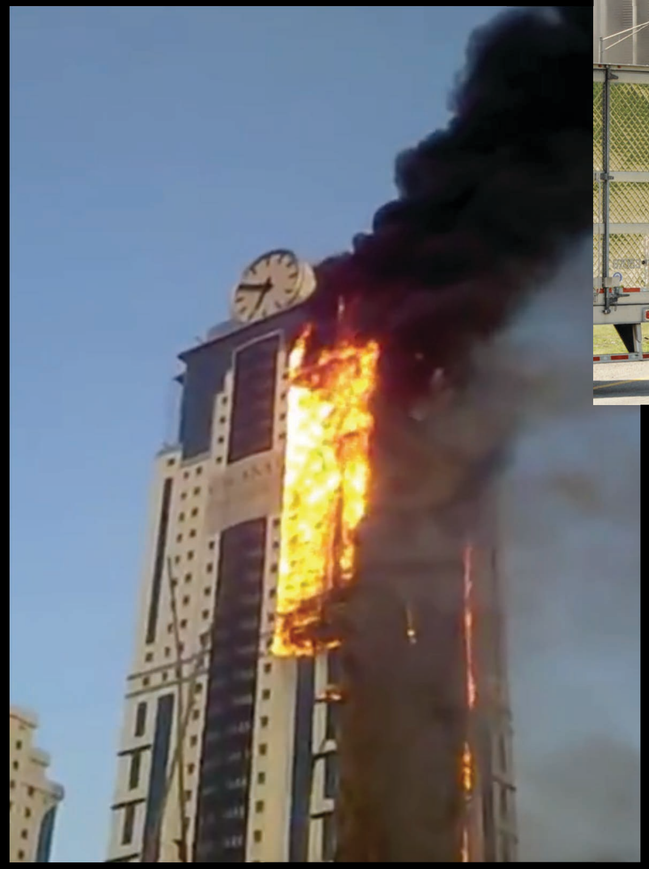
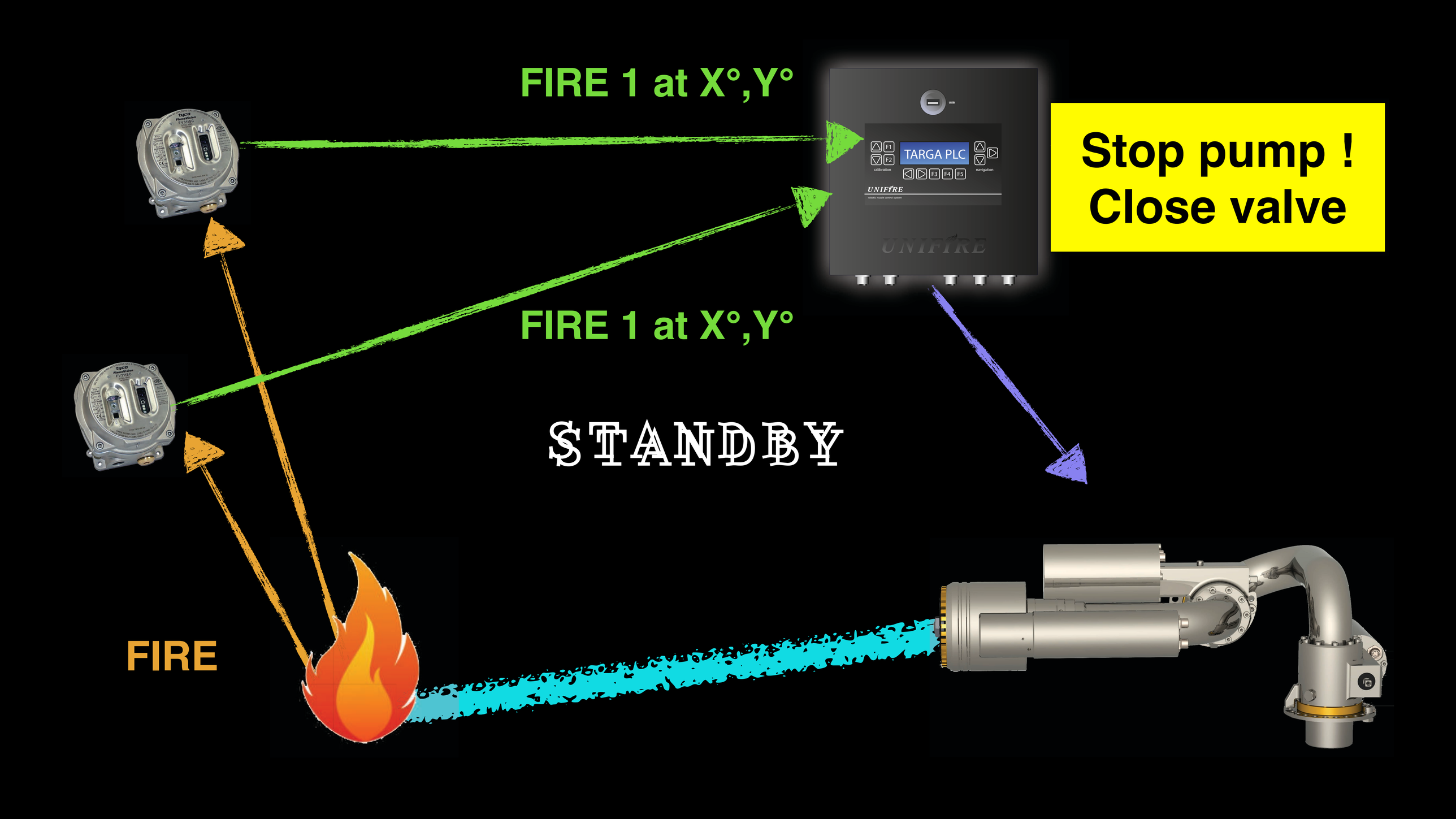


