

BUILDING DESIGN FOR HOMELAND SECURITY

Unit XI

Electronic Security Systems



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Unit Objectives

Explain the basis concepts of electronic security system components, their capabilities, and their interaction with other systems.

Describe the electronic security system concepts and practices that warrant special attention to enhance public safety.

Use the Building Vulnerability Assessment Checklist to identify electronic security system requirements that can mitigate vulnerabilities.

Justify selection of electronic security systems to mitigate vulnerabilities.



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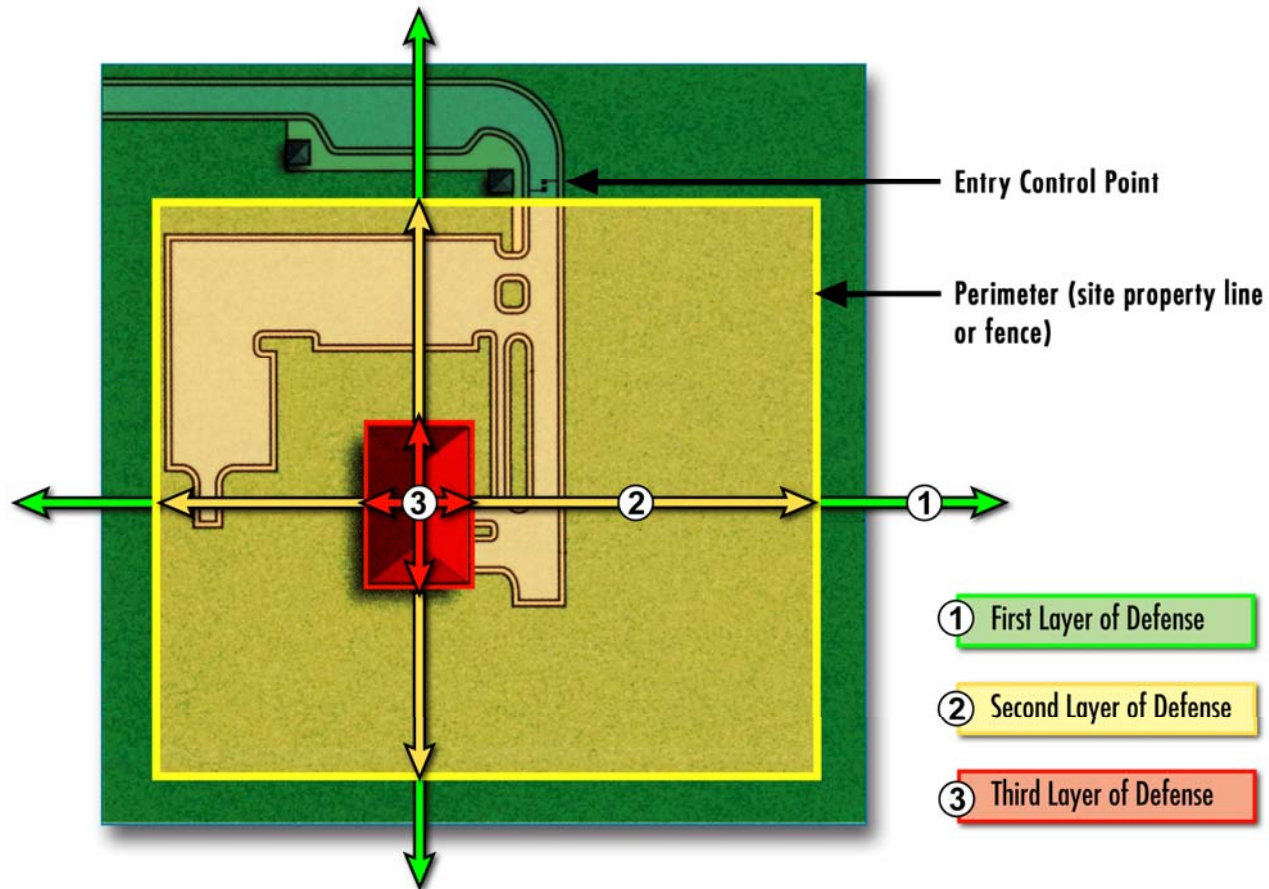
Electronic Security System (ESS) Concepts

