



**EMTAKE**  
**(주)엠테이크**

# Introduction of EMTAKE

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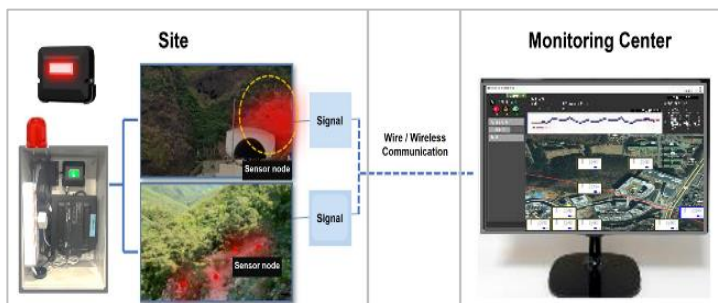
AUG. / 2024

Jason Cho (CEO)

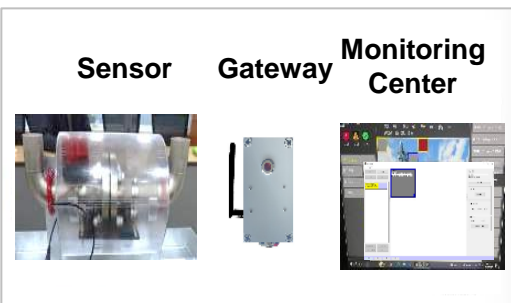
# EMTAKE's Products & Systems

## Disaster/ Safety systems

[On Sale]

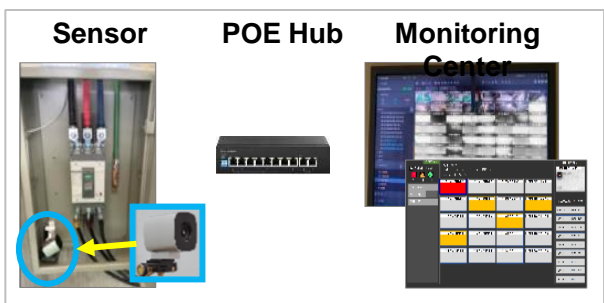


① Ground/structure collapse detecting System



② Water level detecting system System

③ Toxic Chemical / Oil/ Gas Leak Detection

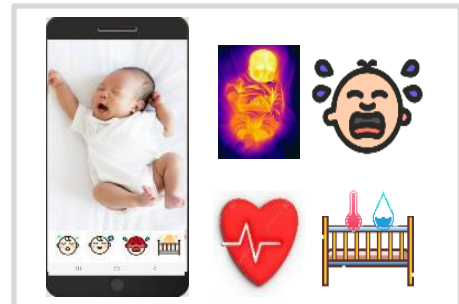
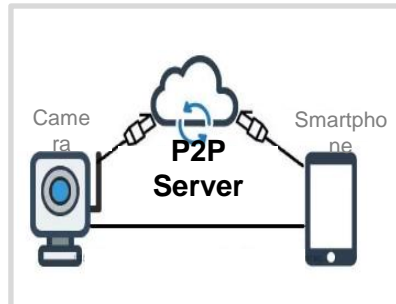


④ Fire Detection System

[Etc.] Auto fire extinguishing, AI Box

## Human Care System

[Launching : OCT./`24, KC Certification ]



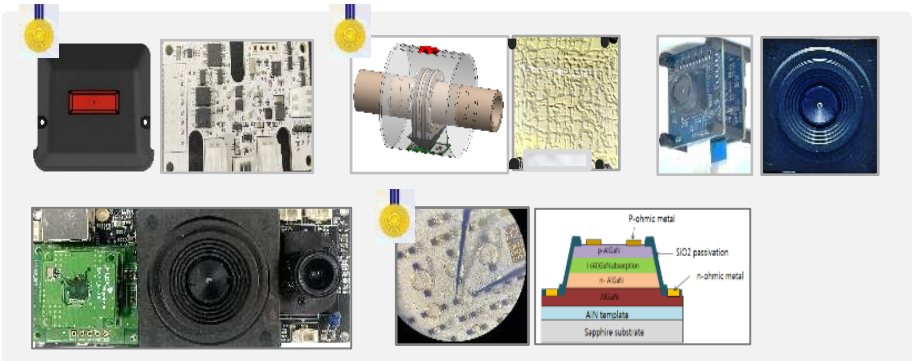
⑤ Vital detecting Infant Healthcare Camera

# EMTAKE's Products & Systems

## Hardware parts

### Sensor & Module

- > Sensor : Collapse/Chemical leak detector, Photo-Semi sensor
- > Module : IR/Radar multi modules, IR sensor module



### Communications & Signal Processing

- > Comm. : 900Mhz wireless, Giga Bit Ethernet
- > DSP : Low-power bi-direction datalogger, Embedded blackbody



## Software / Platform

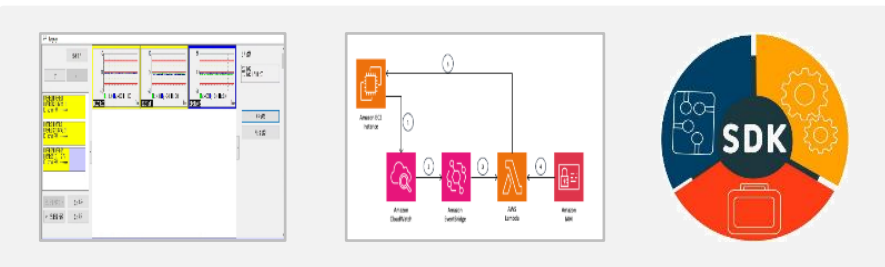
### Software & Algorithm

- > Local server, Monitoring program (thermal imaging AI)



### Service Server & Platform

- > Monitoring : P2P / DB Management server, Web-based
- > Service : Cloud, Content, Data analysis, Alarm text service



# 1. Building / Ground Collapse Sign Detecting System

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# ● Current Situations

## Sites under Consideration



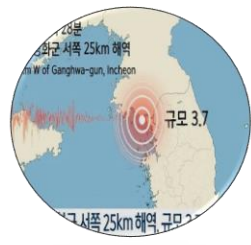
Building construction or Demolition site, Old houses, Tunnel construction, Mine, Historic site



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)]  
“KC1)” certified



1) KC : Korea Certification



# EMTAKE Solutions

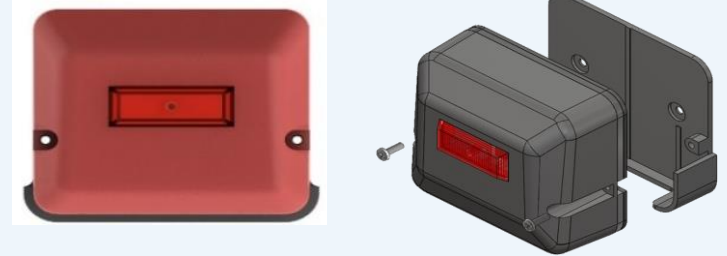
## Displacement & Movement Sensor & System

### Competitiveness

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

<b>Sensors</b>	Dual Sensor (Radar, Acceleration)
<b>Detect Resolution</b>	Rotation Angle : 0.01 °, Subsidence : 1mm
<b>Button / Port</b>	Power (Reset), Alarm, Data, Power input
<b>Operating Temp.</b>	-30 ~ 80 °C
<b>Monitoring Range</b>	< 100 m / Red LED On/Off flashing
<b>Monitoring System</b>	Movement data save & Network

