

# See the tree. Save the forest.

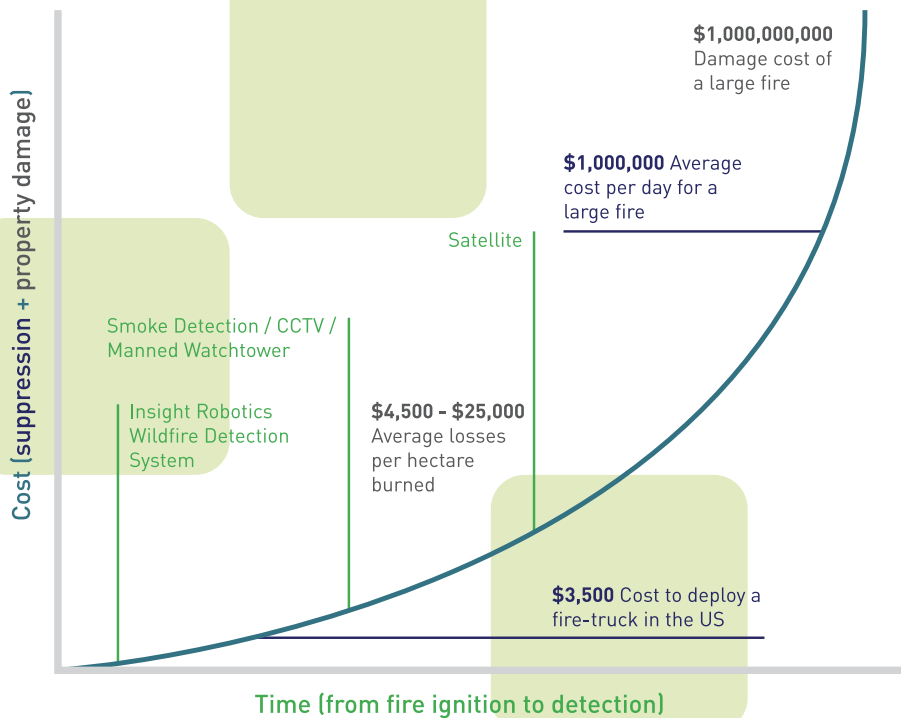
## Insight Robotics Wildfire Detection System

The world's leading solution for  
24/7 automated wildfire detection



# Protecting Land Through Early Wildfire Detection

## The Value of Early Detection



Every minute a wildfire is allowed to burn, the damage it does and the cost to suppress it goes up exponentially. Early detection is therefore the key to stopping fires before they burn out of control. Our innovations have led to a thermal technology-based system that is the industry leader in delivering on the savings that come from reliably catching fires while they are still small - before they do serious damage.



## The Insight Robotics Wildfire Detection System offers best-in-class:

- ✓ **Fire location accuracy** - pinpoint the location of a fire as small as a single 2m<sup>2</sup> tree within a 5km radius and detect relatively larger fires at greater distances
- ✓ **Detection time** - spot small fires within minutes of ignition
- ✓ **Coverage** - each unit can detect fires up to 8km away, scanning a coverage area of 20,000 hectares for all fires within line of sight
- ✓ **Reliability** - 100% track record of detecting small fires within line of sight, day and night, even in low visibilities (smoke, fog, haze, etc.)
- ✓ **Convenience** - fully-automated, 24/7 monitoring with real-time fire alerts
- ✓ **Cost effectiveness** - protect an area for as little as \$1.8 dollars per hectare per year



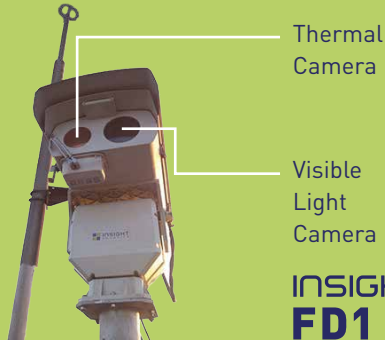
In its deployments throughout the world, our system has enabled first responders to execute effective fire fighting strategies in minutes instead of hours, helping save trees, property and lives.



# The Insight Robotics Wildfire Detection System

The Insight Robotics system is comprised of a network of InsightFD1 wildfire detection robots linked to a central control room. Each robot provides 360° scanning and is equipped with thermal imaging and visible light cameras. These cameras communicate to Insight Globe, our geospatial intelligence system (GIS), which displays the data on a 3D model of the Earth.