- Basic concepts of site security systems
- Use of ESS
- General ESS Description
- ESS Design Considerations



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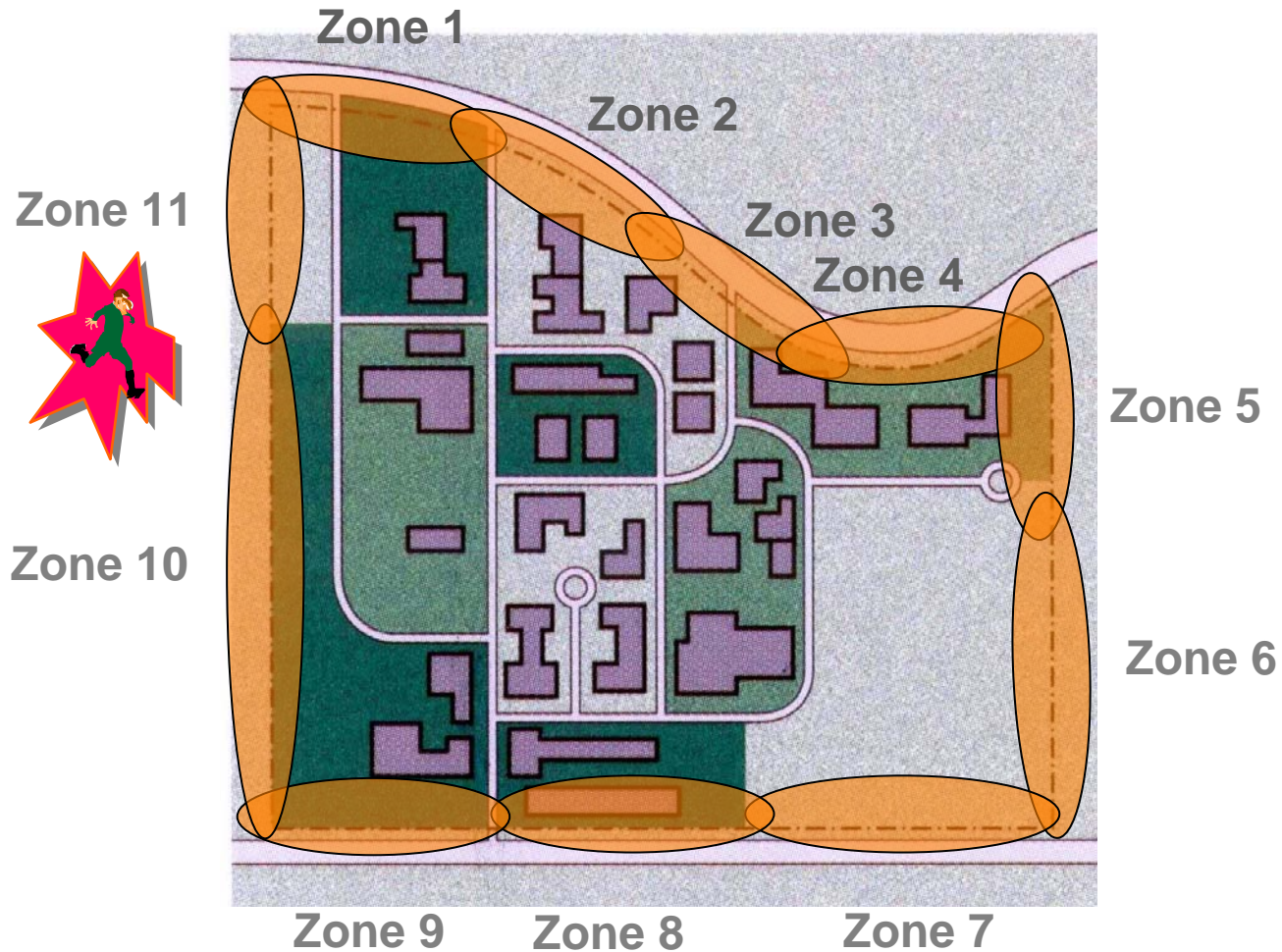
Perimeter Zone



