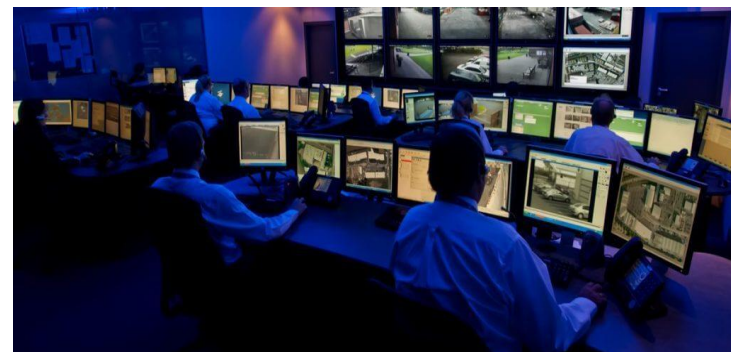
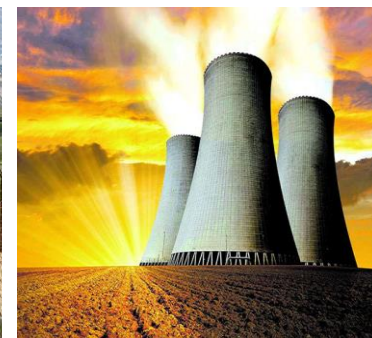


# JERIKON JOSS intrusion detection system in large perimeters



# **JERIKON JOSS**

## **fiber optic based security system**

JERIKON JOSS is a technology based on analyzing signals in a fiber optic cable, which changes characteristics based on the vibrations in its area.

One segment of this technology is capable of detecting noise and vibration at distances of up to 40 km.

# **JERIKON JOSS**

## **fields of use**

### **Large perimeter protection:**

state borders, airport areas, military bases, drinking water sources, railroads, highways, pipelines, etc.

### **Detection of failure and sabotage on long lines:**

gas and oil pipelines, EHV lines, railroads, highways.

### **Monitoring the movement of vehicles along the sensor cable:**

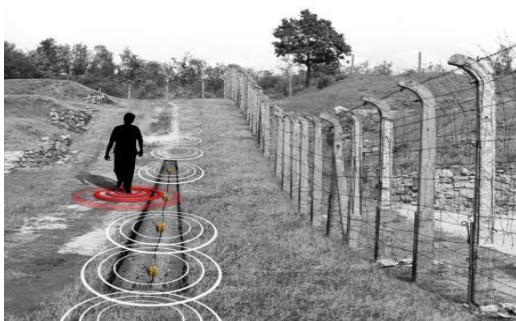
determining the position of a train in real time.

### **Unusual situation detection:**

events such as an emergency brake being used on a train, accidents on the highway, detection of traffic jams.



# THE OPTICAL FIBER SENSING SYSTEMS USED FOR INTRUSION DETECTION MONITORED AREAS AND TO PREVENT DAMAGE



Perimeter Protection



Supervision pipeline  
- failure, damage,...



