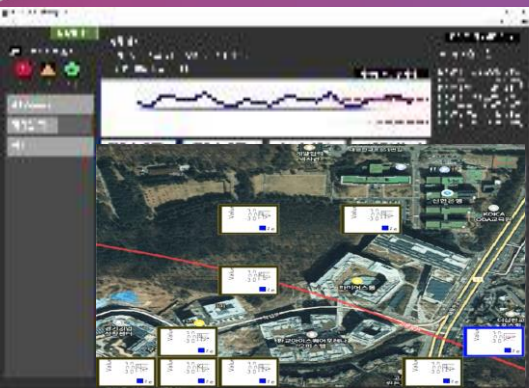


# Detection & Alarm Solutions for Collapse, Intrusion & Fire Sign



## DO IT TOGETHER

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# 0. About EMTAKE

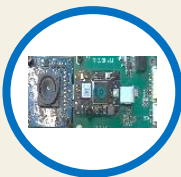
Since March 2018,

## Core Technologies

- Semiconductor Photo Sensors & Modules
- Photo Signal Synthesis, Processing & Analysis
- AI & Machine Learning Analysis
- SDK<sup>1)</sup> based Monitoring Systems

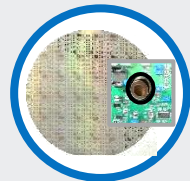
## Photo Sensors

On sale



**Thermal IR<sup>2)</sup> Sensor Modules**

Under development

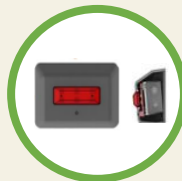


**4) UV<sup>3)</sup> Photo Sensor**  
- Bacteria Detection

## Human Care / Safety Systems

On sale

**1. Building / Ground Collapse Sign Detecting System**



**2. Hazardous Area Intrusion Detecting System**



**3. Fire Signal Detecting Thermal Camera System**



1) SDK : Software Development Kit, 2) IR : Infrared, 3) UV : Ultra Violet

## Sites under Consideration



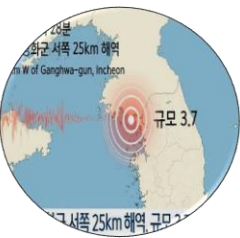
Building construction or Demolition site,  
Old houses, Tunnel construction, Mine, Historic site



Inside Culvert,  
underground structure



Roadside with steep slope, Landslide,  
Falling Rocks, Old Embankment & Bridge



Earthquake causing  
Ground Collapse

## Conventional Equipment



Inclination  
Measurement



Displacement  
Measurement

### Restrictions

- Several days to analyze & report
- Retarded evacuation operation after recognizing collapse signal
- Expensive equipment with limited operations

## A simple Solution provided by “EMTAKE”

- **Low-cost smart sensor** : Easily attaches to hazardous blocks with collapse possibility
- **Notifying early signs of collapse at site** : Control centers with real-time alarm to save human lives.

[Sensor (BD30)]  
“KC<sup>1)</sup>” certified

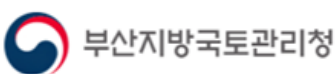


1) KC : Korea Certification

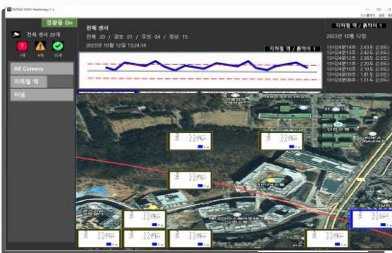


References

• Product 1) : Stand-alone sensor for on-site alarm only

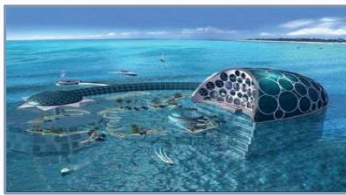
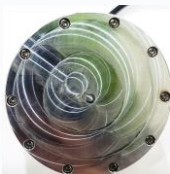


• Product 2) : + Movement Data Storage / Analysis & Remote Monitoring System



Special Development

• Collapse signs and movement detection systems for underwater structures (Made-to-Order)