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FEMA 452, Figure 2-2: Layers of Defense, p. 2-3

Perimeter Zone



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Adapted from FEMA 426, Figure 2-2: Dispersed Facilities, p. 2-8

Intrusion Detection Systems

Old Generation

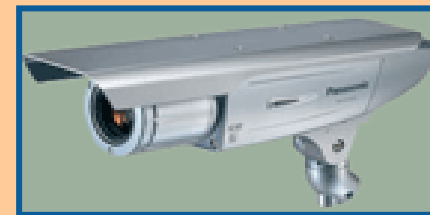
CCTV



Motion Sensors

New Generation

CCTV



Motion Sensors



Source: Protech



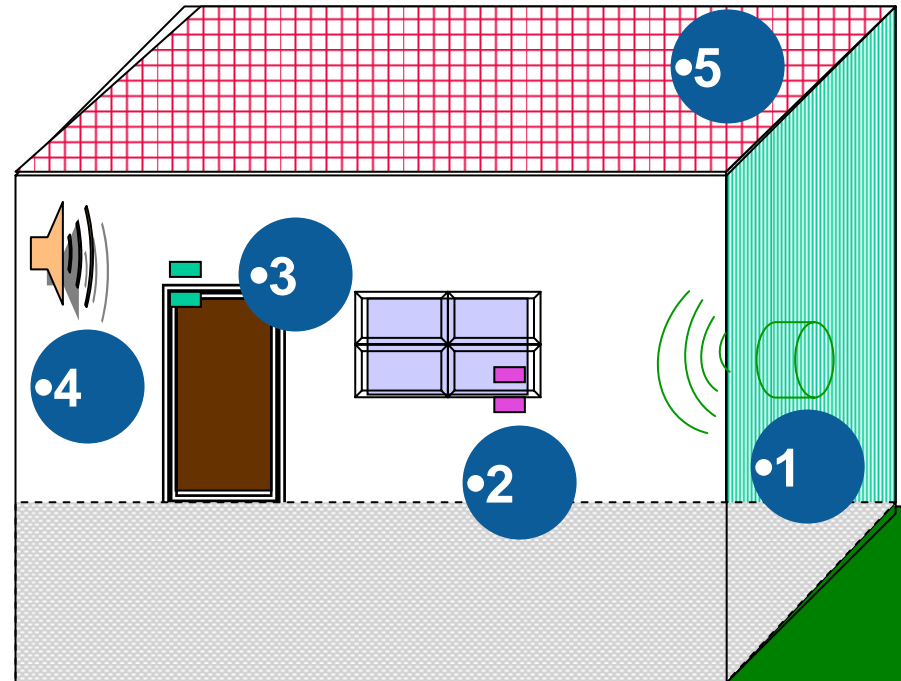
Source: Protech



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Boundary Penetration Sensors

1. Structural Vibration Sensors
2. Glass Break (GB) - both acoustical and contact mount
3. Balanced Magnetic Switches (BMS) - doors, windows, and hatches
4. Passive Ultrasonic Sensors
5. Grid Wire Sensors



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Adapted from DARPA Perimeter Security Sensor Technologies Handbook,
July 1998, p. 1-13

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Volumetric Motion Sensors

Designed to detect intruder motion within the interior of the protected volume

- Microwave Motion Sensors
- Passive Infrared (PIR) Motion Sensors
- Dual Technology Sensors
- Video Motion Sensors
- Point Sensors
- Capacitance Sensors
- Pressure Mats
- Pressure Switches



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Exterior Intrusion Detection

