

Security Technology

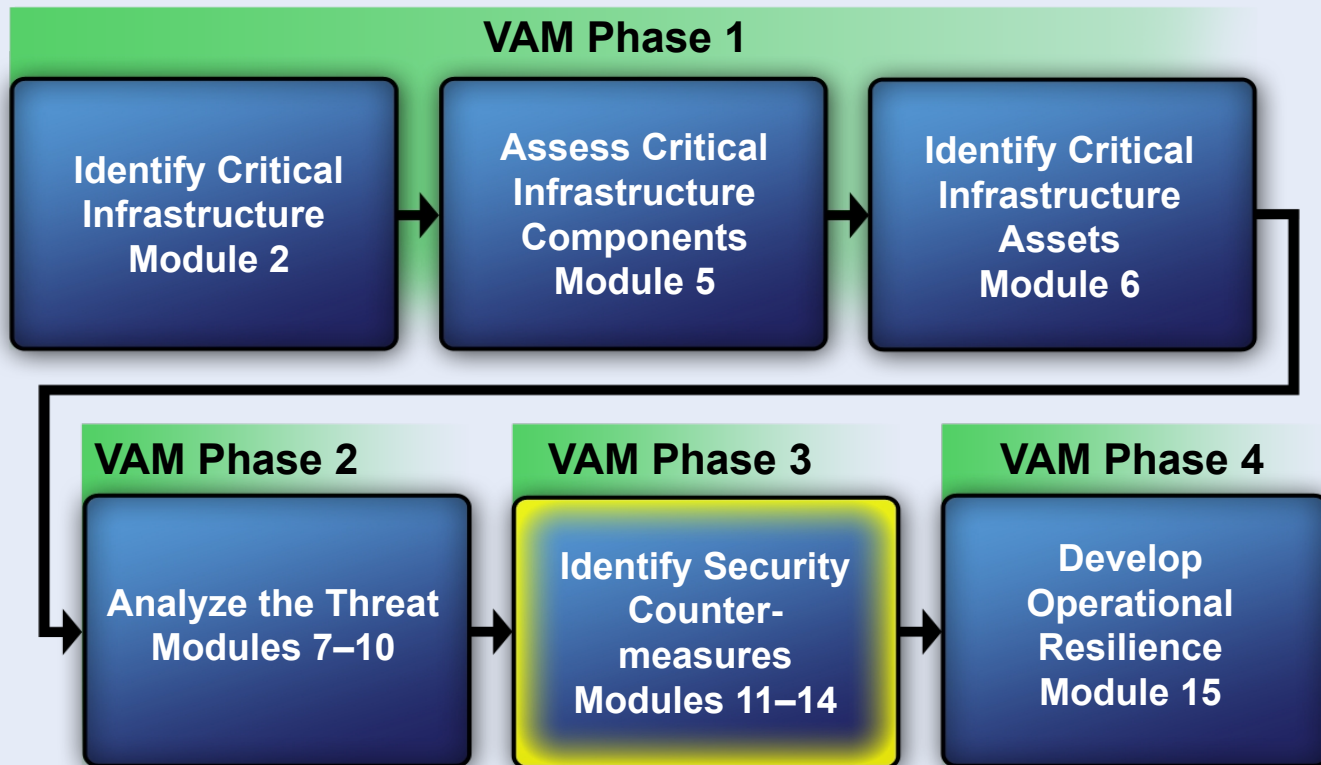


Module Objective

- **By the end of this module, you will be able to develop a security technology plan for the protection of critical infrastructure**



Physical Protection System



Characteristics of a Physical Protection System

Refer To:

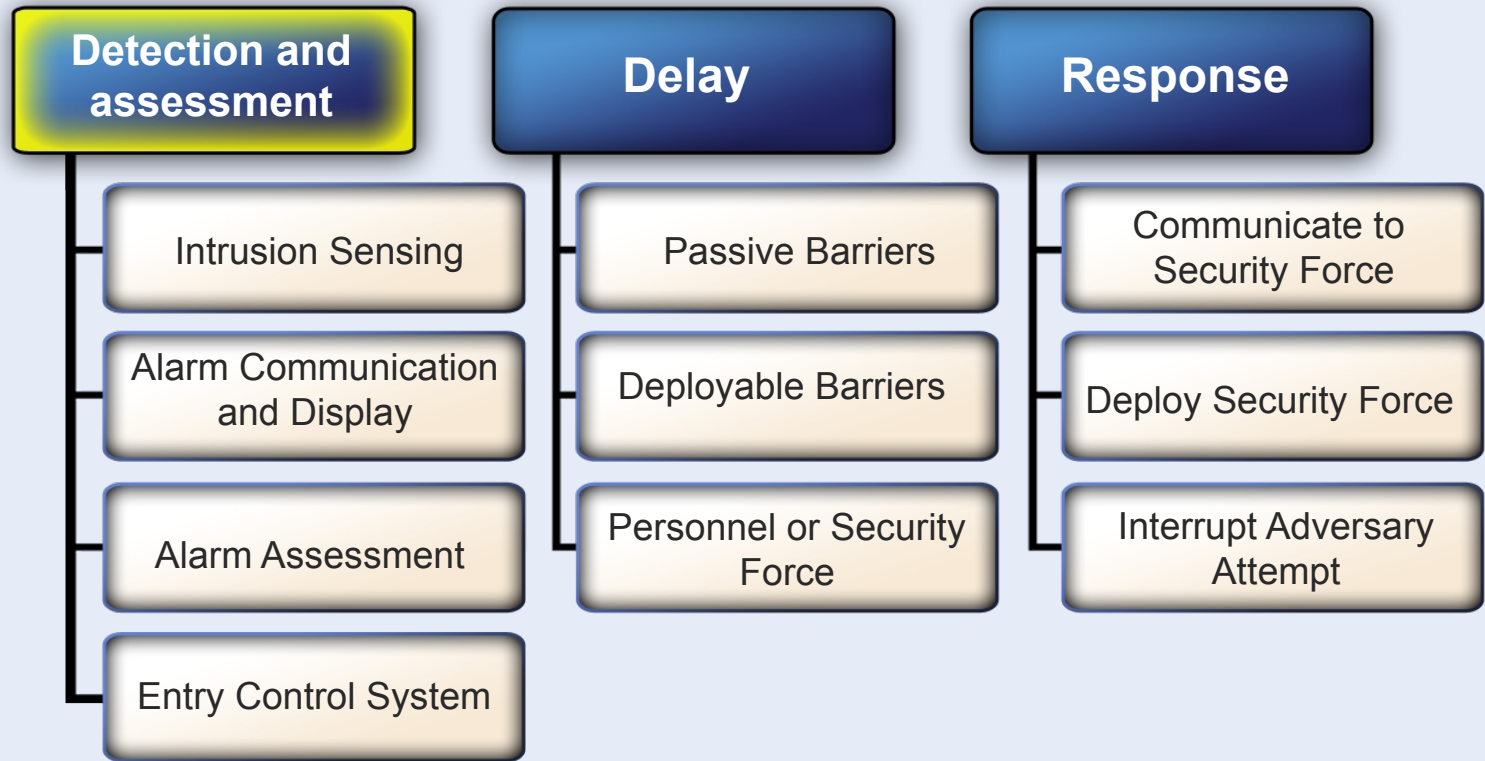
Workbook 13.1



- Protection-in-depth
- Minimum consequences of component failure
- Balanced protection



