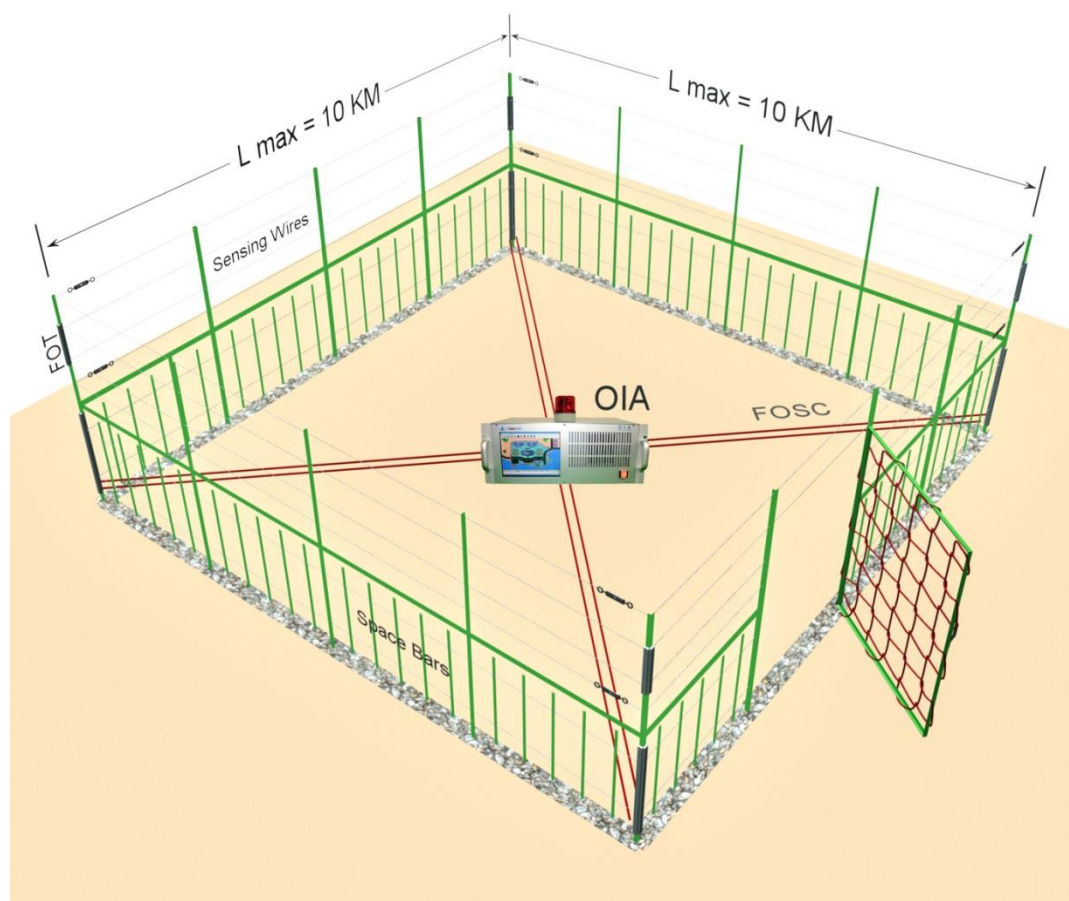


SWF

Sensing Wire Fence



- No field equipment up to 40km
- Free from nuisance alarm
- New Fence having both fencing and sensing capability
- High Probability of Detection over 95%
- Locate intrusion spot within ± 25 meters
- Environmental Proof



