



***The Washington Nuclear Summit And
Challenges On The Road To 2012 Summit In Korea***

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Nuclear Security Summit Participants





Scope of the Problem

- On a global basis, there are roughly 1,600 metric tons of highly enriched uranium (HEU) and 500 metric tons of plutonium
- There are nearly 40 countries with HEU or plutonium stocks
- 436 commercial nuclear power reactors operate in 30 countries
- 56 countries operate a total of about 250 research reactors, and a further 220 nuclear reactors power ships and submarines
- There have been 18 documented cases of theft or loss of HEU or plutonium, and perhaps others not yet discovered



Washington Nuclear Summit

- **Background and initial objectives**

- **President Obama's three-part strategy (April 5, 2009 in Prague):**



- **Propose measures to reduce and eventually eliminate existing nuclear arsenals**
 - **Strengthen the Nuclear Non-Proliferation Treaty (NPT) and halt proliferation of nuclear weapons**
 - **Prevent terrorists from acquiring nuclear weapons or materials**



Washington Nuclear Summit

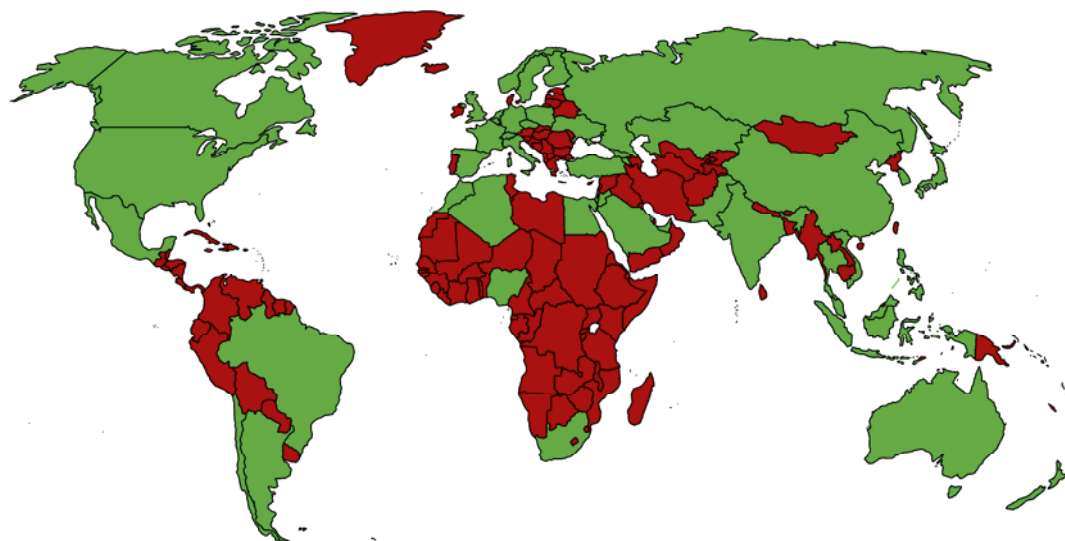
- **Background and initial objectives**
 - President Obama's announcement of his plans to host a **Global Nuclear Security Summit** in 2010 at the L'Aquila G8 Summit
 - Collectively improve our nuclear security culture
 - Share our best practices
 - Raise our standards for nuclear security





Participants of the Summit

- 47 states and 3 international organizations
- 3 states not party to the NPT were in attendance – Pakistan, Israel, and India
- Egypt's participation carried weight as the vocal member of the NAM
- Iran, North Korea, and Belarus did not attend





Summit Outcome

- **Communiqué:**
 - Secures all vulnerable nuclear material in *four years*
 - Calls for focused national efforts to improve security and accounting of nuclear materials as well as strengthen regulations – with a special focus on plutonium and HEU
 - Seeks consolidation of stocks of HEU and plutonium in addition to reduction in the use of HEU
 - Promotes universality of key international treaties on nuclear security and nuclear terrorism



Summit Outcome

- **Communiqué (Continued)**
 - Notes the positive contribution of nonbinding mechanisms like the GPCNT
 - Calls for the IAEA to receive additional resources to develop guidelines and provide advice
 - Encourages bilateral and multilateral assistance
 - Encourages nuclear industry to share best practices for nuclear security but in a way that would not prevent countries from enjoying the benefits of peaceful nuclear energy