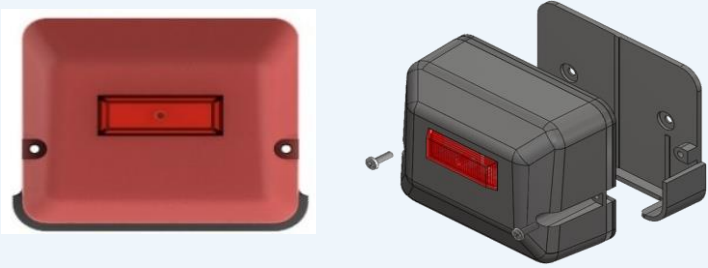
## Displacement & Movement Sensor & System *Collapse & landslide sign detection*

- **Early warning** with real-time detection and on-site alarm
- **High accurate** measurement system
- **Inexpensive devices**, Easy to install & operation
- Real-time movement data storage and remote monitoring
- **Total Wireless : Solar Power, Wireless Communication Network**

### Specification

|                   |  |
|-------------------|--|
| LED               | High Brightness RED LED                          |
| Detect Resolution | Rotation Angle : < 0.01 °                        |
| Button / Port     | Power (Reset), Alarm, Data, Power input          |
| Operating Temp.   | -30 °C ~ 80 °C                                   |
| Monitoring Range  | < 100 m / Red LED On/Off flashing                |
| Monitoring System | Movement data save & Network ( <i>optional</i> ) |

### • Product 1) Stand-alone Sensor



### • Product 2) Network Monitoring System



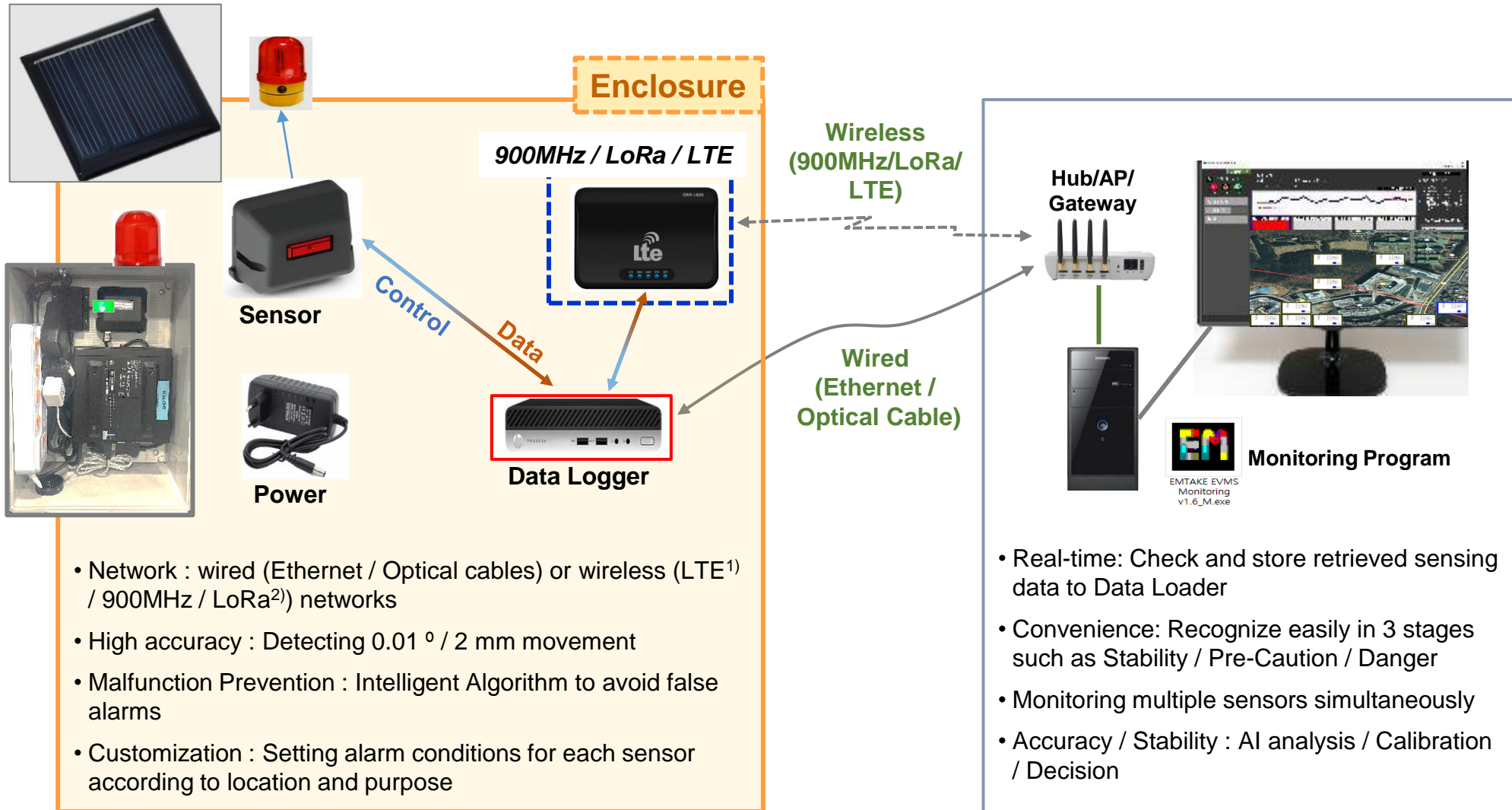
**Applications :** Building, Bridge, Construction site, Steep slope, Earthquake area, Guard post (Military) and etc.