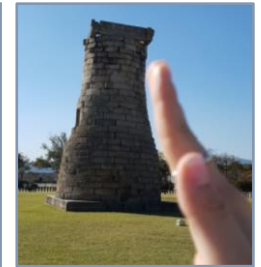
### • Device) Stand-alone Sensor



### • Product) Network Monitoring System

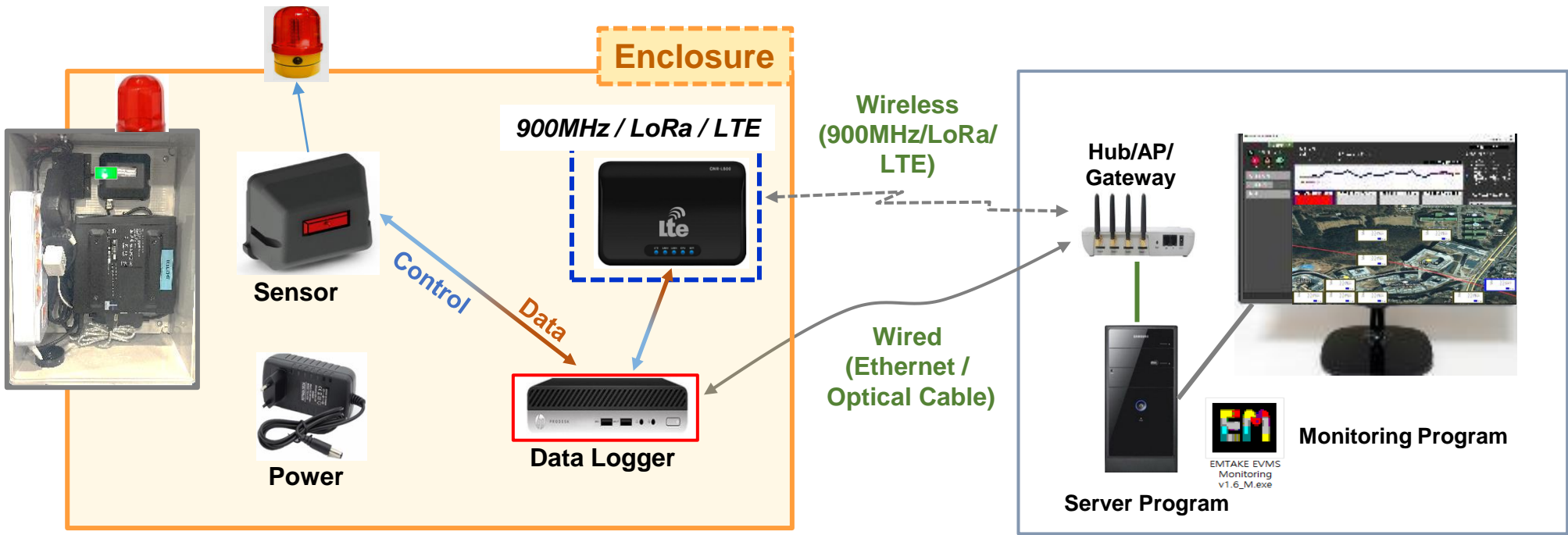


**Applications :** Building, Bridge, Construction site, Steep slope, Earthquake area, Guard post (Military) etc.



# ● Network Monitoring System

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

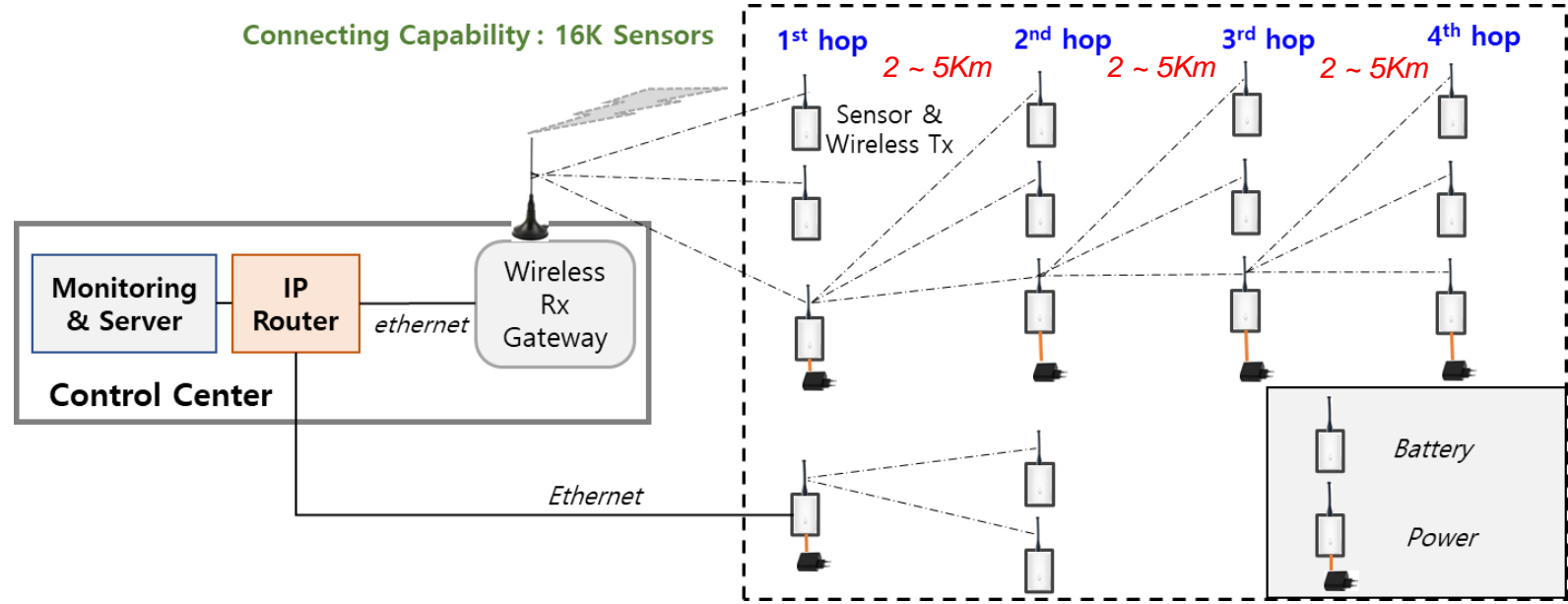


- Displacement sensor: Real-time detection of movement of buildings/ground
- Data logger: Sensor data analysis/transmission/alarm issuance, sensor control/setting, two-way signal processing
- Wireless communication / wireless gateway: wireless Rx / Tx two-way communication (900Mhz, LoRa, LTE, etc.)
- Server program: Remote alarm triggering condition setting, displacement sensor registration, data storage
- Monitoring program: control program, multi operation

# ● Long distance Wireless Solution

## Wireless solution Spec. : EMTAKE vs. Third Party Technology








Frequency	940MHz band (USN : 940.1~944.3MHz) : <b>Less frequency congestion</b>
Transmission Power	100mW (20dBm) : <b>4x higher output</b>
Transmission Speed	80kbps(GMSK), 50kbps(GFSK) : <b>Higher transmission rate compared to LoRa</b>
Protocol	2-Way Proprietary Protocol : <b>Automatic retransmission, multi-hop</b>
Security	AES128 : <b>Supporting Encryption</b>
I/O	2x UART, 8x GPIO, I2C, 12bit ADC, 12bit DAC : <b>Various I/O support</b>
Power Consumption	87mA(Tx@+20dBm), 8.2mA(Rx), under 1uA(Deep sleep) : <b>Lower power</b>
Transmission Distance	5Km ~ 2Km (outdoor) : <b>Long-distance communication performance</b>





