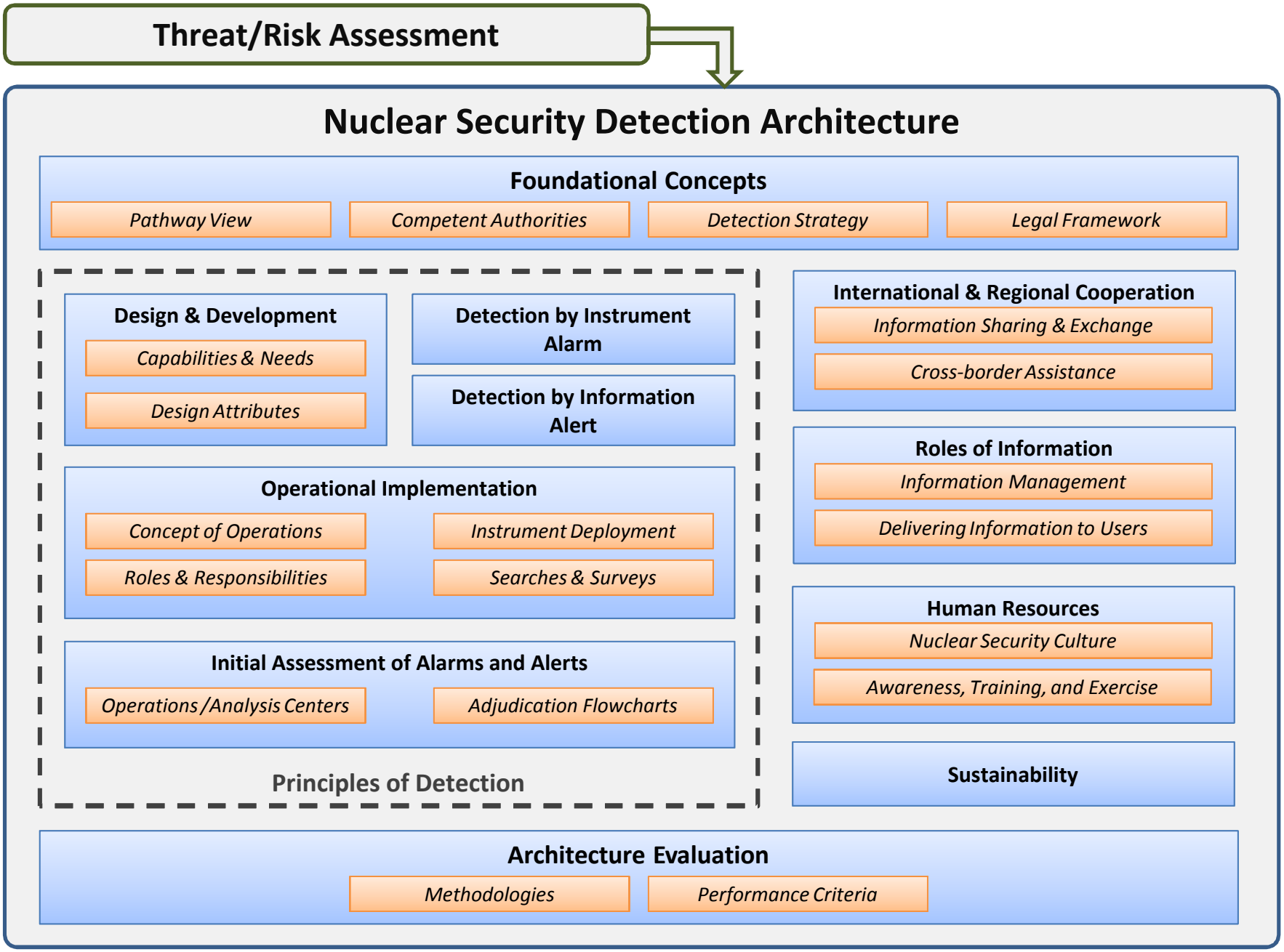
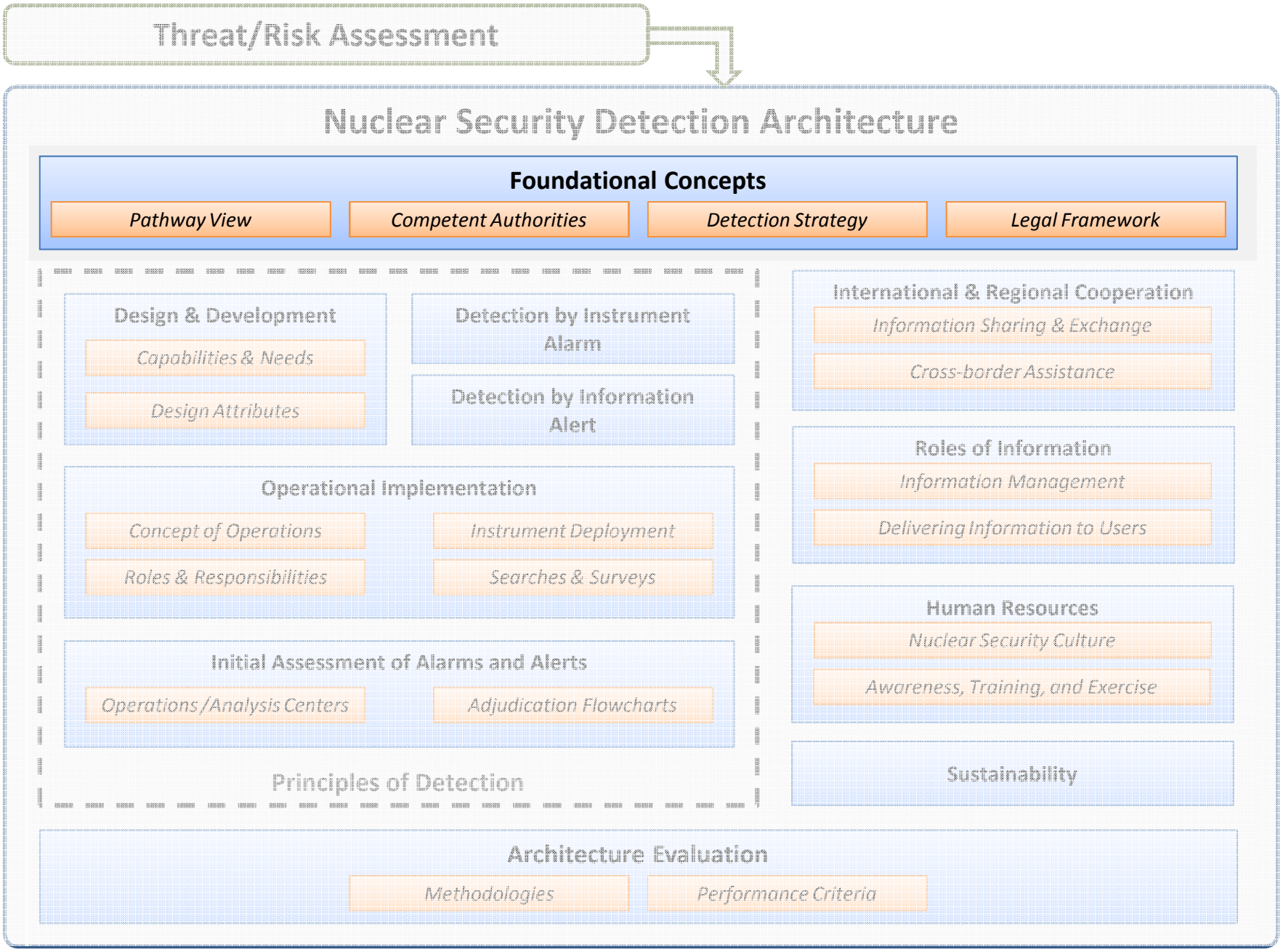
SAND2012-6061P

