



# FIBER HUNTER

OPTICAL FIBER NET INTRUSION DETECTION SYSTEM



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# FIBER HUNTER: Perimeter Detection using “Optical Fiber”

## Perimeter detection with state of art technology for fiber optics

- ✓ Perimeter detection with fiber optic Net using military tactical fiber and OTDR(Optical Time Domain Reflectometry)
- ✓ Using OTDR technology for detection, Fiber Hunter can detect intrusions with pin point accuracy as well as multi-detection
- ✓ System reliability guaranteed using standard fiber optic protocols

## High reliable detection not effected by outdoor climate

- ✓ Fiber Hunter is not effected by lightening, vibrations, electromagnetic interferences, electrostatics and so on because Fiber hunter is using only fiber optic cables on perimeter area for detection.
- ✓ Fiber hunter is designed to detect only the intrusion action so that climate changes like temperature, humidity, rain, snow and wind does not effect on detections

## Easy system expansion for complete perimeter detections

- ✓ Fiber Hunter controllers are 19” rack mountable system to be easily installed in existing system
- ✓ Fiber hunter software provide TCP/IP protocols to be easily integrated into any other system like CCTV camera and supervisory system

## Proven technology from military

- ✓ Fiber Hunter had been installed in Republic of Korea Army, Air-forces, and Navy since the year of 2014





# FIBER HUNTER: System Performances

## Detection rate :

>95%

## False alarm rate :

< 5 times per zone(2-ports of controller) per month

## Detection point accuracy :

+/- 3 meter in optical fiber NET detection within 12 meters in other fiber optic cable

## Intrusion action detectable :


- Cutting/bending of optical fiber NET
- Attempt of breaking/climbing the NET
- Attempt of lifting optical cable connected to lower triggering fixtures for crawling underneath






# FIBER HUNTER


Detection accuracy within  $\pm 3m$ <sup>(\*)</sup>  
Provide perfect detection with complete situation analysis



**Performance**



**Reliability**



**Cost**

**High performances**

- Detection accuracy within  $\pm 3m$ <sup>(\*)</sup>
- Detection rate more than 99% (no jump)
- Provide false alarm rate less than **5/Km/month**
- Diamond shape NET to detect only for intrusion action
- Provide upper/lower triggering fixtures for complete detection
- Provide chicken net to protect system from animals
- Easy integration into existing surveillance system

**High system reliability**

- Using military tactical outdoor cable to provide reliability more than 10 years in harsh environment
- No electrical sensor used in perimeter area
- Reliability test has been done for operation environment
  - Optical fiber NET : Temperature/Salt water/Climate changes/Non-flammable
  - Controller : EMC(EMI/EMS)
  - Upper/lower Triggering fixtures : Temperature/salt water/Climate changes

**Minimum maintenance cost**

- Each controller port can cover upto 50m perimeter length
- Fiber Hunter controller has upto 16ports to cover maximum of 800m per controller
- Using fiber optical cable of MTBF 90,000Hrs.
- For cutting in optical fiber net can be fixed for using optical splicing, not changing entire net
- Network based TCP/IP protocol can minimize operating personnel

(\*) detection in optical fiber net





# DETECTION OF INTRUSION ACTIVITY

- Cutting of optical fiber NET
- Bending of optical fiber NET
- Attempt of breaking the NET
- Attempt of climbing the NET
- Attempt of climbing with upper triggering fixtures
  - Horizontal pushing/pulling
  - Vertical pushing/pulling
- Attempt of lifting optical cable connected to lower triggering fixtures for crawling underneath