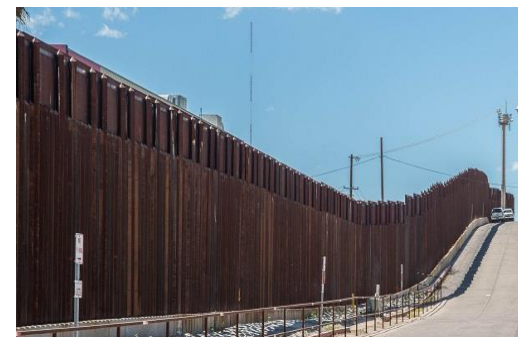
Localization of protective  
fencing



Protecting buildings against  
undue distortions of space



Tracking Rail Traffic



Border security

# **JERIKON JOSS**

## **main advantages**

**Low cost of long distance objects security organization (JERIKON )  
Integration with another security systems**

**Hidden operation of the system – no metal detection, no visible sensors, no emission**

**Immunity to electromagnetic influence and interferences**

**Stable system operation regardless weather conditions: raining, snowing, fog, wind etc.**

**Self education - the system can be taught depending of new events and facility types**

# **JERIKON JOSS**

## **main advantages**

**Standard optical fiber G.657 as distributed sensitive element**

**Easy to install - put the trench in the soil or along the fence**

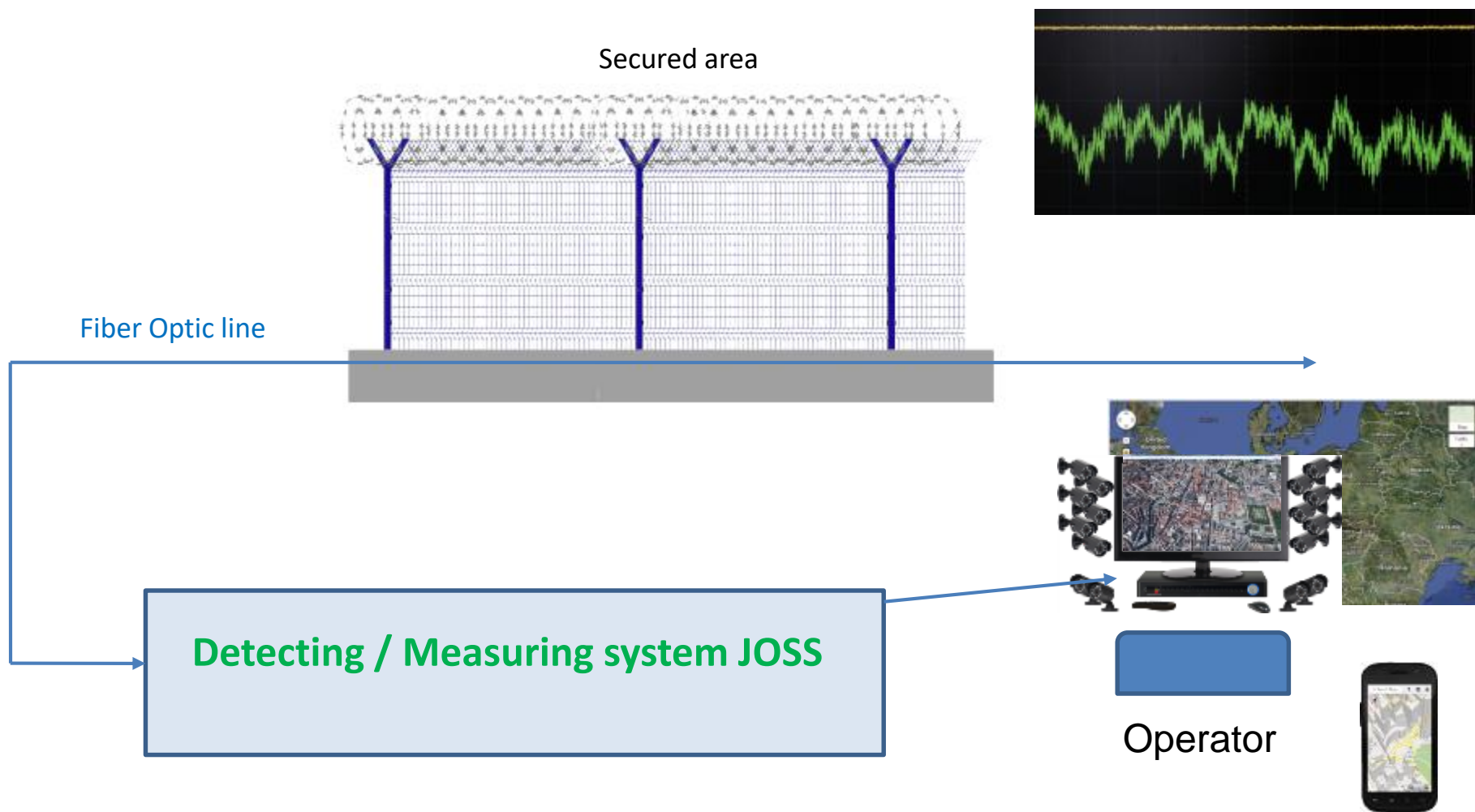
**No special cable needed – the sensing element is a conventional single-mode fiber optic cable**

**No power supply or electronics along the protecting perimeter needed**

**Possibility of underground use in any soil**

**No special skills of the operator in monitoring center needed**

# THE OPTICAL FIBER SENSORS





# GUARDING A LARGE PERIMETER using distributed optical fiber sensor

- Airports, military bases, warehouses, state material reserves ...
- Length of about 40 km
- Laying the sensor according to the project
- Detection, localization, classification of events stored in the event database
- Communication interface for sharing events database to a superior surveillance system of building security, where are centralized security information from multiple sources