Summit Outcome

- **Work Plan**

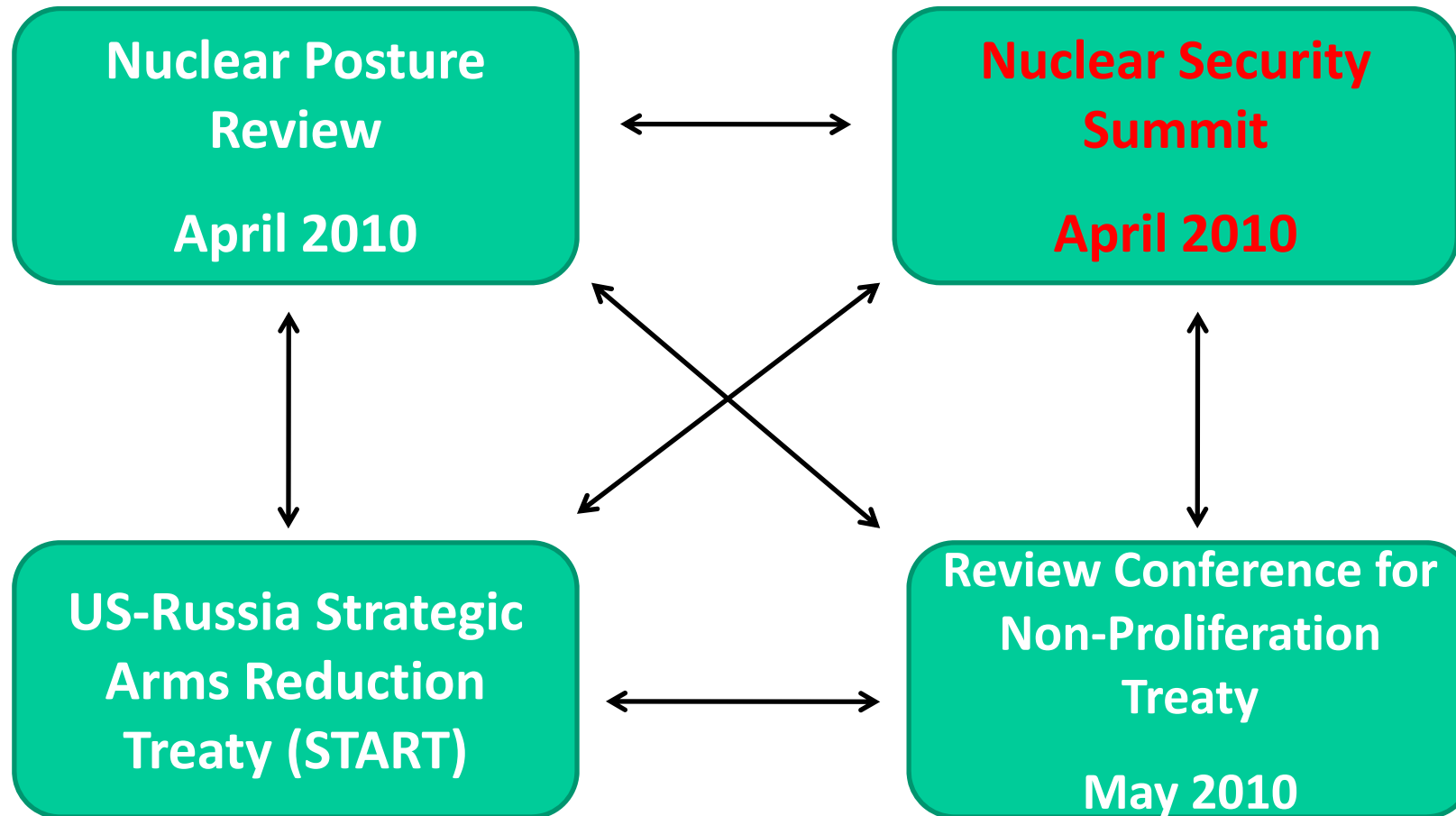
- Promotion of Communiqué provisions
- Research on new nuclear fuels, detection methods, and forensics technique
- Development of corporate and institutional cultures that prioritize nuclear security
- Education and training to ensure that countries and facilities have the people they need to protect their materials
- Joint exercises among law enforcement and customs officials to enhance detection approaches
- Urge supplier countries and technology suppliers to support the creation of national nuclear security capacities in the recipient countries, including human resources development through education and training