Fast detection + **Fast** extinguishing = Disaster **prevented**

2 x FV300 IR Array detectors
1 x Robotic Nozzle

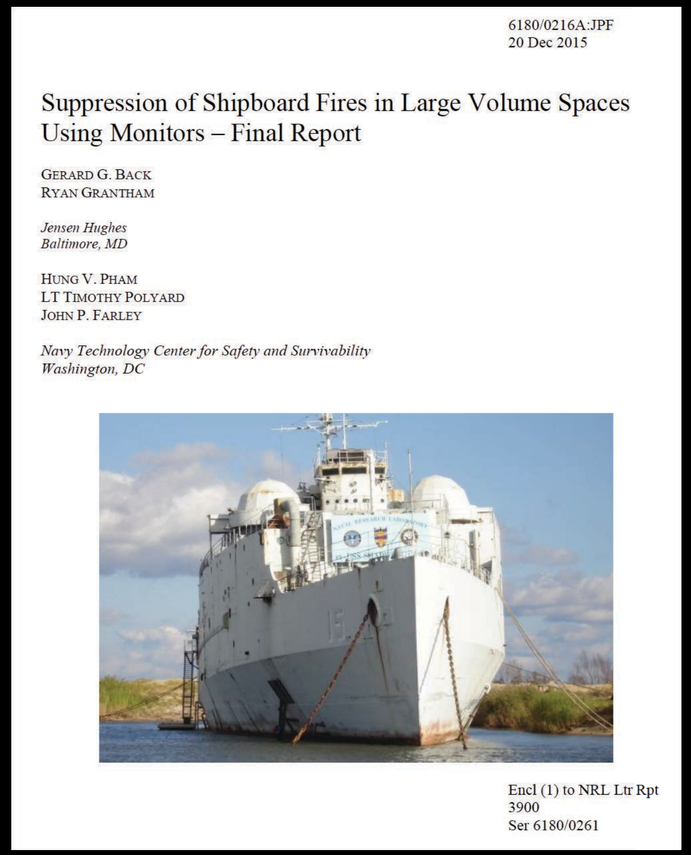

FIRE 1 at X°,Y°
TARGA PLC
UNIFIRE
Stop pump !
Close valve
FIRE 1 at X°,Y°
STANDBY
FIRE

FLAMERANGER

- Fully automatic fire detection and fire extinguishing system
- Active response within seconds
- High flow for forceful, effective intervention
- Pin point aiming accuracy = very high water density
- Follows flames dynamically
- Auto shut-off when flame is out ensures minimal use of water with minimal water damage

…. acting just as a fire fighter would.