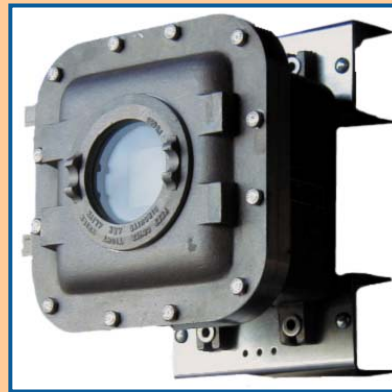
Strain Sensitive Cable

Fiber Optic Cable, Bistatic/Monostatic Microwave, Active Infrared, and Ported Coax

Dual Technology
(PIR/MW)

Video Motion

Explosion Proof



Source: Protech



First Layer of Defense



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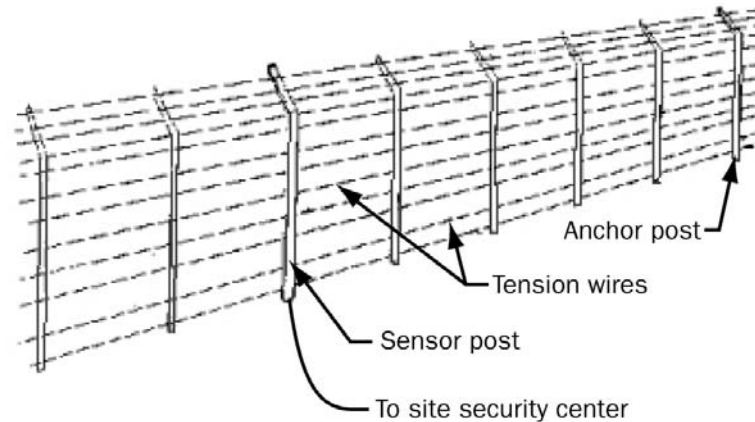
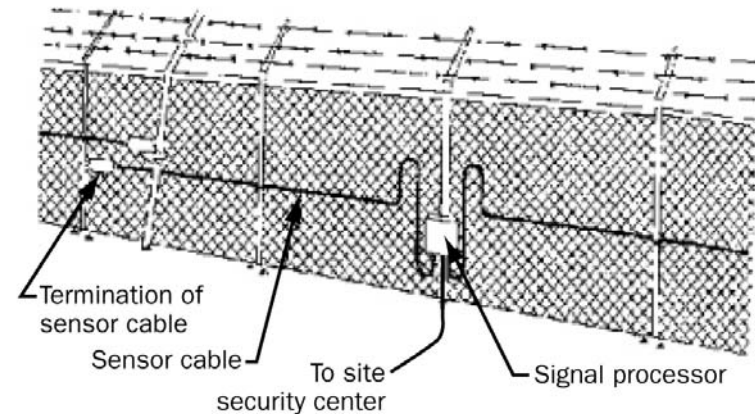
Fence Sensors