Foundational Concepts for a Nuclear Security Detection Architecture

Nuclear Security Detection Architecture

Module D


Threat/Risk Assessment
Nuclear Security Detection Architecture
Foundational Concepts
Pathway View
Competent Authorities
Detection Strategy
Legal Framework
Design & Development
Capabilities & Needs
Design Attributes
Detection by Instrument Alarm
Detection by Information Alert
Operational Implementation
Concept of Operations
Instrument Deployment
Roles & Responsibilities
Searches & Surveys
Initial Assessment of Alarms and Alerts
Operations /Analysis Centers
Adjudication Flowcharts
Principles of Detection
International & Regional Cooperation
Information Sharing & Exchange
Cross-border Assistance
Roles of Information
Information Management
Delivering Information to Users
Human Resources
Nuclear Security Culture
Awareness, Training, and Exercise
Sustainability
Architecture Evaluation
Methodologies
Performance Criteria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Module Objectives

Participants will become familiar with foundational concepts of a nuclear security detection architecture, including:

- The pathways view of the architecture
- Identifying competent authorities
- The basis of a nuclear security detection architecture
- The nuclear security detection strategy
- The legal framework for a nuclear security detection architecture

Country Self-Assessment Checklist

This module will enable or motivate the following questions:

1. Has a nuclear security detection strategy been established?
2. Has your country determined the scope and priority of the nuclear security detection architecture?
3. Have the results of a threat or risk assessment been factored into the development nuclear detection strategy?
4. Has a legal framework for a nuclear security detection architecture been established, including defining relevant criminal acts?
5. Has a coordinating body or mechanism for the nuclear security detection architecture been identified?

What is Detection?

Detection includes a known encounter between the threat and the defensive countermeasures

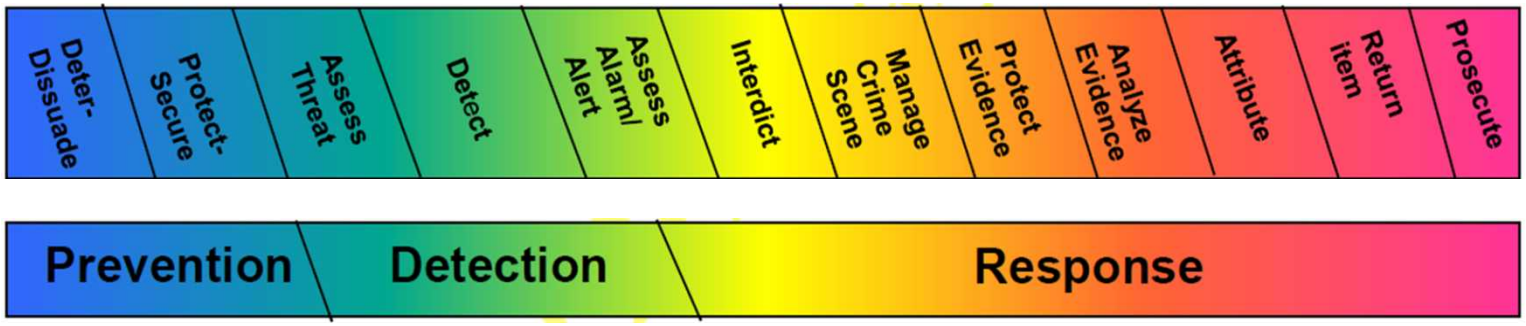
A detection event includes:

- Instrument alarms
- Information alerts
- Collection of information concerning the alarm or alert
- Integrating information from additional sources
- Initial assessment of the alarm or alert

What is a Nuclear Security Detection Architecture?

