



# TECHNOLOGY

## Keeping up with the requirements of Homeland Security & Homeland Defense

**Presentation by:  
Keith Harman, V.P., Engineering,  
Senstar Corporation, Canada  
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## Ever increasing challenges

- Terrorism
- Criminal activity (Drug trafficking, Smuggling, etc.)
- Illegal immigration

**A Race we can not afford to lose!**



## Rapidly changing technology

- Increased signal processing capabilities (computational power)
- Updated technologies (radar, video, fiber optics etc.)
- Fusion of data from multiple sensors
- New sensor platforms (robots, UAVs, etc.)



## Traditional outdoor perimeter security requirements:

**DETER**

**DETECT**

**Must have all 5 components!**

**DELAY**

**ASSESS**

**RESPOND**



## Intrusion detection – Sensors classification

Active – Passive

Overt - Covert

Volumetric - Contact

Terrain Following – Line of sight

Deployable – Permanently installed (Fixed)

Zone Based – Precise locating

**Select a sensor type  
based on threat and  
system requirements**



## Traditional sensor technologies

- |                |   |
|----------------|---|
| Barrier        | – Taut Wire   |
| Fence sensors  | – Copper-based acoustic cables<br>– Fiber optic-based<br>– Geophones<br>– Motion switch type          |
| Buried cable   | – Leaky coaxial cable<br>zoning<br>ranging<br>– Pressure tubes<br>– Fiber optics<br>zoning<br>ranging |
| Electric Field | – Capacitive  |

**No one panacea!**





## Traditional sensor technologies (Continued)

Microwave

- Bistatic
- Monostatic

Infra Red

- Active
- Passive

Radar

- Scanning
- short range  
long range

Image Motion

- Video
- Thermal

**No one panacea!**



## Measures of Performance

Probability of Detection (Pd)

**Applies to ALL sensors**

Nuisance Alarm Rate (NAR)

**Must meet ALL three**

False Alarm Rate (FAR)



## New technologies – Laboratory vs Field Results

Most new technologies work in the laboratory, BUT in real world there are two technology terminators or challenges:

**MOTHER NATURE**

**&**

**HUMAN NATURE**







## Importance of testing new technologies

**There are NO shortcuts!**

Products must be tested in numerous environments (climatic and other) during the four seasons with realistic test procedures

The role of professional test agencies like Sandia National Labs, the US Air Force (Eglin C3), The US Army COE, US Navy China Lake, The British Home Office, etc. is critical

Bypassing these tests and going straight to the field almost always leads to disaster – Mother Nature and Human Nature usually win!



## Security Approach

### Traditional Approach



Typical Canadian Prison

### Homeland Security

BORDERS, SEA PORTS, AIRPORTS

Long perimeters in a potentially hostile environment present the challenges of:

- Rugged terrain
- Land/Water Interface
- Vegetation
- Animal population
- Assessment challenges

**Traditional approaches need to be modified**





## Proven approach to Border Security

### Gaza Border



### Lebanon Border



Taut Wire Fence  
Barrier  
Sensor

Over 700 km of Taut  
Wire Sensor on Borders  
Worldwide

### Syria Border



**Tailoring the technology to the  
threat and the environment**





## Border Security Using “Trip-Line” Sensor

Simple Fence Demarcation

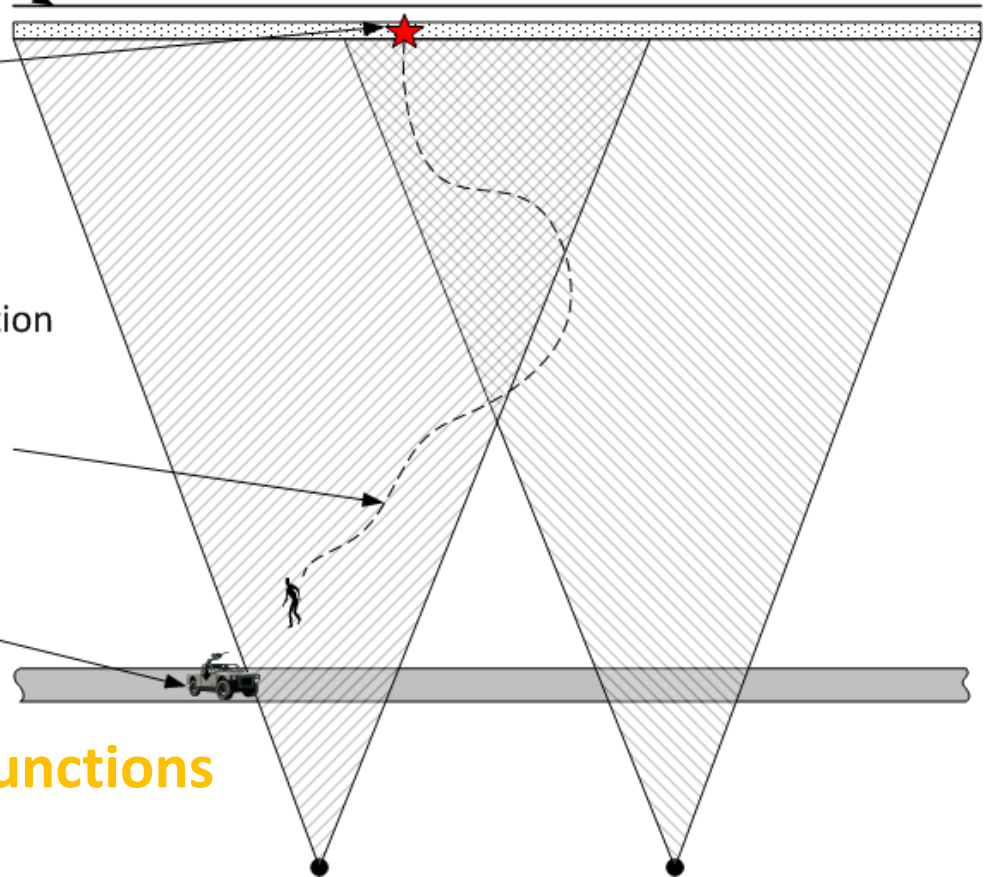
Buried Line Sensor (Covert)