Development Background



FOM at Saudi Top Military Site Wall 2015 AUG



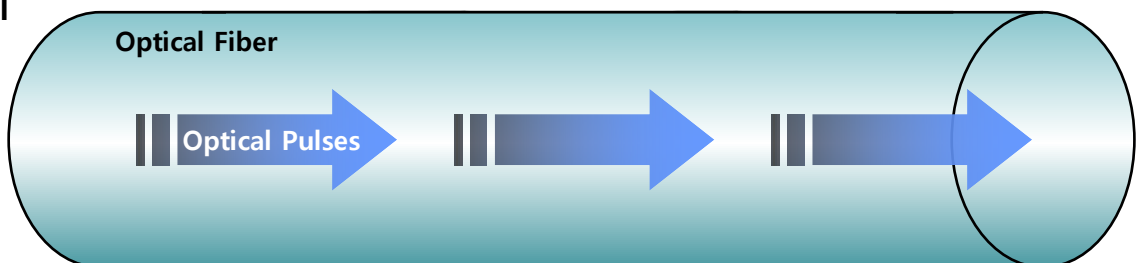
FOM at Korea Top Gov't Site Fence 2015 MAY

FOSM (Fiber Optic Security Mesh) operates based on Optical Radar principle and throughout its worldwide installations over 15 years has been reputed as the unique foolproof accurate intrusion detection system being free from nuisance alarm. However overlaying FOSM to fence costs high.

FMVS (Fence Mount Vibration Sensors) costs low but are known as ineffective because of severe nuisance alarms due to wind, rain, vehicle etc, and limitations not to detect intruder at bad weather as well as intruder climbing over fence from a shoulder /ladder without touching the fence mes

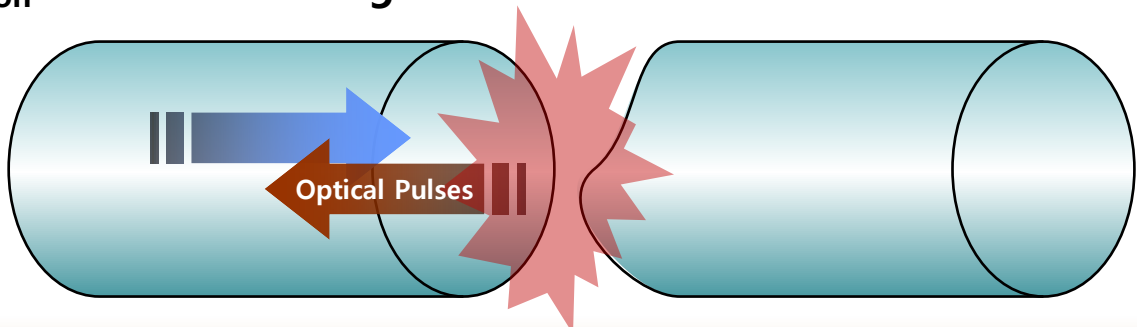
The conventional perimeter protection by both fence and a sensor mounted costs double. Recently Fibertron Co., Ltd. developed & presented **SWF** (Sensing Wire Fence) as an extended application of FOSM technology under Korea Patent #10-1698837 to proudly offer a new generation of fence having sensing capability itself for the highest perimeter protection but for the lowest cost.