# GUARDING THE PIPELINES, BORDERS, ROADS

## Using distributed optical fiber sensor

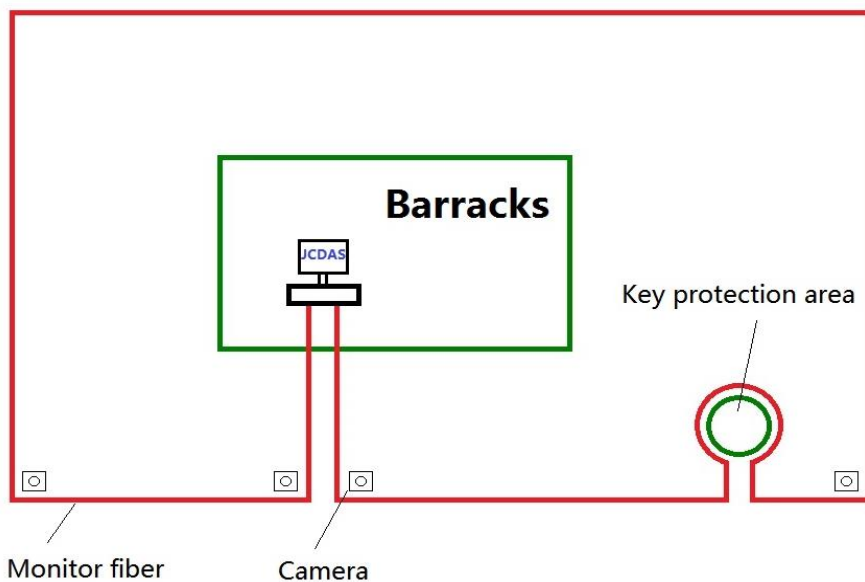
- Use for pipelines, highways, railways, border protection
- Supervision of the 40 km (DAS) or 100 km pipeline from one site (BOTDA) – measurement of temperature and strain
- Connection to the central dispatching - Networking stations, tracking several thousand km pipeline
- Monitoring of operational incidents on pipelines and roads (the valves, motors, jam on the highway ...)
- Identifying faults (broken pipes, faulty axle ...)
- The detection of intrusion attempts pipeline, classification of events
- Guarding state borders
- Environmental protection water supply dams
- Laying the sensor over the pipeline, the possibility of using existing telecommunication lines running parallel



# Military Asset Protection

Safeguarding borders and military with a surveillance system that identifies threats quickly and effectively is your first line of defense.

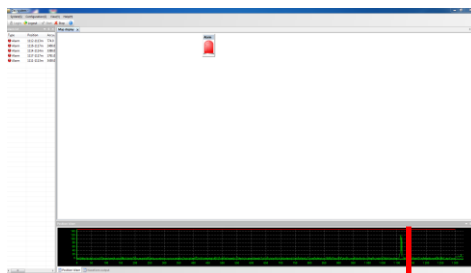
- Detects, tracks, and classifies a wide range of threats
- Delivers real-time, actionable intelligence
- Endures challenging environments



The system offers three types of installation:

- Fence
- Buried
- Hybrid

# Communication with monitoring center

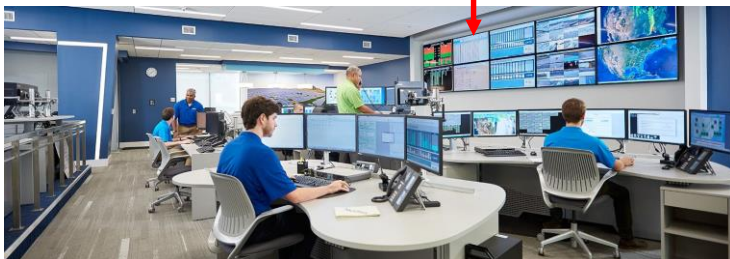


Events database in  
JERIKON JOSS SW

Data transfer



Monitoring center



Database in central  
surveillance system

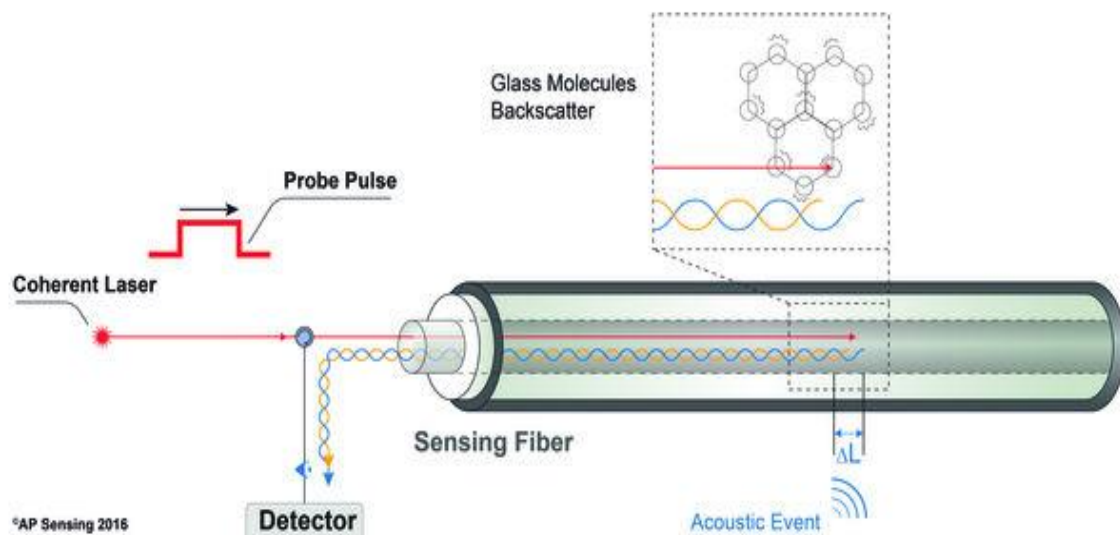
# **DISTRIBUTED SENSORS PRINCIPLES**

- **Fiber Optic Distributed Temperature Sensors – Brillouin BOTDA scattering version**
- **Fiber Optic Distributed Strain and Temperature Sensors (DSTS) – BOTDR Module**
- **Distributed Raman Optical Fiber Temperature Sensing System**
- **DAS – Distributed Acoustic Sensor**
- **DVS – Distributed Vibration Sensor**