Primary Physical Protection System Functions — Detection and Assessment



Intrusion Detection Systems (1 of 2)

- **Designed to detect unauthorized persons or vehicles attempting to gain access to a protected critical asset**
- **Intended to supplement security forces, not replace them**



Intrusion Detection Systems (2 of 2)

- **Consist of the following components working together:**
 - Exterior and interior intrusion sensors
 - Video alarm assessment
 - Entry control and alarm communication



Performance Characteristics

- **This section will cover:**
 - **Probability of detection**
 - **Vulnerabilities to defeat**



Probability of Detection (1 of 2)

- **The likelihood that an intrusion detection system senses an actual threat or attack**
- **The design of the physical protection system should specify the detection criteria required or expected of a sensor or sensor system**



Probability of Detection (2 of 2)

- **Factors that may influence the probability of detection for a specific sensor:**
 - Target to be detected
 - Sensor hardware design
 - Installation conditions
 - Sensitivity adjustment
 - Weather conditions
 - Condition of the equipment



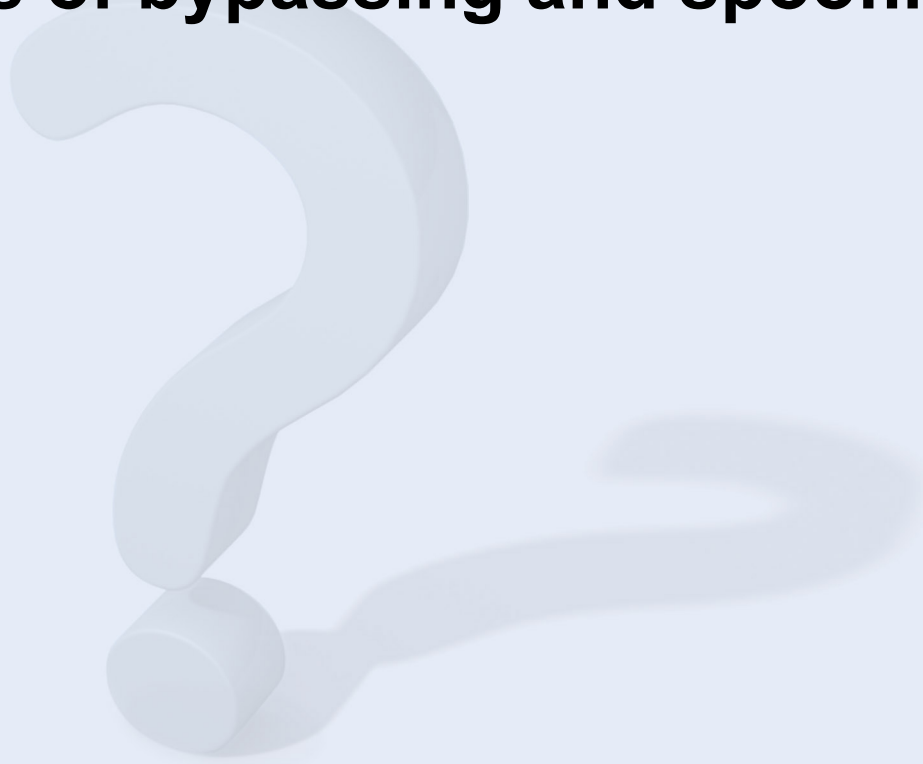
Vulnerabilities to Defeat

- **Bypassing — going around a sensor's detection zone**
- **Spoofing — passing through a sensor's normal detection zone without triggering the alarm**



Discussion Question

- Drawing from your own experiences, what are some examples of bypassing and spoofing?



Intrusion Sensor Application

Refer To:

Workbook 13.2



- **Must determine how sensors should be used in the protected area**
- **Application modes are different for exterior sensors and interior sensors**
- **Classified as:**
 - **Passive or active**
 - **Covert or visible**



Discussion Questions (1 of 2)

Refer To:

Workbook 13.2



- How can pressure or seismic sensors be defeated?
- How can magnetic field sensors be defeated?
- How can ported coaxial cable sensors be defeated?
- How can fiber-optic cable sensors be defeated?



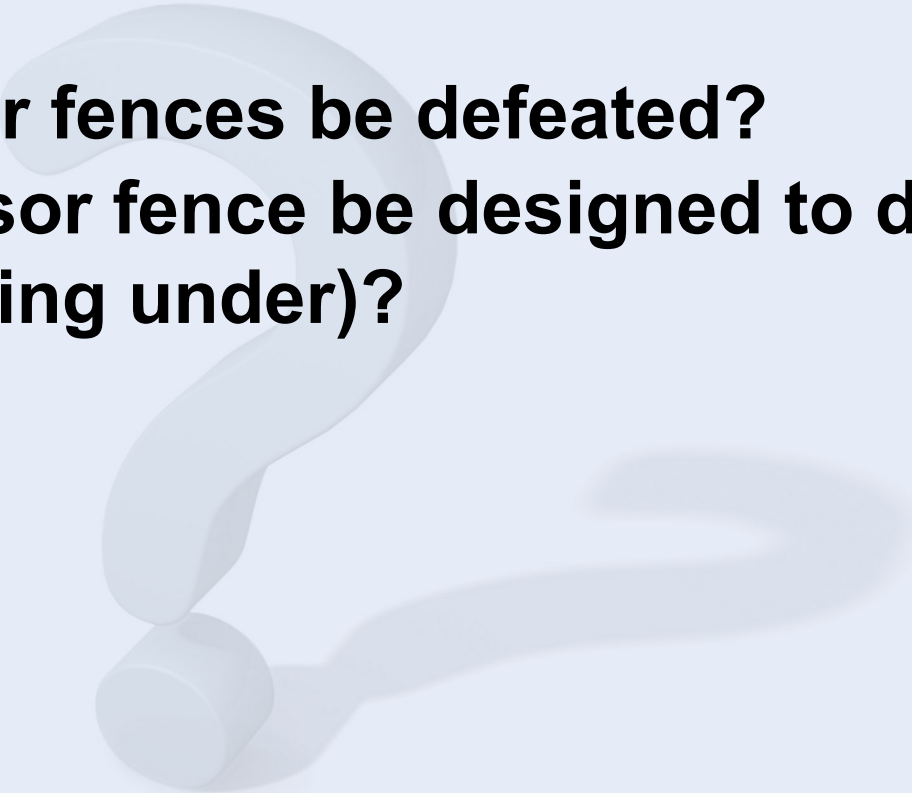
Discussion Questions (2 of 2)

Refer To:

Workbook 13.2



- How can fence-disturbance sensors be defeated?
- How can sensor fences be defeated?
- How can a sensor fence be designed to deter tunneling (digging under)?



