SAND2015-10485PE

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Border Security System Integration: Strategy, Personnel & Technology

U.S. DEPARTMENT OF ENERGY

National Nuclear Security Administration

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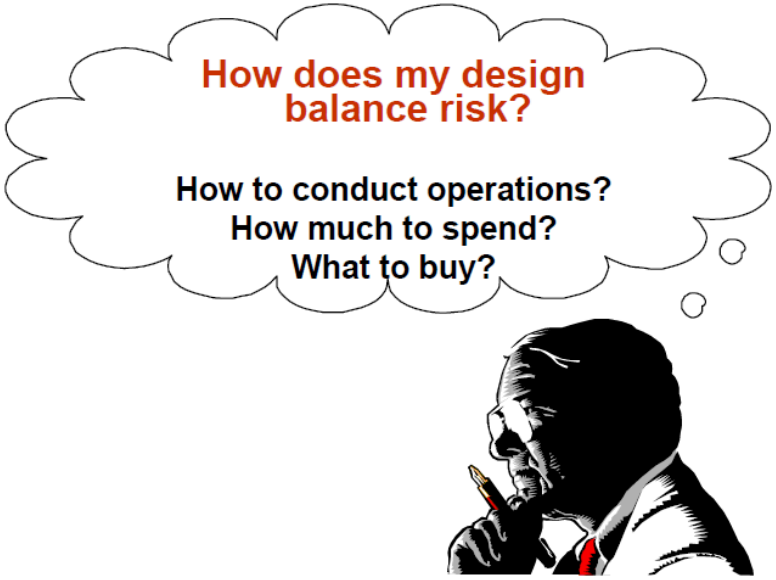
What's the point?

- Based on what has been presented and discussed to this point in the workshop…

- What is effective implementation of border security?
  - [discussion question for participants]



Outline

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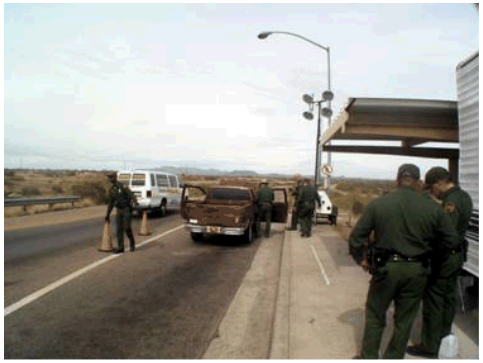
- Strategy & Risk-Based Planning
  - Establish Objectives
  - Design and Implement the Border Security System
  - Assess the Border Security System
- Application of Border Security System Integration
  - Role of Personnel
  - Role of Technology
  - Discussion
  - Examples

Border Security



- Effective border security system operation is a **complex problem**
  - It is not just a **technical equipment** problem; it is also a **procedural** and **implementation** problem
  - Border security success **requires** both adequate technical equipment **AND** adequate operations, procedures & response

Strategy

- Based on **objectives**:
  - **Detect** and **prevent** illegal border crossings
    - Terrorists
    - Smugglers
    - Illegal immigrants
  - **Detect** threats to fixed sites
    - Military outposts and bases
    - Other infrastructure
  - **Reduce** risk of accidental conflict
  - Potential to **enhance** bilateral or regional confidence

Strategy

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- How to organize or prioritize objectives?

- With a **systems** and **risk-based** approach:

  - Clearly define what border security needs to do
  - Illustrate how risk is reduced and/or mitigated
  - Identify appropriate roles for personnel & technology
  - Adjust & align security system to changing physical, political or social landscapes
  - Outline costs vs. benefits trade-off
  - Justify resource allocations or resource requests

Strategy

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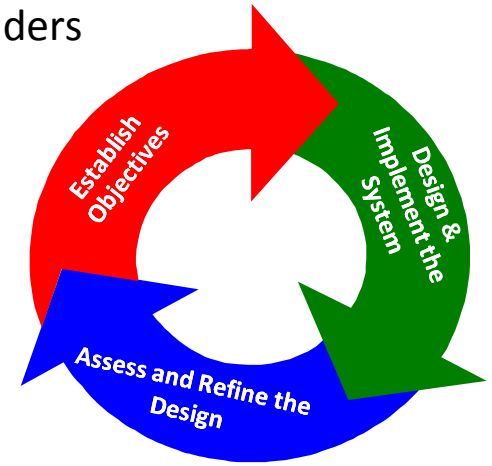
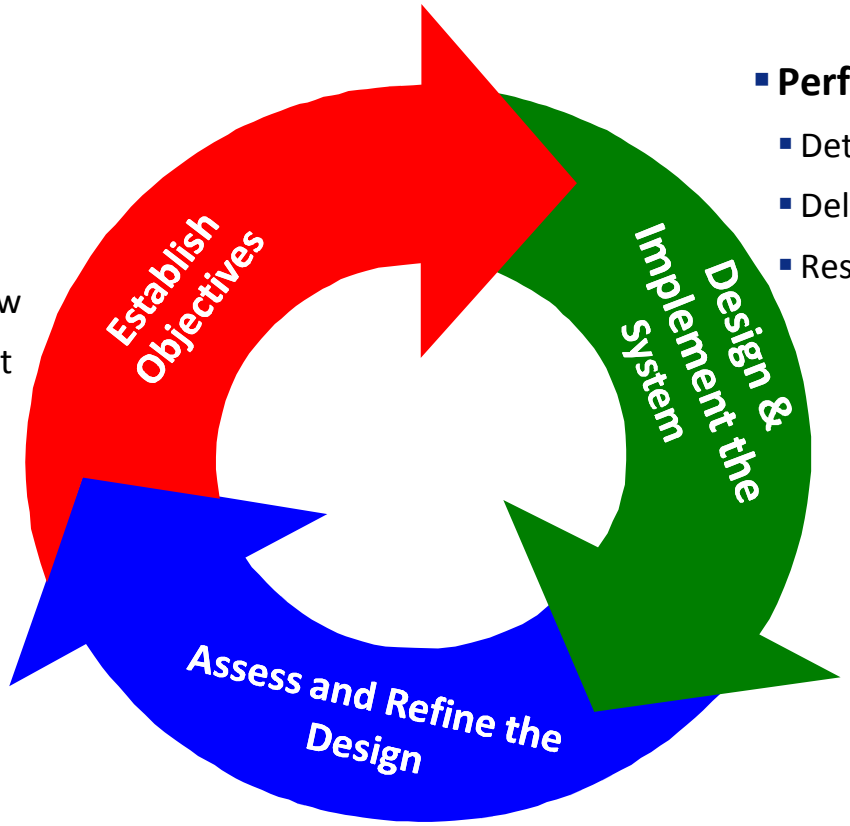
- Generic aspects of a ‘good’ border security strategy
  - Set operational objectives: assess threats & performance metrics
  - Use systems & risk-based planning approach
  - Balance cost with benefit: maintenance & sustainability
  - Coordinate between technology & personnel: support, not replace
  - Cooperate between relevant internal & external stakeholders
  - Assess & update border security systems & policies