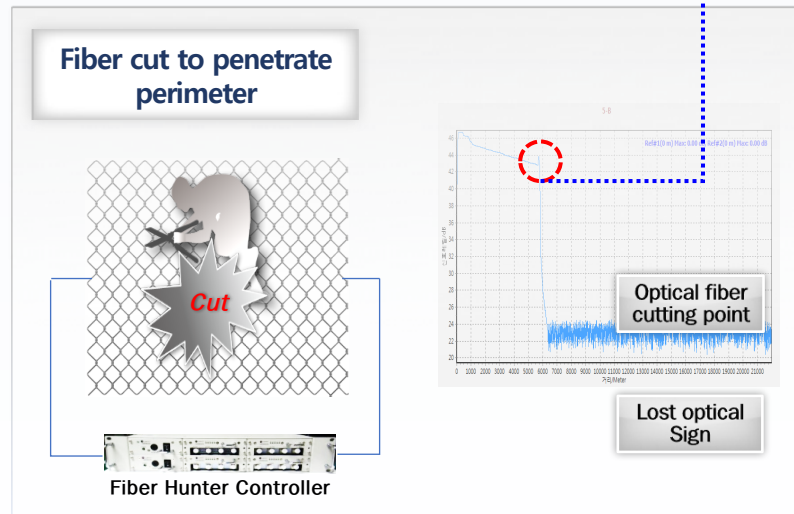




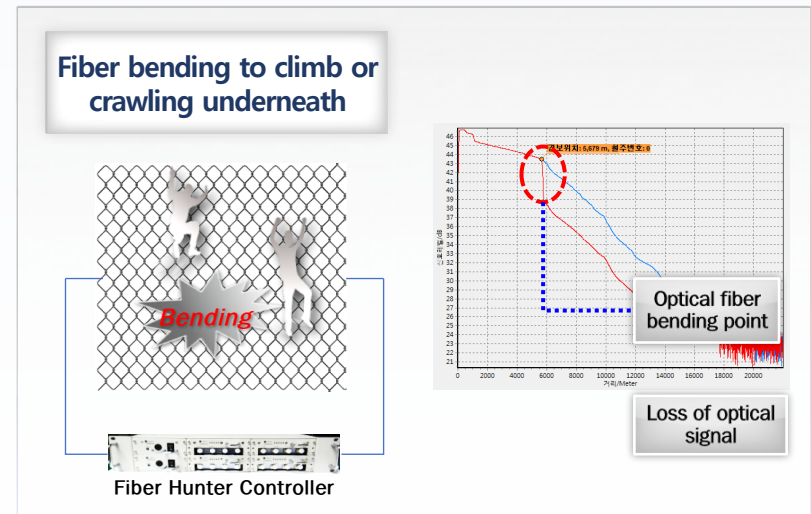
# OPERATION PRINCIPLE

Detecting optical fiber attenuation changes with intrusion activities.

## - Cutting



## - Bending



Multi-detection for bending is also capable for multiple intrusion action.  
Dual-detection for fiber cutting is also applicable.