# 1. Collapse Sign Detecting System (4/5)

## Network Monitoring System

Sensor + Data Logger + Remote Network (Wired or Wireless) + Monitoring Program + Solar Cell



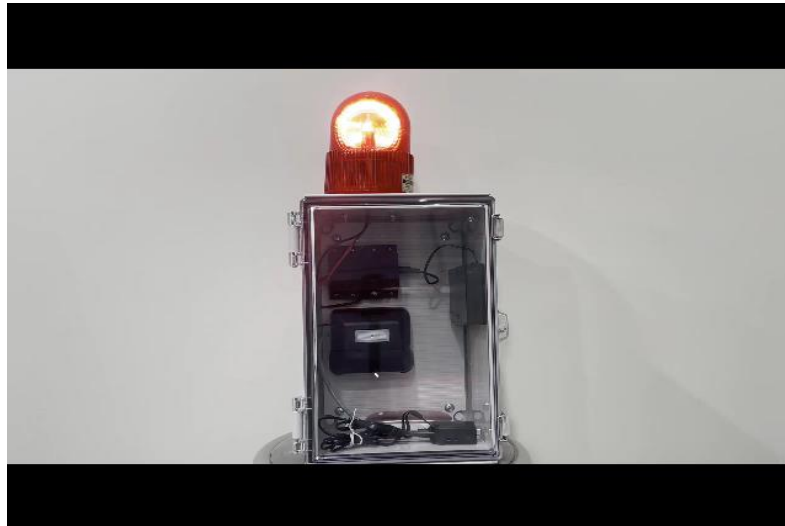
1) LTE : Long Term Evolution, 2) LoRa : Long Range



Stand-alone Sensor



Monitoring System



Collapse Sign Detecting System



[Various hazardous & restricted Sites with fatal Dangers]



[Issues]