Strategy

- **Objectives**:
  - What to stop/allow
  - Threat assessment
  - Risk reduction



- **Performance Metrics**:
  - Detection
  - Delay
  - Response

- **Elements to assess**:
  - Performance testing
  - Cost-benefit trade-off
  - Implementation

Strategy

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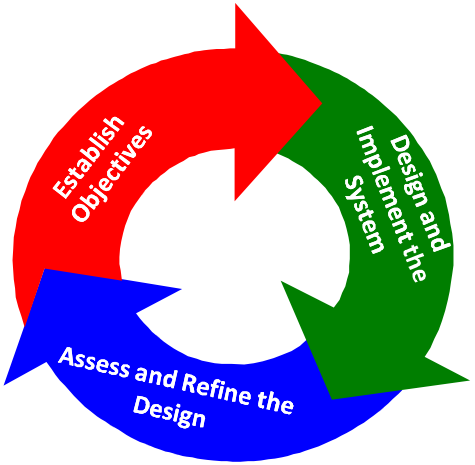
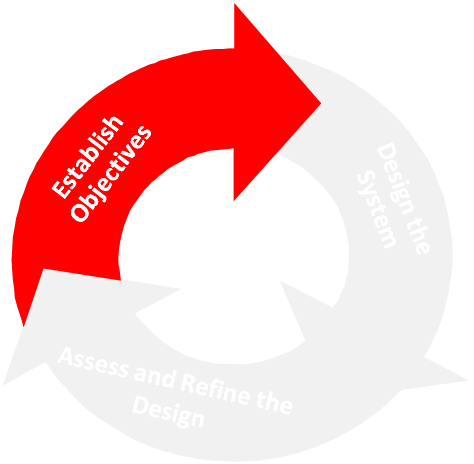
- Border security development enhanced with a **systems approach** & **risk-based planning**

- Need to identify border security:
  - **Mission**
  - **Metrics**
  - **Performance Requirements**

- ***Must balance **operational costs** (financial, manpower, etc) with **demonstrated benefit** (risk reduction)

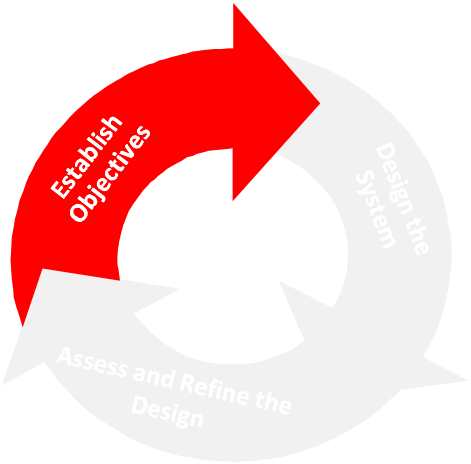


Establish Objectives



- Objectives are the **fundamental basis** for a strong border security system
- Need to identify **WHAT** the border security system should:
  - Detect & allow
  - Detect & prevent
  - Defend against (threat assessment)
- Also defines desired level of **risk reduction**

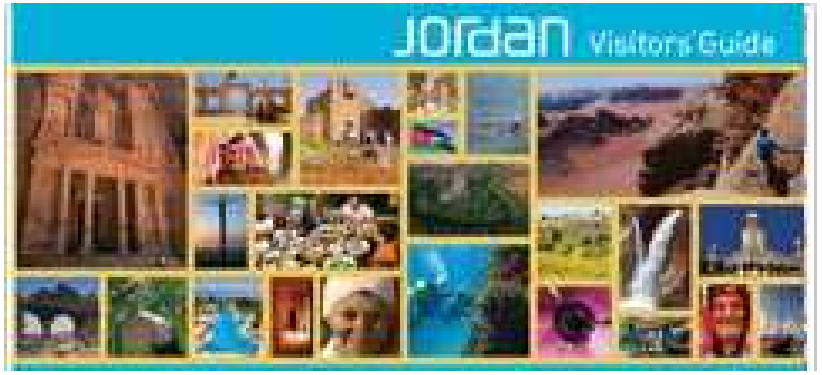
Establish Objectives



- What border security system to **detect** & **allow**
  - **Trade**

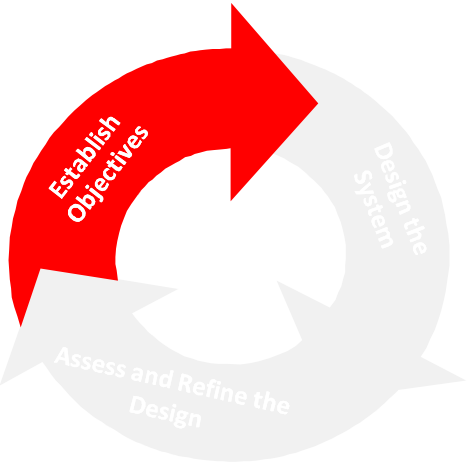
Courtesy: bacb.co.uk

  - **Tourism**



Courtesy: visitjordan.com

Establish Objectives



- What border security system to **detect** & **prevent**

Courtesy: cbp.gov

- **Illicit goods**

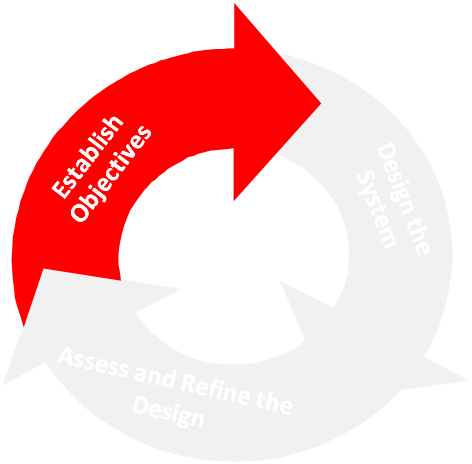
- **Unsavory people**

Courtesy: elpasotimes.com

- **Violence**

Courtesy: bbc.co.uk

Establish Objectives



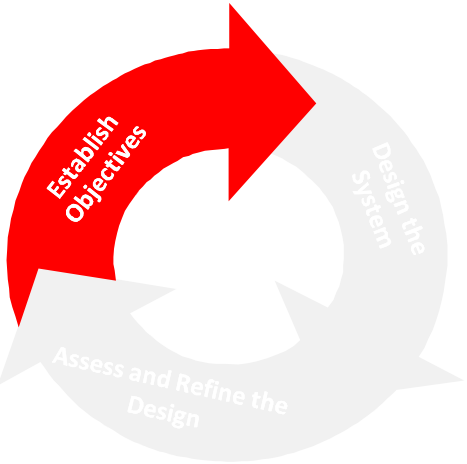
- What to defend against = **threat assessment**

- Threat assessment = formal analysis of
  - Credible motivations or intentions
  - Demonstrated capabilities of potential adversaries
  - Undesirable consequences