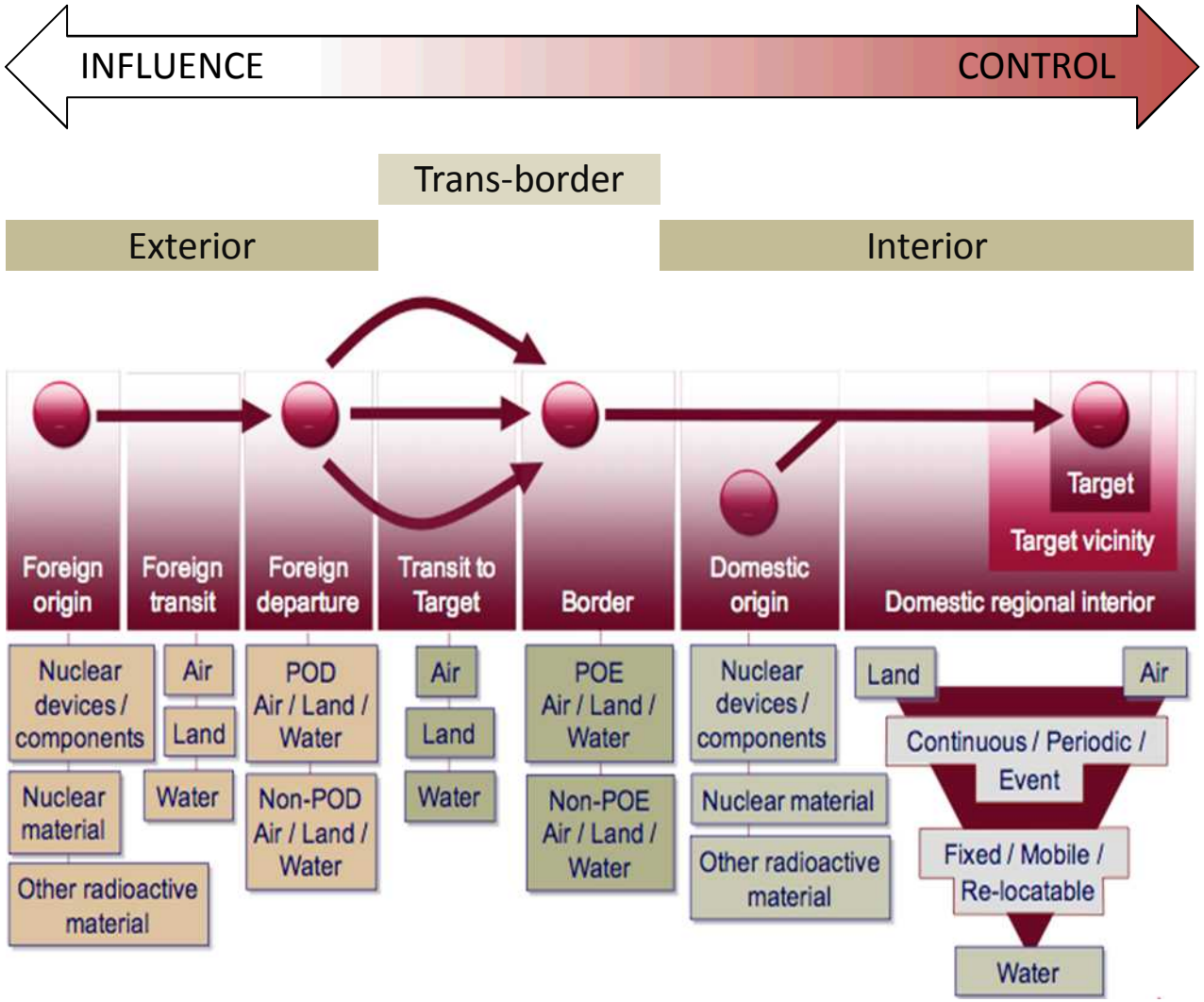
The integrated set of nuclear security systems and measures, based on an appropriate legal and regulatory framework, needed to implement a national strategy for the detection of nuclear and other radioactive material out of regulatory control

Spectrum of Nuclear Security Activities

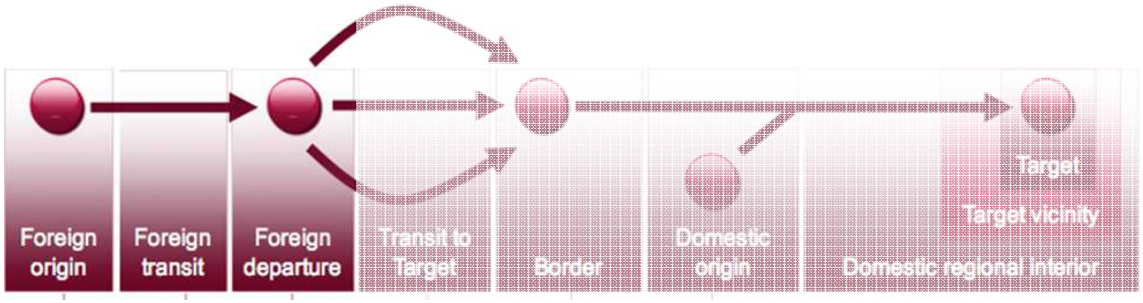


- The full nuclear security spectrum includes prevention, detection, and response activities
- The scope of a detection architecture includes:
  - Threat assessment
  - Detection
  - Assessment of the alarm/alert