The FLAMERANGER system was tested by US Navy
NAVAL RESEARCH LABORATORY September 2015 with spectacular results



6180/0216A:JPF
20 Dec 2015

Suppression of Shipboard Fires in Large Volume Spaces Using Monitors – Final Report

GERARD G. BACK
RYAN GRANTHAM

Jensen Hughes
Baltimore, MD

HUNG V. PHAM
LT TIMOTHY POLYARD
JOHN P. FARLEY

Navy Technology Center for Safety and Survivability
Washington, DC

Encl (1) to NRL Ltr Rpt 3900
Ser 6180/0261

Suppression of Shipboard Fires in Large Volume Spaces
Using Monitors – Final Report

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Fully automatic operation

With 3 minutes pre-burn time - then automatic

The FLAMERAN

NAVAL RESEAR

th spectacular results

6180/0216A:JPF
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46 PAGE DOCUMENT
+ videos on request

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US NAVY TEST RESULTS:

Fully Automatic Mode

7.3.2.3 Test FS-9: Large Fire Prevention (Automatic Activation and Targeting)

“**The system detected the fire so quickly, that the firefighting party igniting the heptane pan fires below the stacks of pallets, had to run out of the hangar after ignition. The system applied water to the fuel package within 5 seconds of ignition. The applied water prevented the pallets from igniting** but the heptane pans located below the stacks continued to burn until all of the fuel (heptane) in the pan had been consumed. The continued burning of the pans was expected since the monitor was discharging water during this test. If the monitor had been discharging AFFF, the heptane pans would have been immediately extinguished.”

US NAVY TEST RESULTS:

3 Min. Pre-Burn, Then Fully Automatic

“7.3.2.4 Test FS10: Large Fire Suppression (Delayed Automatic Activation and Targeting)

“The system **detected and aimed the monitor at the fire within five seconds of ignition** but the water supply was not activated until three minutes later. Within seconds of water application, the fire was quickly suppressed with the residual burning located low, on the backside of the two stacks. **By 15 seconds into the discharge, there was no visible flaming inside of the stack of pallets** but the heptane pan fires located below the pallets continued to burn for almost a minute. FS-10 was actually the first test conducted in the test series and the amount of heptane used in the pans to ignite the pallets was reduced after this test.

US NAVY TEST RESULTS:

Multiple Small Fires, 1 Min Pre-Burn, then Fully Automatic

“7.3.3 Multiple Small Fires

“… a test was conducted at the end of the test series to assess the systems’ [sic] capabilities against multiple fires. Three wood cribs were used during this test. …The cribs were ignited (using small pans of heptane) and allowed to burn for one minute prior to activating the monitor system.

“According to the manufacturer, the detection system records the location of the three fires and attacked the fires in the order in which they were detected. The system initially applied water to the fire located in Grid Sector 2. **Within a few seconds of water application, the fire was completely extinguished**. The system then applied water to the fire located in Grid Sector 7. **Within a few seconds of water application, the fire at this location was also completely extinguished**. The system then applied water to the remaining fire located in Grid Sector 5. **Within a few seconds of water application, the fire at this location was also completely extinguished**.

US NAVY TEST RESULTS:

Table 3 – Large Fire Suppression Test Results

Test #	Description	Activation Time	Control min:sec	Extinguishment min:sec	Total Water (gal)
FS-7	Large Fire Suppression (Manual Control)	3:00 pre-burn	0:10	0:20	<100
FS-8	Large Fire Suppression (Pre-programmed Targeting)	3:00 pre-burn	0:15	0:30	125
FS-9	Large Fire Prevention (Automatic Activation and Targeting)	0:10 act.	instant	instant	<25
FS-10	Large Fire Suppression (Delayed Automatic Activation and Targeting)	3:00 pre-burn	0:10	0:15 wood 1:00 pans	~65 wood 250 pans