- Value of threat assessment:
  - Help justify (potentially) expensive decisions
  - Establish functional goals for the border security system
  - Assess border security system performance

Establish Objectives

- Example **threat assessment** matrix



	External Threat		
	Terrorists	Criminals	Illegal Crossers
Motivations			
Intentions			
Capabilities			
Numbers			
Weapons			
Explosives			
Tools			
Transportation			
Technical Skills			
Funding			
Insider Collusion			
Support Infrastructure			
Other			

Design & Implement the System

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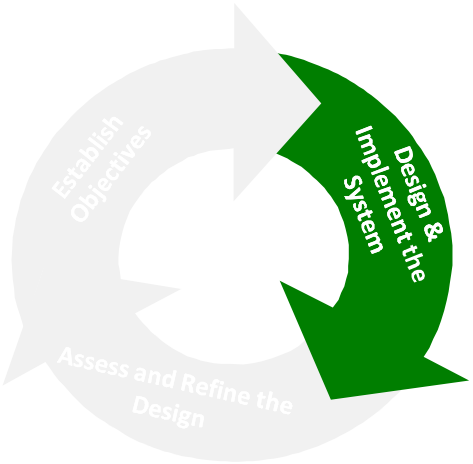

- Border security objectives **drive** system design
- Need to identify **HOW** the border security system should:
  - Detect & allow
  - Detect & prevent
  - Defend against (threat assessment)
- Also determines how to achieve desired level of **risk reduction**

Design & Implement the System

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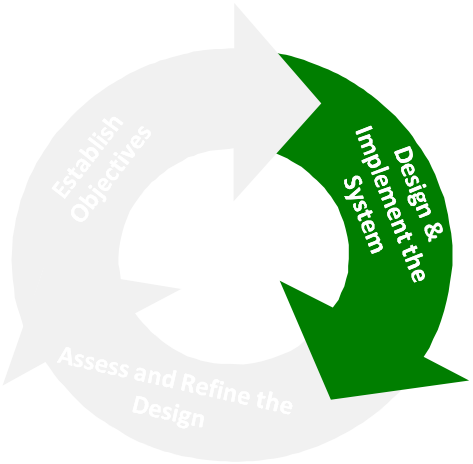

- What border security system **functions** are needed?
- **Detection** = monitoring + assessment
- **Delay** = increase time/difficulty for adversary to complete desired objective
- **Response** = ability to deploy action to counter threat

Design & Implement: Detection

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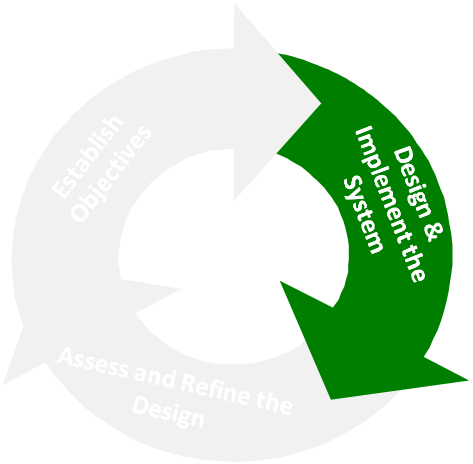
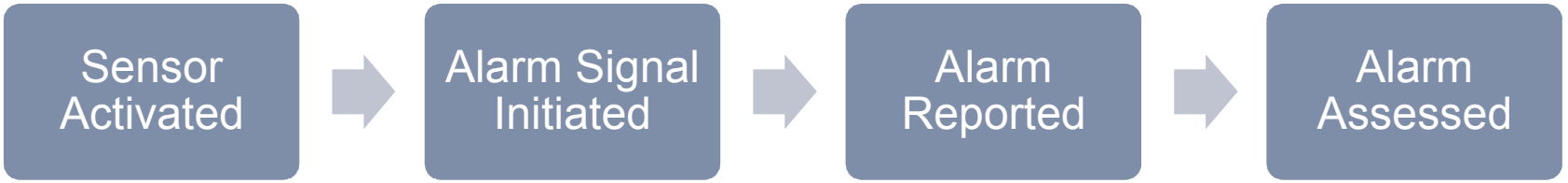
- Monitoring (observation) + Assessment (determination of significance) = Detection
  - Monitoring without assessment is **NOT** detection
- Performance Measures:
  - Probability of detection
    - Likelihood that an intrusion will be observed and reported by a sensor or human observer
    - Factors in frequency of nuisance alarms / false alarms
  - Time for communication and assessment





Design & Implement: Detection

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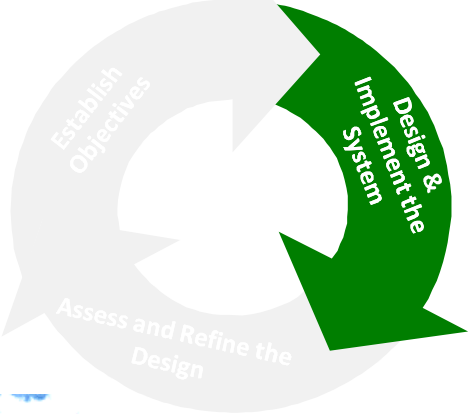
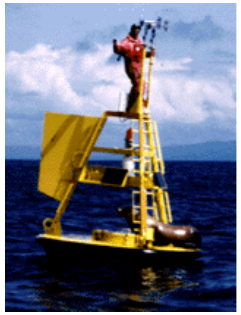
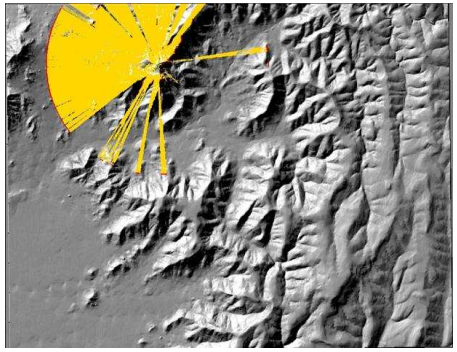
- Example options for **DETECTION**