## Wildfire Detection Robot



## User Interface



Our proprietary wildfire detection algorithm dynamically adjusts the thermal sensor's threshold to minimise false alarms and increase accuracy. Armed with geographic information and smart algorithms, our robots are able to make sophisticated detection decisions, in low visibilities and without human assistance.

## How It Works

### 01/IDENTIFY

Wildfire detection robots identify a fire using thermal sensors



### 02/ANALYSE

Visual and thermal images of the affected area are displayed on Insight Globe, our GIS software platform



### 03/ALERT

Forestry authorities are alerted so they can take immediate action to suppress the fire





# See the tree. Save the forest.



## Saving the world, **bit by bit**, grid by grid.

Insight Robotics safeguards natural resources and infrastructure around the world with intelligent early-warning threat detection. We help our customers visualise data across large land areas easily and intuitively so they can assess risks and respond quickly before large-scale disaster strikes. Our innovations include the world's first single-tree automated wildfire detection system, a cost-effective aerial survey solution for precise mapping and pinpointing of risk areas and a fully-integrated real-time software GIS for precise and powerful insights.



**Insight Robotics was awarded IBM Global Entrepreneur of the Year and Best for the Environment by B Corp in 2015.**



# The Insight Robotics Wildfire Detection System

## Technical Specifications

### Insight Globe software

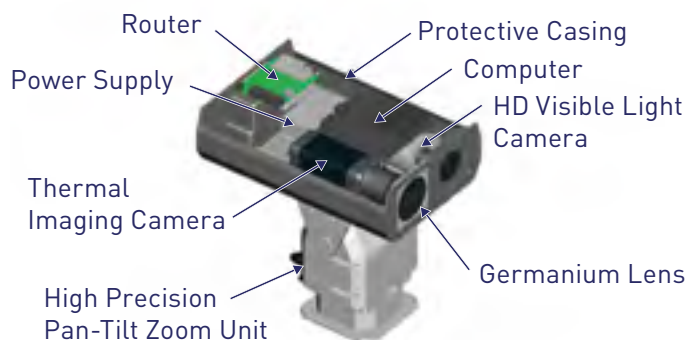






 = Area covered by an InsightFD1 wildfire detection robot network

### InsightFD1 wildfire detection robot



The Insight Robotics Wildfire Detection System is the world's most powerful and reliable automated wildfire detection solution. Comprised of a network of wildfire detection robots, visible light and thermal sensors, and Insight Globe, our geospatial intelligence system (GIS) software, the solution was made for those looking to protect high-risk, high-value land from the destructive effects of wildfire. The system offers the fastest detection times, the most accurate location data and real-time images and video feeds of a fire in progress - all at a cost-effective price allowing for wide deployment.

## System Features

<b>Automatic fire detection scanning</b>	The InsightFD1 wildfire detection robot automatically scans the coverage area and detects emerging wildfires up to 8km away, covering a 20,000 hectare area and detecting all fires within line of sight.
<b>Detection in low visibilities</b>	The system is able to operate effectively in low visibilities (smoke, smog, haze, etc.) and at night.
<b>Automatic warning</b>	Upon detecting a fire, an automatic alert signal and audio warning is sent to the control center with the fire's location and images within minutes of ignition.
<b>Remote real-time monitoring</b>	The InsightFD1 provides real-time remote monitoring. In the event of a fire, the control room can engage the InsightFD1 to monitor the fire and effectively coordinate a response.
<b>Multi-spectrum imaging</b>	The InsightFD1 relays both visible light and thermal images back to the control room. Operators are also able to pull real time video feeds from the visible light camera.
<b>3D fire location map</b>	The InsightFD1 displays fire alert data on a topographically accurate 3D map on Insight Globe. The system can pinpoint the location of fires as small as 2m <sup>2</sup> within a 5km radius and detect larger fires at greater distances.
<b>Coverage and blindspot simulation</b>	Insight Globe is capable of simulating the coverage and blindspots of any InsightFD1 network, ensuring optimal system deployment and coverage.
<b>Panoramic viewing</b>	The Panoramic view on Insight Globe allows an operator to easily determine the full extent of an InsightFD1's line of sight and adjust its settings accordingly for optimal performance.
<b>Hot object masking</b>	Insight Globe allows the 'masking' of hot objects within its line of sight that are not fire risks in order to eliminate false alarms.
<b>Weather station</b>	The InsightFD1 can be equipped with a weather station capable of measuring microclimate data.
<b>Historical data and image storage</b>	Insight Globe logs historical information on fire events in its system for later review, allowing the control room to identify fire patterns and at-risk areas.