Normal

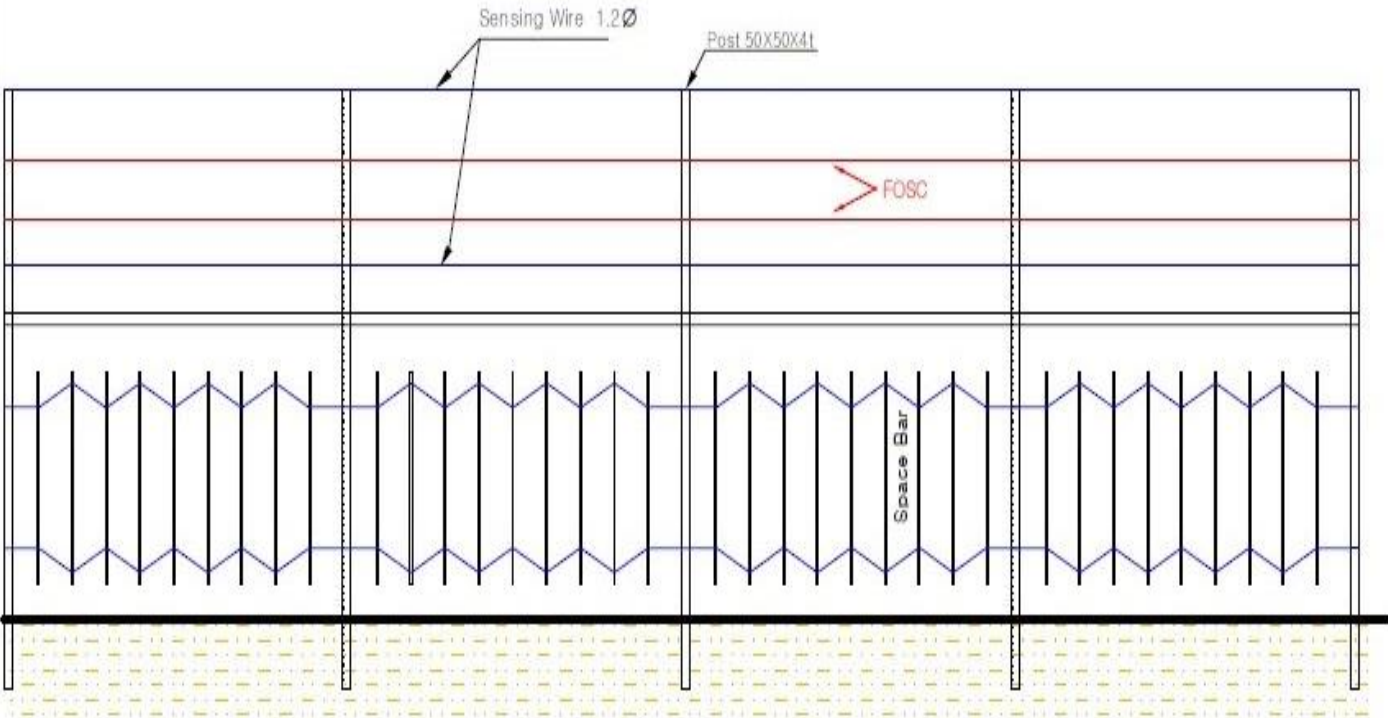


Intrusion

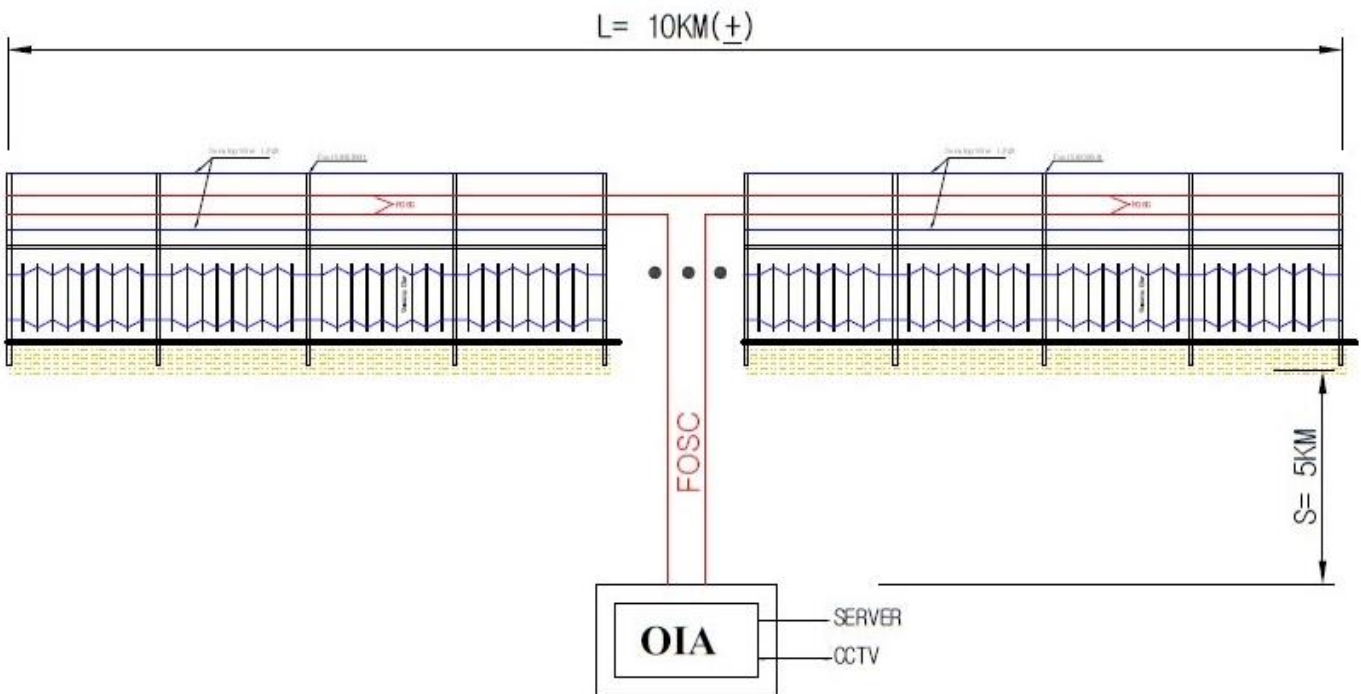
Cutting or Excessive Force



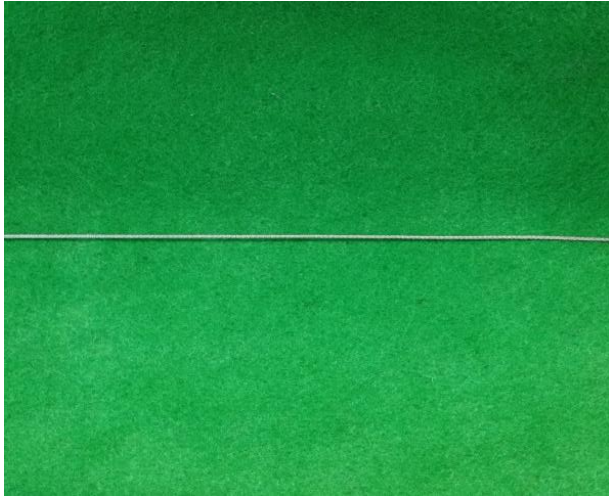
SWF drawing, front view



SWF System Diagram, 10KM



SW (Sensing Wire)



- Diameter : 1.2 mm typical
- Material : SUS 304
- Weight : 8kg / km
- Environmental : immune to water, electricity, vibration.
- Operating Temperature : -40°C to + 75°C