FLAMERANGER

System components

TYCO FV300 IR Array Flame detectors

UNIFIRE FORCE Robotic Nozzle

UNIFIRE TARGA Robotic Nozzle PLC

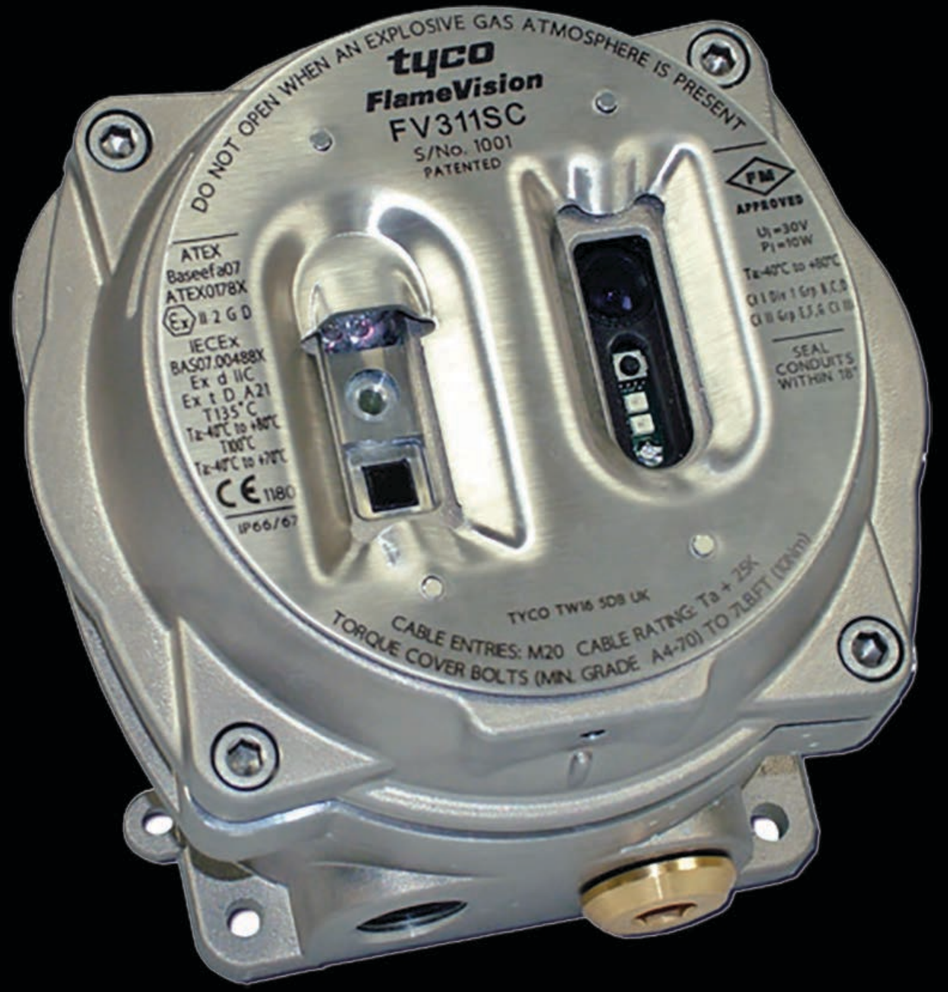
FLAMERANGER Software

Web server and Human User Interface

FLAMERANGER

System components

TYCO FV300 IR Array Flame detectors



FLAMERANGER

System components

2 x FV300

TYCO FV300 IR Array Flame detectors

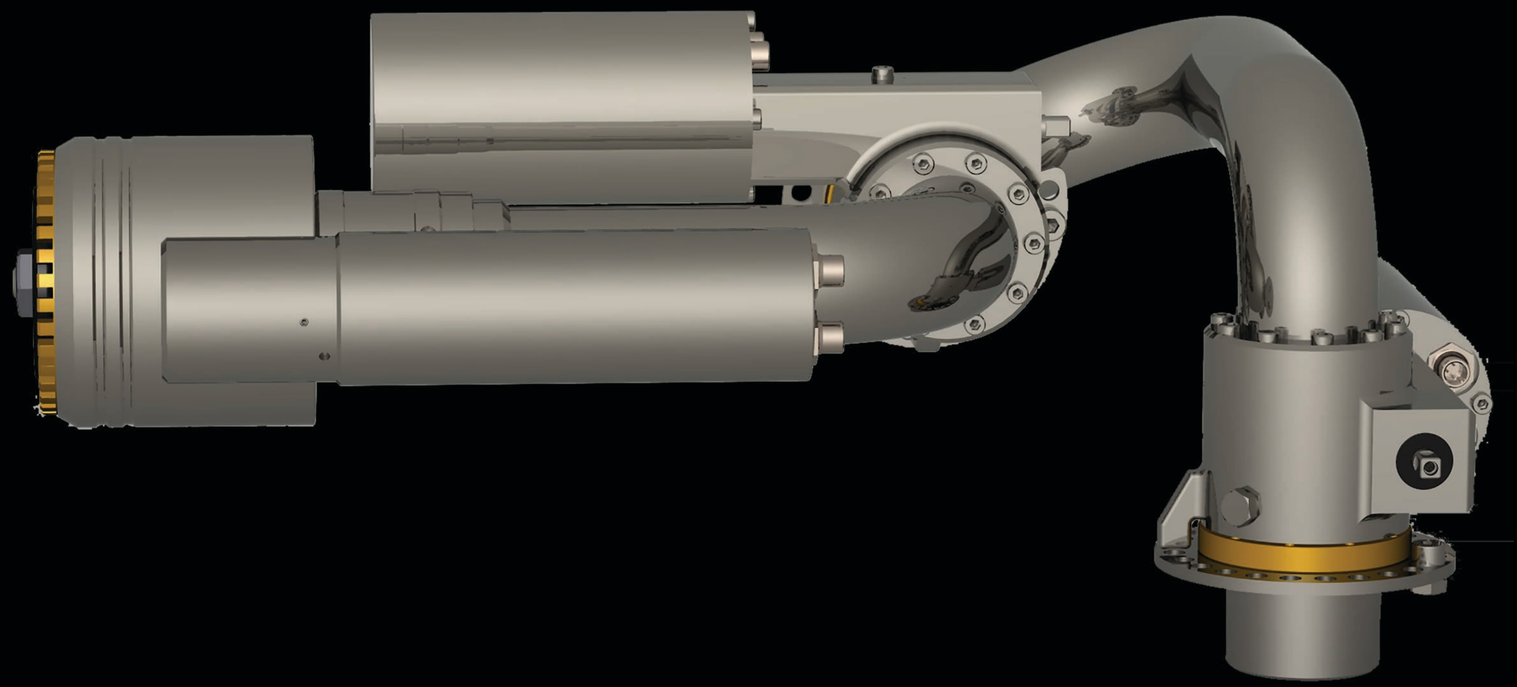
- Extremely quick flame detection
- With high resolution
- Provides the X-Y angle and size of up to 4 flames
- Immune to false alarms
- Detects a 0.1m²-heptane pan fire from over 50 meters
- 90° horizontal and 80° vertical field of view
- SS316 stainless steel housing
- MODBUS communication protocol

FLAMERANGER

System components

2 x FV300

UNIFIRE FORCE Robotic Nozzle



FLAMERANGER

System components

2 x FV300

FORCE 50

UNIFIRE FORCE Robotic Nozzle

- BLDC industrial-robot-type motors (up to 10.000 hours)
- Position accuracy better than 0.1°
- Full 360° horizontal, and +/- 90° vertical range
- Unique, ultra effective INTEG jet/spray nozzle
- 316L Stainless Steel and bronze design
- Minimum maintenance
- Flow: 500 - 5000 lit/min
- Reach: up to 50-85 meters

FLAMERANGER

System components

2 x FV300

FORCE 50

UNIFIRE FORCE Robotic Nozzle

FORCE 50 robotic nozzle performance

FLAMERANGER

System components

2 x FV300

FORCE 50

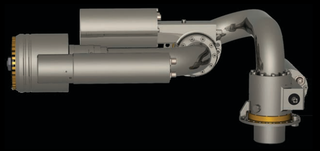
TARGA Robotic Nozzle PLC

FLAMERANGER

System components

2 x FV300

FORCE 50



TARGA PLC

TARGA Robotic Nozzle PLC

- Takes in fire alarm data from 2 x FV300 detectors
- Power and control up to 6 x BLDC motors
- Connect gauges, sensors, generic joysticks, etc.
- Connect external valves and end-position switches
- 2x CANbus, Modbus, RS485, I2C and SPI buses

