

Sustainability

Nuclear Security Detection Architecture Module M

Threat/Risk Assessment

Nuclear Security Detection Architecture

Foundational Concepts

Design Strategies

Pathways Model

Mission, Goals, Objectives

Competent Authorities

Design & Development

Architecture Principles

Capabilities & Needs

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

Human Resources

Nuclear Security Culture

Awareness, Training, and Exercise

Roles of Information

Information Management

Delivering Information to Users

Sustainability

Architecture Evaluation

Methodologies

Performance Criteria

Module Objectives

Participants will have an understanding of the factors necessary to promote long-term functionality and effectiveness of a nuclear security detection architecture, including:

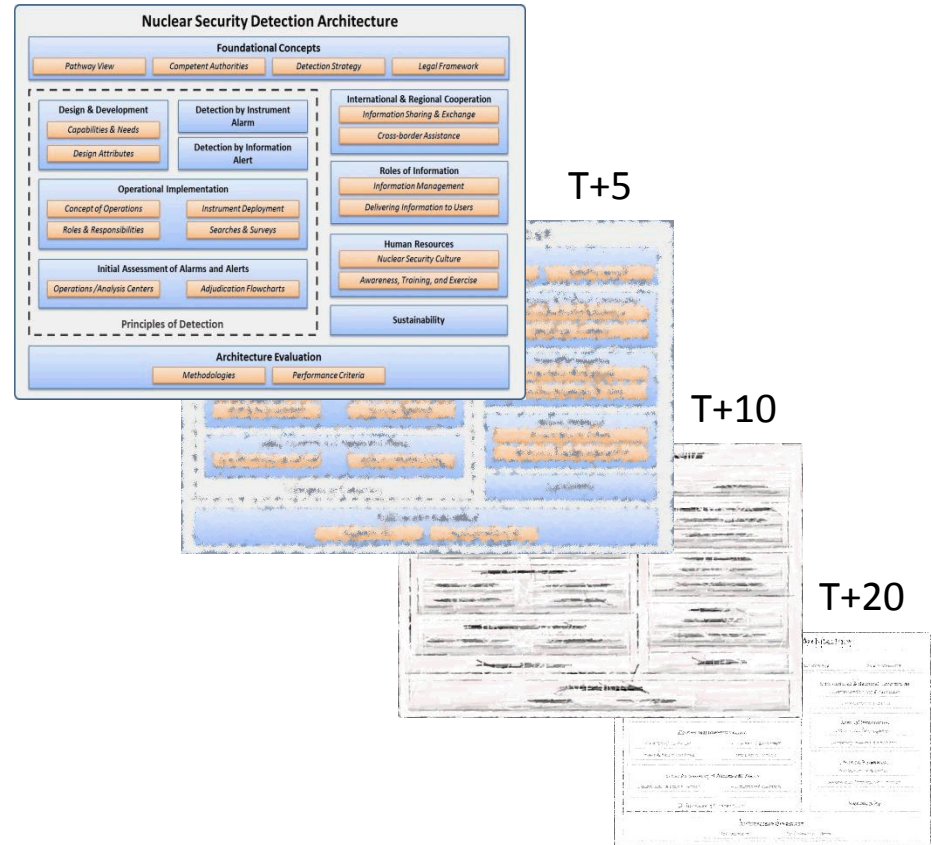
- Financial resources
- Equipment life cycle
- Instrument calibration
- Infrastructure maintenance
- Addressing challenges to sustainability

The information presented in this module is relevant to checklist questions:
25, 28, 16, 60