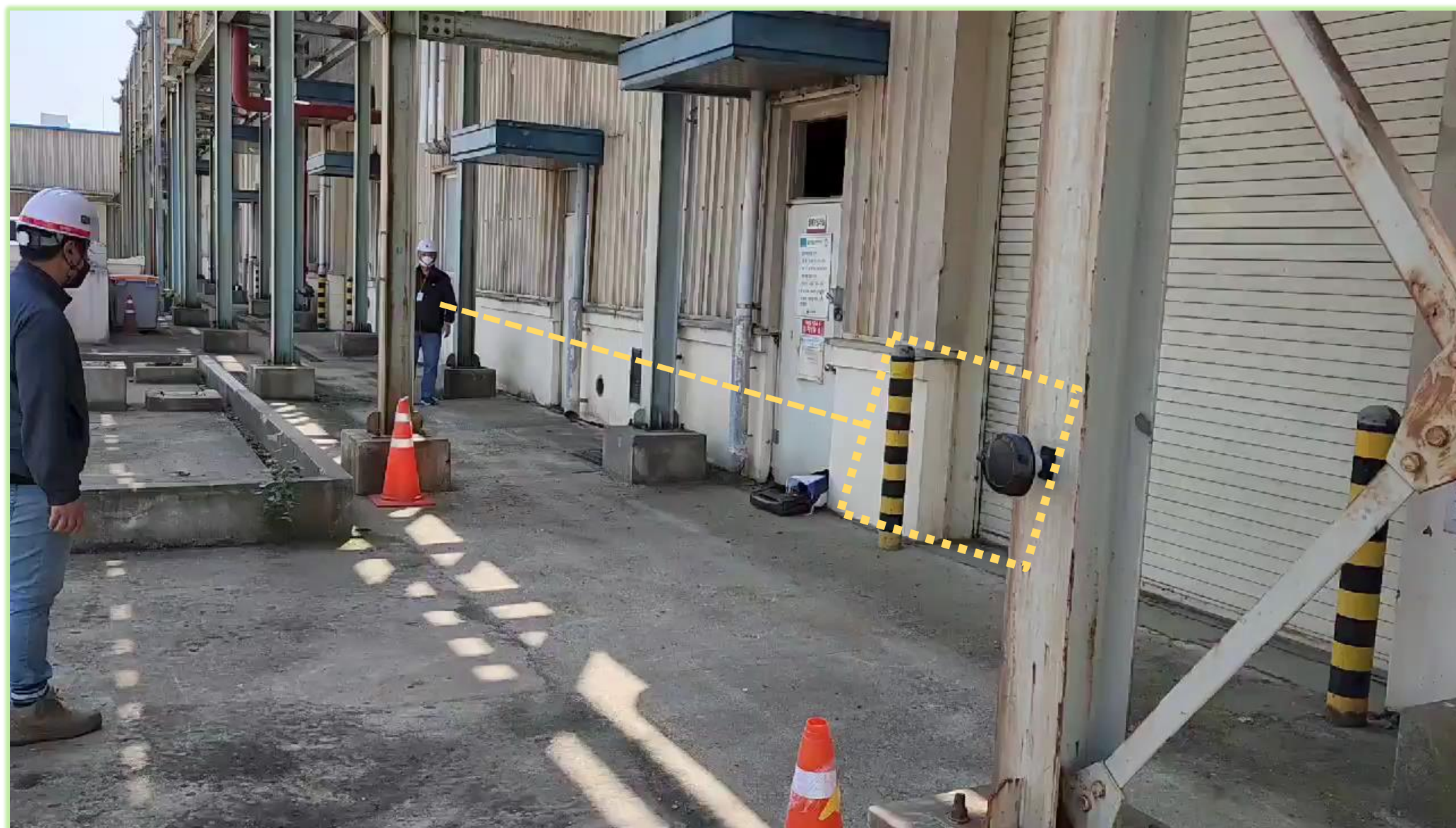
- Low awareness of safety guides : Sometimes ignoring Safety Tape / Fence / Railing etc.
- Risk of mortality accidents : multiple safety levels are required with flashlight & audio alarm.
- A number of hazardous indoor / outdoor sites nearby

“Smart safety sensor”





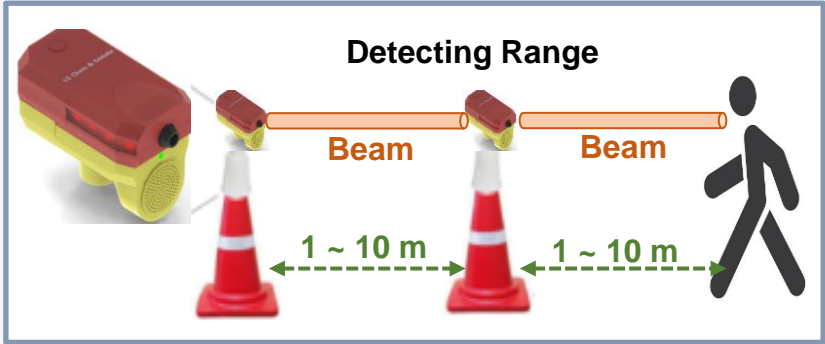
## 2. Intrusion Detecting System (2/3)



# 2. Intrusion Detecting System (3/3)

## Affordable Intrusion Detector *in hazardous / restricted areas*

- Real-time accurate alert and notification with LED and alarm
- Low operating cost due to unmanned detection
- Adjustable detecting range (5 ~ 10 m, line type detection)
- Synthesizable warning alarm sounds
- Waterproof device for outdoor environment
- Various installation tools : L-Shaped, I-shaped, Magnet, Velcro, etc.