# DAS / DVS (Distributed Acoustic / Vibration Sensing)

- The fiber functions as if there were thousands of microphones installed
- Detects vibrations
- Captures acoustic energy along the optical fiber
- Classification algorithms are used to detect and locate, for example, intrusion activities



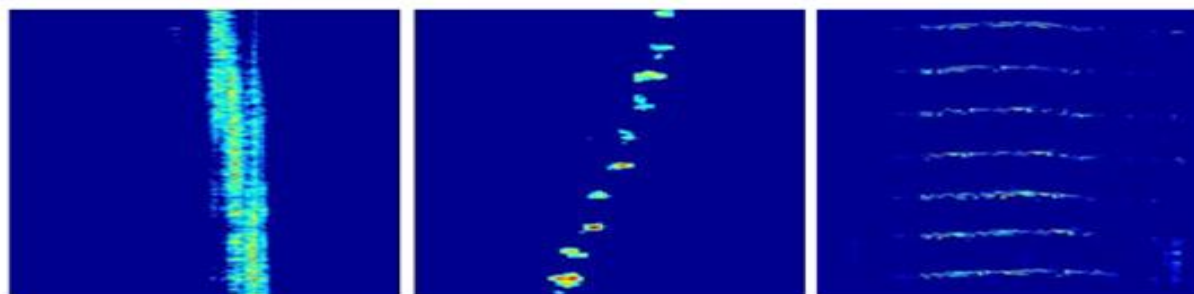
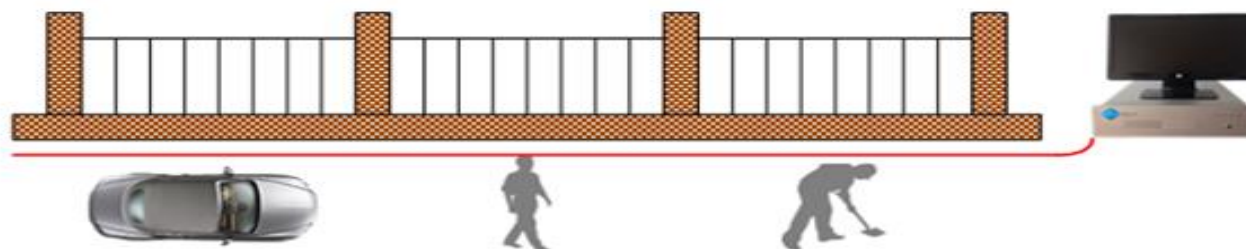
# **JERIKON JOSS DAS – Distributed Acoustic Sensing**

- **Uses phase-sensitive optical time-domain reflection technology**
- **Detection and location weak vibration signals.**
- **Use a highly coherent pulsed light source, which interferes with the Rayleigh signals that are scattered back in the pulse-width area**
- **The intensity of the interfering signal changes with the phase deviation as the result of vibration**
- **Vibration signals of different physical characteristics are produced by different vibration sources**
- **Analyzing the vibration signals - the physical characteristics can be extracted**