A Pathways View of the Architecture



Exterior Layers

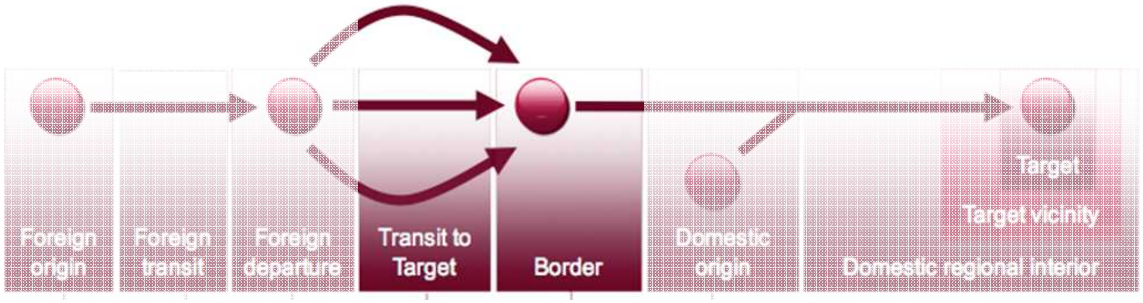


Foreign Origin: locations in other States where nuclear and other radioactive material are stored, used or produced

Foreign Transit: transport of material with or between States from point of origin to last point of exit prior to reaching the target State

Foreign Departure: the last possible departure point through which traffic will pass through prior to entering the State.

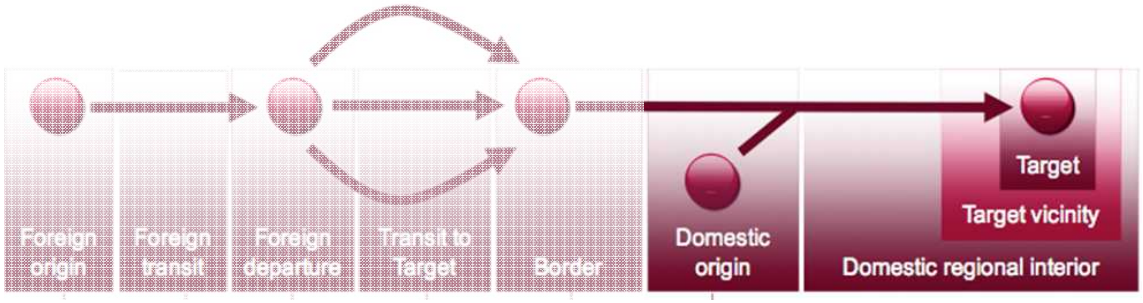
Trans-border Layers



Transit to Target: The passage of material from the last foreign port of departure to point of entry into the State

Border: air, land, and maritime points of entry and the area between points of entry; often the geographic boundary of the State

Interior Layers



Domestic Origin: locations within the State that store, use, or process radioactive material

Domestic Interior: the pathways that exist within a State, including roadways, airports, rail lines, etc.