URBAN



MARITIME



FRONTIER

Design & Implement: Delay

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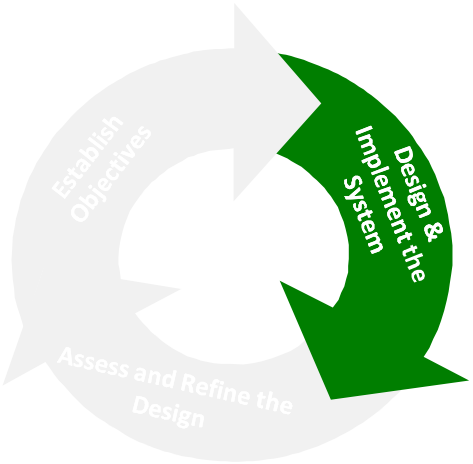
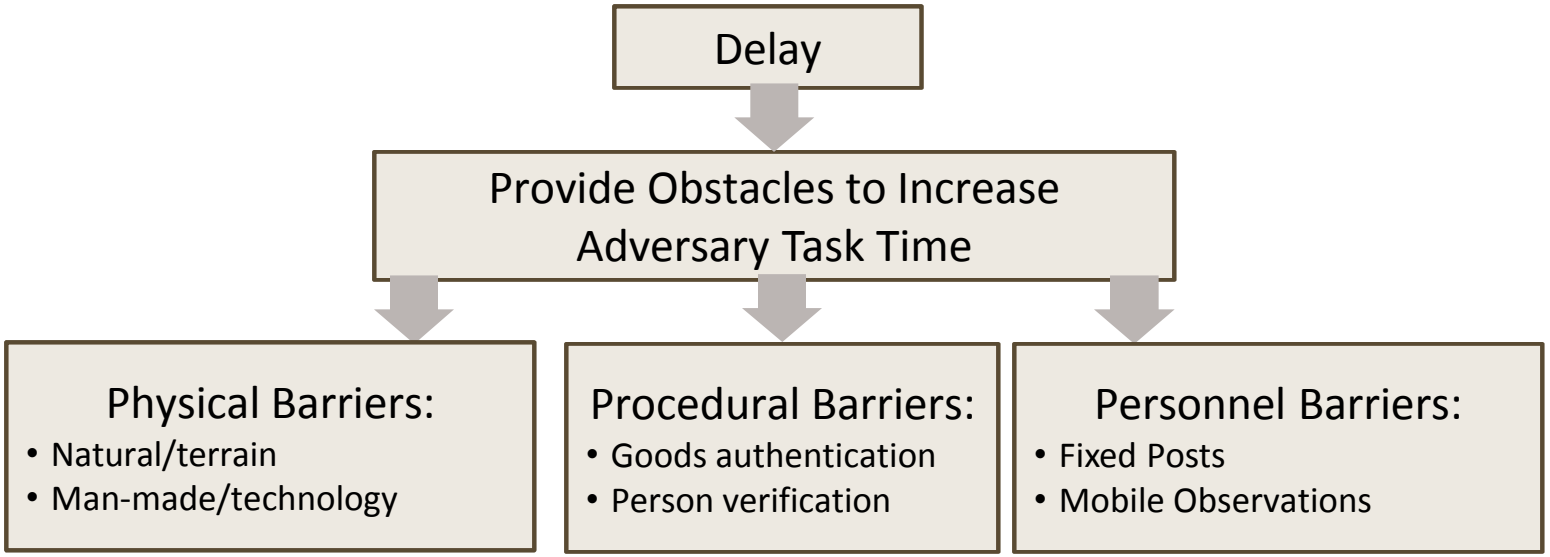
- Functional steps for **DELAY**
  - Impede undesirable actions, **NOT** desirable actions
- Performance Measures:
  - Time required for adversary to accomplish task and/or cause undesired event





Design & Implement: Delay

- Example options for **DELAY**

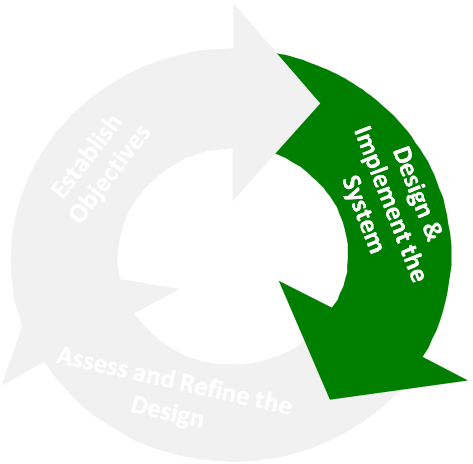
URBAN

FRONTIER

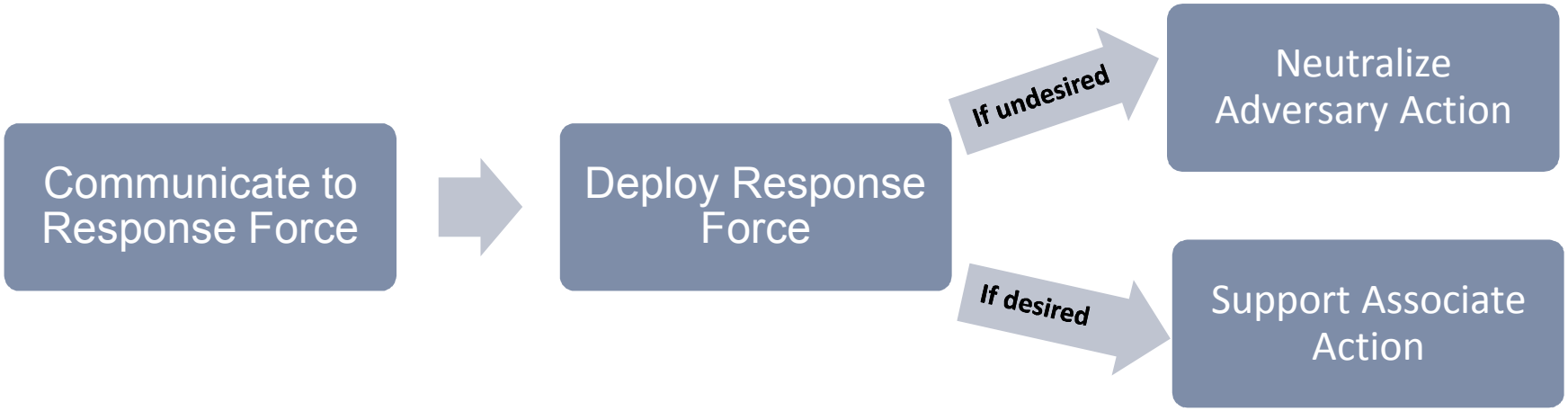
MARITIME

Design & Implement: Response

- Functional steps for **RESPONSE**
  - Adequate reaction is accurate, timely, and proportionate



- Performance Measures:
  - Time to communicate & deploy adequate response
  - Effectiveness of the response



Design & Implement: Response

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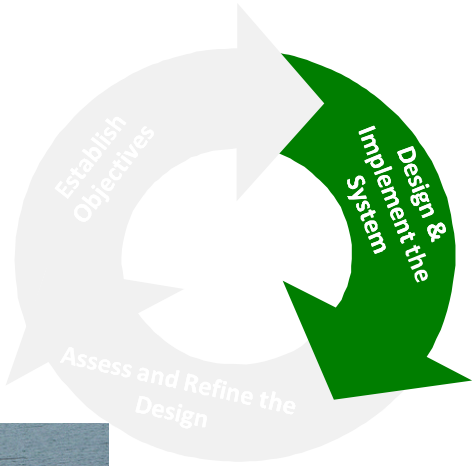
- Example options for **RESPONSE**