Application Modes for Exterior Sensors

Refer To:

Workbook 13.2



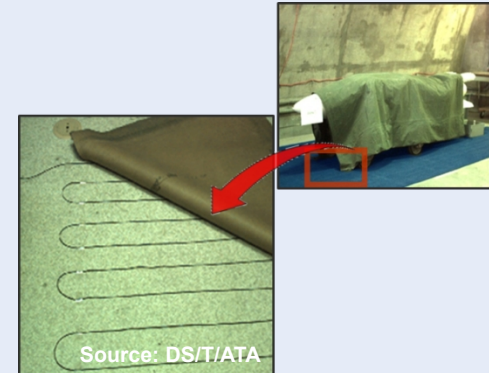
Application Modes for Interior Sensors

Refer To:

Workbook 13.2



- **Boundary-penetration sensors**
- **Interior motion sensors**
- **Proximity sensors**



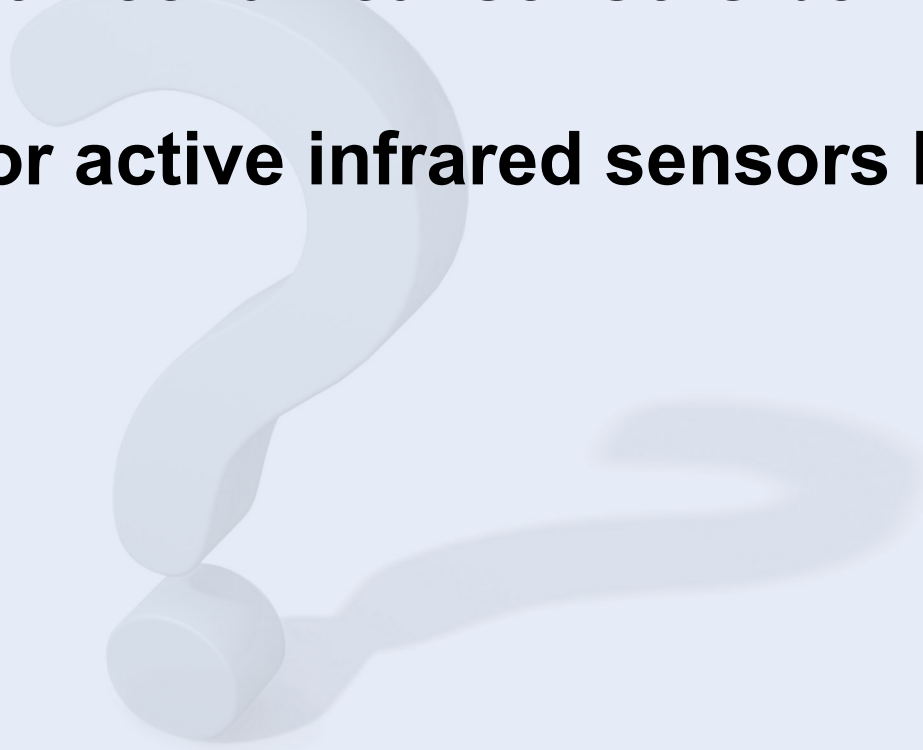
Discussion Questions (1 of 2)

Refer To:

Workbook 13.2



- How can vibration sensors be defeated?
- How can electromechanical sensors be defeated?
- How can interior active infrared sensors be defeated?



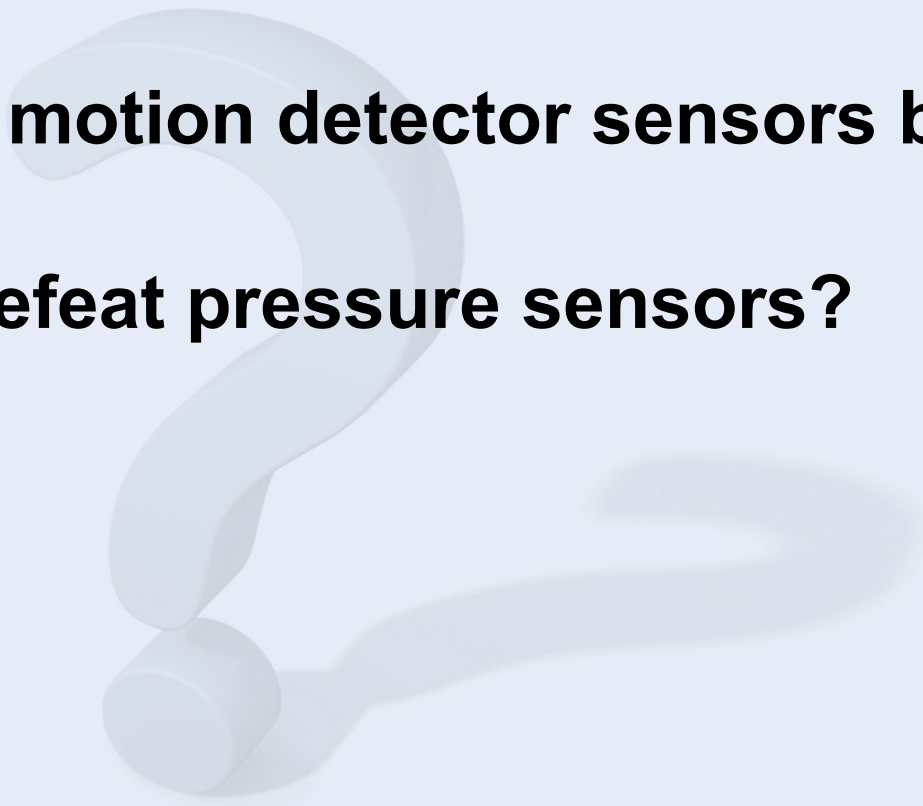
Discussion Questions (2 of 2)

Refer To:

Workbook 13.2

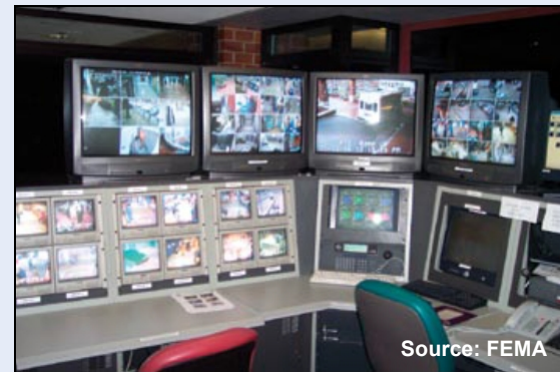


- How can monostatic microwave sensors be defeated?
- How can video motion detector sensors be defeated?
- How can you defeat pressure sensors?



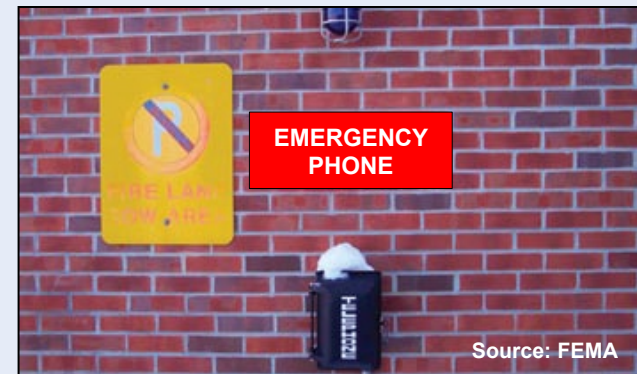
Alarm Communication and Display Systems (1 of 2)

- Provide security personnel with rapid response capability
- Perform two critical tasks:
 - Transport alarm and assessment information to a central point
 - Provide information to the security control center operator



Alarm Communication and Display Systems (2 of 2)

- **Five subsystems:**
 - Communications
 - Line supervisions and security
 - Information handling
 - Control display and alarm assessment
 - Off-line functions
- **Subsystems enable operators to respond appropriately**