Strain sensitive cables

Taut wire sensors

Fiber optic sensors

Capacitance proximity sensors



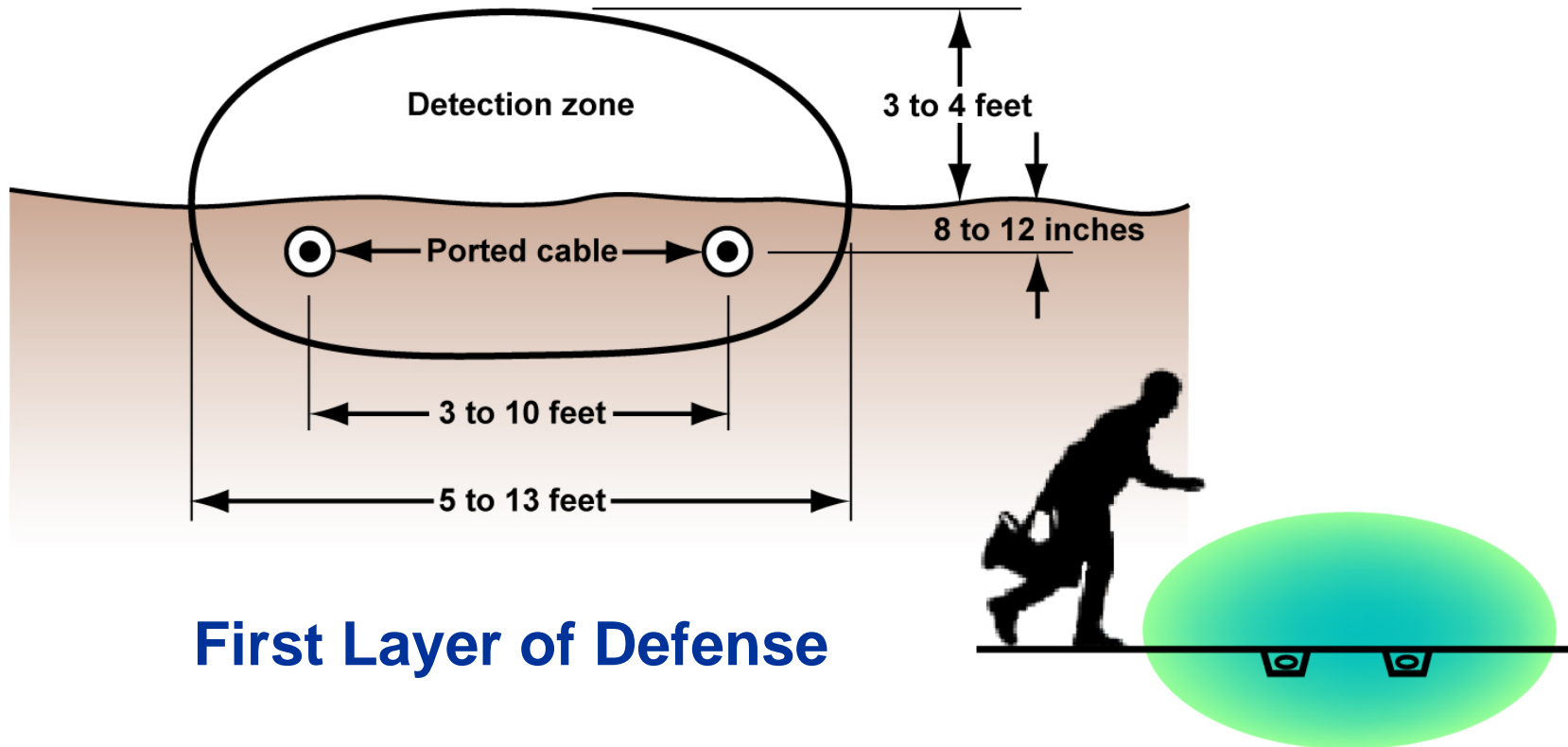
First Layer of Defense



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Army TM 5-853-4, Electronic Security Systems, pgs. 5-3 and 5-4

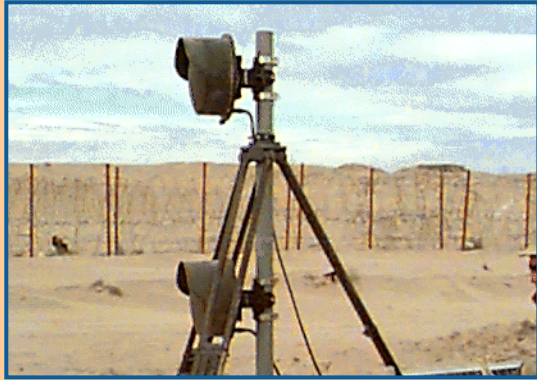
Buried Line Sensors



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Army TM 5-853-4, Electronic Security Systems, p. 5-6