# JOSS - Distributed Acoustic Sensing System

## Probe Range:

- People walking: 5 m
- Vehicles: 20 m
- Mechanical Excavation: 100 m



# JERIKON JOSS

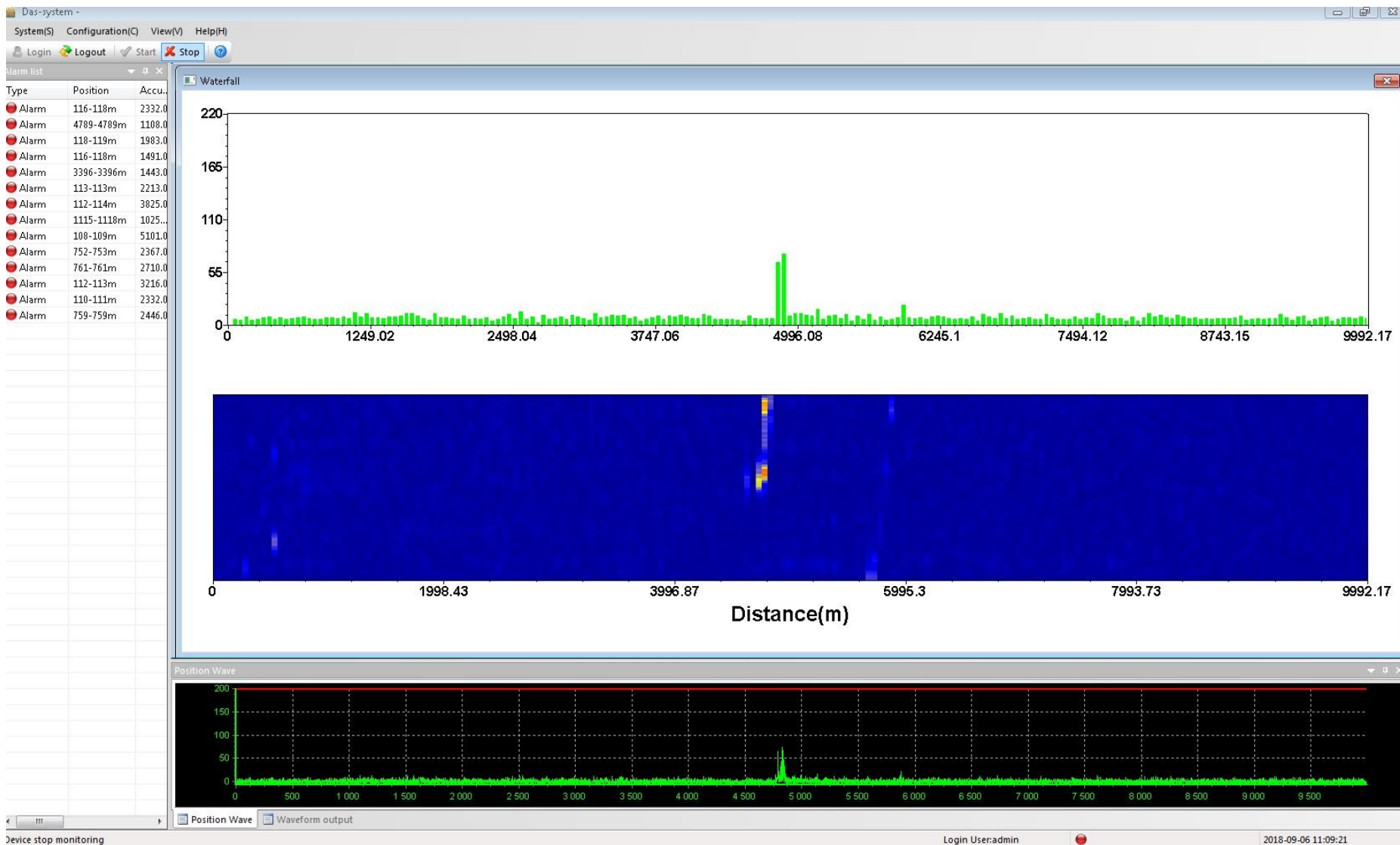




# JERIKON JOSS

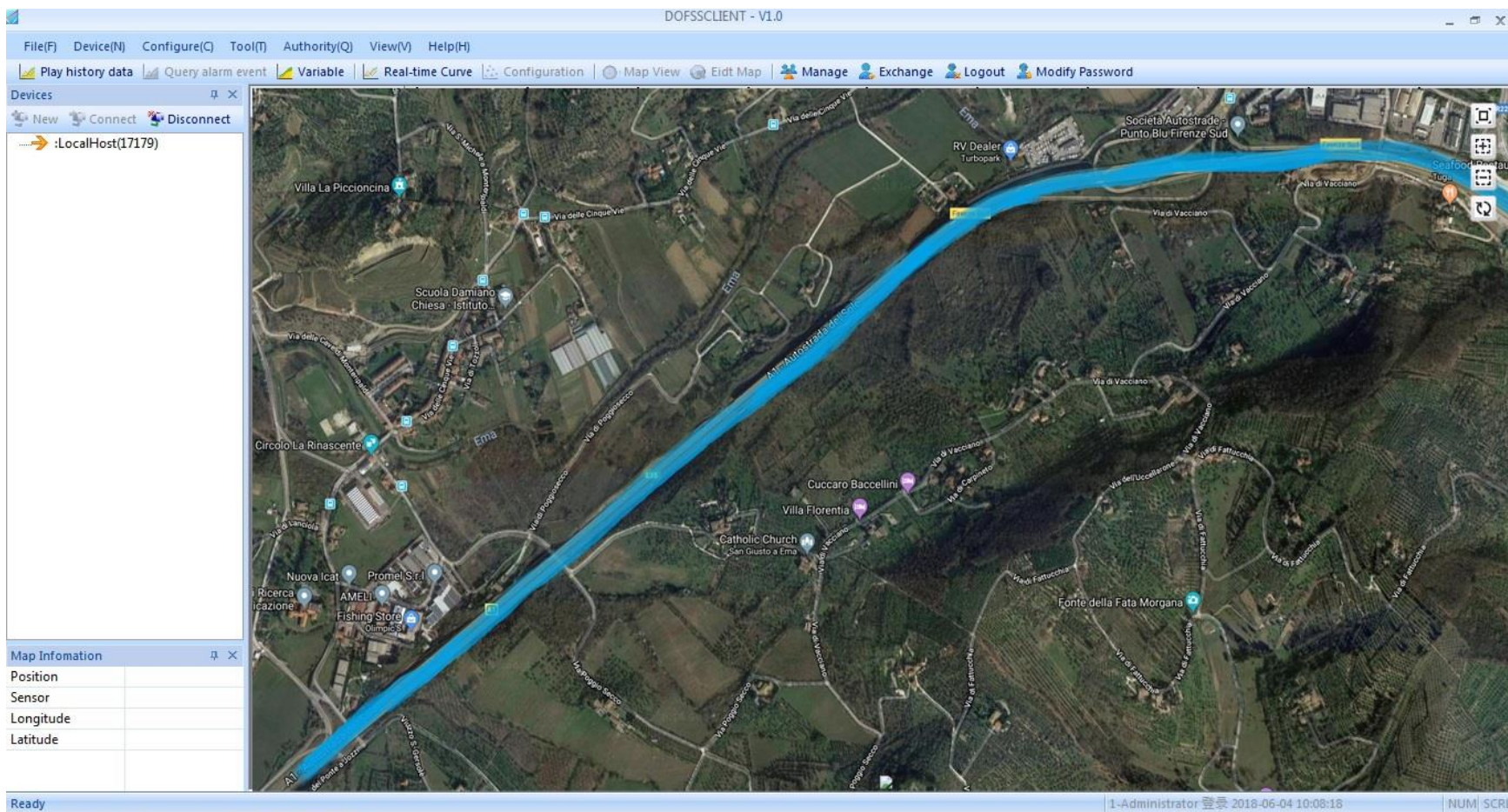
Performance	
Input Voltage	220 V $\pm$ 10%, 50 Hz $\pm$ 5%
Rated Power	80 W
Frequency Response	10 Hz – 100 kHz
Measuring Range	40 km
Signal Response Time	<3 s
Positioning Accuracy	10 m
Operating Temperature	0 °C to +40 °C
Operating Humidity	10% - 90% at 25 non-condensing
Fiber Connector	FC/APC
Dimensions(L×W×H)	482.6 mm × 458.4 mm × 133.5 mm (19" rack mount)
Sensing Optical Fiber Cable	
Optical Cable Type	Single Mode Optical Fiber Cable
Operational Life Span	>15 years
Optical Cable Loss	<0.20 dB/km
Temperature	-40 °C to+70 °C