Alarm Communication and Display System Characteristics

- Fast reporting time
- Secure from attack
- Durable
- Backup capable
- User friendly



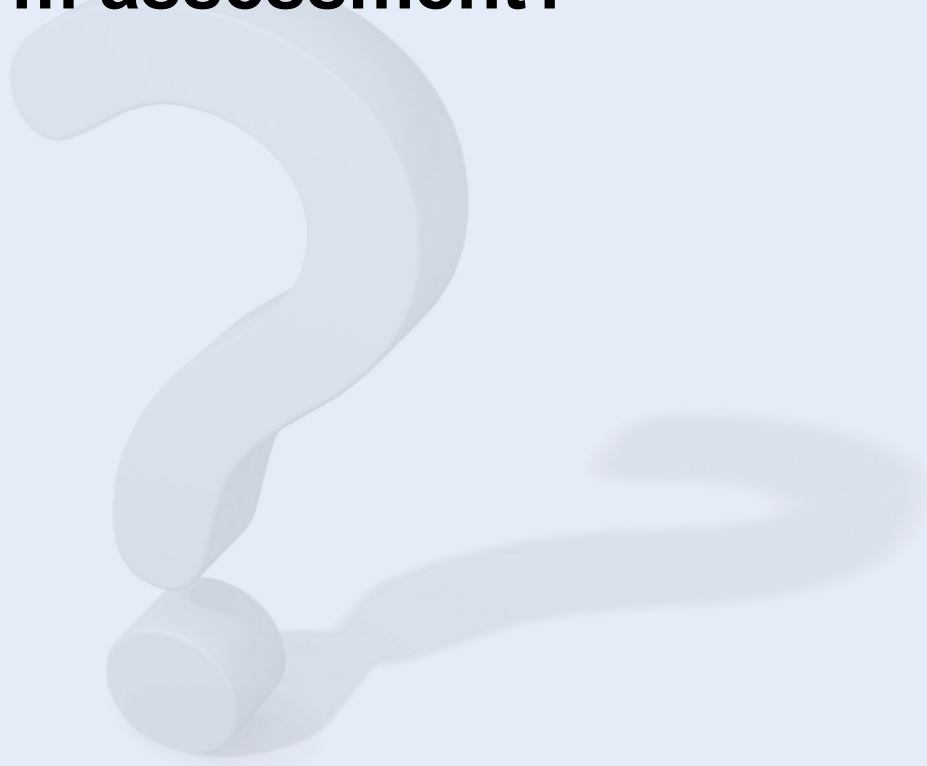
Alarm Assessment

- **Purpose:**
 - Determines the cause of an alarm
 - Provides additional information for security force
- **Provided through:**
 - Closed-circuit television coverage of each zone
 - Visual checks by personnel
- **Closed-circuit television may provide assessment and surveillance**



Discussion Question

- **When would security force members need to perform an alarm assessment?**



Alarm Assessment Components (1 of 3)

- **Camera, lens, and mount**
- **Lighting system**
- **Transmission system**
- **Video switching equipment**
- **Recorder, monitor, and controller**



Alarm Assessment Components (2 of 3)



Alarm Assessment Components (3 of 3)



Entry Control Systems (1 of 2)

- **Purposes:**
 - Permit entry and exit to authorized personnel only
 - Detect and prevent entry or exit of contraband material
 - Provide information to the security force
- **Located at a facility's perimeter or interior**



Source: Pixabay



Entry Control Systems (2 of 2)

- **Performance is measured according to:**
 - **Flow rate** — the measure of the time it takes for an authorized person or material to successfully pass an entry or exit point
 - **Error rate** — the percentage that a specific entry control technique or process falsely rejects an authorized person or falsely accepts an unauthorized person



Entry Control Systems Features (1 of 2)

- Prevents bypass
- Allows observation by security force members
- Protects the security force member
- Performs access and material control
- Blocks passage until access and material control are complete



Entry Control Systems Features (2 of 2)

- Provides secondary inspection for those who cannot pass automated inspection
- Accommodates maximum flow of vehicles and people
- Provides central alarm station surveillance
- Allows facility entry and exit



Entry Control Systems Categories

- **This section will cover:**
 - **Personnel entry control systems**
 - **Contraband detection systems**
 - **Locks**

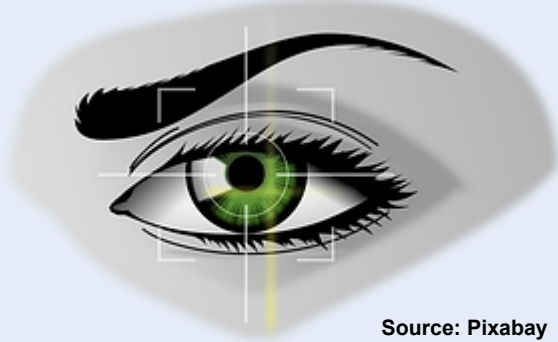


Personnel Entry Control Systems (1 of 2)

- **Verify the authorization of individuals seeking entry to a controlled area based upon whether the person seeking entry:**
 - **Knows a valid personal identification number**
 - **Carries valid credentials**
 - **Possesses physical characteristics that match database information**
- **Combinations of systems fortify protection**



Personnel Entry Control Systems (2 of 2)



Source: Pixabay



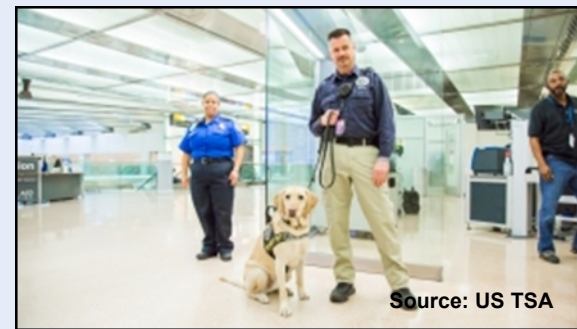
Source: Pixabay



Source: Bing

Contraband Detection

- **Examining personnel, materials, and vehicles to detect unauthorized items**
 - Metal detectors
 - Package searches
 - Explosive detectors



Locks

- **Used with other protection measures, such as security force checks and sensors**
- **Two major components:**
 - **Fastening device —secures the door in the closed or locked position**
 - **Coded mechanism — allows the movement of the bolt or latch to the unlocked position**



