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

DELAY

ASSESS

RESPOND

Must have all 5 components!
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
  - Fiber optic-based
  - Geophones
  - Motion switch type

- **Buried cable**
  - Leaky coaxial cable
    - zoning
    - ranging
  - Pressure tubes
  - Fiber optics
    - zoning
    - 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)

Nuisance Alarm Rate (NAR)

False Alarm Rate (FAR)

Applies to ALL sensors

Must meet ALL three
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

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

*Typical Canadian Prison*

*Traditional approaches need to be modified*
Proven approach to Border Security

Gaza Border

Taut Wire Fence
Barrier
Sensor

Lebanon Border

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

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

Technology Candidates
- Leaky Cable
- Fiber Optics

Traditional approaches need to be modified
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!