# JOSS Software



# JOSS Software

## detects, locates and classifies multiple threats



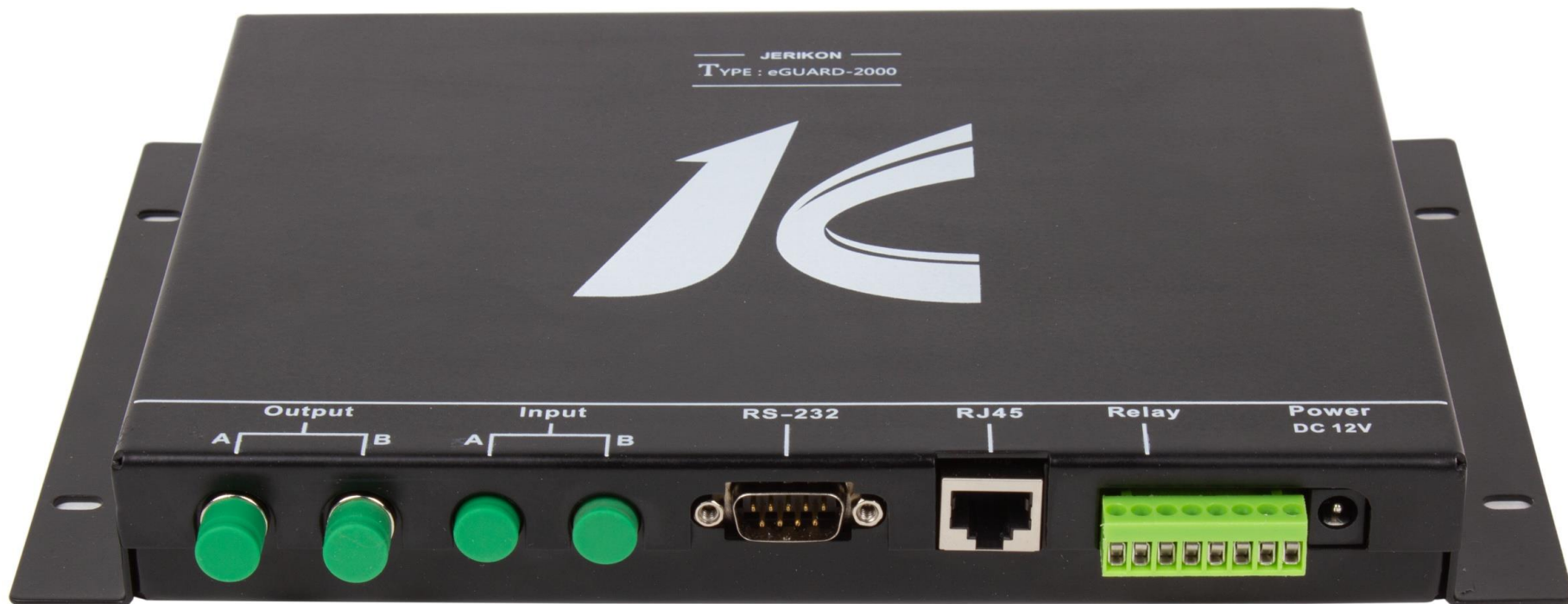
# JOSS Software

**Detects, locates and classifies multiple threats**

- **Identifies vehicles, personnel, digging and fence breach**
- **Offers passive and undetectable protection**
- **Provides continuous coverage**
- **Installed on standard fiber optic cable**
- **Connects to other sensors (CCTV)**
- **Reduces nuisance alarms**
- **Provides exceptional wind noise rejection**
- **Delivers a scalable and expandable system**
- **Eliminates infield maintenance requirements**