URBAN

MARITIME

FRONTIER



Design & Implement the System

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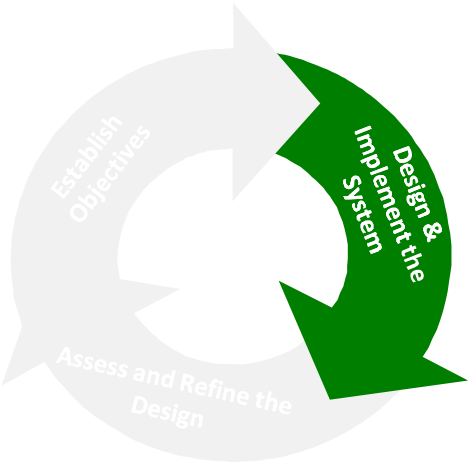

- Border security implementation includes: **CONTEXT**
- Physical
  - Geography
  - Climate
  - Port of Entry (POE) vs. Frontier
- Political
  - Cooperative vs. Unilateral
  - Ungoverned spaces
- Social
  - National culture
  - Local relationships

Design & Implement the System

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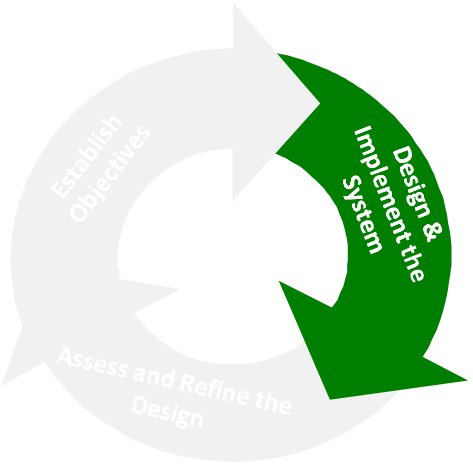
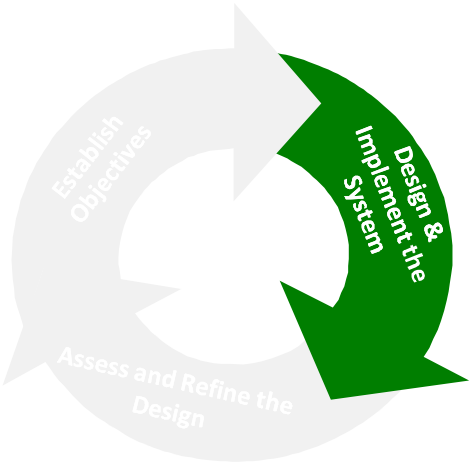
- Border security implementation includes: **RESOURCES & LOGISTICS**
- Resources = what is needed for border security implementation
  - Finances
  - Manpower
  - Time
- Logistics = how to organize for border security implementation
  - Technology
  - Personnel
  - Procedures
  - Maintenance
- *Must be considered in cost/benefit analysis of possible border security system solutions



Design & Implement the System



- Border security implementation includes: **STAKEHOLDERS**

- Internal = organizations **WITHIN** a country with border security responsibilities:
  - National decision-maker(s)
  - Military or police
  - National trade/commerce
  - Foreign affairs

- External = organizations **OUTSIDE** a country with border security relationships:
  - Military or police
  - Foreign affairs

Design & Implement the System

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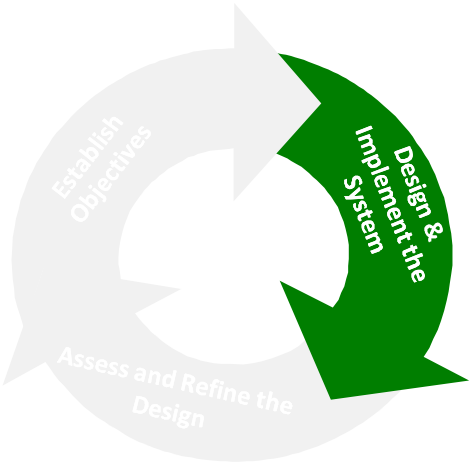
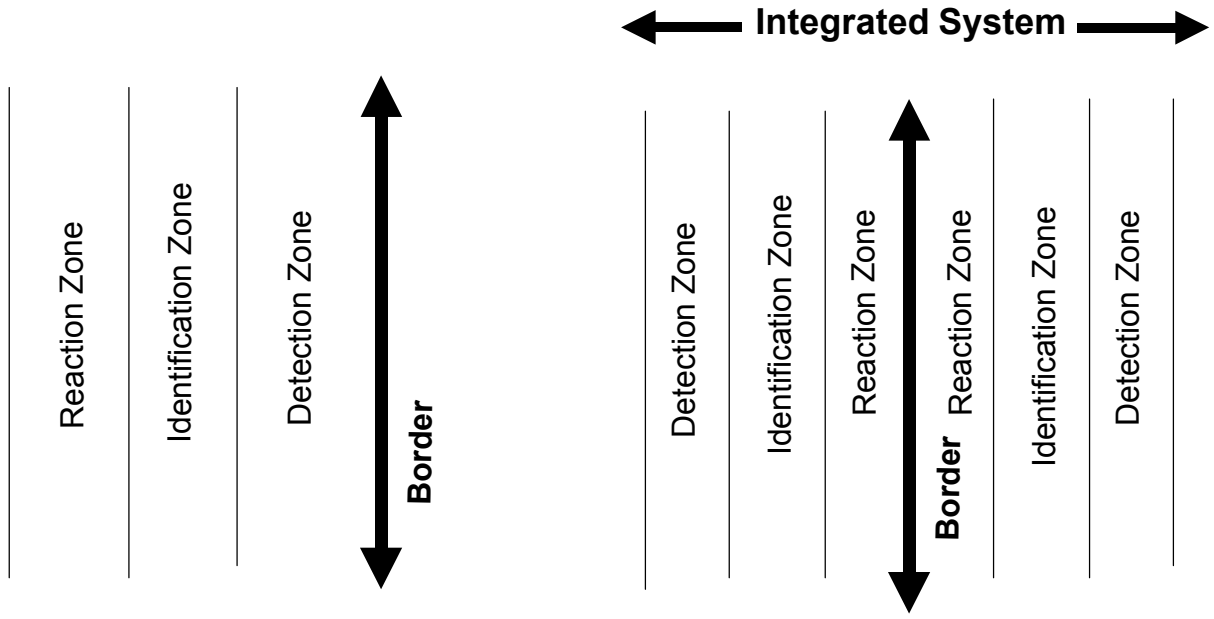