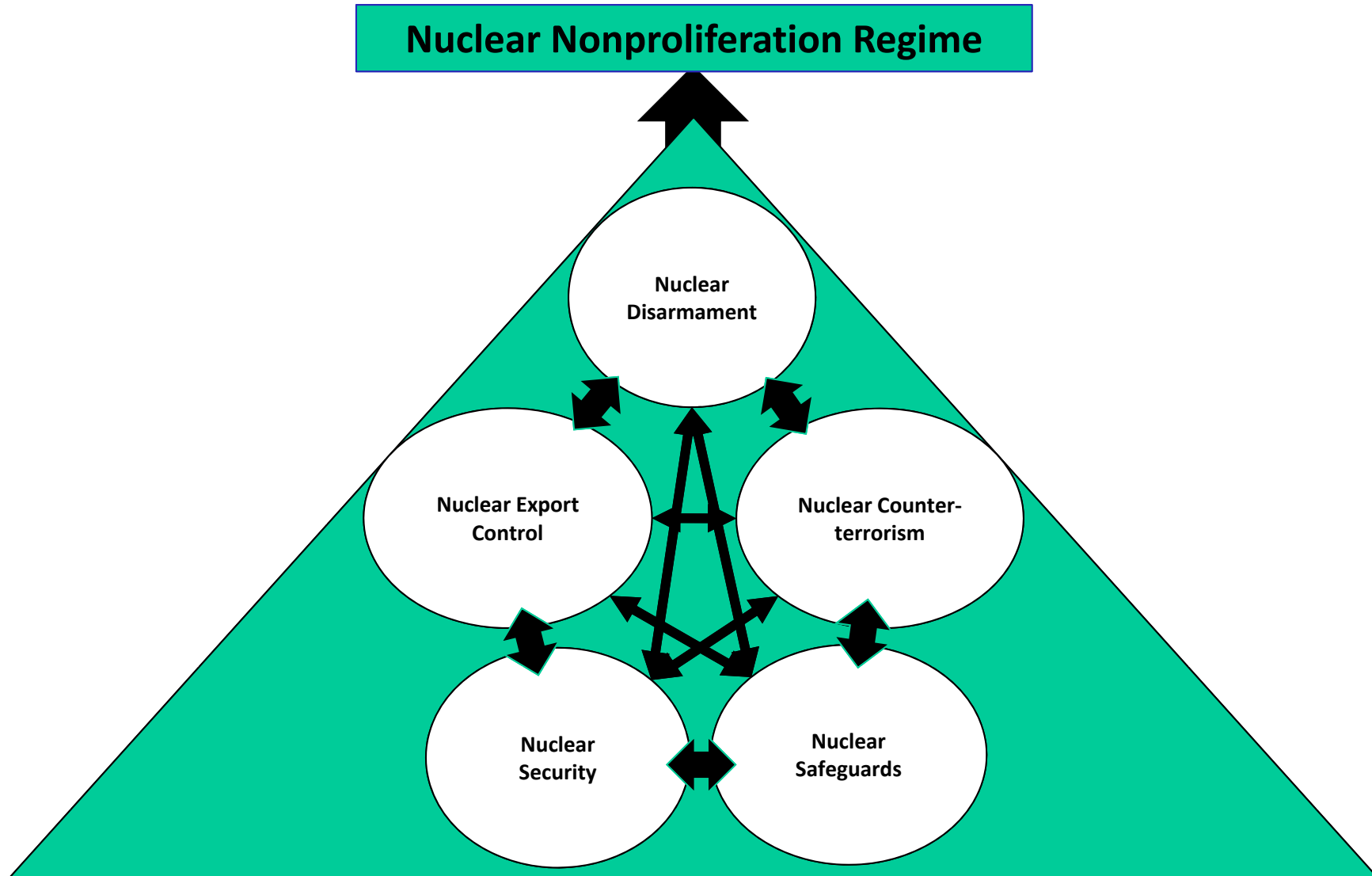
Summit Outcome

National Commitments	
Remove and eliminate weapons-grade materials	Canada, Chile, Kazakhstan, Mexico, Russia, Ukraine, USA
Convert research reactors	Chile, Kazakhstan, Mexico, Vietnam
Accelerate ratification process of legal instruments	Armenia, Australia, France, Germany, Georgia, United Kingdom
Support capacity-building activities or centers of excellence	China, Italy, India, Japan, Kazakhstan, USA, United Kingdom
Join the GICNT	Argentina, the Philippines, Thailand, Vietnam
Adopt and improve national regulations on nuclear security and export control	Armenia, Egypt, Malaysia
Conclude megaport agreements	Argentina, Italy, UAE
Host national or regional conferences in support of nuclear security	Canada, Japan, Kazakhstan, Korea, Saudi Arabia

U.S. Domestic Context



International Context: Synergies and Interdependence





Nuclear Security: Definition and Scope

- **“The prevention and detection of, and response to, theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances or their associated facilities.”**