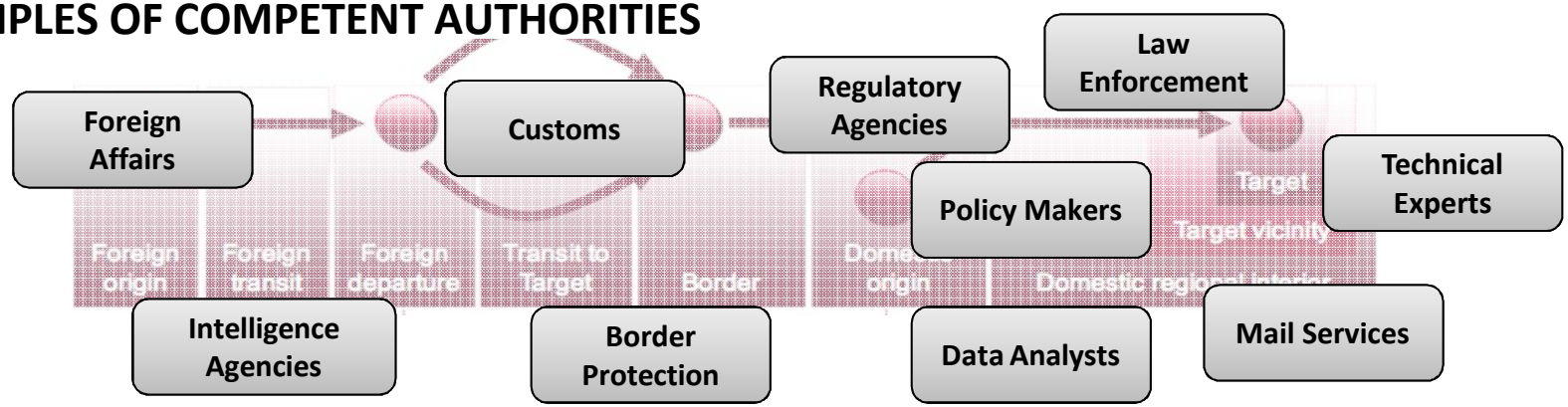
Target Vicinity: a layer that surrounds the target with sufficient standoff distance to protect targets

Target: the target can include special events, infrastructure, points of interest, ports of entry, etc.

Competent Authorities

- Competent authorities are governmental organizations or institutions that have been designated by a State to carry out one or more nuclear security functions
- The pathways view can be used to identify competent authorities within a State's institutional hierarchy
- The term "stakeholders" is also used, which includes the competent authorities as well as other, non-governmental organizations or institutions (such as members of the public or industry)