## Installation Prerequisites

<b>Supporting pole</b>	Each InsightFD1 must be mounted on a pole or existing watchtower elevated above the tree line at the installation site and capable of supporting up to 300kg. Insight Robotics will run a simulation based on your required coverage area to determine optimal pole height and location.
<b>Power</b>	Voltage: DC 24V (an AC to DC power adaptor will be included for 100~240 VAC power source) Wattage: 100W (normal operation); 160W (maximum) A 1000KVA UPS is recommended but not necessary
<b>Data Connectivity</b>	Standard IP connection with minimum 5Mb/sec stable bandwidth per robot Latency <80ms, one fixed IP address Wired LAN (preferred), WiFi Point to Point or 4G

## System Specifications

<b>Pan Tilt Platform</b>	Horizontal movement: 0 to 360 degrees Vertical movement: -40 to 40 degrees Axis speed: 4 degrees/sec Axis accuracy: $\pm 0.1$ degrees
<b>Thermal Imaging Optics</b>	Field of view: 7.3 degrees (H) x 5.4 degrees (V) Sensor resolution: 384 x 288
<b>Visible Light Optics</b>	Visible IP camera: 25x optical zoom Sensor resolution: 1920 x 1080
<b>Electrical Specifications</b>	Power: 100W Dual input voltage: DC 24V AC 100~240V (adaptor included)
<b>Environmental Specifications</b>	Temperature range: -15° to 50° C Waterproof grade: IP65
<b>Communication Interface</b>	Based on customer infrastructure: Wi-Fi b/g/n/ac, Gigabit Ethernet
<b>Physical Specifications</b>	Weight: 50kg (excluding supporting pole) Dimensions: 60 (H) x 40 (W) x 80 (D) cm



**INSIGHT  
FD1**

Wildfire detection  
robot

## Thermal Camera Specifications

<b>Sensor type</b>	Uncooled Micro Bolometer
<b>Resolution</b>	384 x 288
<b>Field of view</b>	7.3 degrees (H) x 5.4 degrees (V)
<b>Thermal sensitivity</b>	<80mk @F/1,60hz, 300K
<b>Aperture</b>	F1.0
<b>Image frame rate</b>	50hz (PAL)/60hz (NTSC)
<b>Digital zoom</b>	2X, 4X
<b>Probe temperature range</b>	-20°C ~120°C / -20°C ~650°C
<b>Output video format</b>	NTSC / PAL
<b>Detection accuracy</b>	$\pm 2^\circ\text{C}$ or 2% at 30°C of ambient temperature
<b>Communication</b>	10/100 Mbps Ethernet
<b>Operating voltage</b>	DC 12V
<b>Detection distance</b>	8km (75mm lens)

## Visible Light Camera Specifications

<b>Sensor type</b>	1/2.8" Progressive Scan CMOS
<b>Resolution</b>	1920 x 1080
<b>Shutter</b>	1 sec ~ 1/100,000 sec
<b>Auto iris</b>	DC drive
<b>Day and night mode</b>	ICR filter (Auto/Schedule/Alarm Trigger)
<b>Video compression standard</b>	H.264/MJPEG/MPEG4
<b>H.264 Codec Profile</b>	Baseline Profile/Main Profile/High Profile
<b>Compression output rate</b>	32Kbps ~ 16Mbps
<b>Optical zoom</b>	25x
<b>Storage function</b>	Support SD/SDHC/SDXC, NAS
<b>Supported protocol</b>	TCP/IP, ICMP, HTTP, HTTPS, DHCP, DNS, DDNS, RTP, RTSP, RTCP, PPPoE, NTP, UPnP, SMTP, SNMP, IGMP, 802.11X, QoS, IPv6
<b>Communication interface</b>	1xRJ45, 1xRS485, 1xRS232
<b>Operating voltage</b>	DC 12V