Detects (terrain following)  
Locates (to nearest meter)  
Classifies  
reject small animals  
based on speed & direction

Radar and/or Thermal Camera  
Track only qualified targets

Response vehicle

**Separate Detection and  
Assessment & Tracking Functions**







## “Trip-Line” Sensor Technology

### Sensor Features

- Terrain Following
- Vegetation Tolerant
- Covert
- Optimized for the Environment
- Discriminate against Small animals

**Traditional approaches  
need to be modified**

### Sensor Performance

- Pinpoint Target Location
- Direction of Crossing
- Target Classification (man, vehicle, etc.)

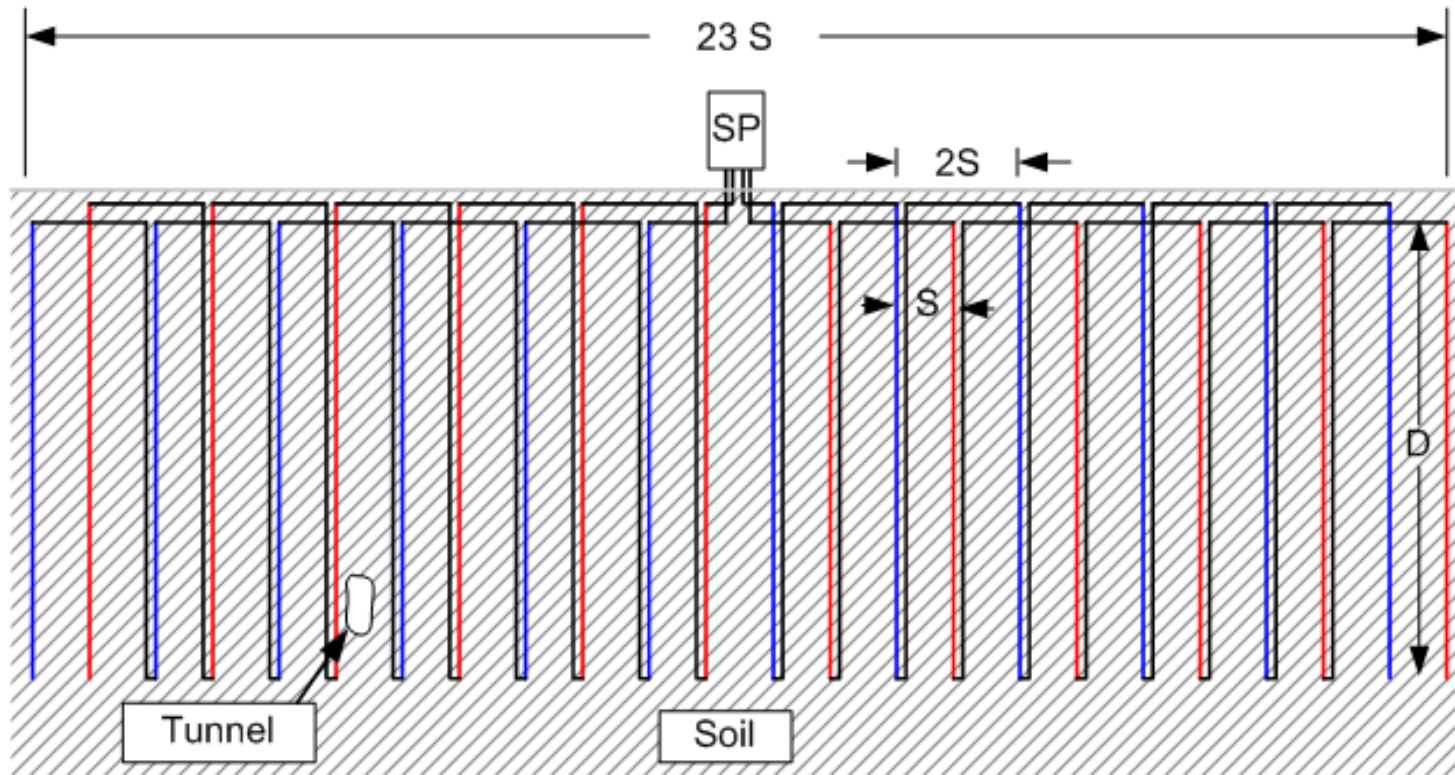
### Technology Candidates

- Leaky Cable
- Fiber Optics





## Adapting Traditional Technologies



**Leaky Coaxial Cable to Detect Tunnels,  
Tunneling and Tunnelers**



## Summary

**Mother Nature & Human Nature Challenge**

**Traditional Technologies have much to offer**

**Performance Measurements (Pd, NAR, FAR) vital**

**Importance of Realistic Testing & Test Agencies**

**Adapting Proven Technologies to address New Requirements**

**Using New Technology and Innovation while not throwing away the many years of experience in outdoor perimeter security we can and will win the race!**