**Applications :** Loading & unloading zone, Construction site, Temporary fence, Safety Guard, Museum, Art gallery, Performance Hall

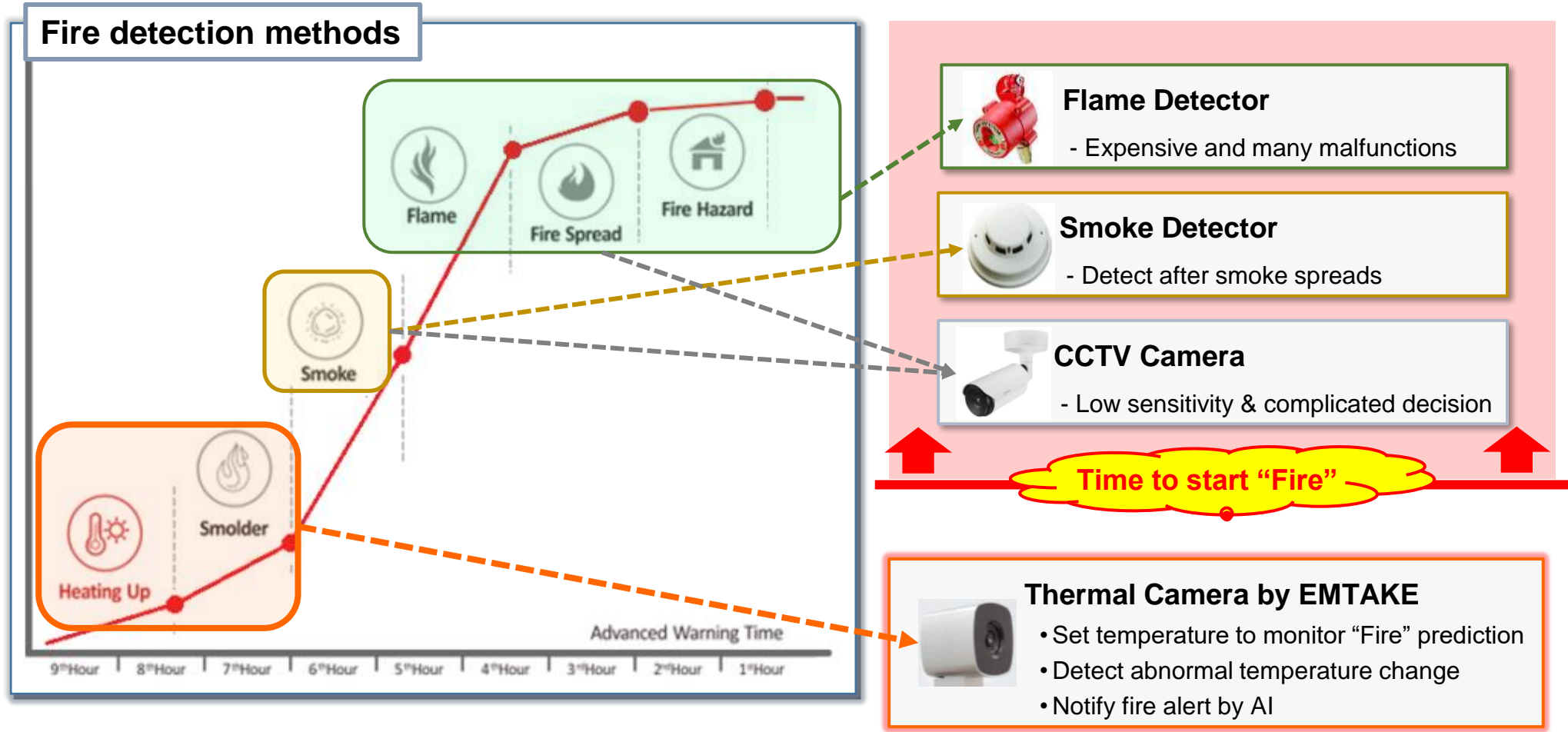


## Specification

|                    |   |
|--------------------|---|
| Sensor Type        | Thermal sensing & Movement sensing                      |
| Detecting Angle    | 3 ~ 30 ° (Factory preset available by customer request) |
| Detecting Range    | < 10 m (Adjustable)                                     |
| Alarm LED          | High brightness LED                                     |
| Alarm Sound        | 5 W / Voice or Alarm sound (Customizable)               |
| Button / Size      | Power, Mode, Volume / 78 x 145 x 90 mm                  |
| Power / Waterproof | DC 5 V or Battery (9 V) / IP 64                         |