# ● Install References Detail(1/2)

## EMTAKE Reference Detail (till June / 2023)

Customer	Place	Purpose	System conf	date	Site
Incheon City	Sihwa Sewage Treatment Plant	Detecting structural changes due to earthquakes	Sensor, wireless communication system, Monitoring Program	Y2022	
	Gongchon Water Purification Plant	Detecting structural changes due to earthquakes	Sensor, wireless communication system, Monitoring Program	Y2022	
Jeju Island / Cultural Heritage Administration	Manjanggal Cave	Cave (cultural property) collapse and moving detection	sensors, alarm systems	Y2023	
	Jeamcheongul Cave	Cave (cultural property) collapse and moving detection	stand alone sensor	Y2022	
Busan Land Management Office	National Highway No.7	Detect signs of collapse on steep slopes along national highways	stand alone sensor	Y2022	
	Uljin-gun District	Detecting Signs of a landslide near Bogwangsa Temple	stand alone sensor	Y2022	
Korea Electric Power Corporation	Chungju City/Yeosu City	Apartment construction and civil engineering	sensors, alarm systems	Y2022	
Kumho E&C	Cheongju City	Plant construction and civil engineering	sensors, alarm systems	Y2022	

# ● Install References Detail(1/2)

Customer	Place	Purpose	System conf	date	Site
Hyundai E&C	Seoul	Collapse detection of buildings, bridges, etc.	Sensor	Y2023	
	Paju City	Freeway tunnel collapse detection	Sensor, wireless communication system, Monitoring Program	Y2023	
Daewoo E&C	Kimpo City	GTX-A (Paju-Gimpo high-speed railway) construction safety	Sensor	Y2022	
LG Chem Inc.	Yeocheon Factory	Collapse detection in high voltage landfill facilities	Sensor, wireless communication system, Monitoring Program	Y2022	
Anyang City	Anyang City, Gyeonggi Province	Detect Landslide Signs	Sensor, wireless communication system, Monitoring Program	Y2023	confirmed
Masung E&C	Kwangmyung City, Gyeonggi Province	Detect subsidence and slope of highway surface	Sensor, wireless communication system, Monitoring Program	Y2023	confirmed
Hanjin E&C	Yongin City, Gyeonggi Province	New Bundang subway extension (Gwanggyo-Homaesil) construction	Sensor, wireless communication system, Monitoring Program	Y2024	confirmed
KCC E&C	Seoul	GTX-B subway (Sangbong-Yongsan) construction safety	Sensor, wireless communication system, Monitoring Program	Y2024	confirmed

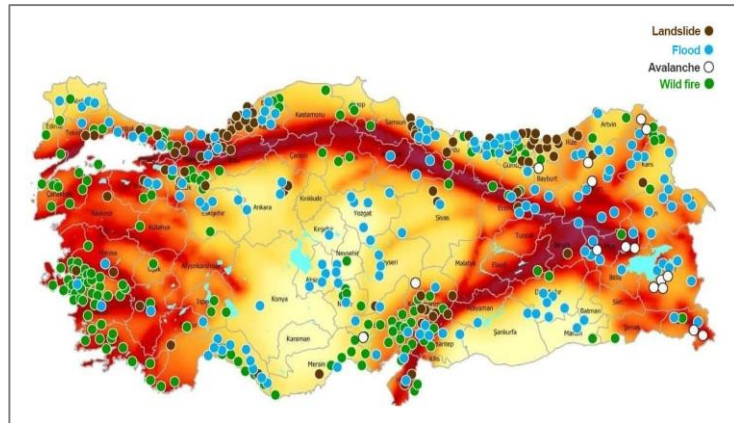
## 2) Water level & Rising speed Detecting System

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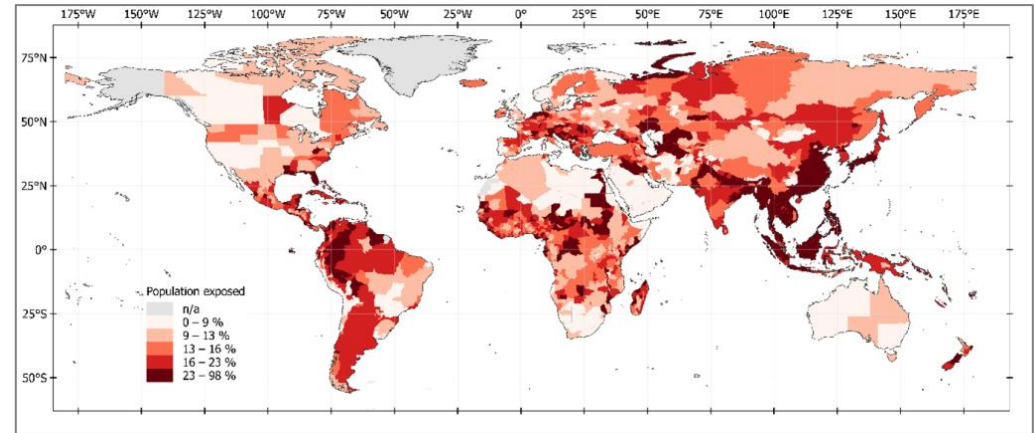
# Accidents

Damage from floods and landslides is rapidly increasing due to heavy rain and rising sea levels due to abnormal climate around the world.

- Leads to disasters such as flooding, landslides, and ground/building collapse



Turkey Disaster map



Worldwide Flood map



Turkey Eastern ('23.02)



Turkey Northern ('21.08)