- IAEA Advisory Group on Nuclear Security



IAEA

International Atomic Energy Agency



Nuclear Security: Definition and Scope

- **Physical protection as well as accounting and control measures**
- **Cargo inspection, customs and border security**
- **Export control and cooperation to identify and interdict shipments**
- **Personnel reliability screening and training**
- **Nuclear security culture**



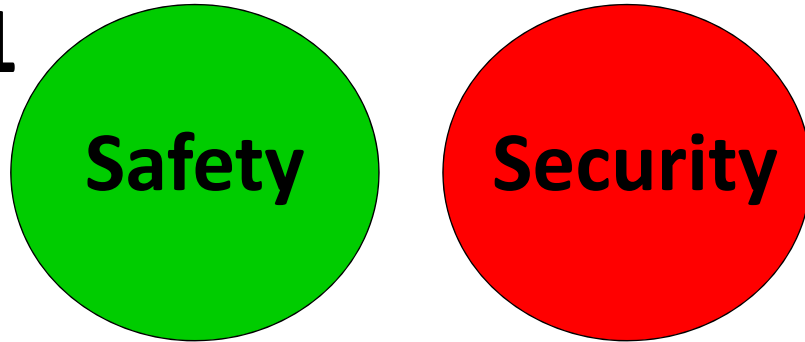
Safety and Security

- For nuclear safety, the primary focus is on unintended acts or conditions that could lead to disruptions, breakdowns and radiation releases from authorized nuclear research, production, and transportation chains, with responses emphasizing engineered protection and safety management.
- For nuclear security, the primary focus is on the intentional misuse of nuclear infrastructure and products by terrorist, criminal, or other elements with responses emphasizing intelligence gathering, physical protection, vigilance and compliance.