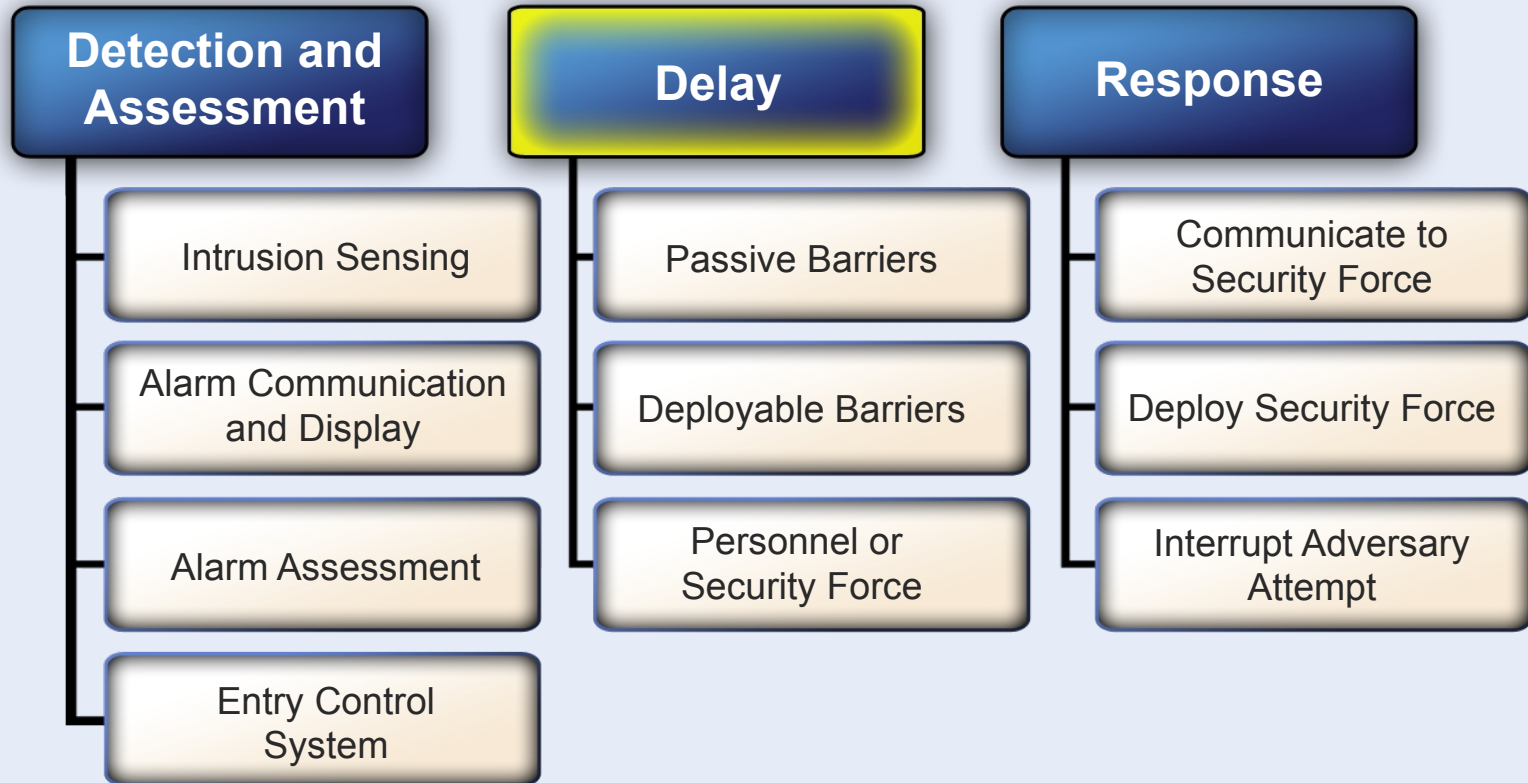
TeachBack Moment



- **What are the three characteristics of an effective physical protection system as they apply to technology?**
- **What are the performance characteristics of intrusion sensor systems?**



Primary Physical Protection System Functions — Delay (1 of 3)



Primary Physical Protection System Functions — Delay (2 of 3)

- **Purpose: increase the time it takes for a terrorist to carry out an attack by placing obstacles along the intended path to the target**
- **Performance measure: time**
 - **Critical element of system effectiveness**
 - **Depends on barrier and penetration time**
 - **Detection systems and barriers should be adjacent**



Primary Physical Protection System Functions — Delay (3 of 3)

- **Passive barriers (fixed)**
- **Deployable barriers (operable)**
- **Personnel or security force**



Passive Barriers

- **Remain in place at all times**
- **Delay an attacker from completing the attack objective**
- **Are divided into two categories:**
 - **Perimeter**
 - **Structural**



Passive Barriers — Perimeter

- **Purpose:** prevent unauthorized entry
- **Function:** form the outermost protective layer of the physical protection system
- **Types:** fences, gates, vehicle barriers, and natural barriers



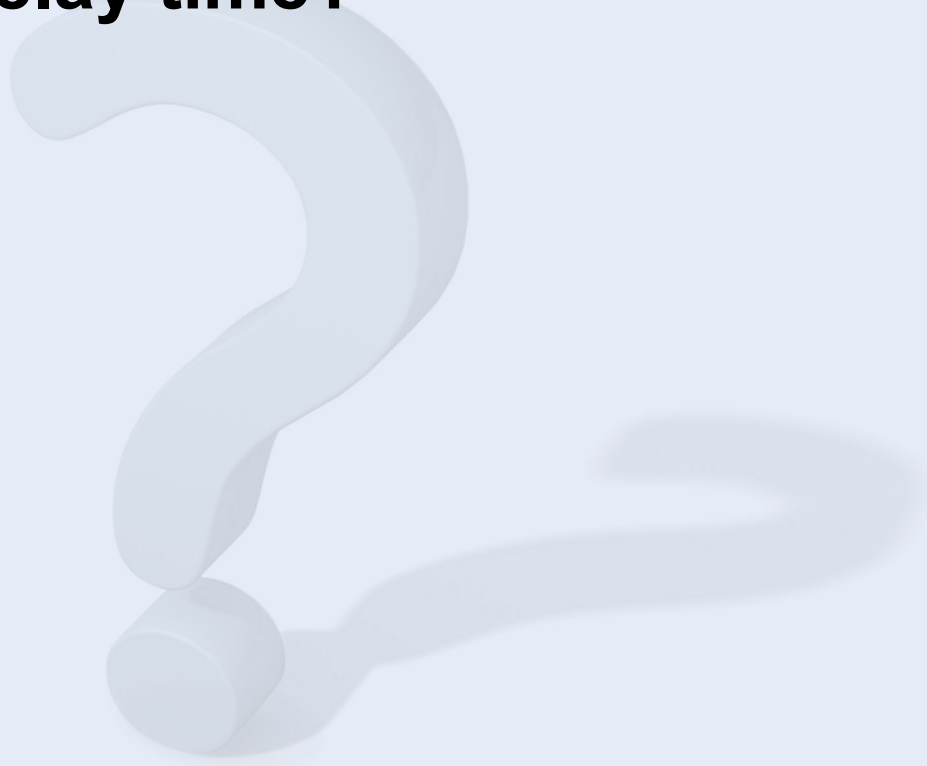
Fences (1 of 2)

- **Common perimeter barriers**
- **Not always a strong deterrent but provide a visible legal boundary and warning**
- **Can increase delay time and allow response force time to interrupt and neutralize the intruder closer to the point of alarm**