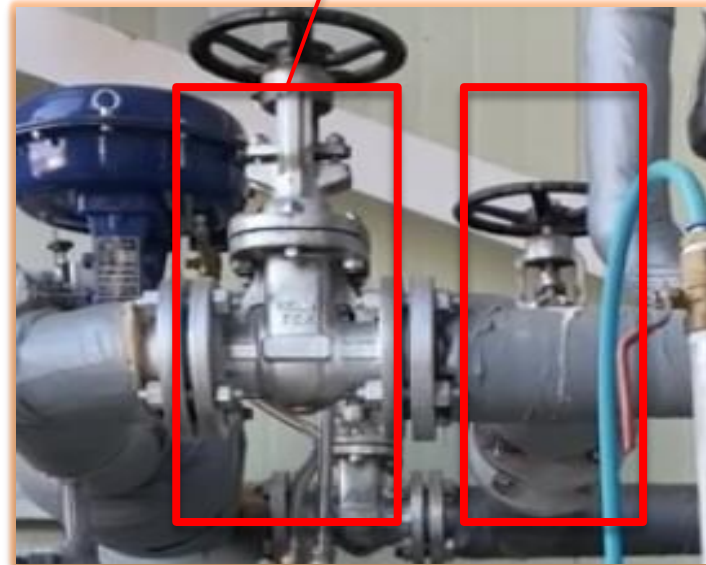
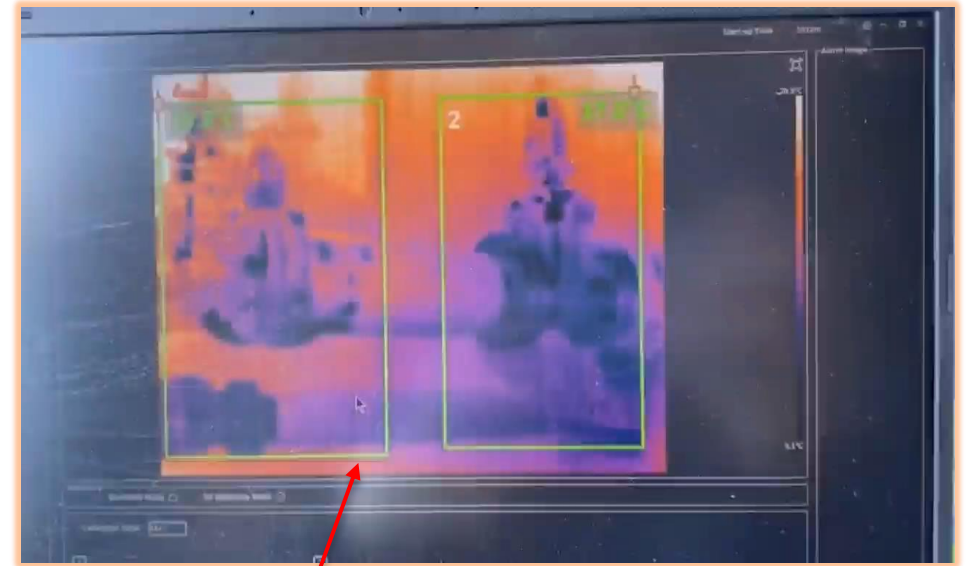
## Various installation tools



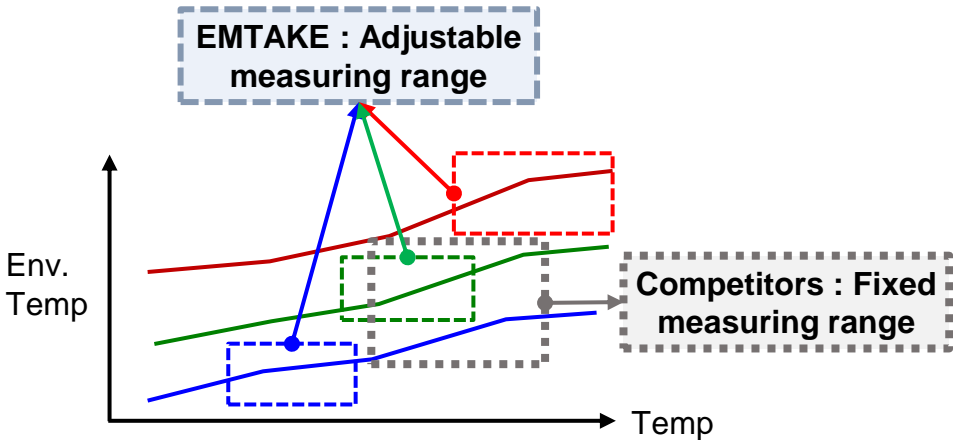


Only thermal cameras can detect signs of “Fire” 2 ~ 3 hours in advance and prevent big fire disasters.