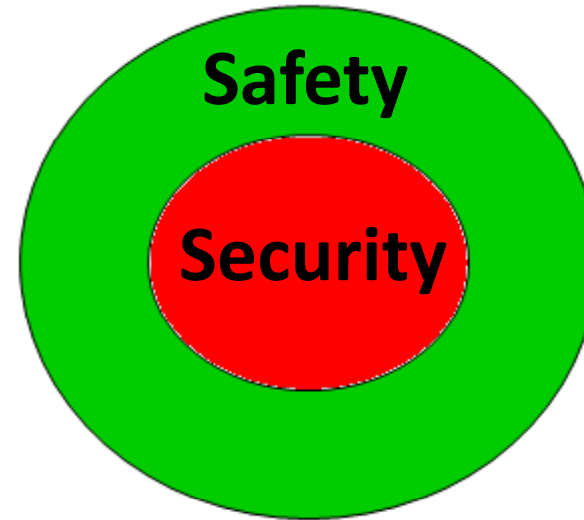
Safety and Security



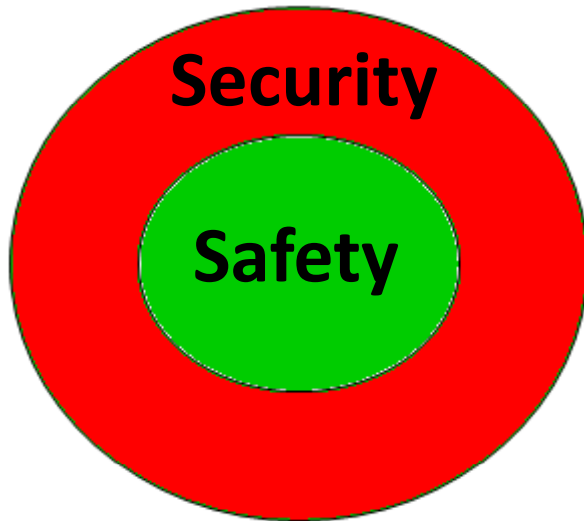
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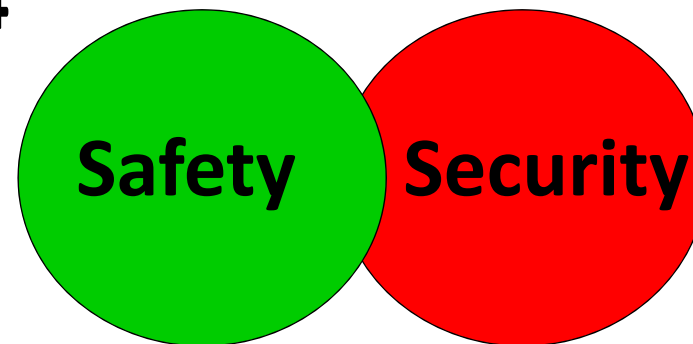
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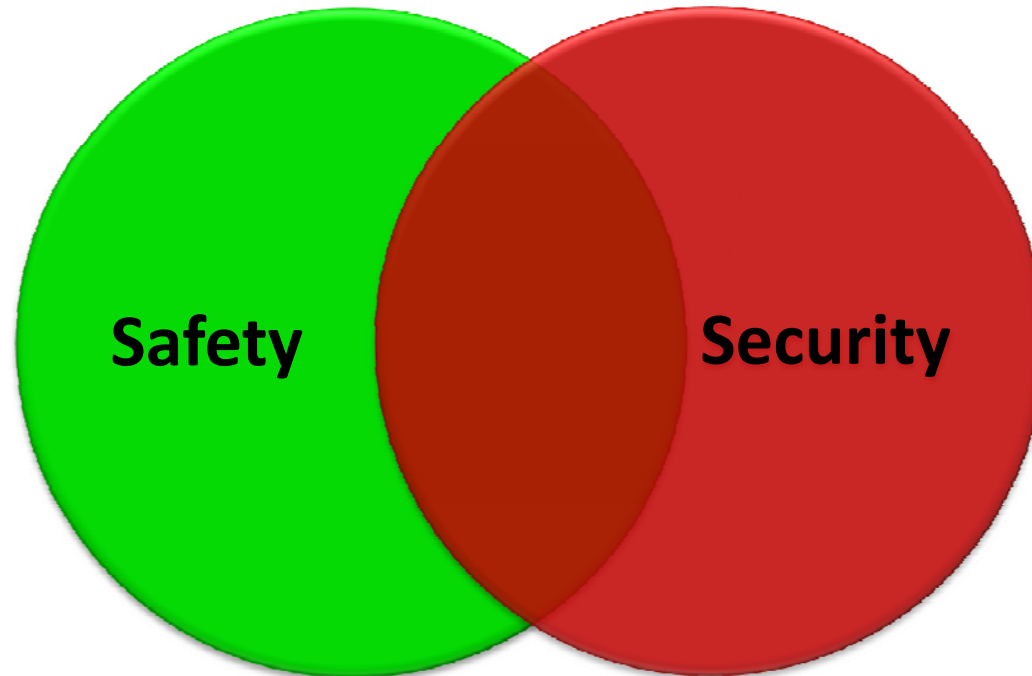
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Safety and Security



- An exact distinction between the terms *safety* and *security* has not been defined.
- In general, security is concerned with malicious or negligent actions by humans that could cause or threaten harm to other humans, while *safety* is concerned with the broader issue of harm to humans or the environment from radiation, whatever the cause.

Safety and Security



Safety and security coexist and should ideally reinforce each other because they share the common objective of limiting risk.

Synergy Examples:

- Regulatory infrastructure
- Engineering provisions in design and construction
- Control on access
- Categorization of radioactive sources
- Source design
- Security and management of radioactive sources and materials
- Recovery of orphan sources
- Emergency response plans
- Radioactive waste management



Safety and Security

- **Despite obvious synergy between safety and security, their meaningful interaction poses organizational, functional, and cultural challenges.**
 - There are linguistic difficulties: in a large number of languages, one word is used for both meanings, or there is one word for safety and security, and another that just means security. To talk about safety and security as distinct concepts in most languages requires the use of further qualifying adjectives and it cannot be done with single words.
 - Security and safety experts often come from different backgrounds, speak different professional languages, and have different mindsets; security community is diverse by itself and may represent both private entities and different government agencies.
 - Safety matters are intrinsic to activities, transparent and probabilistic safety analysis is used, while security matters concern malicious actions and are confidential, and threat based judgment is used.
 - Intelligence, a concept inherent to security, is irrelevant or marginal to safety.



Safety and Security

- **Organizational, functional and cultural challenges of safety-security interaction (continued):**
 - In order to enhance the operational reliability of vital systems, proponents of safety typically call for building increased redundancy into at-risk systems, while proponents of security point out that greater redundancy might render these systems more vulnerable and unaffordable for protection.
 - Frequent visits to the “operating island” of a facility or to any other safety-critical area by engineers and managers is a vital part of a strong safety culture, while security personnel are likely to insist on restricting their accessibility.
 - Competition for resources and other benefits between different units inside the same organization including safety and security personnel is common, as are bureaucratic hurdles in the way of establishing meaningful channels of communication between them.