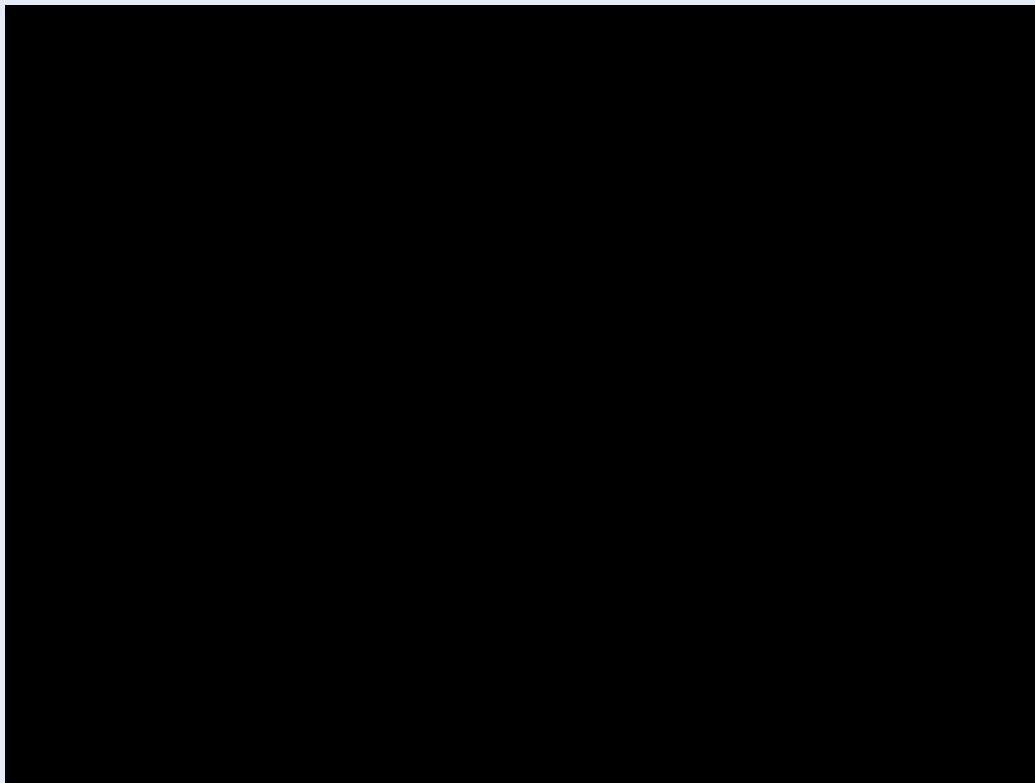


Discussion Question

- How could you strengthen perimeter fence use and increase delay time?



Fences (2 of 2)



Gates (1 of 2)

▪ Function:

- Establish specific points of entry and exit to an area defined by fences and walls
- Limit the flow of pedestrian or vehicular traffic and establish a controlled traffic pattern



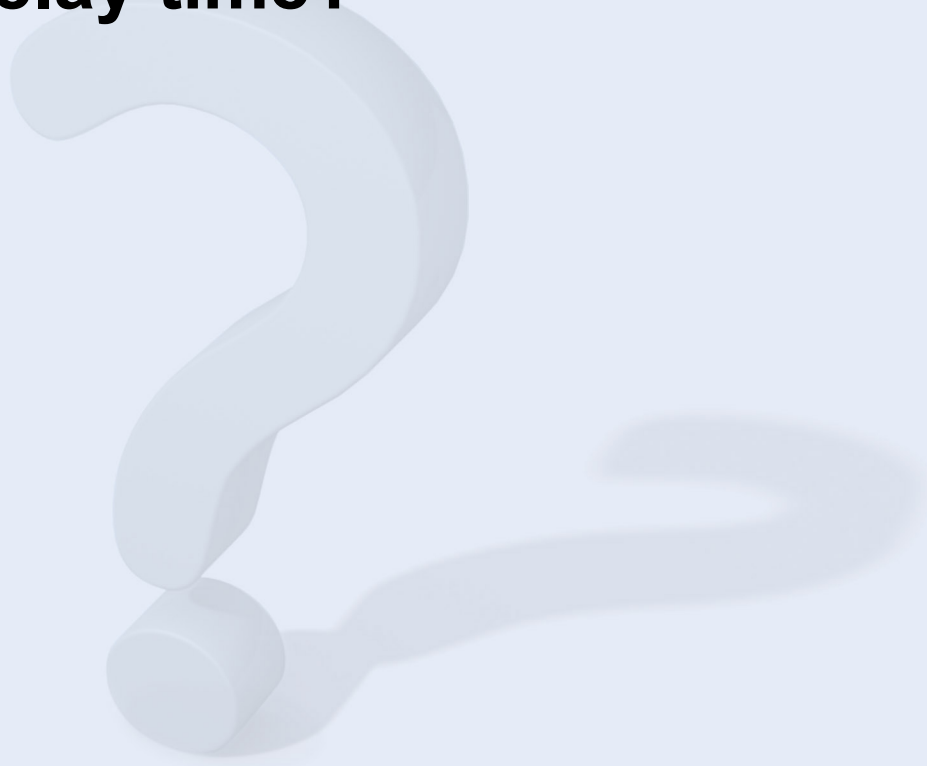
Gates (2 of 2)

- **Easy to defeat if they have:**
 - Weak hinges, locks, and latches
 - Driveways positioned directly in front of the gate (make ramming by vehicle easier)



Discussion Question

- How could you strengthen perimeter gate use and increase delay time?



Vehicle Barriers (1 of 3)

- **Function: restrict and control entry**
- **Design considerations:**
 - Define the threat that the barrier system is intended to stop
 - Define the asset and determine area to be protected
 - Examine site-specific conditions



Vehicle Barriers (2 of 3)

- **Install vehicle barriers that are difficult to defeat in areas that cannot be monitored continuously**



Vehicle Barriers (3 of 3)



Natural Barriers

- **Water**
- **Vegetation**
- **Ditches or trenches**
- **Hard-to-access terrain**

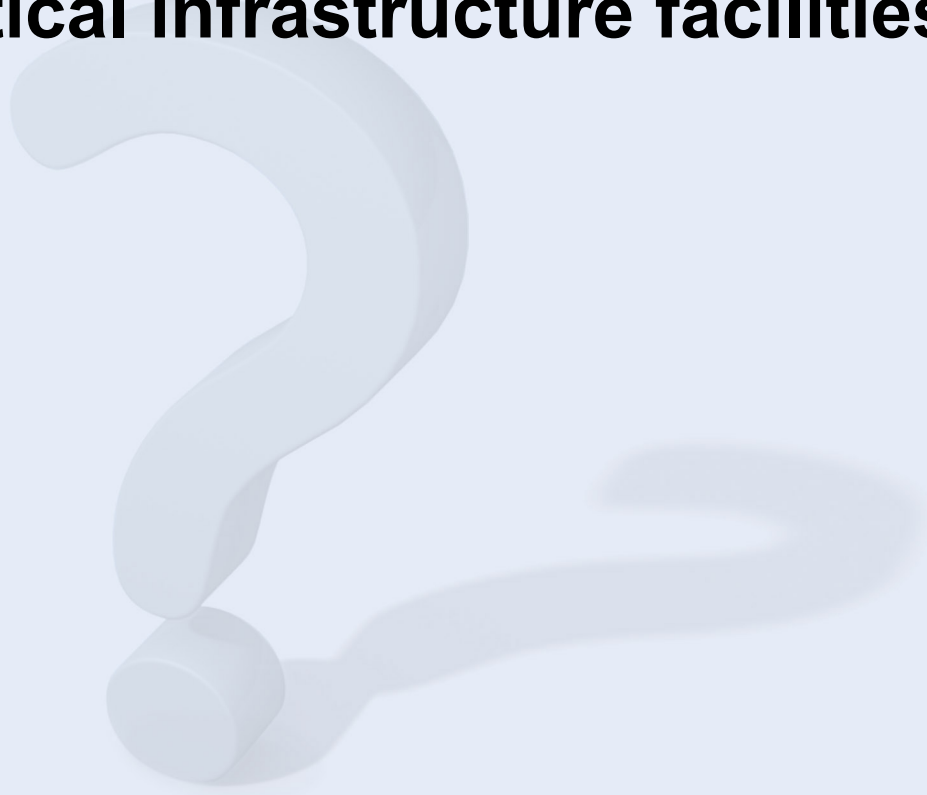


Source: Pixabay



Discussion Question

- **What examples can you provide of natural barriers for critical infrastructure facilities in your country?**



Passive Barriers — Structural

Refer To:

Workbook 13.3



- Walls
- Doors
- Windows and utility ports
- Roofs and floors



Discussion Questions

- How can using two or more concrete walls in a series increase delay time?
- How can you reinforce doors to increase penetration resistance?
- How can you increase window penetration resistance?
- Why do floors offer more penetration resistance than roofs?