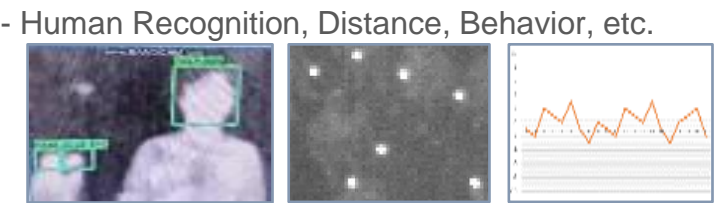




1) Customization for various environments

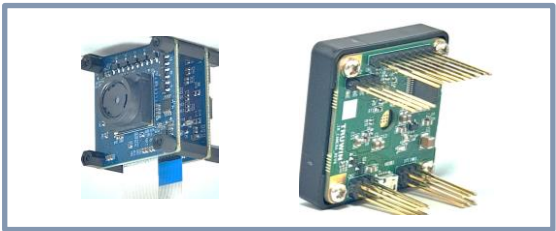


3) AI / Machine Learning



2) Cost competitiveness

- EMTAKE developed its own affordable thermal sensor module.










4) Accuracy : Embedded Blackbody (EMTAKE solution)

- EMTAKE provides H/W & S/W blackbody solution



References

|   |  |   |  |
|---|--|---|--|
| <br>Shopping mall / EV charging station | <br>Shopping mall          | <br>Factory, Switchboard  | <br>Shopping mal |
| <br>Switchboard, EV charging station   | <br>Factory, Switchboard | <br>Factory, Switchboard | <br>Human Care  |

Affordable Thermal Image Camera

- Early detecting abnormal temperature change due to fire
- Network connectivity and supporting ONVIF<sup>1)</sup> for CCTV compatibility
- Remote monitoring & control via PC, NVR<sup>2)</sup>, Smart Phones etc.
- High accurate and stable system with embedded blackbody

Model) MT-50



Applications : Smart Factory / Building / Farm, EV<sup>3)</sup> charging station, Shopping mall, Healthcare, Military surveillance



Specification

|                                       |                                   |
|---------------------------------------|-----------------------------------|
| Thermal Sensor Resolution             | 80 x 60 (4,800) pixels            |
| Lens viewing Angle                    | 90 ° or 30 ° / Shutterless        |
| Video Format                          | H.264, MJPEG, PNG, Raw            |
| NETD <sup>3)</sup> / Measurement Step | < 100 mK (@ 30 °C) / 0.1 °C       |
| Max. detecting Range                  | 90 ° : ~ 7 m, 30 ° : ~ 10 m       |
| Operating Temp.                       | - 10 ~ 50 °C ( option : < 100 °C) |
| Network                               | Ethernet, 62 x 53 x 65mm          |

Monitoring System



1) ONVIF : Open Network Video Interface Forum, 2) NVR : Network Video Recorder, 3) EV : Electric vehicle, 4) NETD : Noise Equivalent Temperature Difference



Dual Camera with High Resolution Thermal & Real Image

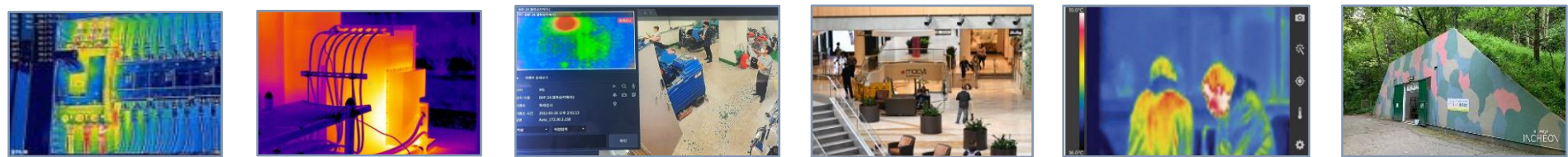
- Both high resolution (256x192) thermal image and HD visual Sensor
- Various usages : Fire signal detection, Crime prevention Alert and etc.
- Network connectivity and supporting ONVIF / PoE<sup>1)</sup> for CCTV compatibility
- Remote monitoring & control via PC, NVR, etc.
- High accurate and stable system with shuttered Lens