Modbus to communicate with detectors
I2C to communicate with Web-server

FLAMERANGER

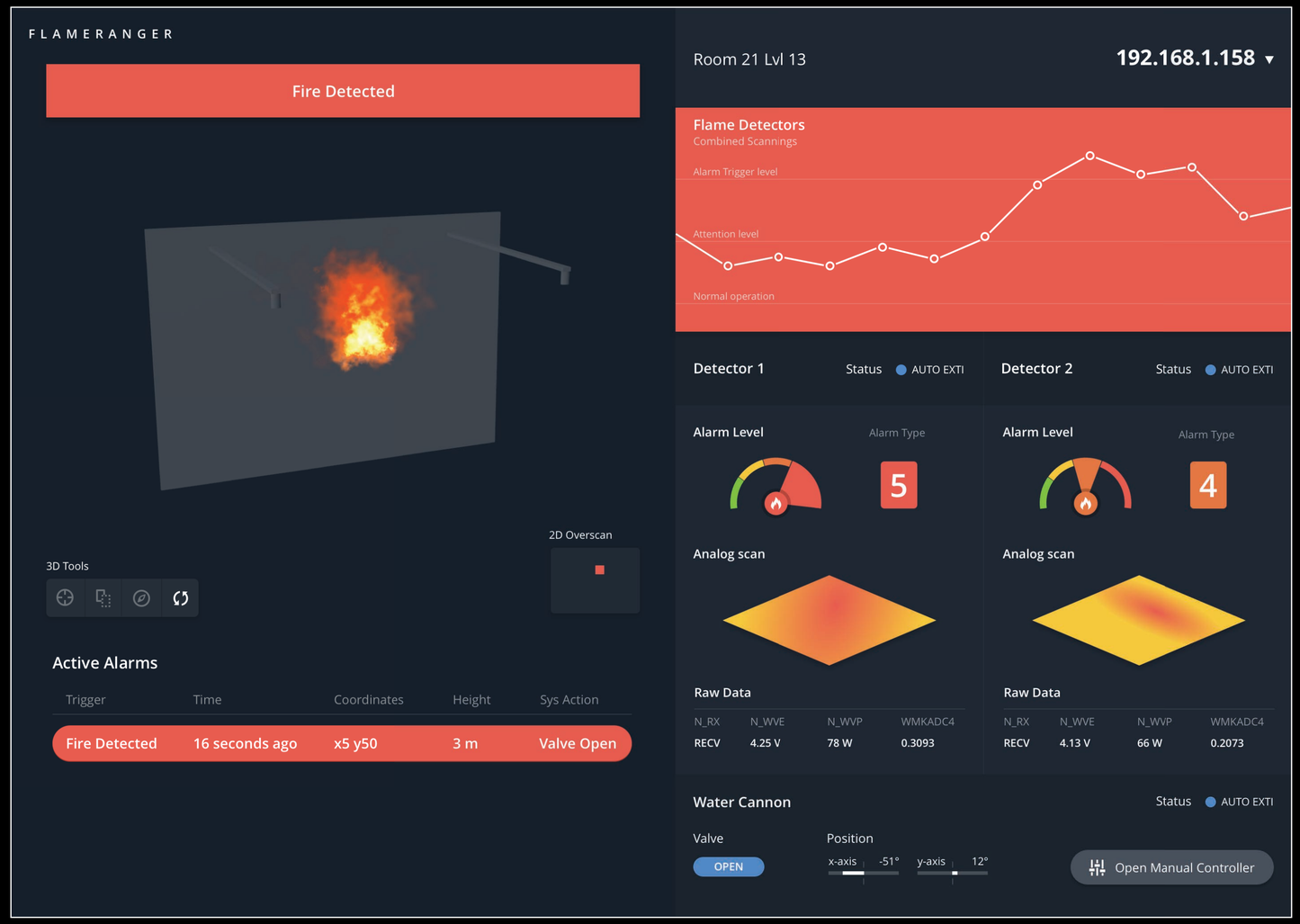
System components

2 x FV300

FORCE 50

TARGA PLC

FLAMERANGER Software



FLAMERANGER

System components

2 x FV300

FORCE 50

TARGA PLC

FLAMERANGER

FLAMERANGER Software

- Processes fire alarm and position data from up to 4 x FV300 detectors
- Determines size and position in 3D for up to 4 flames at once
- Aims the Robotic Nozzle to the flames
- Opens valves or start pump
- Oscillates the stream, and adjusts nozzle spray and elevation
- Follows flames dynamically if fire spreads
- Turns off the valves & returns to stand-by when flames are out
- Each Flameranger operates fully autonomously