Landslide due to flood

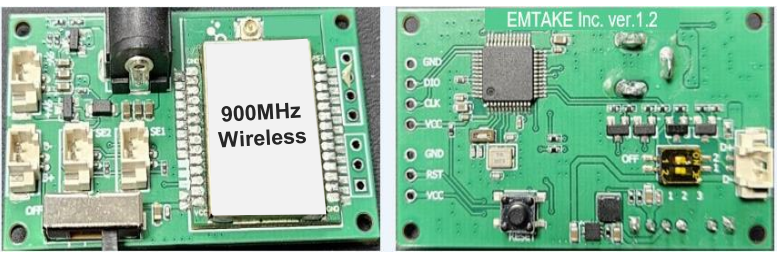


# ● EMTAKE's flooding signal detecting Solution

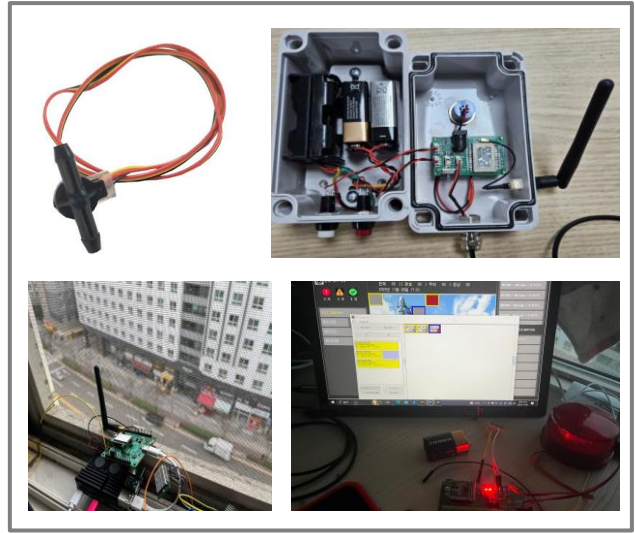
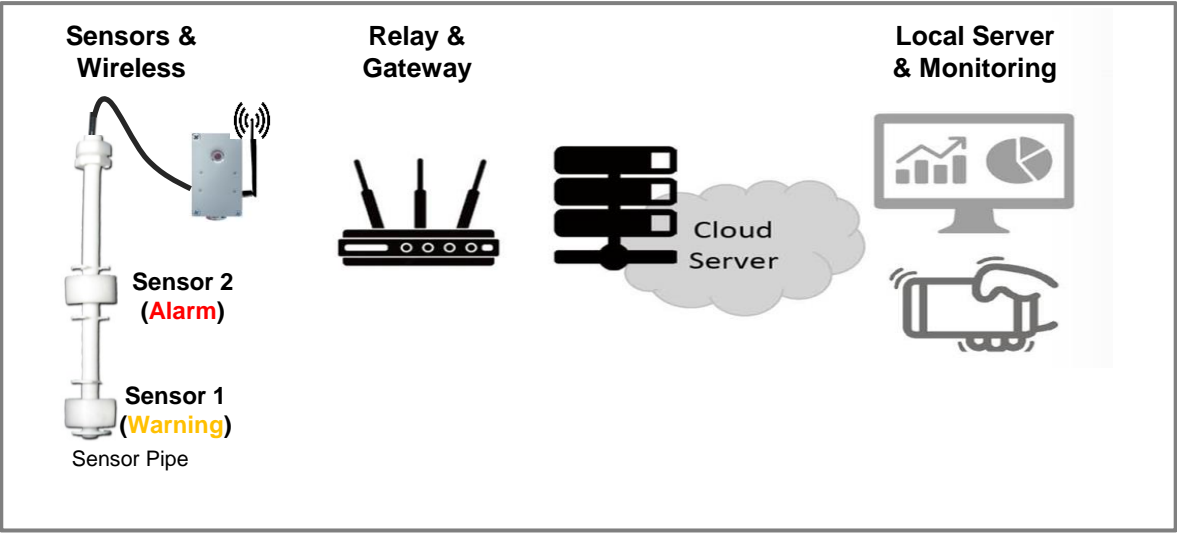
## □ Configuration

### 1) Main components :

- Sensor, **Data Logger**, battery, antenna, gateway, server/monitoring system , leak protection cover
- Data Logger : 900Mhz Wireless Comm. Module, Sensor data processor, Detecting Algorithm, 2-way protocol Firmware



### 2) Flooding signal detecting System Configuration





# EMTAKE's flooding signal detecting Solution (2/2)

## 3) Water level and flooding Detecting Sensor

- ▶ Application : Flooding of riverbank / Dam / Reservoir / Underground structures etc.
  - Auto. calculates the rate at which water levels rise and alarm an evacuation warning before flooding occurs.
  - It is safer when installed together with EMTAKE's collapse sign detection sensor & system.



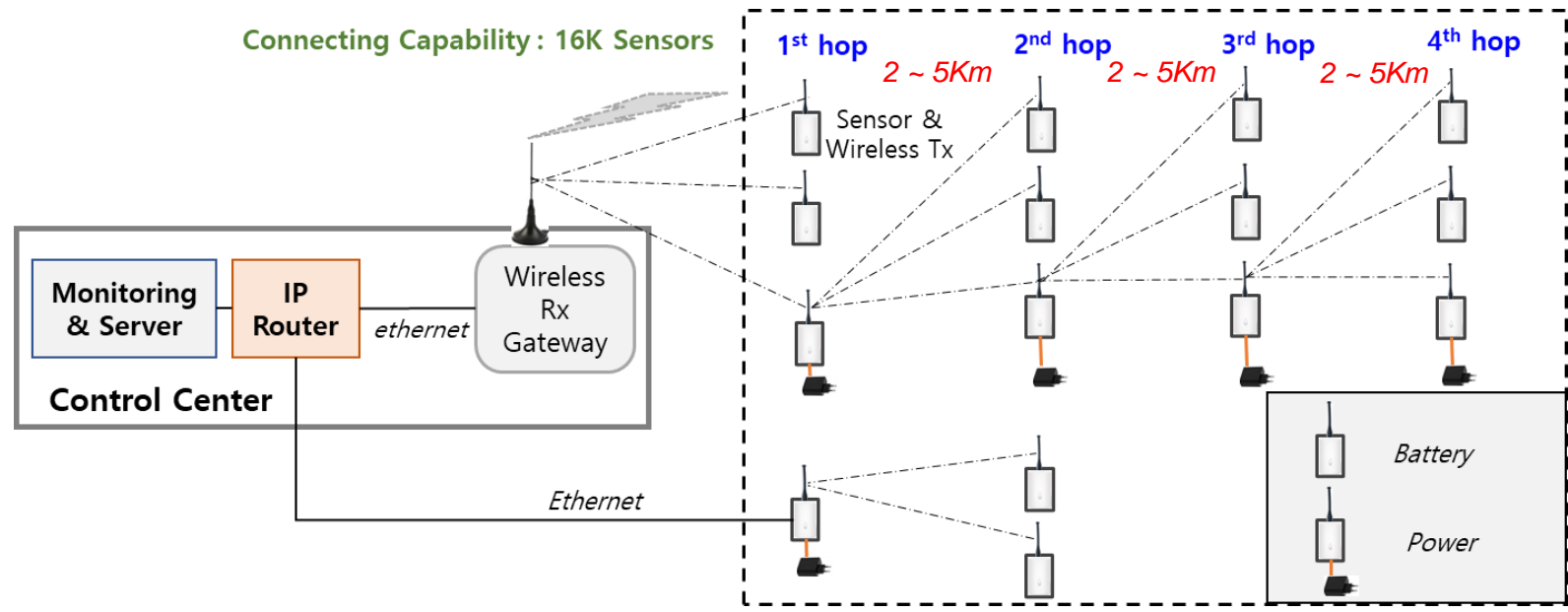
### ▶ Feature & Competitiveness

- High cost-effectiveness system
- Very stable and accurate system : Dual water level detection sensors
- No Cable (No electric wire, No network cable) : Low Power with the battery, 900MHz Wireless system
- Long operating time : For more than 3 years without battery replacement after installation
- Easy to Install & Maintenance & Operation

# ● Long distance wireless Solution

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Security	AES128 : <b>Supporting Encryption</b>
I/O	2x UART, 8x GPIO, I2C, 12bit ADC, 12bit DAC : <b>Various I/O support</b>
Power Consumption	87mA(Tx@+20dBm), 8.2mA(Rx), under 1uA(Deep sleep) : <b>Lower power</b>
Transmission Distance	5Km ~ 2Km (outdoor) : <b>Long-distance communication performance</b>



# 3) Toxic Chemical Leak Detecting System

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# ● Accidents

**One chemical accident: 218 leaks, 80 fire/explosion accidents in 2022**

**- 241 injured, 13 dead**

Refer to ) Korea National Fire Agency data

**Korean gas accidents: 471 cases last 5 years, explosion 27%.**



Kunsan Phenol ('21.04)



Yeocheon NCC ('21.04)



Kimcheon Phenol ('20.08)



France Gas('23.06)



Yeosoo sulfuric acid ('21.05)



Indo Gas ('20.05)