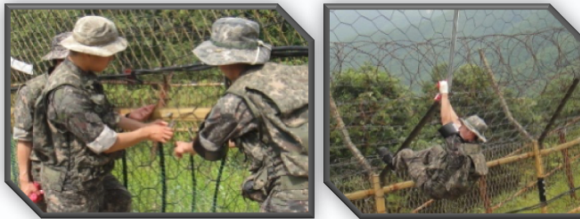




# DETECTION PROCESS (Operation Concept)

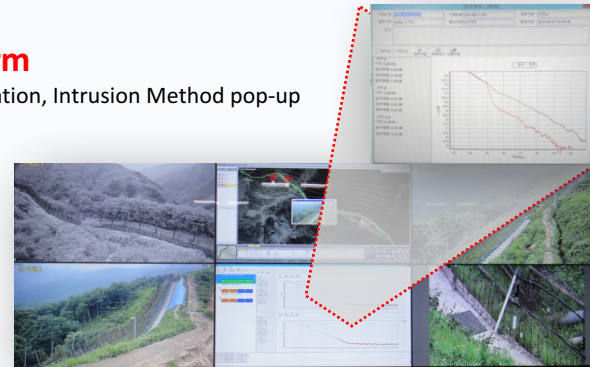
## Intrusion Trial

- Cut, Climb, pulling, etc

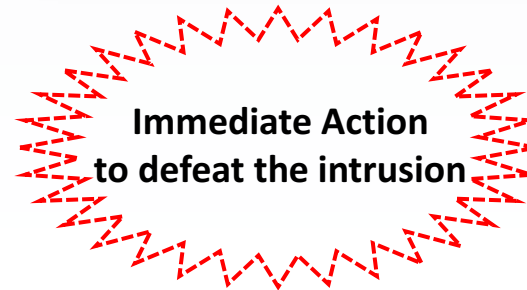


## Alarm

- Location, Intrusion Method pop-up

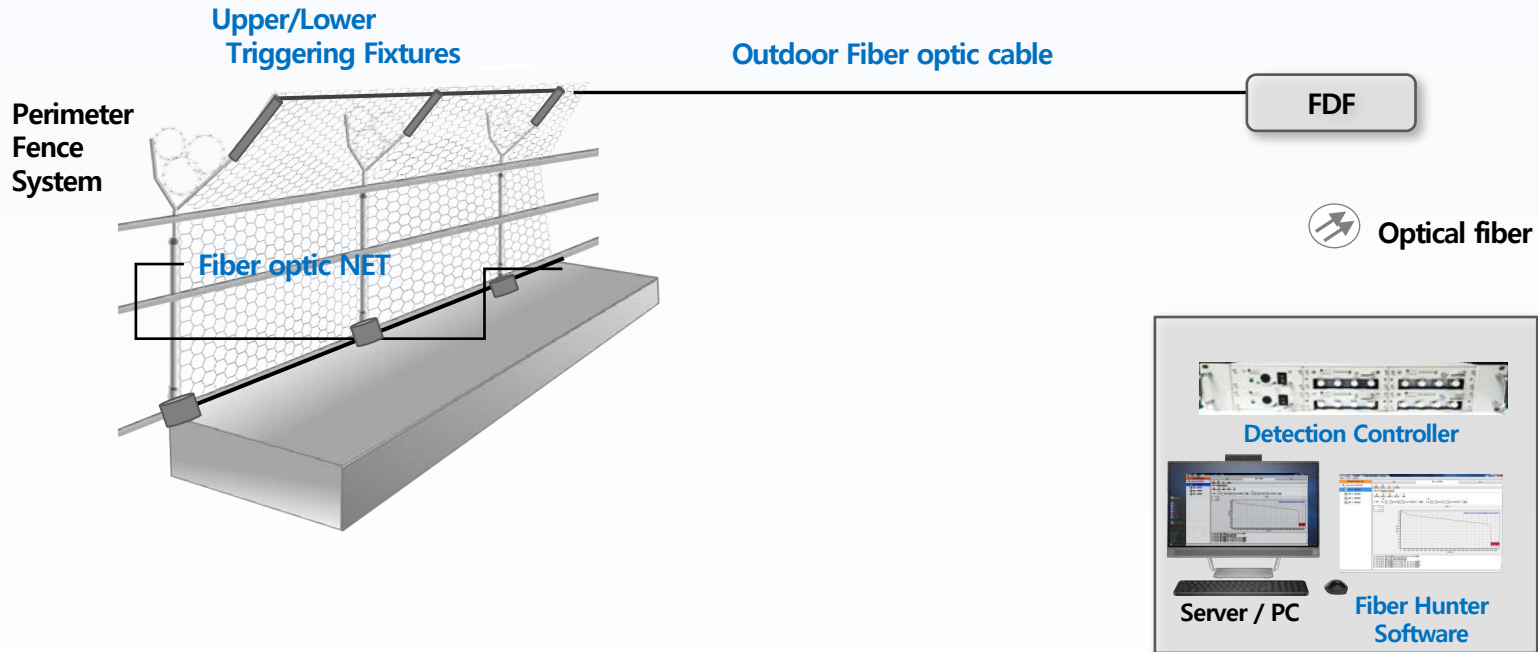


## Camera Point-out (optional for automatic)





# SYSTEM BLOCK DIAGRAM







# ADVANTAGES OF FIBER HUNTER

## Detection Advantages for Fiber Hunter

### Countermeasures for high speed winds/heavy rain/heavy snow

- Fiber optic net is very insensitive to heavy rain, heavy snow and high speed wind, so false alarms can be minimized due to heavy rain, heavy snow and high speed wind up-to 15m/s. In case of high speed wind more than 15 m/s like typhoon or hurricane, sensitivity for alarm threshold can be changed to minimized false alarm.