- Allowable strength : 20kg
- Lifetime : over 20 years



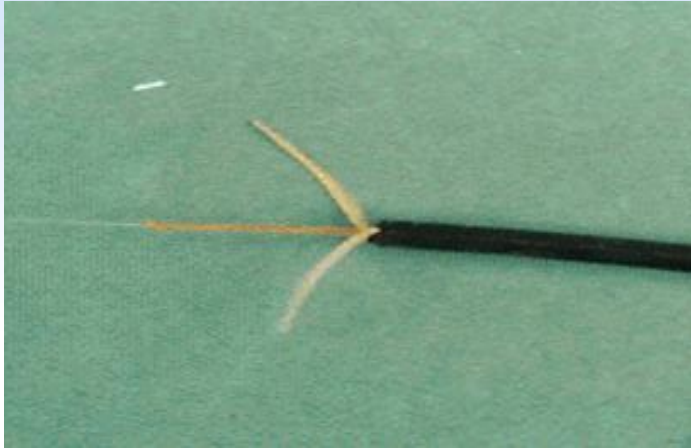
FOT enclosed

Sensing Wire

Space Bar

FOSC (FO Sensor Cable)

FOSC provides connection between FOT and the control equipment, supplies Optical Laser Pulses to every FOT on the fence and conveys Optical backscatter from FOT back to the control equipment for triggering alarm at picking up abnormal Optical Echoes due to intrusion.