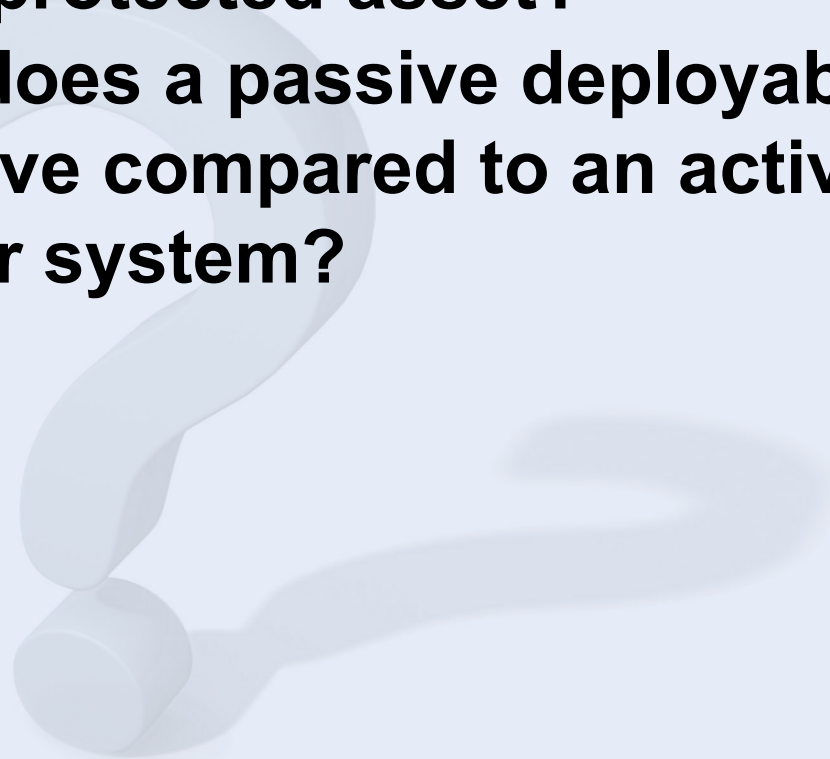
Deployable Barriers

- **Deployed:**
 - When threat level is high
 - Very close to the protected asset
- **Operate using two types:**
 - Active — activated on command
 - Passive — activated automatically
- **Allow security force time to respond to threat**



Discussion Questions

- **Why are deployable barriers typically deployed very close to the protected asset?**
- **What advantage does a passive deployable barrier system have compared to an active deployable barrier system?**



Bollards and Rising Wedge Barriers

- **Bollards** — fixed or retractable often used in high-traffic entry and exit lanes
- **Rising wedges** — retractable and can be raised or lowered

Wedge barriers



Bollards



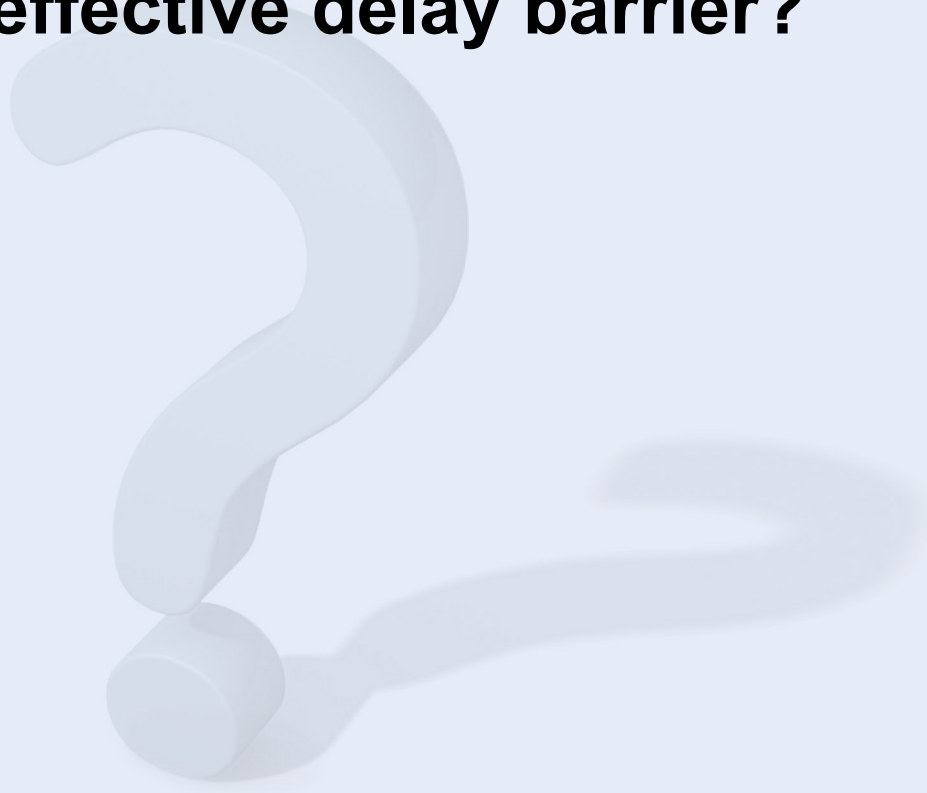
Personnel or Security Force as Barriers

- **Can serve as delay barriers if security force members:**
 - **Hold fixed positions**
 - **Are well-protected and well-trained**
 - **Are properly equipped**
 - **Have clear communication protocols**