- Border security implementation includes: **STAKEHOLDERS**

- Unilateral vs. Cooperative Border Concept



A. Unilateral Monitoring Model

B. Cooperative Monitoring Model

Assess the System

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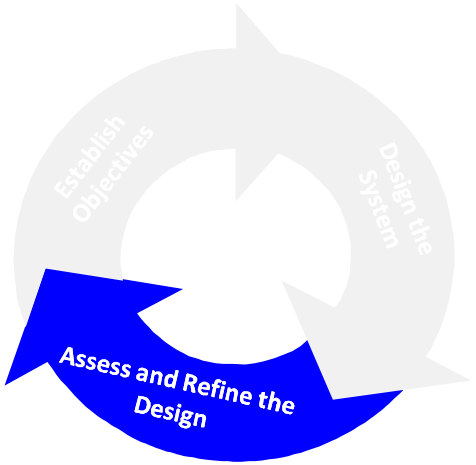
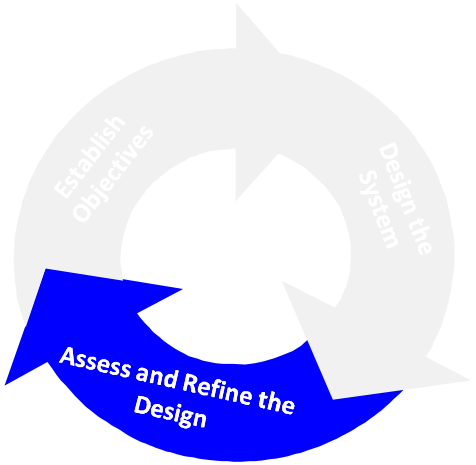
- Border security objectives **drive** system design
- Need to identify **HOW WELL** the border security system was able to:
  - Detect & allow
  - Detect & prevent
  - Defend against (threat assessment)
- Measures how well the desired level of **risk reduction** was achieved



Assess the System

Sandia National Laboratories

- Border security objectives **drive** system design
- Assess = calculate effectiveness of performance metrics
  - Detection
    - Probability of detection
    - Time for communication and assessment
  - Delay
    - Time required for adversary to accomplish task and/or cause undesired event
  - Response
    - Time to communicate & deploy adequate response
    - Effectiveness of the response



Assess the System

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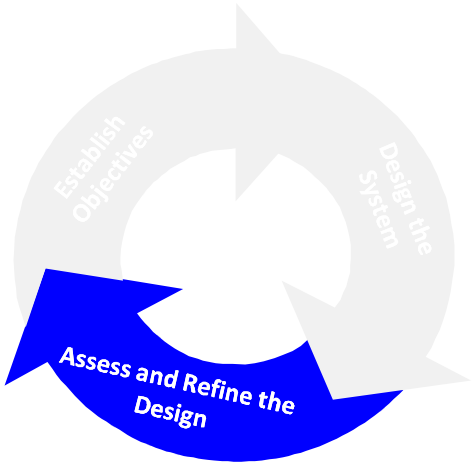

Functional Type Test	Performance Type Test	System Type Test
• Do the components function as designed? • Do subsystems complete desired **function**?	• Do the subsystems interact as designed? • Does entire system meet **performance requirements**?	• Does the system perform as designed? • Does entire system meet **support objective**?

Assess the System

Design Adjustment for Risk Reduction

Assess the System

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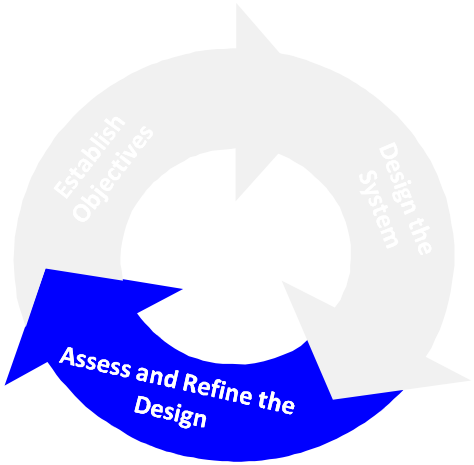
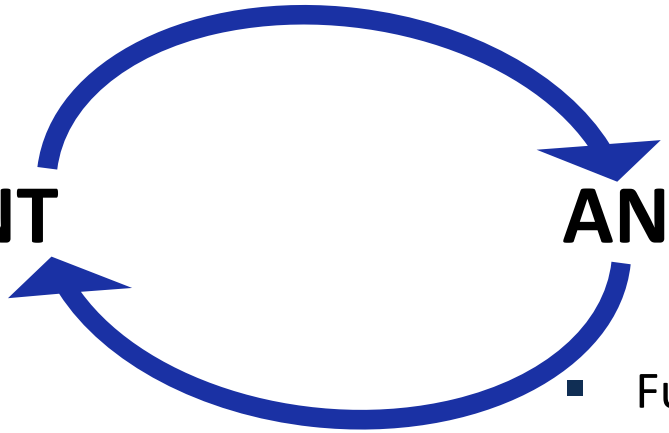
- Border security objectives **drive** system design
- Assess = calculate effectiveness of performance metrics





- Procure
- Install
- Test
- Commission
- Operate

- Functional Performance Testing
- Field Testing
- Performance Analysis
- Vulnerability Analysis
- Cost-Benefit Analysis
- Modeling and Simulation

Application of Border Security

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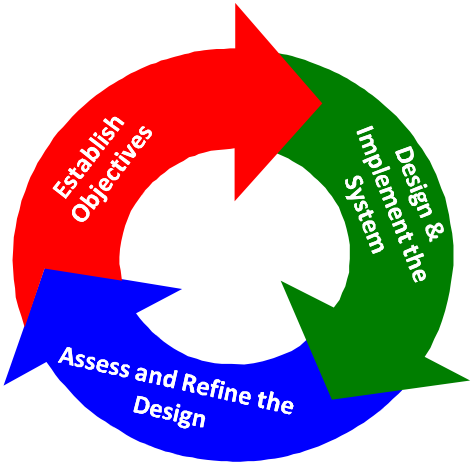
- Border security development enhanced with a **systems approach** & **risk-based planning**
- Need to know how to achieve border security:
  - **Functions** (detection, delay, response)
  - **Performance Requirements** (risk reduction)
  - **Implementation factors** (context, resources, stakeholders)
- Need to examine tradeoffs between options and **identify the optimal (best possible) combination** of personnel & technology