Architecture Sustainability

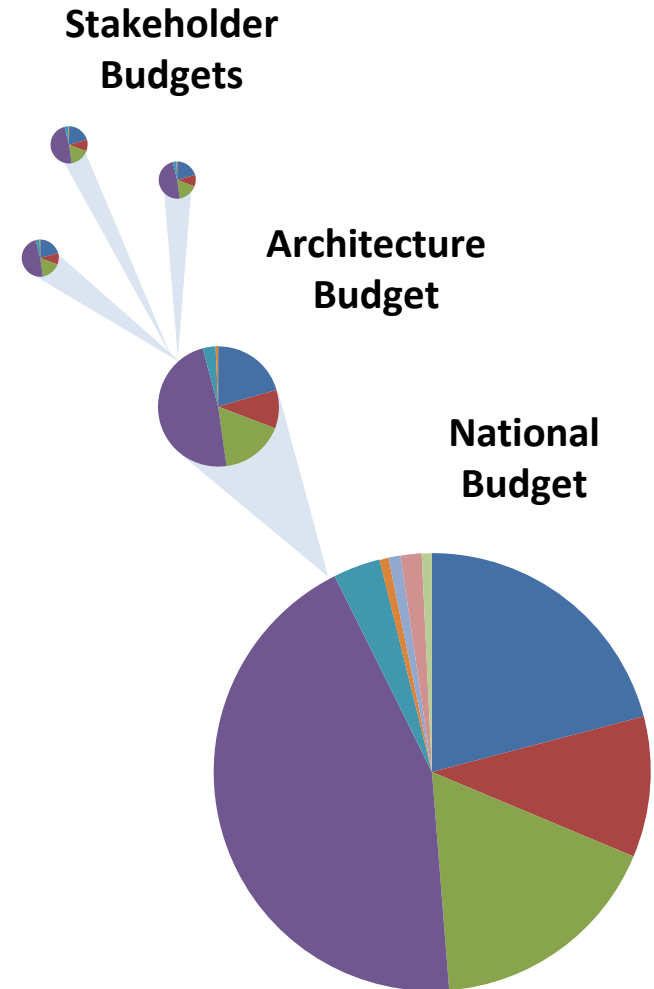
- Implementation of a nuclear security detection architecture is an ongoing process
- Significant planning and commitment of resources are needed to ensure the long-term operational effectiveness of detection capabilities
- Lack of attention to sustainability can result in degradation of capabilities over time

Implementation T+0



Financial Resources

- Architecture sustainability is directly contingent on the availability of funding for the planning, acquisition, and maintenance of detection capabilities
- Capabilities will likely be distributed across diverse stakeholders, each with unique funding requirements and constraints
- Funding of the architecture must also compete with other national budget priorities

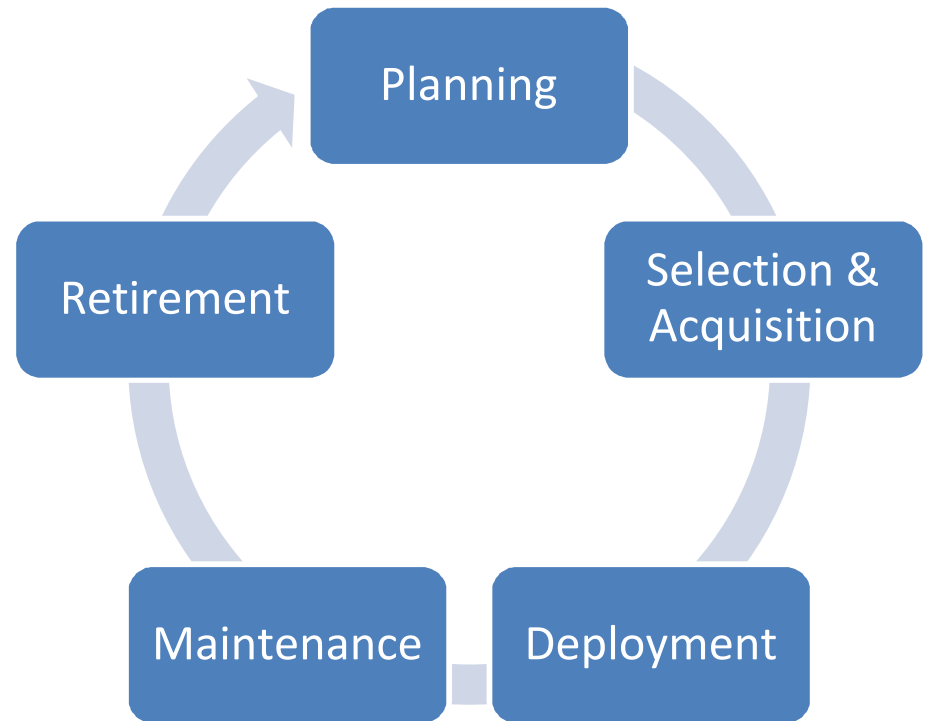


Financial Planning

- Financial planning should both inform and be informed by:
 - Goals and objectives from the national detection strategy
 - Current and projected capabilities and assets
 - Individual stakeholder needs and requirements
 - Anticipated growth
- Financial requirements should be assessed from the beginning and periodically reviewed to account for:
 - Changes in detection goals, objectives, and strategy
 - Evolving fiscal environment
 - National budget priorities
 - Technical developments