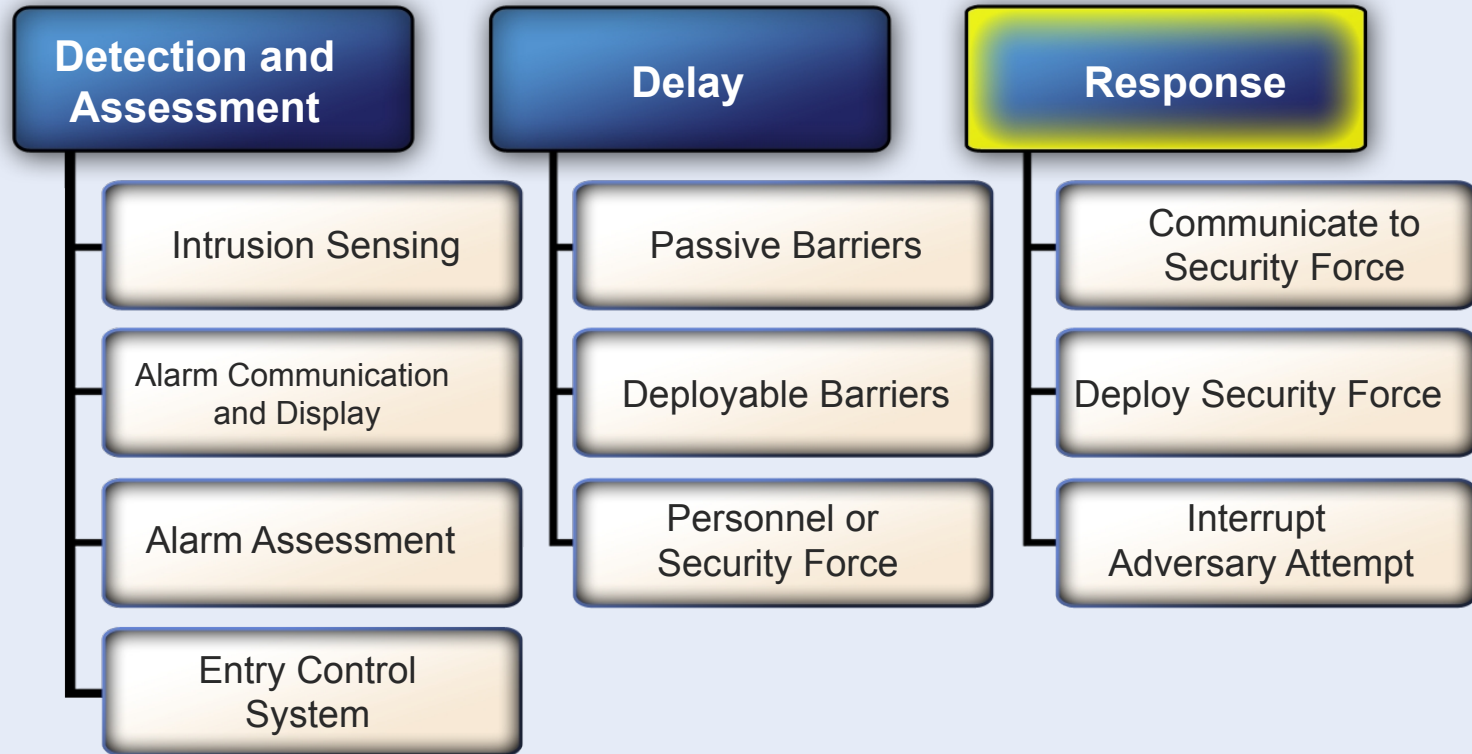


Discussion Question

- **What other factors affect security force's ability to serve as an effective delay barrier?**



Primary Physical Protection System Functions — Response (1 of 2)



Primary Physical Protection System Functions — Response (2 of 2)



Communicate Information to Security Force (1 of 2)

- **Frequency modulation or two-way radio is the most common method to communicate with the security force**
- **Advantages include:**
 - **Allow rapid reporting and deployment**
 - **Easy to operate**
 - **Efficient**
 - **Inexpensive**



Communicate Information to Security Force (2 of 2)

- **Disadvantages include:**
 - Range limitation (overcome by the use of repeaters and multiple-receive systems)
 - Vulnerability to eavesdropping, deceptive messages, and jamming (overcome by a spread-system or frequency-hopping communication system)



Deploy Security Force

- Responding personnel
- Contingency planning
- Communications
- Interruption and neutralization



Threaded Exercise Part 6 — National Ministries Building

Refer To:

Workbook Part 6



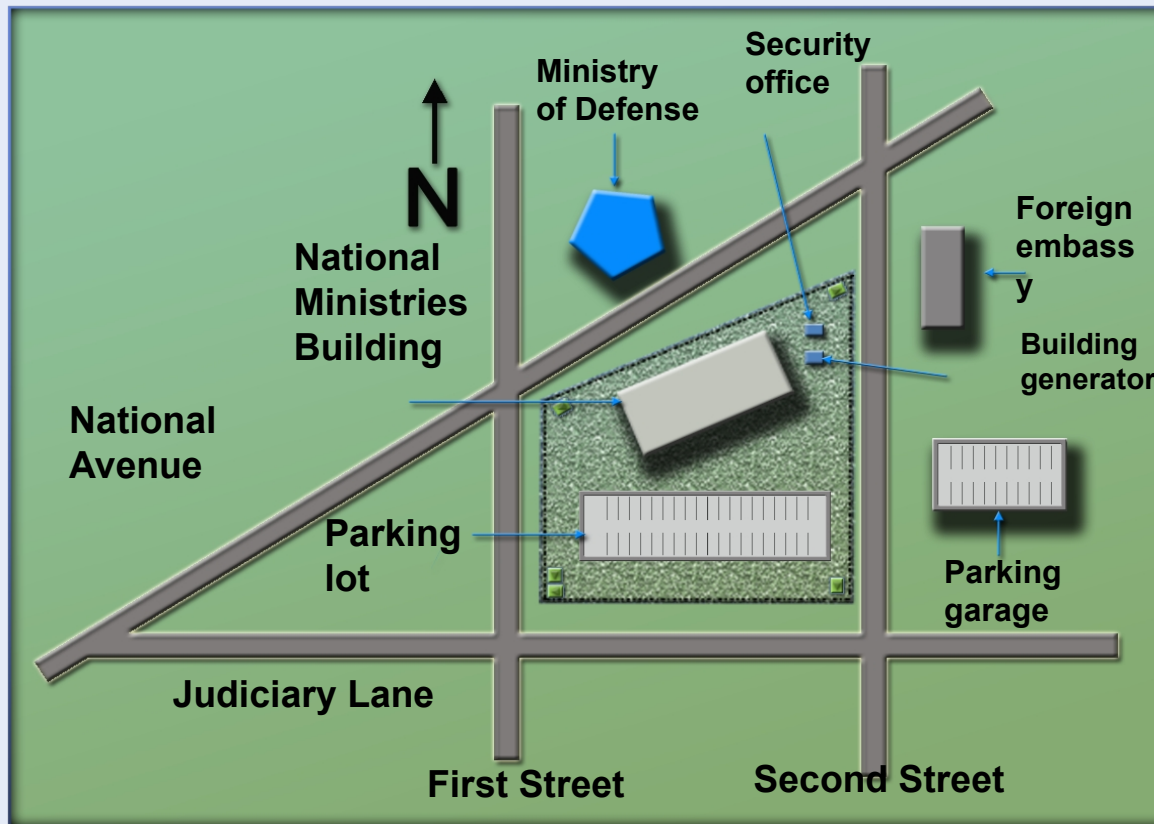
- **Purpose: to develop a security technology plan for the protection of the National Ministries Building**
 - **Duration: 60 minutes (40-exercise; 20-debrief)**
 - **Group composition: table groups**
 - **Debrief: presentation and discussion**



National Ministries Building Complex Map

Refer To:

Workbook Part 6



Module Summary

- **Characteristics of a physical protection system**
- **Primary physical protection system functions**
 - **detection and assessment**
- **Primary physical protection system functions**
 - **delay**
- **Primary physical protection system functions**
 - **response**