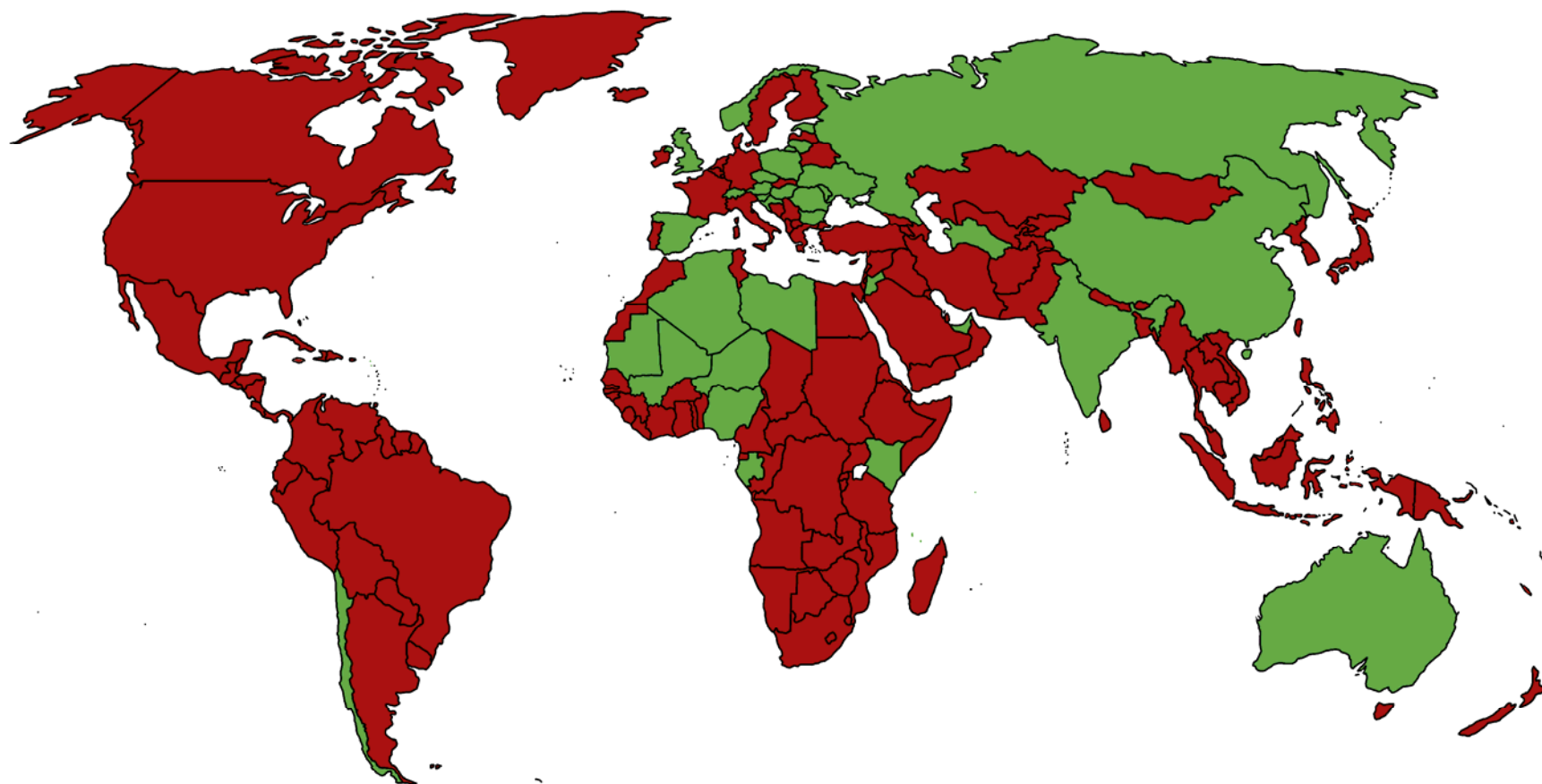
Implementation Challenges

- **Legal Framework: Lack of Universality**
 - 2005 Amendment to the Convention on the Physical Protection of Nuclear Material (35 states)
 - International Convention for the Suppression of Acts of Nuclear Terrorism (66 state parties)
 - Additional Protocol to the Safeguards Agreements (100 ratifications)
 - UN Security Council Resolutions 1373 and 1540 (140 submitted reports)