### Countermeasures for lightening and electromagnetic field applied

- All sensors deployed in outside perimeter is based on fiber optic cable for Fiber Hunter. Fiber optic cable is immunized to electromagnetic field especially for thunderstorm and lightening. For other system like electrical sensors will be highly effective by lightening.

### Countermeasure for temperature and humidity changes

- Due to using military tactical fiber which was tested and proved for anti-salt water and anti-sunlight/temperature changes/high humidity, effects from temperature and humidity changes can be minimized for the detection as well as for the false alarms.
- Fiber hunter NET also can be used for underwater detection.
- Temperature range for operation for the NET is -40 ~ 85°C.

### Countermeasure for vibration

- Fiber Hunter is acting only for the intrusion action like cutting and bending for fiber optic cables.
- Vibration is not effective for alarm even false alarms. Other sensor system is very sensitive because detection alarm is the analysis of vibrations especially for movement sensors and fiber FT sensors.

## Weakness of other sensor systems

Factors for False Alarm	False alarm introduced by sensor types
High speed winds / Heavy now / Heavy rain	Movement Sensors ❌
Lightening / Electromagnetic field	Electromagnetic Sensors ❌
Temperature / Humidity	Infrared Sensors ❌
Deformation of fence system	Tension Sensors ❌
Vibrations	Movement Sensors ❌ Fiber FFT Sensors ❌

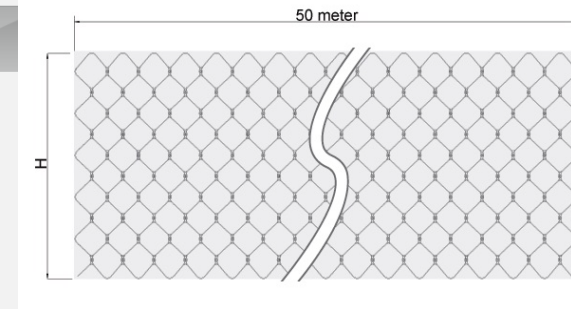




# FIBER HUNTER Optical Fiber NET(1/4)

## Key Features

- Heavy duty military tactical outdoor cable
- Diamond-shape NET to optimize intrusion detection
- Kevlar reinforced polyurethane jacket
- Detection of fiber optic cut and bend due to intrusion
- Operating temperature -40°C ~ +85°C



Items	Specifications
Fiber type	SMF compatible
NET dimension : Height	0.5 ~ 3.0 m
NET dimension : Length	50 m
Operating temperature	-40 ~ +85 °C
Reliability	Temperature / Salt water / Climate changes / Non-flammable



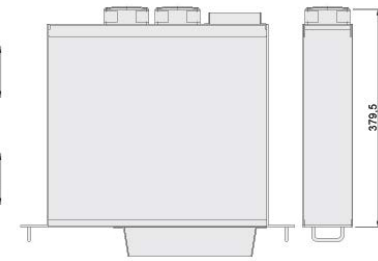
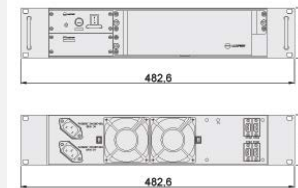


# FIBER HUNTER

## Detection controller(2/4)

### Key Features

- 4 / 16 ports per controller
- TCP/IP Interface
- 19" Standard Rack with 2U height
- Dual Power supply(hot swap)
- Card type controller for easy install, expand and after-service



(unit : mm)

Items	Specifications
Detection type	OTDR (Optical Time domain Reflectometer)
Interface	Ethernet / RS-232C
Dimension	19" Standard Rack, 2U
Power	110 ~ 240VAC / 75W Dual Power (Hot Swap)
Operating temperature	-10 ~ +60 °C