# ● Toxic chemicals and leak spots

**More than 52% of pipe leaks occur at pipe connections.**

- Various acid/alkaline/organic chemicals

□ **Piping connection type**



Flange



Welding



Lock Type

□ **Sorts of Toxic Chemicals (12 sorts)**

- Acid: Phosphoric acid, nitric acid, acetic acid, hydrochloric acid, hydrofluoric acid, sulfuric acid, BOE, semiconductor stripper
- Alkali: TMAH, NAOH
- Organic: H2O2, IPA

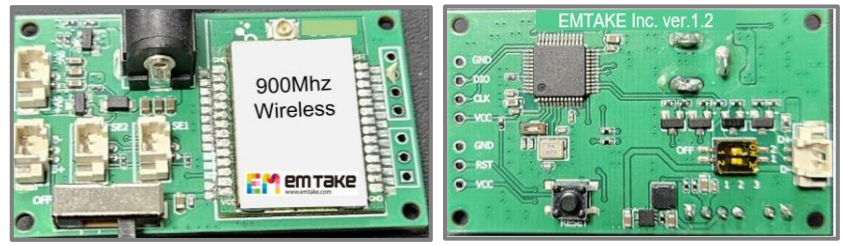


# ● EMTAKE Solution

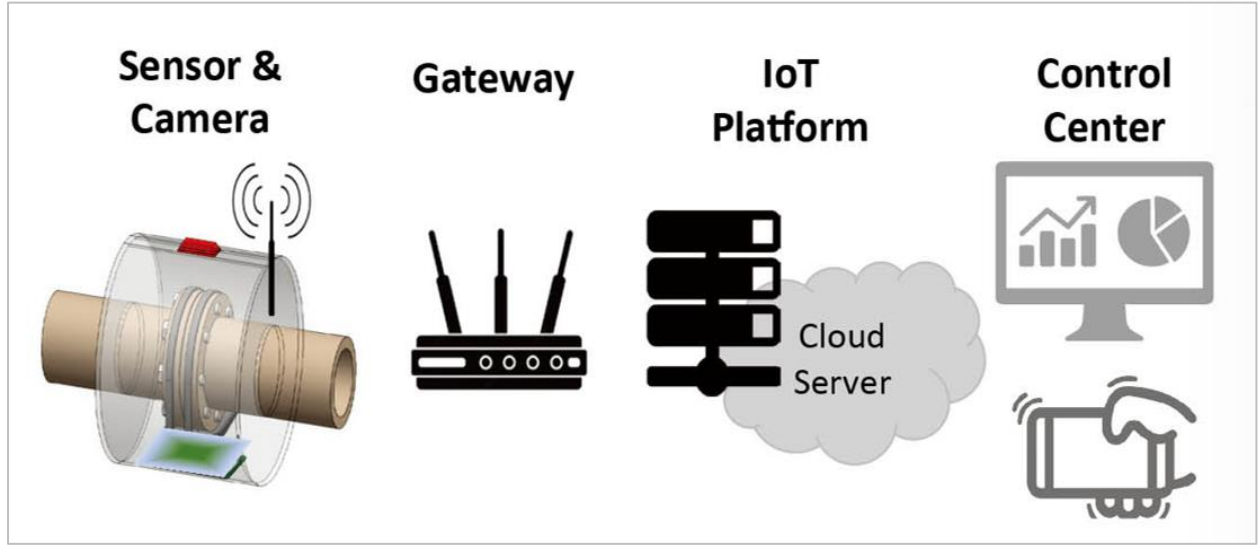
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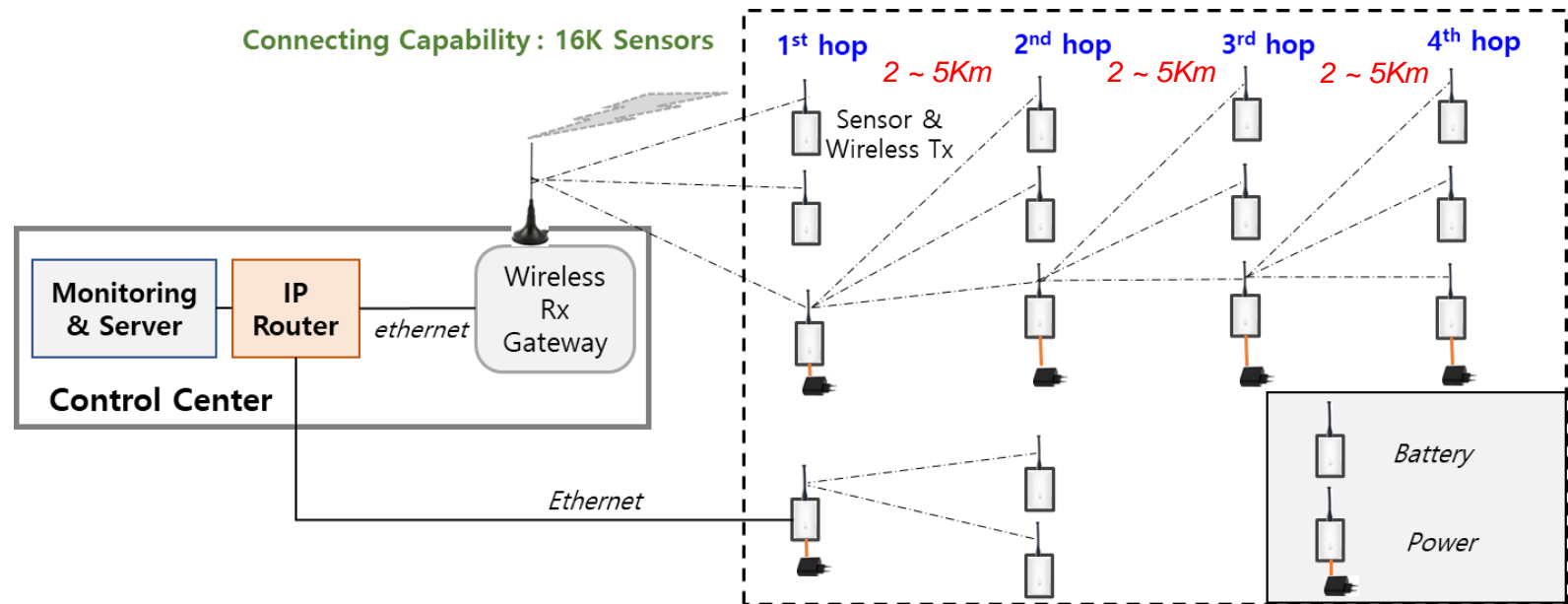
### 2) Toxic/Oil/Gas leak detecting System Configuration



# ● Long distance wireless Solution

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Power Consumption	87mA(Tx@+20dBm), 8.2mA(Rx), under 1uA(Deep sleep) : <b>Lower power</b>
Transmission Distance	5Km ~ 2Km (outdoor) : <b>Long-distance communication performance</b>



# ● Differential & Application Expand

## 1) Dual Sensor :

- Detection of 12 types of various toxic chemicals : Phosphoric acid, nitric acid, acetic acid, hydrochloric acid, hydrofluoric acid, sulfuric acid, BOE, Stripper, TMAH, NAOH, H2O2, IPA
- Gas leak detection

## 2) Accurate and reliable without malfunctions

- Waterproofing, prevents malfunction due to internal dew (water)
- Periodically check remaining operating battery capacity and system operation status.