FLAMERANGER

System components

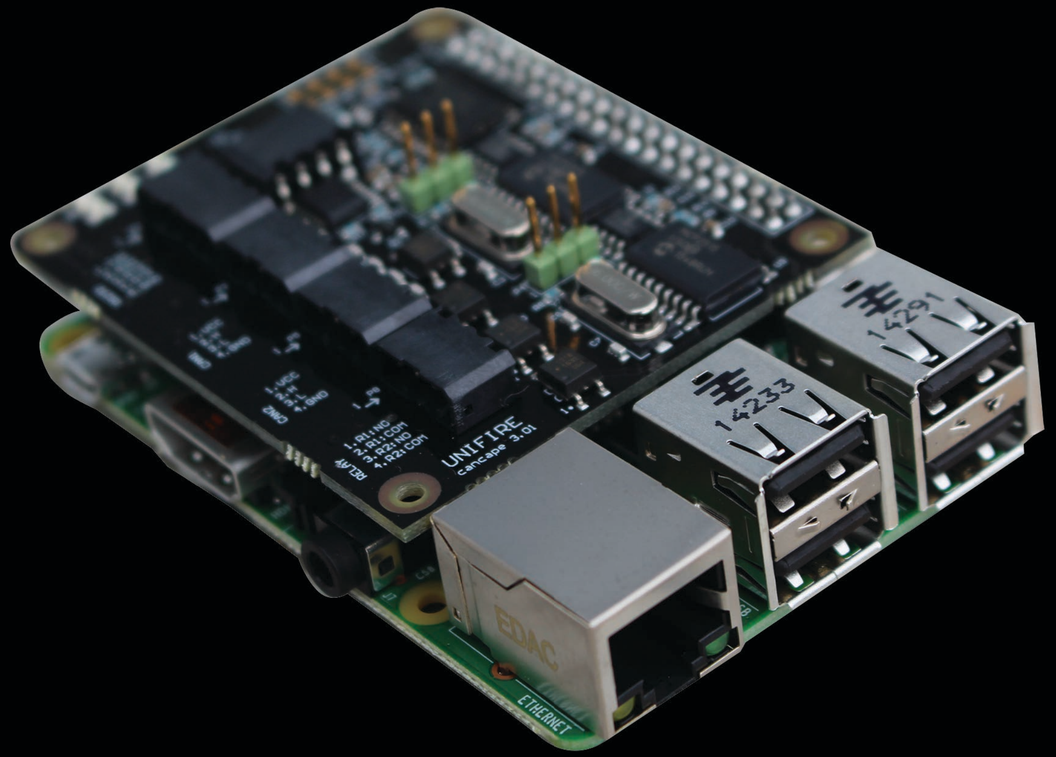
2 x FV300

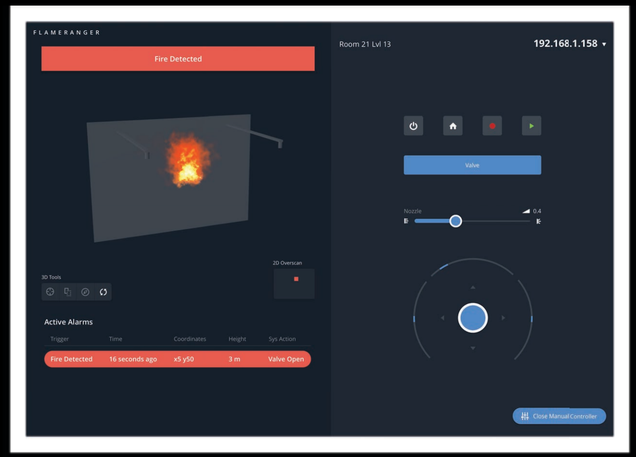
FORCE 50

TARGA PLC

FLAMERANGER

Web server & Human User Interface (HUI)