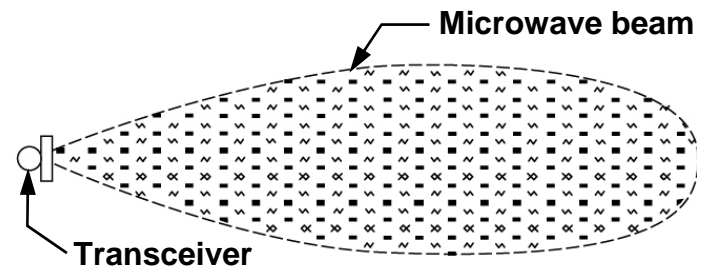
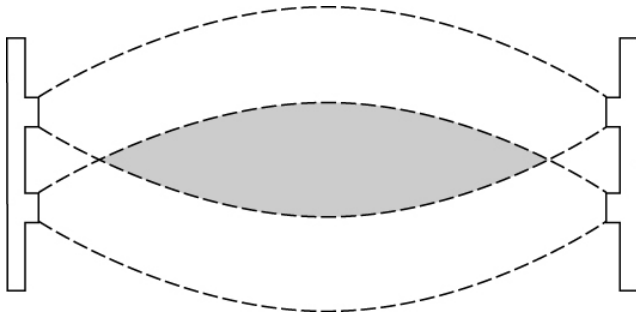
Microwave Sensors



Bistatic System



Monostatic System



First Layer of Defense



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Army TM 5-853-4, Electronic Security Systems, pgs. 5-15 and 5-7

Infrared Sensors

Active

Passive



First or Second Layer of Defense



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Video Motion Sensors

Old Generation



New Generation



Source: Protech



GBC Color Exit Sign Camera

First or Second Layer of Defense



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Electronic Entry Control

Coded Devices

Credential Devices

Biometric Devices



**First or Second
Layer of Defense**



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Coded Devices

Electronic Keypad Devices

Computer Controlled Keypad
Devices



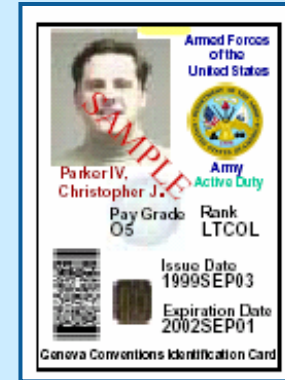
**First, Second, or Third
Layer of Defense**



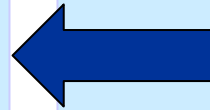
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Credential Devices

- Magnetic Stripe Card
- Wiegand-effect Card
- Proximity Card
- Smart Card
- Bar Code
- “i” Button
- Radio Frequency ID (RFID)



First, Second, or Third Layer of Defense



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Biometric Devices

Fingerprints

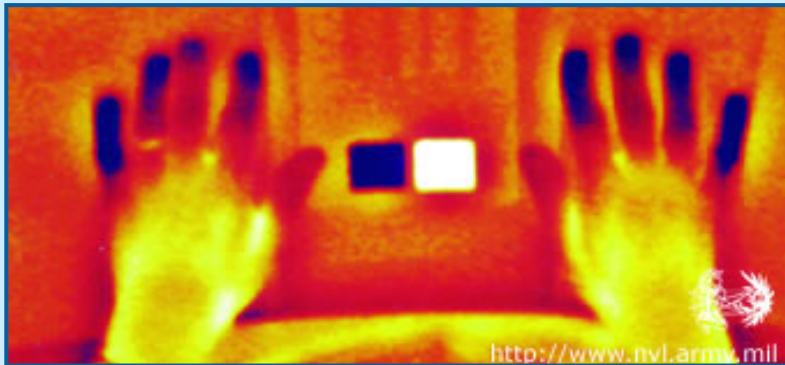
Hand Geometry

Retinal Patterns

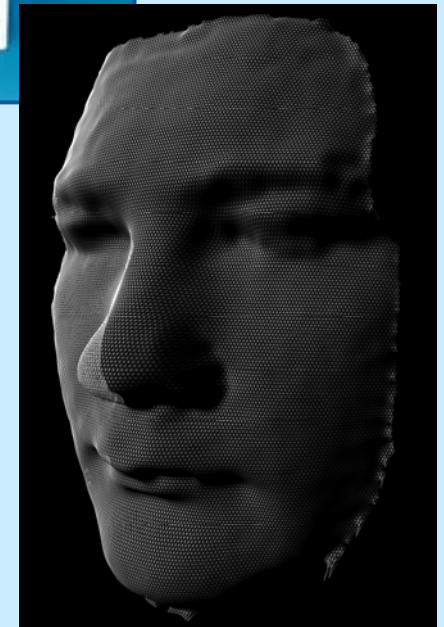
Facial Patterns



Source: Veridit



<http://www.nvl.army.mil>



Source: A4Vision



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First, Second, or Third Layer of Defense

Closed Circuit Television

Source: Protech Protection Technologies, Inc.