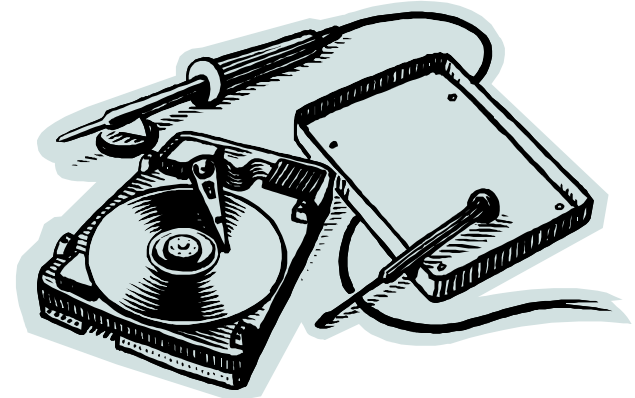
Equipment Lifecycle

- All detection-related equipment has a finite lifecycle
- Each step in this cycle requires careful consideration and planning from the outset, including “back end” requirements



Maintenance of Detection Assets

- Deployed equipment will experience:
 - Regular wear & tear
 - Abuse/misuse
 - Exposure to elements
- Deployment of equipment should be followed by regular inspection and maintenance by qualified personnel
- Maintenance plans should be created and regularly updated for all detection assets



Generic Maintenance Considerations

Regular

- Operational status checks
- Calibration
- Power (electricity and batteries)
- Cleaning

Periodic

- Critical component inspection
- Critical component replacement
- Overhaul
- Upgrades

Unscheduled

- Problem troubleshooting
- “In the field” maintenance
- Return to vendor/manufacturer
- Write-off and Replacement

Cross-cutting Considerations

- Maintenance planning and budget
- Training and availability of qualified personnel
- Provision of spare parts, critical components, and backups
- Maintaining relationships with equipment manufacturers/vendors

Instrument Calibration

- Regular calibration of detection instruments is an important maintenance consideration
- Calibration frequency and procedures will vary according to instrument type
- Inadequately calibrated instruments may:
 - Fail to detect material out of regulatory control
 - Incorrectly identify or characterize source material
 - Incur excessive false or nuisance alarms



Equipment Retirement

- Eventually, equipment will reach the end of its sustainable life or become obsolete, requiring disposal and replacement
- “Cradle-to-grave” considerations should be considered from the beginning during planning and acquisition
- Retirement considerations include:
 - Disposal costs
 - Recycling of components as appropriate
 - Protection of sensitive technologies and information
 - Appropriate disposal of hazardous materials



Infrastructure Maintenance

- A sustainable architecture requires adequate supporting infrastructure, including:
 - Facilities
 - Power/electricity
 - Heating, ventilation, and air conditioning
 - Communication lines
 - Other utilities (water, gas, fuel, roads)
- Maintenance plans should be developed for infrastructure, along with adequate provision of qualified personnel
- Even the best maintained detection technologies can be crippled by weaknesses in supporting infrastructure



Challenges to Sustainability

- Architecture sustainability faces potential challenges, including:
 - Competing priorities and missions
 - Resource constraints
 - Mission or scope “creep”
 - Mission acceptance and mission fatigue
 - Unanticipated changes in technologies, threats, and global environment
- These challenges may emerge at the national, organizational, or individual level

Example Mitigation Strategies

	Competing Priorities/ Resource Constraints	Mission Acceptance & Mission Fatigue	Unanticipated Changes
National	<ul style="list-style-type: none"> • Proactive long-term planning that provides for flexibility in achieving detection mission • Identify resources that can be leveraged across mission areas 	<ul style="list-style-type: none"> • Maintain awareness among national decision-makers of detection mission relevance • Demonstrate progress and value-added through regular reporting and evaluation 	<ul style="list-style-type: none"> • Regular reassessment of national strategy, goals, and objectives • Flexibility in planning, including adaptable strategies and budgets
Organizational	<ul style="list-style-type: none"> • Organizational planning that balances detection mission with broader mission space • Identifying and balancing costs/benefits of tradeoffs in capability across mission areas 	<ul style="list-style-type: none"> • Maintain leadership awareness of detection mission relevance • Balance leadership continuity with periodic rotation to prevent fatigue 	<ul style="list-style-type: none"> • Regular collection and analysis of operational information • Regular reassessment of operational planning and CONOPs
Individual	<ul style="list-style-type: none"> • Awareness, training, and exercises that address role of detection within broader areas of responsibility 	<ul style="list-style-type: none"> • Refresher awareness and training to reinforce detection mission • Ensure adequate provision of personnel and resources to accomplish mission 	<ul style="list-style-type: none"> • Training and exercises that emphasize initiative, flexibility, and adaptability