EXAMPLES OF COMPETENT AUTHORITIES

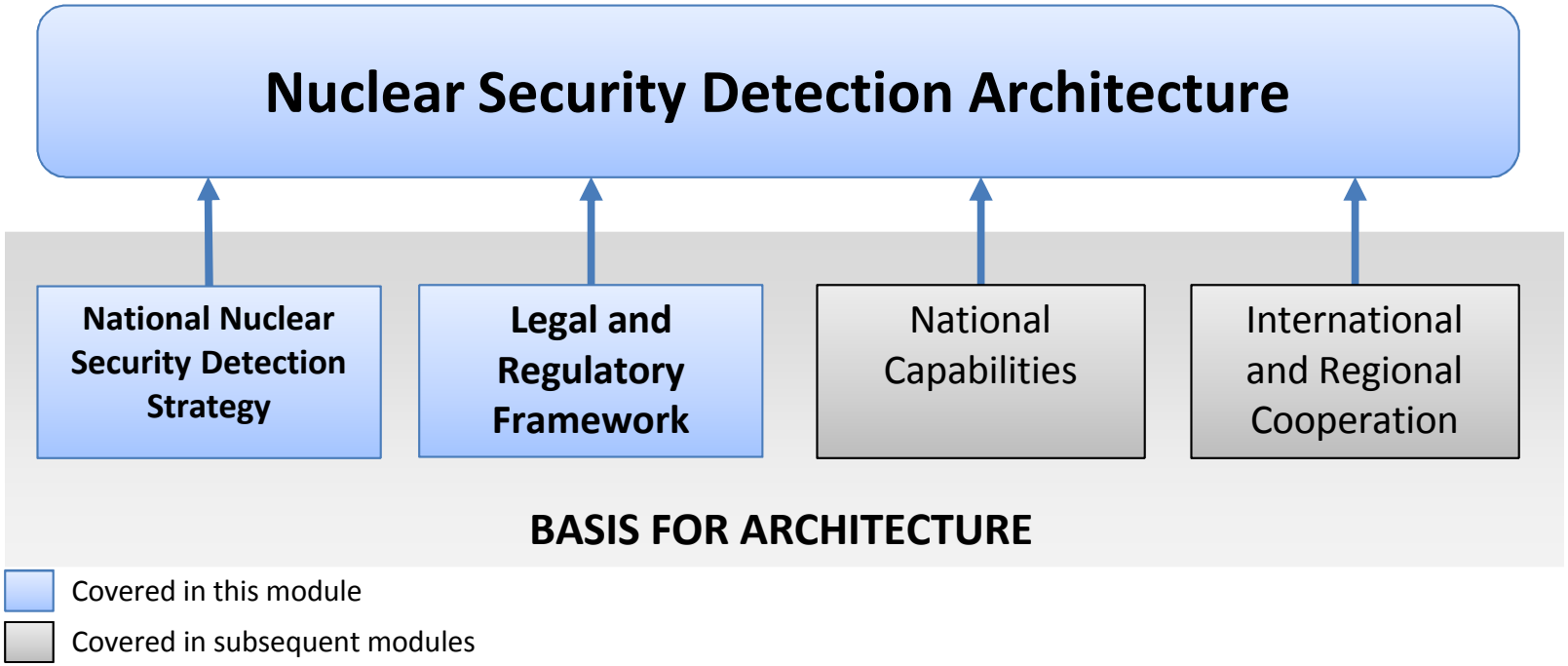


Coordinating Body or Mechanism

- A committee comprised of representatives from relevant competent authorities
- Ensures necessary institutional support for the detection strategy and architecture
- Can be established at various levels in the government structure (national, regional, or local)

Basis of a Nuclear Security Detection Architecture

Various elements of a nuclear security regime form the basis and help frame and motivate the architecture