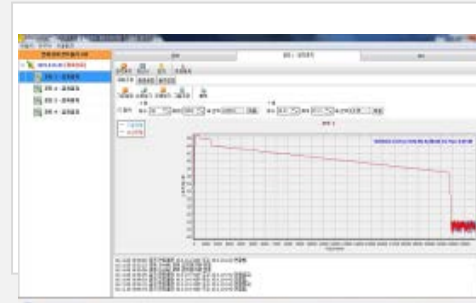


# FIBER HUNTER

Detection software(3/4)

## Key Features

- Analyze and make decision for alarm
- Easy to use Graphic User Interface for alarm handling
- PC or Server can be used to install
- MS SQL Database
- Can be able to connect to CCTV(Optional)



Items	Specifications
PC/server requirements	OS : Windows 7 and above, HDD 1TB, Memory 32GB
Database	MS SQL
Detection accuracy	$\pm 3m$ in optical sensor net
Alarm data transmit	TCP/IP packet
Multi-detection	allowed





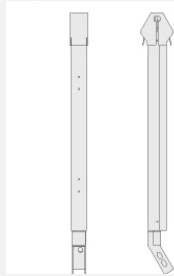
# FIBER HUNTER

## Triggering Fixtures(4/4)

### Upper Triggering Fixtures

#### Key Features

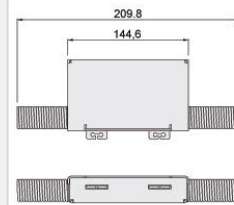
- Alarm trigger for intrusion attempt over the NET
- Vertical push/pull action
- Horizontal push/pull action
- Customization possible



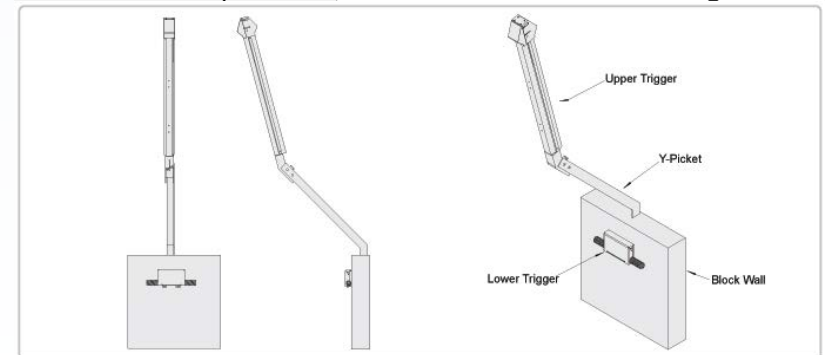
### Lower Triggering Fixtures

#### Key Features

- Alarm trigger for intrusion attempt under the NET
- Alarm action for lifting the net
- Customization possible



Items	Specifications
Material	Metal with powder coating
Dimensions	800 x 60 x 55mm(Upper TF) 145 x 85 x 32mm(Lower TF)
Operating temperature	-40 ~ +85 °C
Reliability	Salt water / Climate changes



Example of installation





# APPLICATION

Military Security		Public Safty	
Border Lines, Military Bases		Prisons/Jails, Airport, Railroad	
Ammunition Depot, Satellite Sites		Historic Sites	
Industrial Security		Commercial Property Protection	
Airport, Harbors		Plant Farm, Animal Farm	
Oil/Water Pipelines		Villa housing or complex	
Electrical Generating Stations		Utility Substations	
Plants Security		Underwater/underground Protection	
Water Plant, Chemical Plant		Underwater/Underground Perimeter detection	
Nuclear Plant, Power Plant, Oil Refinery		Nuclear Generating Stations	





# FIBER HUNTER INSTALLATION SITES

South boarder of DMZ, South Korea





# FIBER HUNTER INSTALLATION SITES

Three Air-force bases, South Korea



Navy bases, Ammunition depots, Satellite sites will be installed by next year in South Korea







FIBER HUNTER WILL BE YOUR BEST PARTNER  
TO PROTECT FOR YOU AND YOUR CLIENTS.

THANK YOU FOR YOUR ATTENTION!



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