Specification of FOSC-1C•

- Diameter : 3mm
- Fiber Grade : multi-mode
- Weight : 10kg / km
- Environmental :
immune to water, electricity, vibration.
- Operating Temperature : -40°C to + 75°C
- Allowable strength : 10kg
- Lifetime : over 15 years



Support

Speiciication of SP30x30x3t

- Size : 30x30x3t
- Material : SS41, Zn Coat
- Weight : 1.5kg

FOT (Fiber Optic Transducer)

FOT houses FOSC coupled with Sensing Wire to generate abnormal Optical echoes at pulling by the Sensing Wire. It requires no electricity and is immune to environment.

Specification of FOT-2D

- Transducer Type :
displacement/bidirectional
- Dimension : 40x40x250mm typically but depending on application
- Material : SS41, Zn Coat
- Environmental : Immune to water, temperature, electricity, vibration
- Lifetime : over 15 yrs
- Weight : 1kg typical



System Description

SWF consists of metal Posts, thin Space Bars, Sensing Wires and a FOSC (Fiber Optic Sensor Cable). A brief description of SWF can be made by introuducing of SW installation. Install 2 meter high Posts at 3 meter spacing along the perimeter. Mount two Sensing Wires with Space Bars up to 1.2meter height from the ground. Mount two Sensing Wires and two FOSC (FO Sensor Cable) up to 2 meters height. Mount FOT (Fiber Optic Transducer) at about 25 meter spacing in a hidden place so to be connected with FOSC and activated by intruder pulling sensing wire.

The FOSC is connected to the control equipment at SCR (Security Control Room) to receive Infrared Laser Pulses periodically for triggering alarm and locating the intrusion spot within ± 25 meters visibly and audibly at reception of abnormal Optical echoes along FOSC..

The system shall not put any field equipment (Electrical Power, Communication Port, and Processor) up to 40km perimeter and thus will minimize maintenance need over its life time 20 years or over. The SWF system shall be intrinsically free from nuisance alarm and immune to environmental effects or outside influences such as aircraft/truck vibrations, high temperature, sunshine, rain, snow, haze, dirt, storm, lightning, surge, power lines, Electric ground loop, Electric cross talk etc.

System specifications

System Construction	OIA – FOSC – Sensing Wire / Space Bar -FOT
Sensing Origin	Cutting or pulling Sensing Wires
Location Accuracy	$\pm 15m, \pm 25m, \pm 50m, \pm 100m, \pm 200m$ Optional
Prob. of Detection	Over 95%
FOSC grade	3Ø 1Core MMF
OIA detection coverage	Lmax = 10 km, typical, Max upto 8 channel
Remote operation	Local OSU to be remotely controlled via comm. Link by ACS at Security Control Room
Op Temperature	-40 °C~ +75°C
Environment	Immune to rain, snow, haze, wind, lightning, pollution, vehicle vibrations
Lifer time	Over 15 years

Control Equipment Specifications

OIA periodically & continuously injects Infrared Laser Pulses into FOSC(FO Sensor Cable) and trigger audible & visible alarming at reception of abnormal Optical Echoes flashing the intrusion spot on its own monitor site map within $\pm 15m$ error. OIA also provides OTDR service function and operation data storage. OIA provides input ports for other sensors such as IR Sensor, Shock Sensor, Door Locks etc and communication ports with other PC, CCTV Control, Server PC, LAN, Internet etc



- ◆ **OIA-nP (Optical Sensing Unit)**
- Operation mode : Normal, Test, Emergency, Setting, Stop
 - Sensing mode : cutting and/or excess force
 - Location Accuracy : $\pm 1m, \pm 15m, \pm 25m$, Optional
 - No of Optical Ports : n (maximum 8)
 - Sensing mode : cutting , excess force , selectable
 - External connection port : PC interface
 - Fiber Optic test function : semi-OTDR
 - Auto-logging : event data (alarm,action,status,setting value etc)
 - Monitor : 8.4" LCD built in or 17" LCD external
 - Interface : dry contacts, serial or LAN
 - Acceptable output devices : warning light, signal phone
 - O/S : Window XP or up to client request
 - Dimension : 19" 4U (177×483×300 mm)
 - Operating condition : indoors
 - Power : AC220V $\pm 10\%$ 50/60Hz, 100Watt approx