Interior CCTV

Alarm assessment, card reader door assessment, emergency exit door assessment, and surveillance of lobbies, corridors, and open areas

Exterior CCTV

Alarm assessment, individual zones and portal assessment, specific paths and areas, exclusion areas, and surveillance of waterside activities



First, Second, or Third Layer of Defense

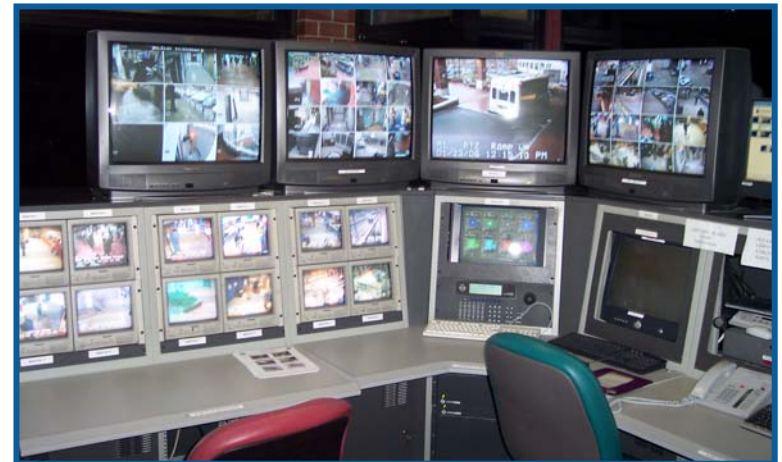


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Security Operations Center

Enhancements to Overcome Operator/System Limitations

- Workspace / Hardening
- Alarm Recognition / Alerts
- CCTV Image Alarm - Motion Detection
- Smart CCTV Auto Pan/Tilt/Zoom on Tripped Sensor Location
- Forwarding Alarms to Pagers, PDAs, Radios
- Data Recording - DVR
- Line Supervision / Backup Feeds
- Emergency Power to System



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Summary

Use the Building Vulnerability Assessment Checklist to identify electronic security system requirements.

Public safety is enhanced by electronic security systems (deter, detect, deny, devalue).

Electronic security systems components and capabilities interact with other systems (LAN, doors, windows, lighting, etc.).

Electronic security systems can be used to mitigate vulnerabilities.



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Unit XI Case Study Activity

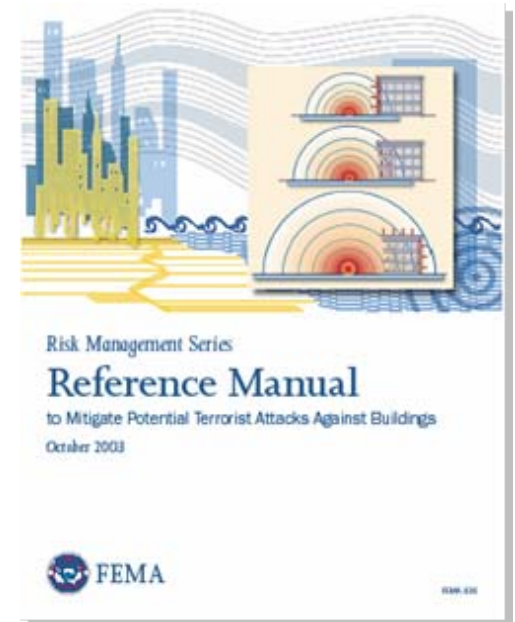
Electronic Security Systems

Background

Emphasis: Various components and technology available for use in electronic security systems

FEMA 426, Building Vulnerability Assessment Checklist

Assess Electronic Security Systems in Case Study for vulnerabilities and recommended mitigation measures



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