Implementation Challenges

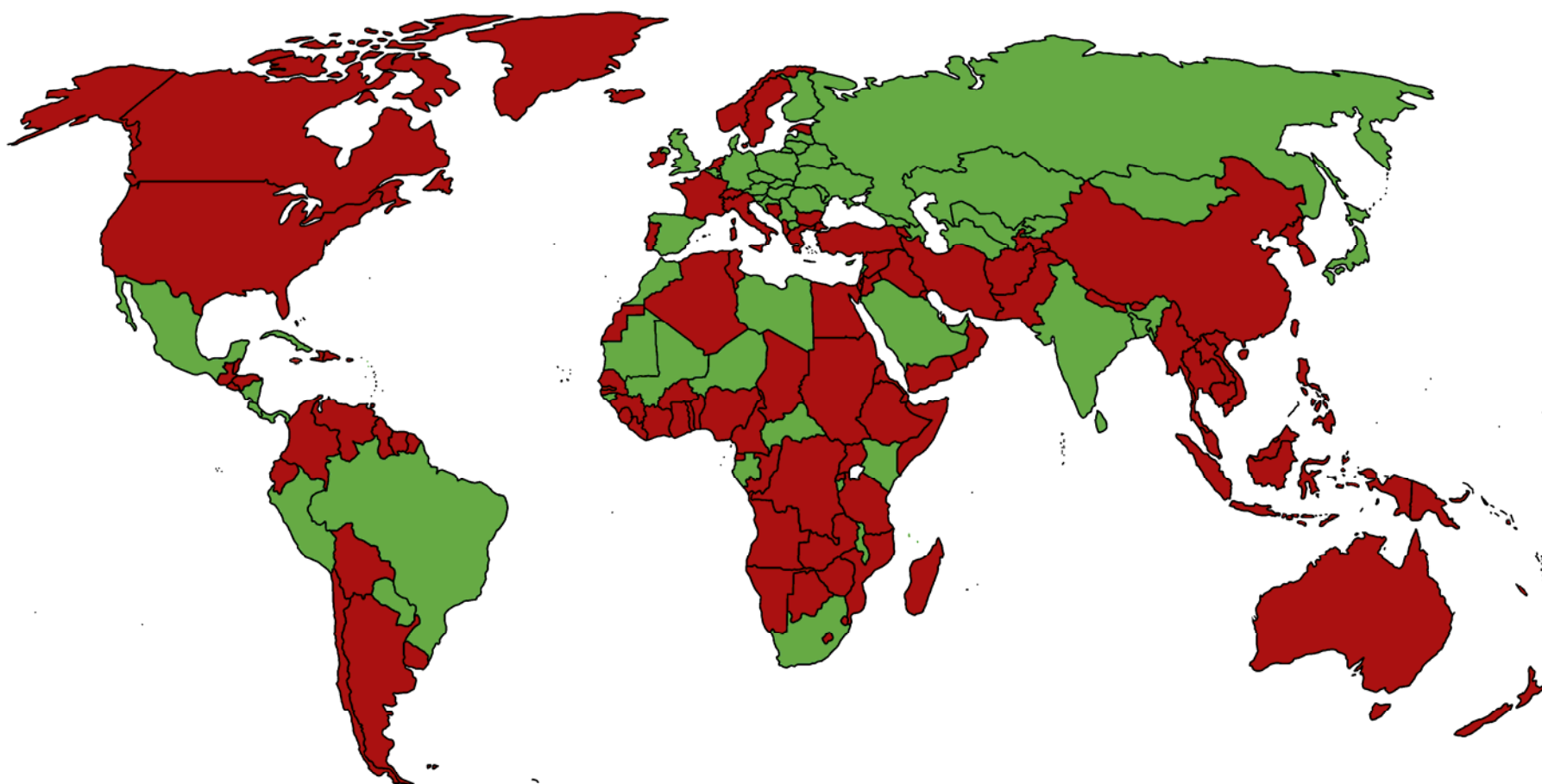
2005 Amendment to the Convention on the Physical Protection of Nuclear Material