## 3) System without any cable: Easy installation and ultra-low power system

- Wireless communication: 900Mhz(free frequency) long-distance/two-way wireless communication(Hopping, Mesh network)
- Operates on batteries: DC battery powered, operates for more than 3 years after installation

## 4) Remote server and intuitive monitoring system

- Real-time/simultaneous monitoring of more than 1,000 sensors detection sensors
- Supporting a local server & a Cloud server
- LED at the installed site indicates alarm point

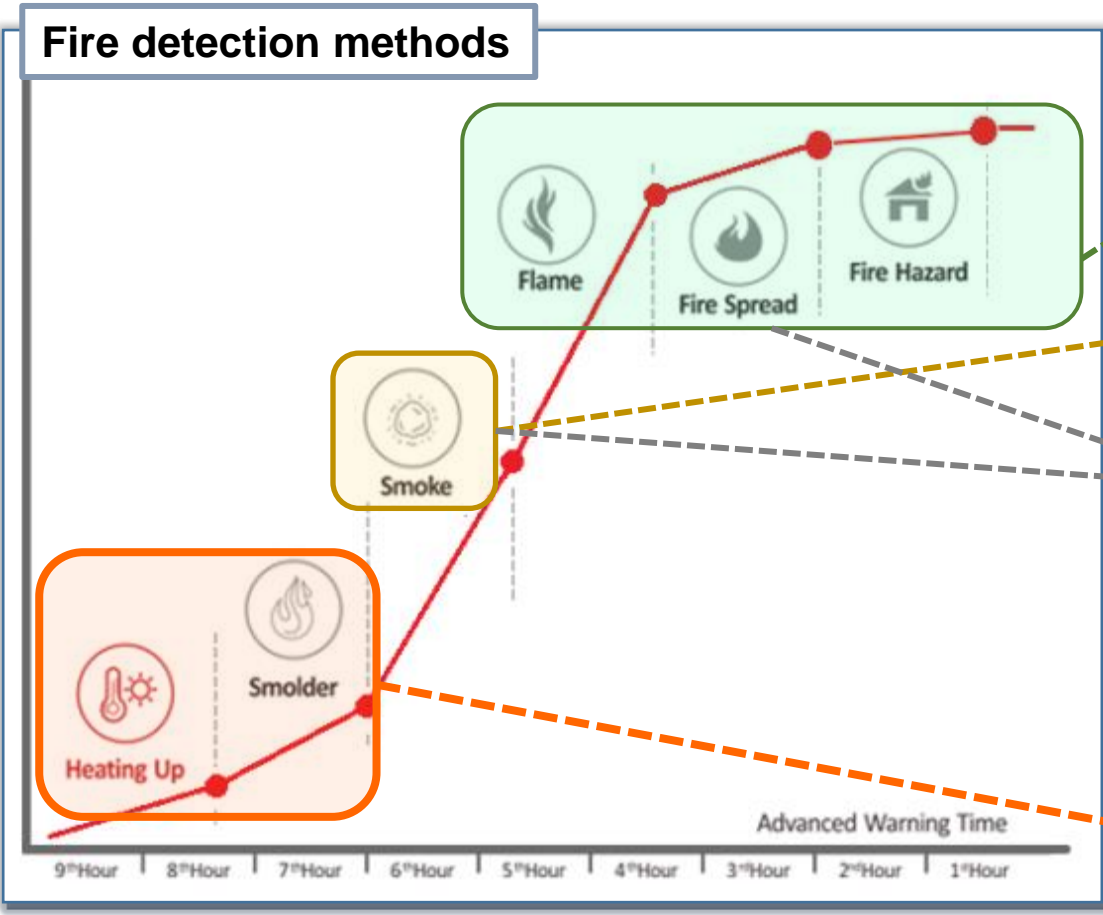
## 5) Installed in a major global chemical company (LG Chemical)


- POC verification completed by LG Chemical: Nov. 2023 ~ June. 2024 (8-months test)
- Installed/operating at 130 major risk points (AUG. 2024)
- Prepare intellectual property rights globally with LG Chemical

## 4. Fire Sign Detection System


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# Advantages of Thermal Cameras




 **Flame Detector**  
- Expensive and many malfunctions

 **Smoke Detector**  
- Detect after smoke spreads

 **CCTV Camera**  
- Low sensitivity & complicated decision

**Time to start "Fire"**

 **Thermal Camera by EMTAKE**

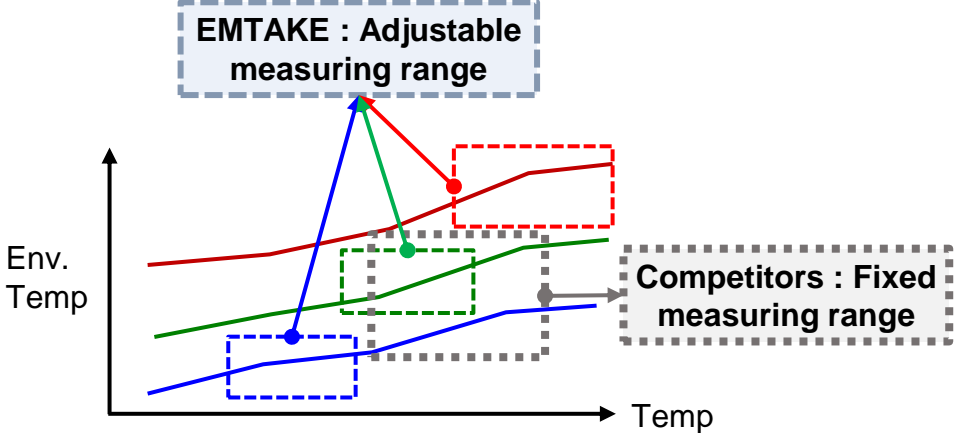
- Set temperature to monitor "Fire" prediction
- Detect abnormal temperature change
- Notify fire alert by AI

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



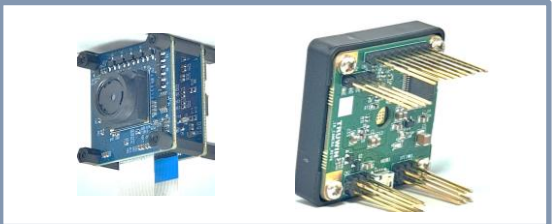
# ● Competences / References

## 1) Customization for various environments



## 2) Cost competitiveness

- EMTAKE developed its own affordable thermal sensor module.



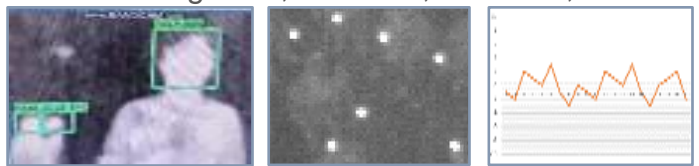
## 4) Accuracy : Embedded Blackbody (EMTAKE solution)

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



## 3) AI / Machine Learning

- Human Recognition, Distance, Behavior, etc.



## Install References

 Shopping mall / EV charging station	 Shopping mall	 Factory, Switchboard	 Shopping mal
 Switchboard, EV charging station	 Factory, Switchboard	 Factory, Switchboard	 Human Care

# EMTAKE Solution (1/2)

## 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

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

# EMTAKE Solution (2/2)

## Dual Camera with High Resolution Thermal & Real Image

- Both high resolution (196x120, 80 x 60) 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, Security, Military Surveillance



## Specification

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

## Monitoring System



# ● Fire extinguishing Tube (Big Space)

An automatic fire extinguisher that instantly sprays fire extinguishing chemicals contained in a tube and extinguishes the fire when it reaches a flame or high temperature..