1) PoE : Power over Ethernet

Model) MD-50



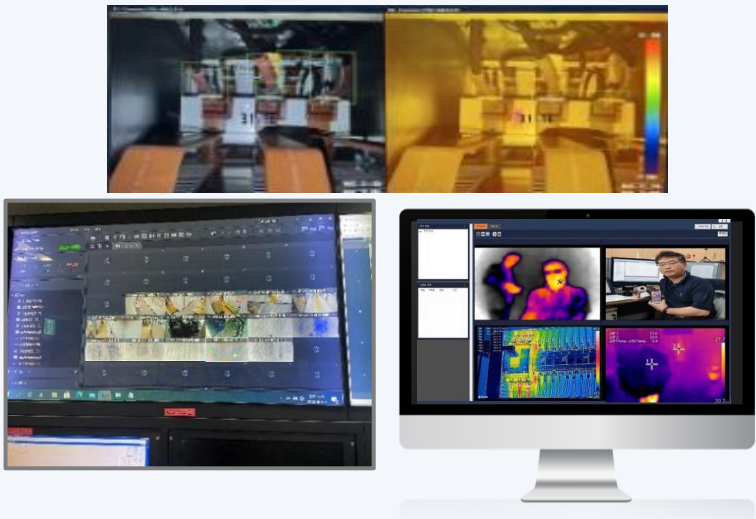
**Applications :** Smart Factory / Building / Farm, EV charging station, Shopping mall, Healthcare, Military Surveillance



Specification

|                            |  |
|----------------------------|--|
| Thermal Sensor Resolution  | 256 x 192 / 160 x 120 / 80 x 60          |
| Thermal Lens viewing Angle | 90 ° or 50 ° or 30 ° / Shuttered         |
| NETD / Measurement Step    | < 100 mK (@ 30 °C) / 0.1 °C              |
| Real Image Sensor          | HD CMOS Sensor                           |
| Video Format               | H.264, MJPEG, PNG, Raw                   |
| Max. detecting Range       | < 50 m (option : resolution, Lens angle) |
| Operating Temp.            | - 10 ~ 60 °C ( option : < 100 °C)        |
| Network / Power            | Ethernet / DC 12V (PoE support)          |

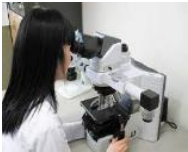
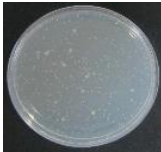
Monitoring System



# 4. Bacteria Detecting Semiconductor photo Sensor (1/1)

## AS IS Solution

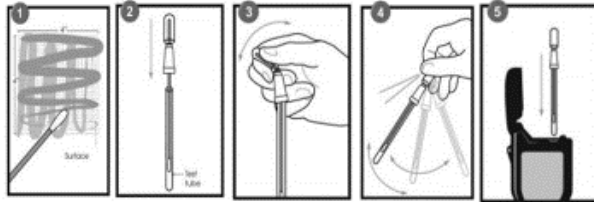

- Difficult to measure specific bacteria in real time and without touch.
- Difficult to apply to portable or consumer products, because of a high voltage, expensive and big size.





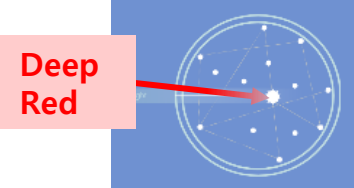
Microscopy



PMT<sup>1)</sup>




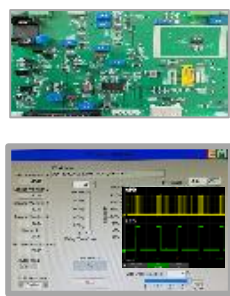
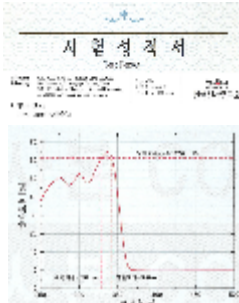

ATP<sup>2)</sup>



Laser

## EMTAKE's Sensor

Focusing on Human care Bio UV Photo sensor & Module  
Prototyping for **non-touch based real-time detection of food poisoning bacteria.**

| Sensor  | System  | Certification   | Patent  |
|---|---|---|---|
|  |  |  |  |

VS

Real Bacteria Test



Sensor Module application for home appliance



1) PMT : Photo Multiplier Tube, 2)ATP : Adenosine Tri Phosphate

# End of Document

## Thank You

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