What is the Nuclear Security Detection Strategy?

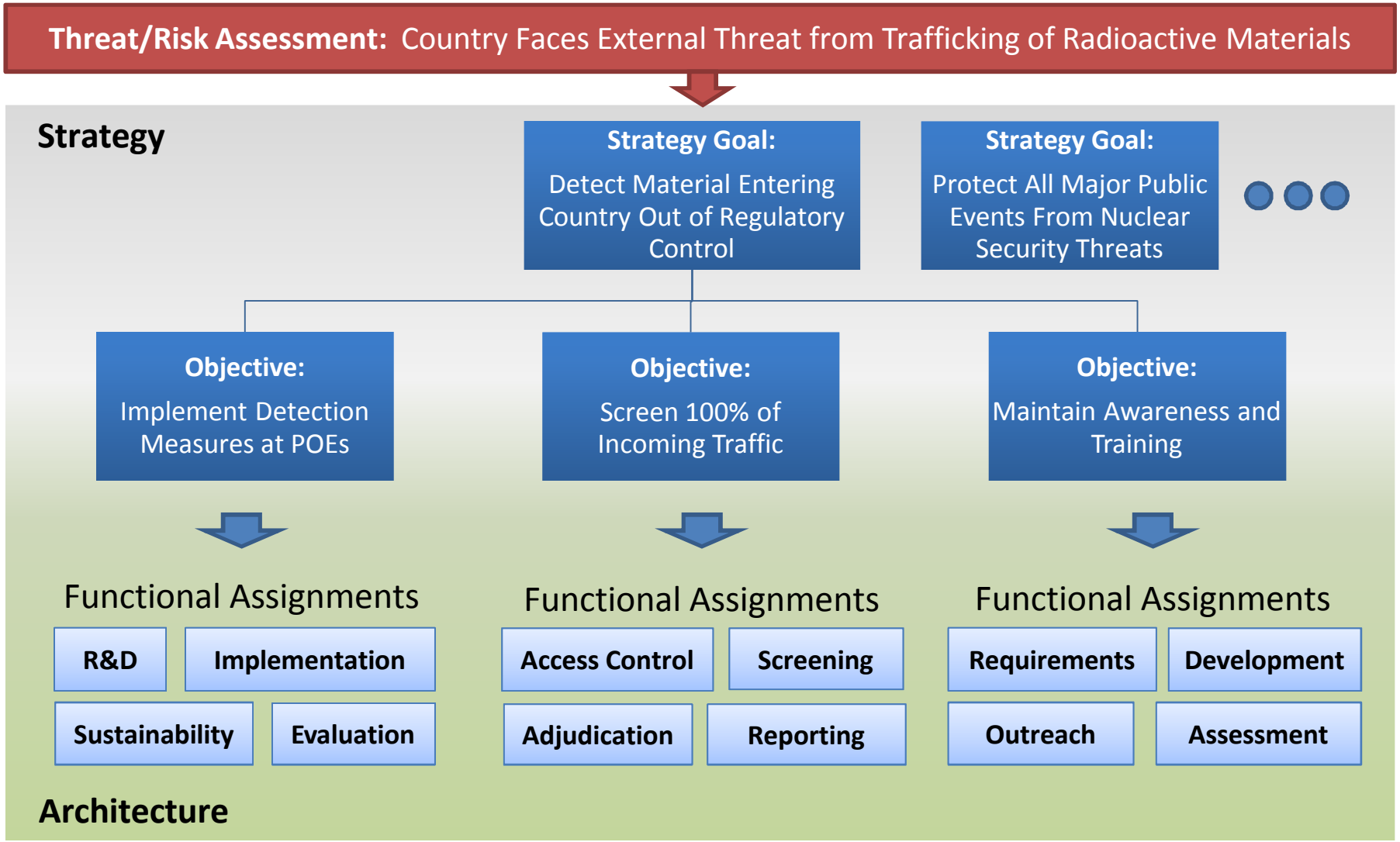
- The nuclear security detection strategy can:
  - Determine the scope and priority of the architecture
  - Articulate objectives for detection systems and measures
  - Provide the basis for the assignment of functions
  - Include a policy on sensitive information and assign responsibilities for information security
  - Include opportunities for international and regional cooperation
- Development should be assigned to the coordinating body or mechanism