- Effective against class A, B, and C fire types
- Suitable for enclosures (electrical switchboards), servers, electric vehicle charger, safe, power plants, etc.)
- Select tube length based on fire extinguishing space size

- Fire extinguishment within 1 second
- Power-free heat detection tube
- Easy to install Semi-permanent product without maintenance
- Eco-friendly & harmless to the human
- No residue after extinguishing the fire
- Ultra-light product means no mechanical hazards
- High cost-effectiveness
- Obtained Korean fire safety certification



Diameter	Length	Protected Volume	Operating Temperature	Weight	Extinguishing Gas
16φ, 16φ, 8φ	100 ~ 8,000mm	0.02 ~ 3m <sup>3</sup>	100 °C(±3°C)	50 ~ 2,000g	FM200 or NOVEC1230

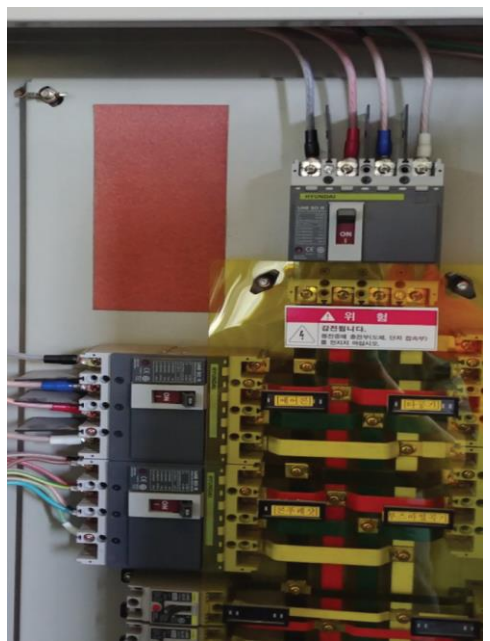


# ● Fire extinguishing Pad (Small Space)

An automatic fire extinguisher that put out the fire by automatically operating microcapsules containing fire extinguishing chemical on the pad

- Effective against class A, B, and C fire types
- Suitable for small spaces (electrical switchboard, server, safe, etc.)
- Select pad length based on fire extinguishing space size

- Fire extinguishment within 5 second
- Power-free heat detection pad
- Easy to install Semi-permanent product without maintenance
- Eco-friendly & harmless to the human
- No residue after extinguishing the fire
- Ultra-light product means no mechanical hazards
- High cost-effectiveness



Size	Protected Volume	Operating Temperature	Extinguishing Gas
200 x 100 x 2mm	0.01 ~ 0.06m <sup>3</sup>	120 °C	NOVEC1230



# 5. Total Disaster providing Solution

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# ● EMTAKE's Affordable Total Disaster providing Solution

## [EMTAKE own Systems]

- 1) Water level and rising speed rate detecting sensor & System
- 2) Ground/Building collapse sign detecting sensor and system
- 3) Toxic Chemical / Gas leak detecting sensor & system
- 4) Fire signal detecting thermal camera system

## [OEM/ODM Systems]

### 5) AI Box for installed existing CCTV Camera.

- Support 20 types of AI functions
- NVR & Recording in HDD
- 4 ~ 32channel existing CCTV Camera monitoring



**AI functions Ex.:**  
Rescue request, Human entry, Boundary violation, Fall down, Wandering, Abnormal clothing, Approaching, Wake up

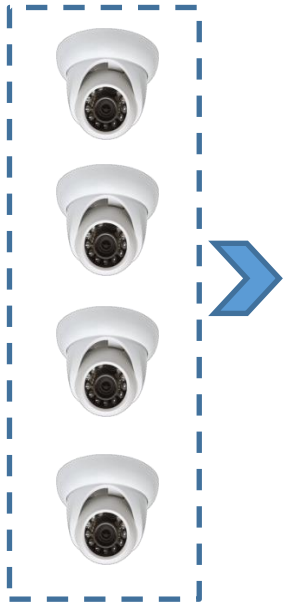
### 6) Traffic control system

- When a traffic accident or natural disaster or fire occurs on a road, bridge, tunnel the AI system recognizes it and immediately issues an alert to the site and control center through LTE wireless communication.
- And immediately close the road to prevent further damage.



# AI Box

## Existing CCTV Camera



Installation using existing CCTV cameras and wiring

## AI Box (AI Box + AI Feature + Monitoring Program)

AI Box (4 / 8 / 16 / 24 channels) AI functions



+

Immediate alerts sent when abnormalities are detected through real-time video analysis

- |                      |                     |
|----------------------|---------------------|
| Human entry          | boundary violation  |
| climb the wall       | falling walls       |
| Long-time standstill | body fight          |
| many people          | Fall down           |
| Rescue call          | Tailing, tracking   |
| protection           | On-duty departure   |
| On-call sleep        | loitering           |
| Abnormal clothing    | Unidentified object |
| luggage delivery     | human approach      |
| Wake/Sleep           | Customized AI       |

Built-in over 20 hazard detection

AI functions

## Monitoring Program



Warning when abnormality is detected

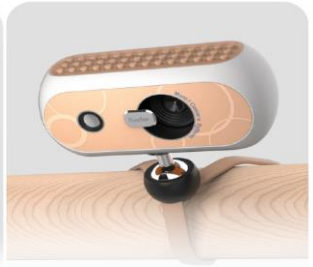
event occurs, data generation

## 6. Vital detecting Infant Healthcare Camera

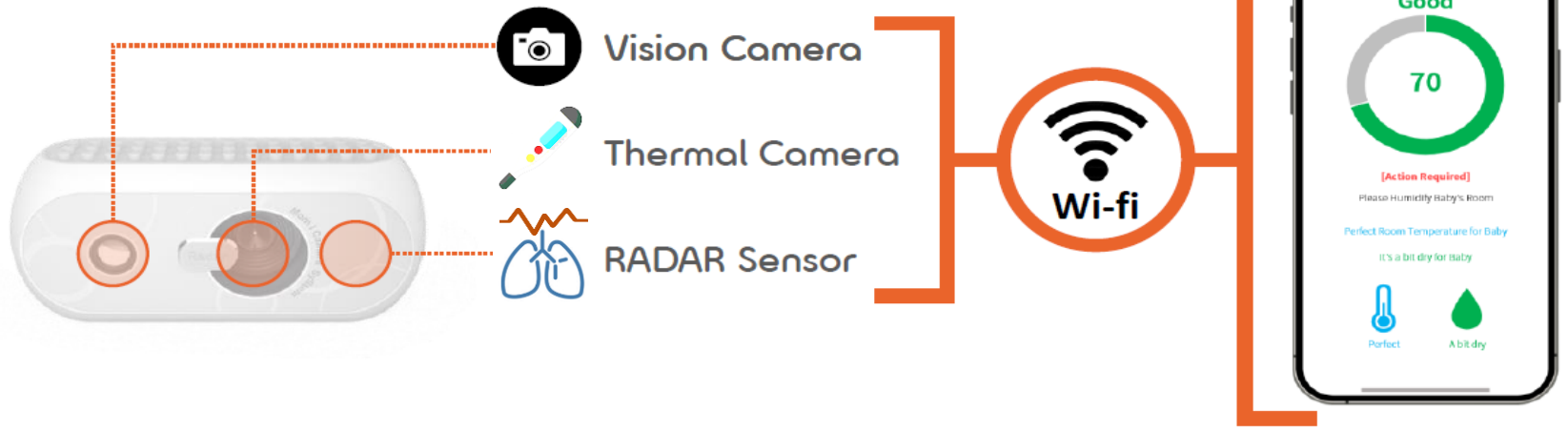
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# ● Concept

A vital multi sensing camera that checks health status of babies under 2 years old  
And transmits health alert / information / videos to a smartphone App. in real time.