Application of Border Security

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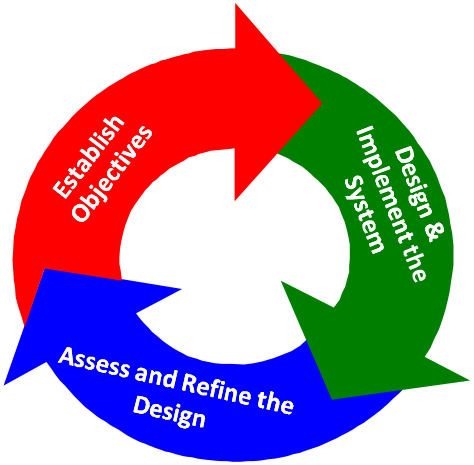
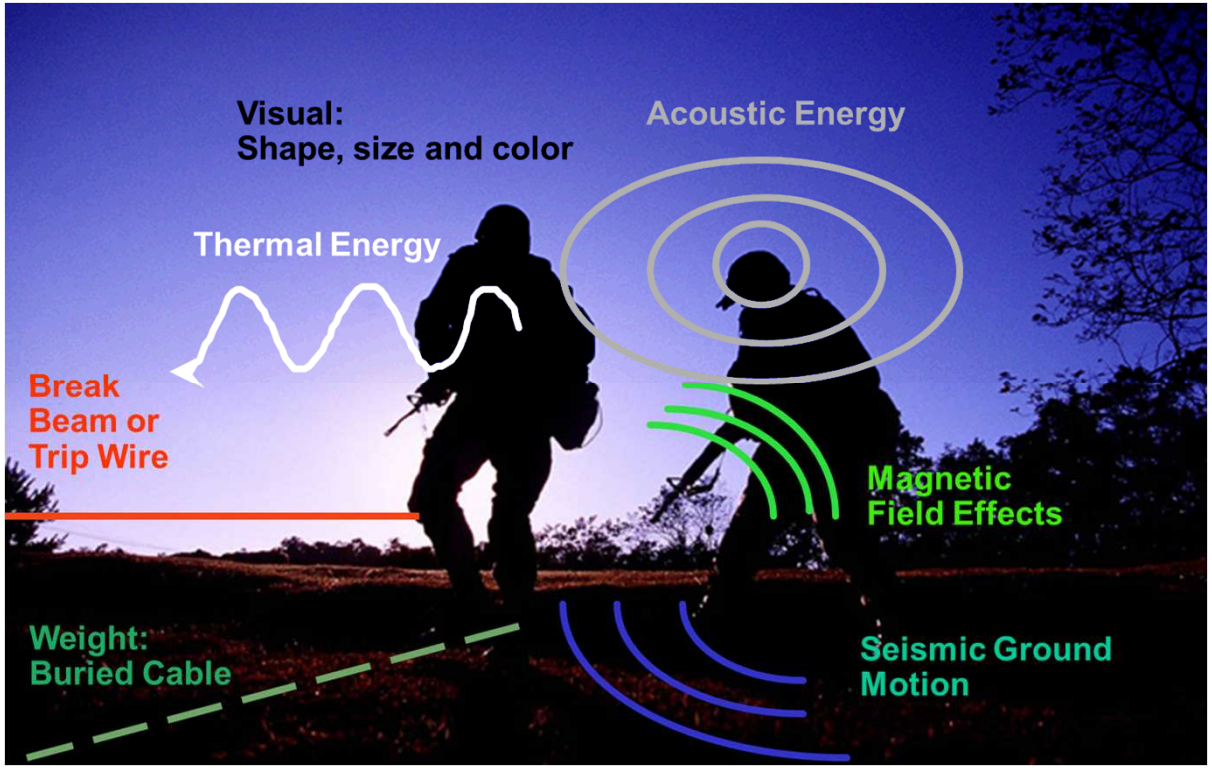
- Border security development enhanced with a **systems approach** & **risk-based planning**



- What can Border Security **technology** provide?



Application of Border Security

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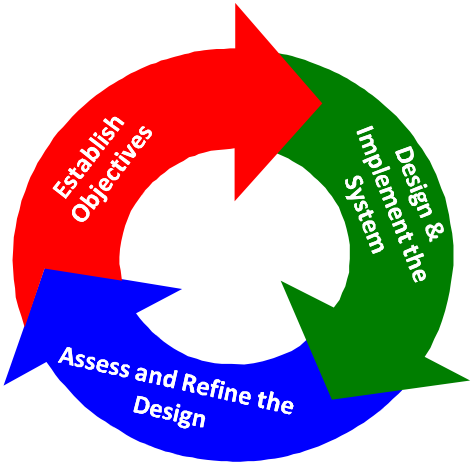
- **Role of Technology** in Border Security



- Advantages:
  - Relatively long 'attention' spans
  - Reduced alarm/signal overload via programming
  - Utility in remote/frontier locations
  - Capable of monitoring larger areas& multiple signals

- Disadvantages:
  - Algorithm-based problem processing (less flexibility)
  - Political/social understanding
  - Require power source &/or energy infrastructure
  - Only reports change in physical parameter(s)

Application of Border Security

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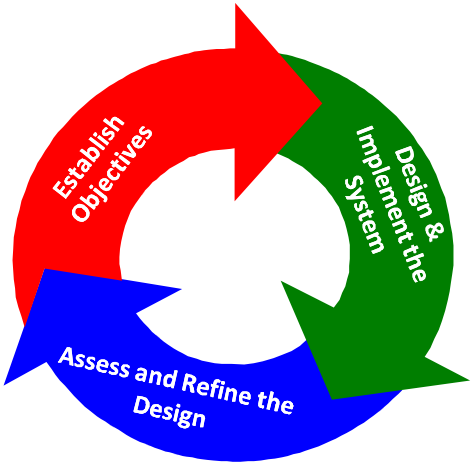
- Border security development enhanced with a **systems approach** & **risk-based planning**



- What can Border Security **personnel** provide?

Application of Border Security

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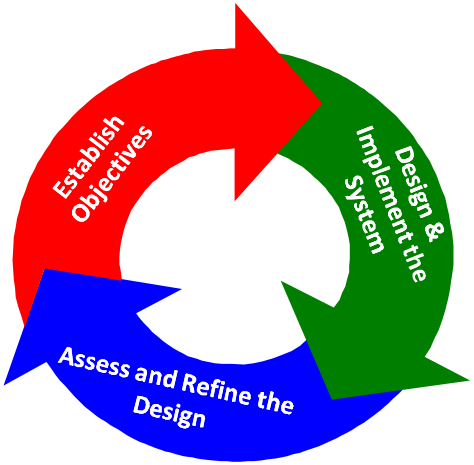
- **Role of People** in Border Security



- Advantages:
  - Complex problem processing
  - Faster assessment & response
  - Political/social understanding
  - More flexibility

- Disadvantages:
  - Expensive (multiple shifts, training, etc)
  - Relatively short attention spans
  - Reduced effectiveness in remote/frontier locations
  - Higher likelihood of alarm/signal overload