# JERIKON eGUARD-2000



# JERIKON eGUARD-2000

- The JERIKON eGUARD system can form a security system. With camera system, all modules can be added up to 256, each module monitoring 4 defense zone. The length of each defense zone up to 2km, and is customizable.
- You can set a workstation connecting an eGUARD module to monitor the current area. In central server, the whole defense area is under supervision.
- As the part of the distributed optical fiber acoustic system, a specific cable is required to lay on the monitoring area. The sensing cable should be sensitive to the vibrations and armored by strong materials sheath.

# THE OPTICAL FIBER SENSORS INSTALLATION METHODS



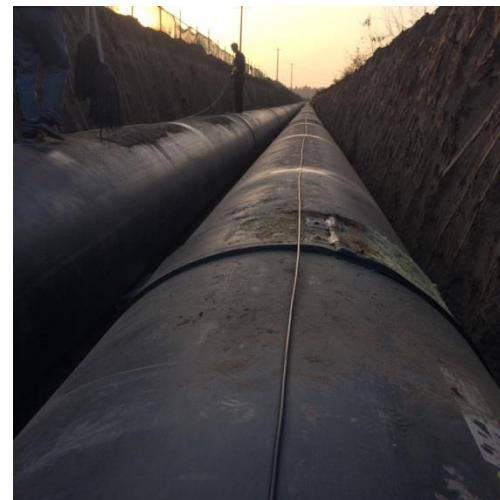
Underground Implementation



Fence Implementation



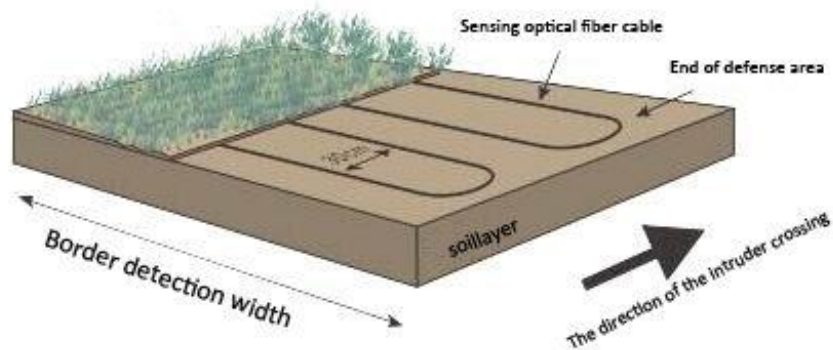
Wall Implementation



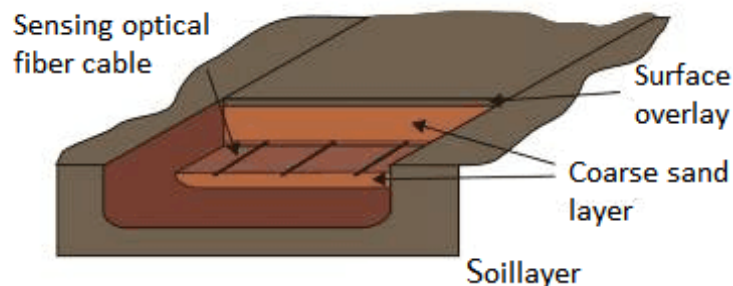
Pipeline Monitoring

# Buried Installation Methods

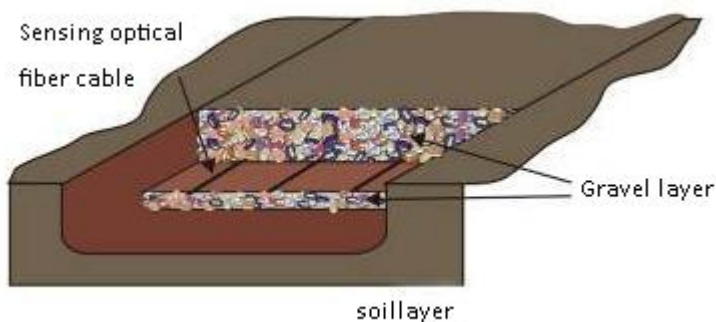
## Lawn, grassland



## Sandy Land (loose dry soil)

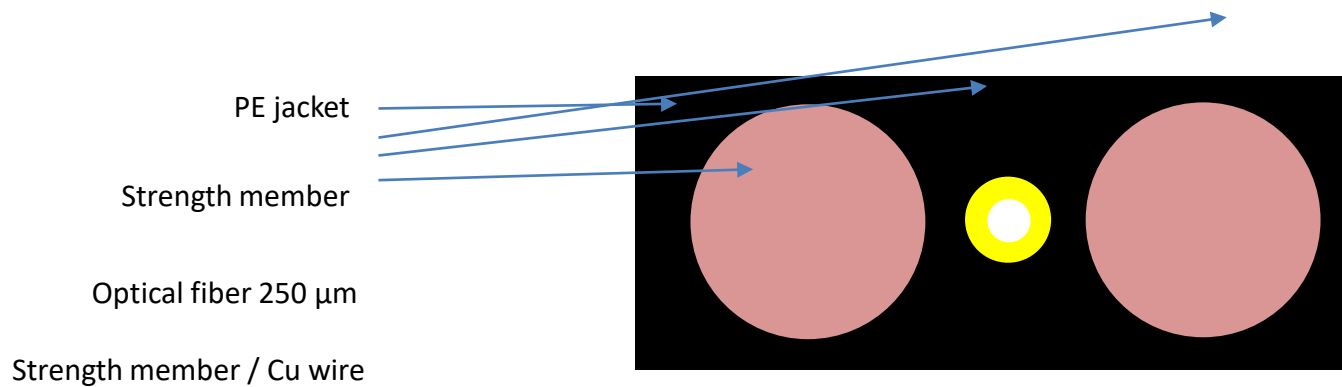
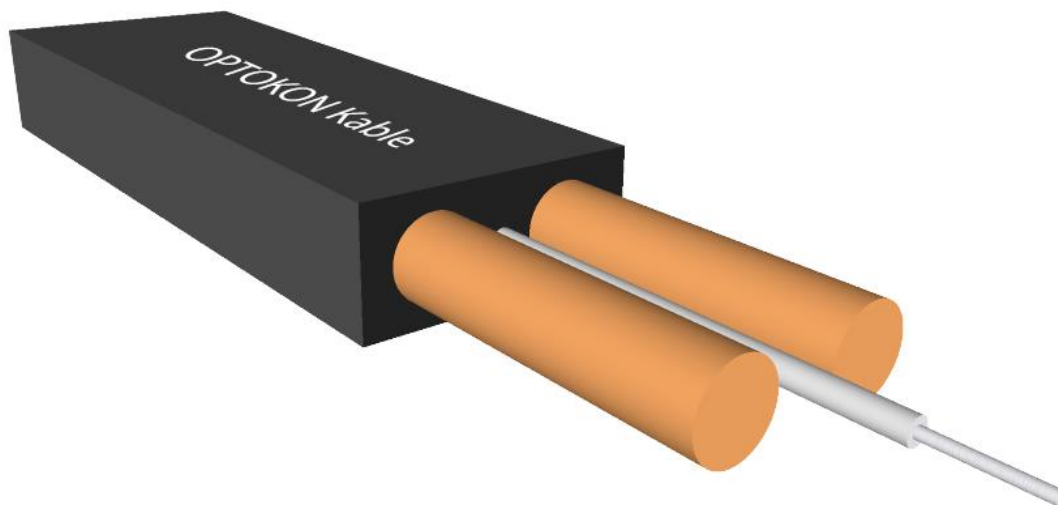


## Gravel





# EXAMPLE OF SENSOR CABLE CONSTRUCTION



# OPTOKON SYSTEMS

Type	Sensor type	Active length	Typical Application
JOSS-100	distributed	100 km	Pipeline
JOSS-40	distributed	40 km	Large perimeter
JOSS-10	distributed	10 km	Small perimeter