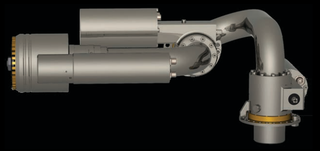


FLAMERANGER

System components

2 x FV300

FORCE 50



TARGA PLC

FLAMERANGER

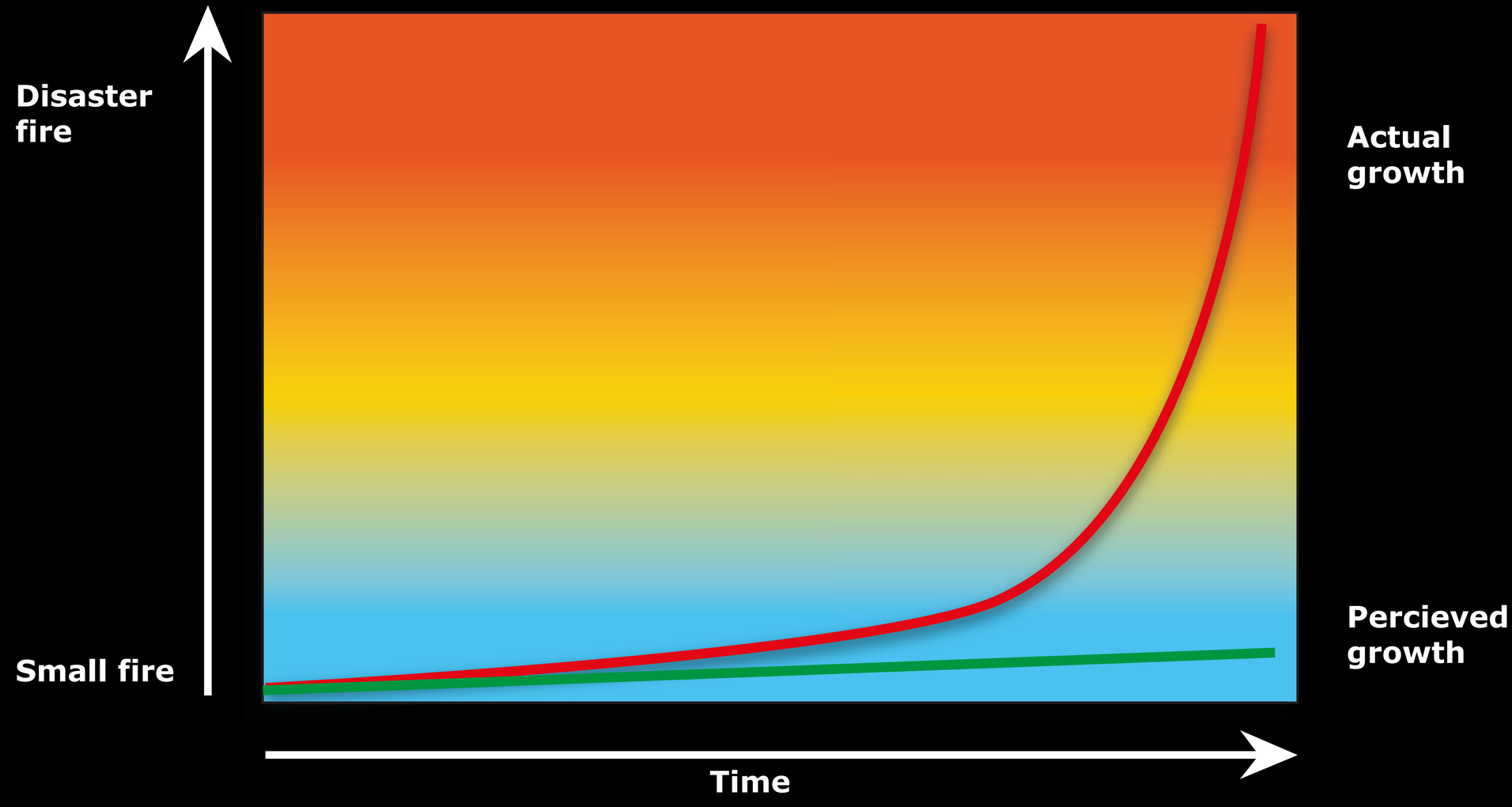
Web server

Web server & Human User Interface (HUI)

- Embedded LINUX PC provides TCP/IP connection
- Supports infinitely large networks
- Supports automation over TCP/IP network
- Allows Control from any device with a web-browser
- Allows to see total system overview
- Connect to each individual TARGA PLC to see status
- Allows upgrade of the TARGA and FLAMERANGER software remotely
- Thereby support anlimited number of ”control stations”

24/7/365 System monitoring and remote control from Command center and/or Smartphone

FIRE grows exponentially.



Time to detection + Time to extinguishing

Unifire.com

AutomaticFireFighting.com

Thank you for your attention!

Questions ?