Application of Border Security

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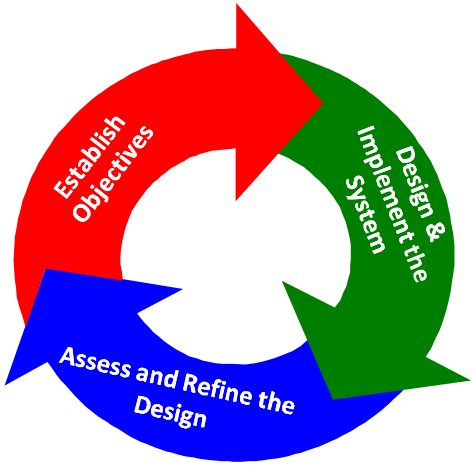
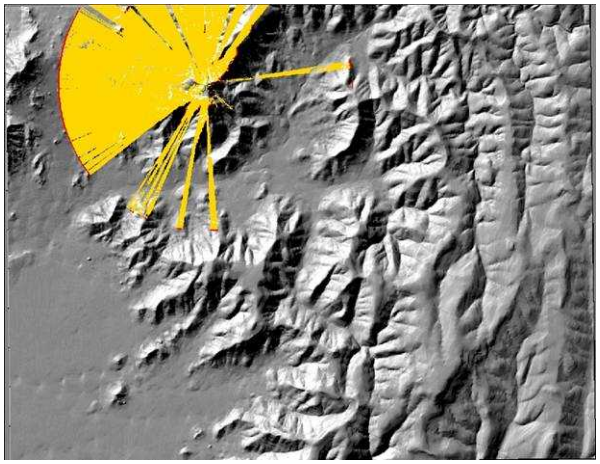
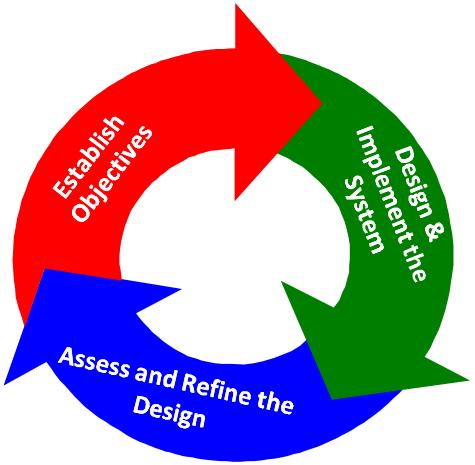
- Workshop Participation
- Discuss several hypothetical border security scenarios
- Need to determine:
  - Objective(s)
  - Threat(s)
  - Functions
  - Requirements
  - Stakeholders
  - Resources/Logistics
  - Special Considerations
  - Possible Implementation Solutions



Application of Border Security

- Hypothetical Case #1: **Mountainous, Frontier Border**





- Objective(s)
- Threat(s)
- Functions
- Requirements
- Stakeholders
- Resources/Logistics
- Special Considerations
- Possible Implementation Solutions

Application of Border Security

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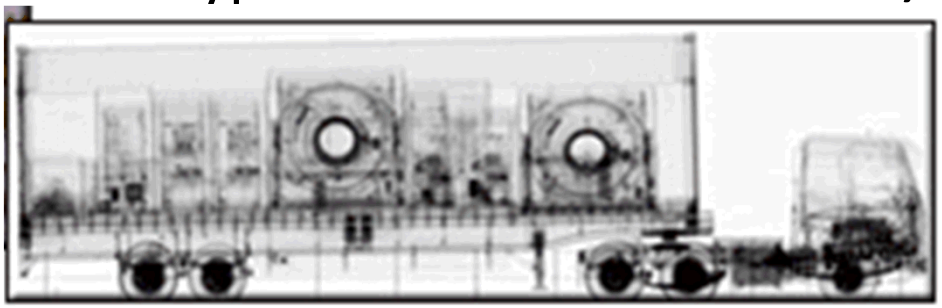
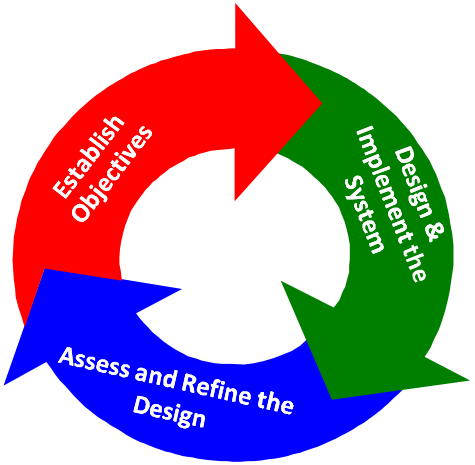
- Hypothetical Case #2: **Urban, Port of Entry**

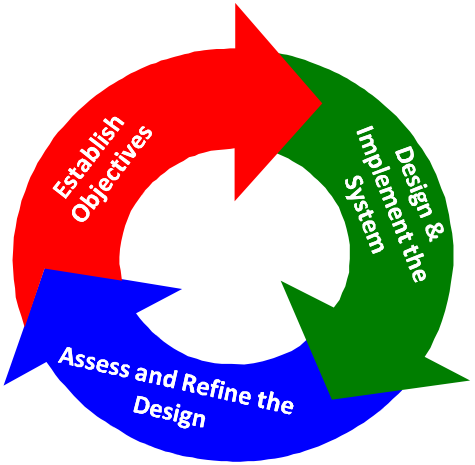




- Objective(s)
- Threat(s)
- Functions
- Requirements
- Stakeholders
- Resources/Logistics
- Special Considerations
- Possible Implementation Solutions

Application of Border Security

- Hypothetical Case #3: **Maritime, Port of Entry**

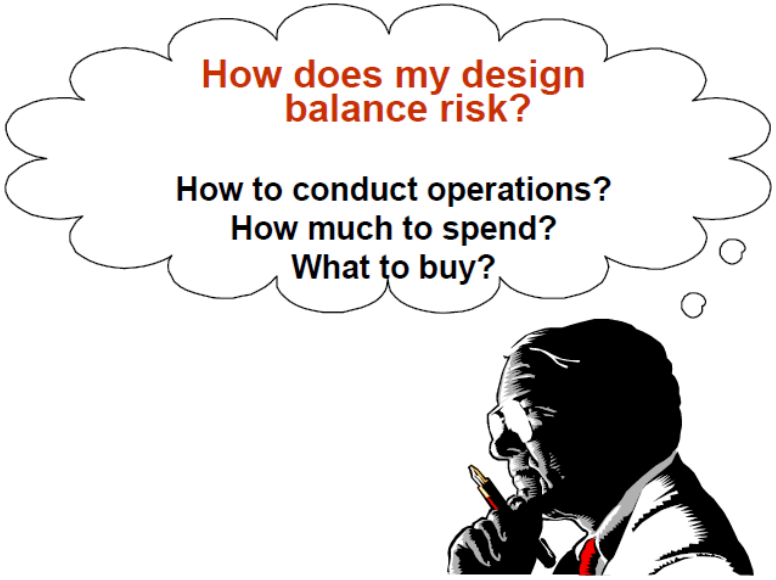


- Objective(s)
- Threat(s)
- Functions
- Requirements
- Stakeholders
- Resources/Logistics
- Special Considerations
- Possible Implementation Solutions

What's the point?

- Based on what has been presented and discussed to this point in the workshop…

- What is effective implementation of border security?
  - [discussion question for participants]



Summary

- Generic aspects of a ‘good’ border security strategy
  - Set operational objectives: **assess threats** & **performance metrics**
  - Use **systems** & **risk-based** planning approach
  - **Balance** cost with benefit: maintenance & sustainability
  - Coordinate between technology & personnel: **support, not replace**
  - Cooperate between relevant internal & external **stakeholders**
  - **Assess** & **update** border security systems & policies