## Composition





# ● Competitiveness

**Design : Minimal / Less but Best & Diverse colors**



## Feature

- ◆ Enjoy a baby HD video on a smartphone App.
- ◆ Vital Sensors : Thermal Image, Radar
- ◆ Body Temp., Breath & Cry detection
- ◆ Check the environment of a sleeping baby
  - Env. Temp., Humidity, Illumination, Noise
- ◆ Send alerts to my smartphone in real time
- ◆ Monitoring & Supporting Multi Cameras
- ◆ Supporting 3<sup>rd</sup> Party Contents service

<b>Thermal Sensor</b>	4,800 Pixel Thermal IR Sensor, 90° Lens
<b>Radar Sensor</b>	60GHz Radar Sensor
<b>Image Sensor</b>	HD CMOS Sensor, 90° Lens, IR Lamp
<b>Env. Sensor</b>	Thermometer, Hygrometer, Microphone
<b>Network/Server</b>	RJ45, WiFi / P2P, Message, Log in
<b>Storage</b>	32GB (Auto. Video save, Play
<b>Sound</b>	Built in 5 types of sleep-inducing sound

**Launch : Aug. / 2024**

# 7. Intrusion Detecting System

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OEM / ODM only

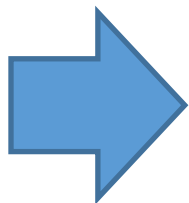
## [Various hazardous & restricted Sites with fatal Dangers]



### [Issues]

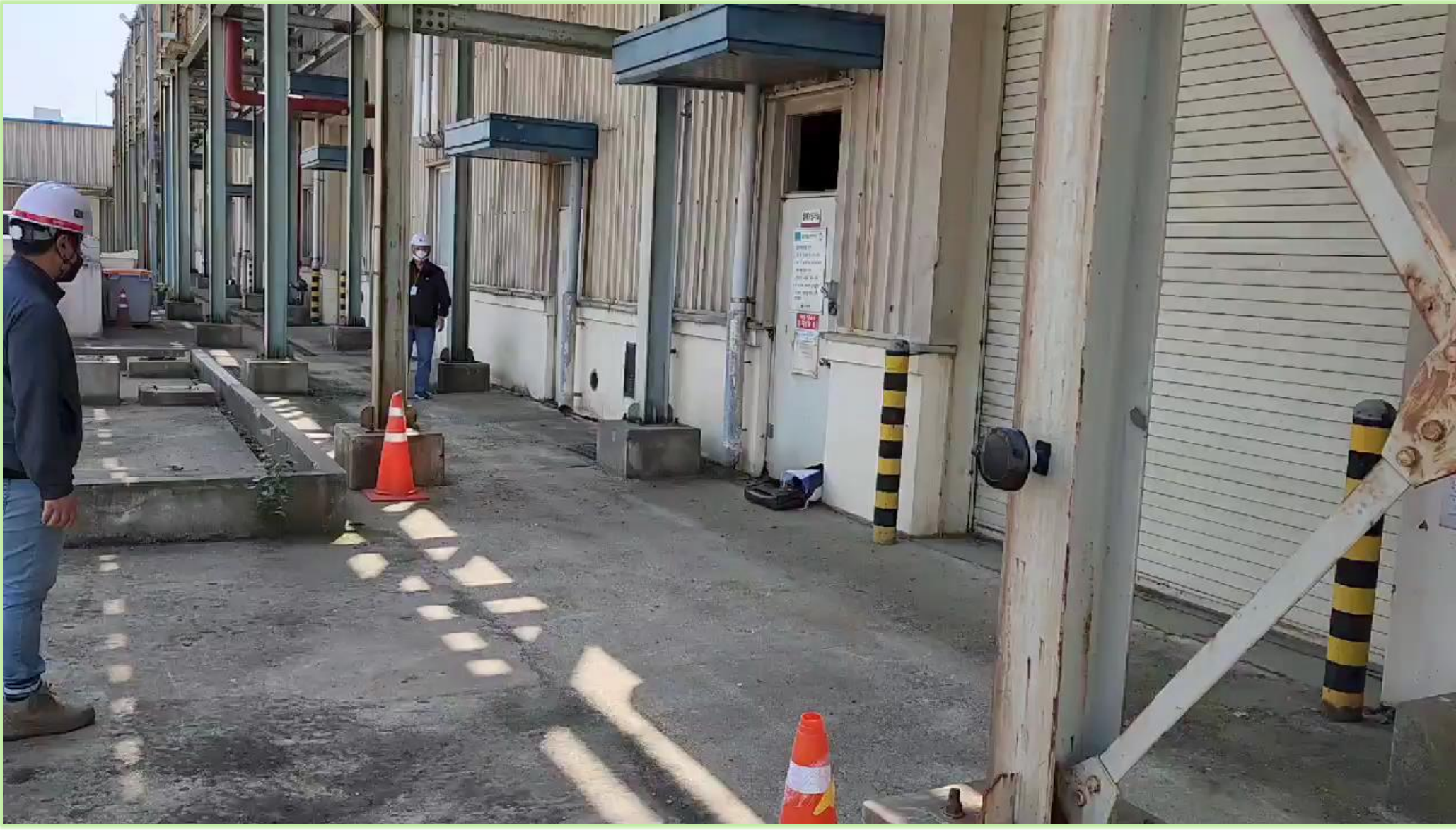
- Low awareness of safety guides : Sometimes ignoring Safety Tape / Fence / Railing etc.
- Risk of mortality accidents : multiple safety levels are required with flashlight & audio alarm.
- A number of hazardous indoor / outdoor sites nearby

### “Smart safety sensor”





# ● Operation

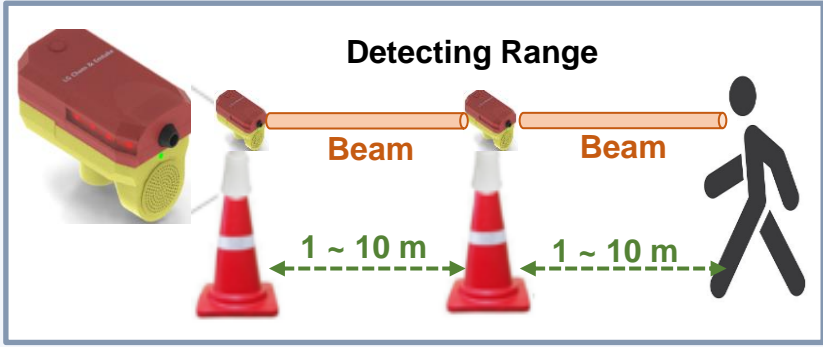


# ● Feature & deferential

## 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

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

## Various installation tools





## Company Ability

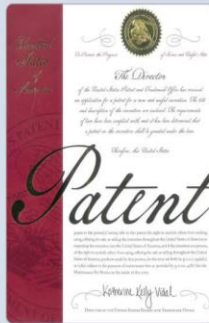


**IP** Registered patent : 8 (Korea 6, US 2)  
Applied patent : 4 (Korea 3, US 1)



### Export Performance

US, China, Thailand, Vietnam etc.



### References



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Homepage



LinkedIn

The product functions, performance, and design specified in this brochure may differ from the actual products.



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# Thank you