An effective architecture is derived from a comprehensive, integrated national strategy

Nuclear Security Detection Strategy Principles

- The strategy should be informed by a threat or risk assessment, accounting for:
  - All threat possibilities (IND, RED, and RDD)
  - All potential levels of adversary sophistication and motivation
  - The possibility that even a low-risk state can be used as an originating point or transit route for material
- The strategy should be updated:
  - Periodically to reflect new information and changing conditions
  - When threat or risk assessment changes

From Strategy to Architecture



Legal Framework for Detection

Provides the legal basis for the nuclear security detection architecture and defines the conduct or actions that are considered to be a criminal act with nuclear security implications, including:

- The actual attempt or commitment of an act
- The threat of act, whether an actual threat or a hoax

Provisions for Detection in the Legal Framework

Additional provisions in the legal framework that can be leveraged by the detection architecture include:

- Protection of source material
- Import and export controls
- Customs and borders protection
- Assign authority to relevant competent authorities
- The ability to search and screen for nuclear or radioactive material

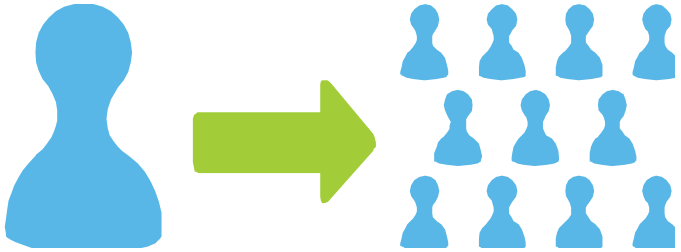
Roles and Responsibilities

The legal framework should also define roles and responsibilities and assign authority to relevant competent authorities. Related functions include:

- Contributing to the national detection strategy
- Developing, operating, and maintaining the detection systems and assessment procedures
- Providing training to implementers
- Sustaining detection capabilities and ensuring operational preparedness
- Developing sustainable channels of communication among stakeholders

Communicating Strategy to Stakeholders

After a strategy and architecture have been approved it is important to communicate relevant aspects to stakeholders in an appropriate and timely manner



Coordinating Body

Competent Authorities

Communication methods include:

- Officially documenting and distributing the strategy
- Developing awareness courses and workshops on the strategy

Module D Summary