**WE OFFER CUSTOMIZED SOLUTIONS TAILORED TO SPECIFIC CUSTOMERS APPLICATION**



# SUMMARY

- **A specially developed optical cable for motion detection with respect to the low weight (and the weight of the receiver or other accessories), with a view to resolving the optimum distance to record movement (people, vehicles) in different environments (night, day, winter, etc.) and with resistance to weathering and other influences (overtaking by heavy vehicles)**
- **Specially crafted templates for reliable IDs (the option of filtering the movement of animals, for example) and with respect to various environments - soil, sand, stony ground, grass, wet clay etc. with the option to determine the direction (s) of motion detected - protected perimeter**
- **Specially customized camera system for directing cameras into focus**
- **Long-lasting system power (a few hours)**
- **Option of integration with different types of radio gateways for signal transmission**
- **Simple construction of the system in view of the low time consumption (in the order of dozens of minutes depending on the size of the perimeter)**

# Thank you for your attention

## **OPTOKON, a.s.**

Červený Kříž 250

586 01 Jihlava, Czech Republic

tel. +420 564 040 111

fax +420 564 040 134

**[OPTOKON@OPTOKON.COM](mailto:OPTOKON@OPTOKON.COM)**

**[WWW.OPTOKON.COM](http://WWW.OPTOKON.COM)**