Implementation Challenges

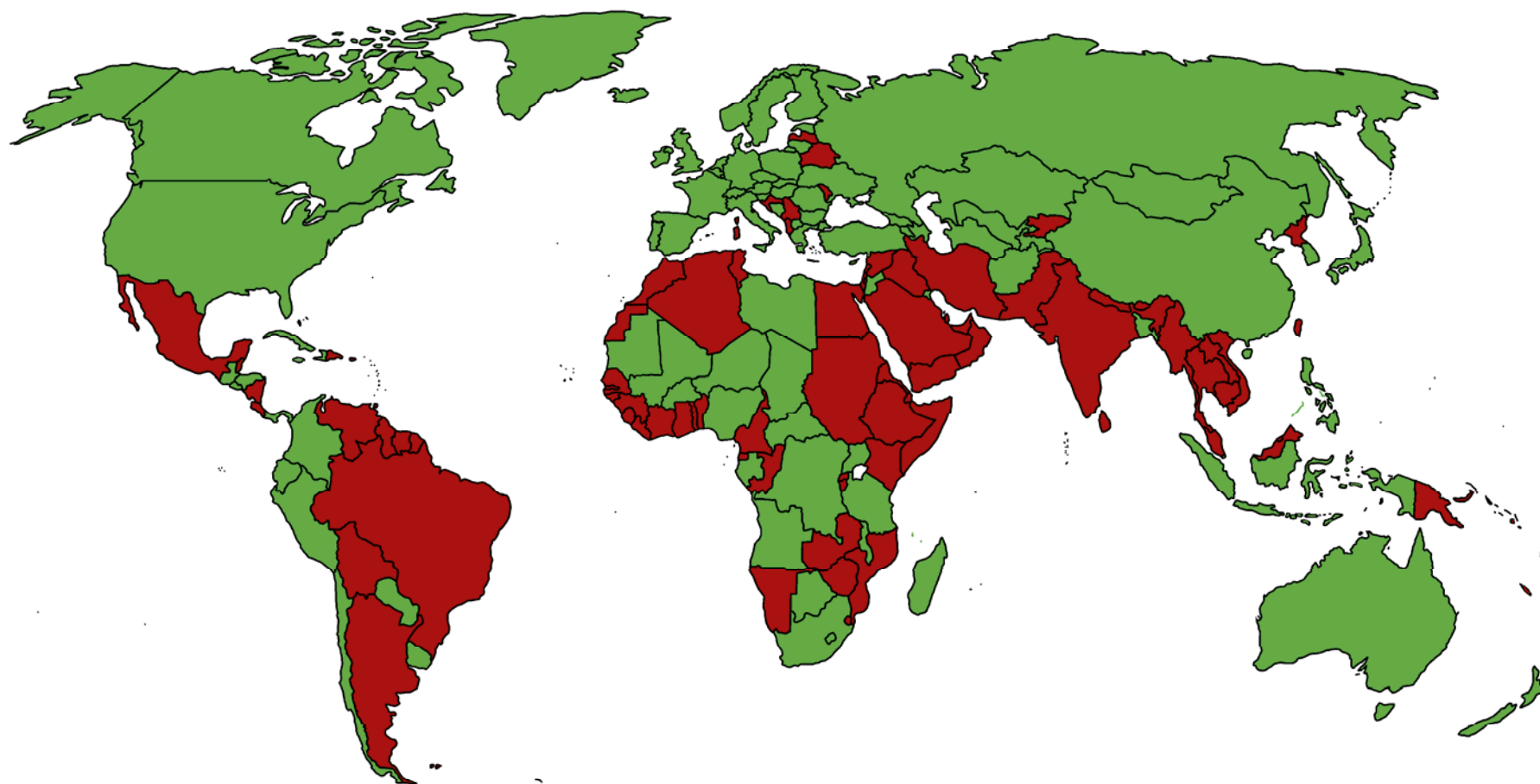
International Convention for the Suppression of Acts of Nuclear Terrorism (2005)





Implementation Challenges

Additional Protocol to the Safeguards Agreements





Implementation Challenges

- Most anti-terrorism conventions, a total of thirteen and three amendments, have been developed within the organizational context of various agencies – IMO, ICAO, United Nations – and have different goals and institutional arrangements
- Many basic terms and definitions have been revised and expanded while some other provisions remained intact
- A comprehensive convention on terrorism is still in the negotiating process



Implementation Challenges

- **A Two-Tiered Structure of the Legal Framework**
 - **Hard Legal Component**
 - Considered binding under international law
 - Negotiated by States through an established diplomatic process
 - Obligations are typically specific
 - Confers provisions for verification and enforcement
 - May involve sanctions for violations
 - **Soft Legal Component**
 - Involves voluntary and non-binding policy commitment
 - Developed by experts through informal consultations or proposed unilaterally
 - Recommendations or guidance are discretionary
 - Weak or non-existent verification or enforcement mechanisms
 - No specific sanctions, but may involve review procedures

Implementation Challenges



HARD

**NPT and safeguards
agreements**

*

Nuclear Terrorism Convention

*

**Physical Protection
Convention**

*

**Twelve other counterterrorism
conventions**

*

**UN Security Council
Resolution 1540 (2004)**

*

**U.S. – Russia Agreements on
Nuclear Weapons Reductions**

*

**Regional Agreements
(Nuclear Free Zones for
example)**

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Implementation Challenges

SOFT

**Global Initiative to Combat
Nuclear Terrorism**

*

**Unilateral Reductions of
Nuclear Weapons**

*

Nuclear Suppliers Group

*

Proliferation Security Initiative

*

G8 Global Partnership

*

**U.S.-Russian Bratislava
Statement**

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**Political Declarations of Top
National Leaders in the uni-
and multilateral context**

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**Communiqué of the Nuclear
Security Summit, April 2010,
Washington DC**

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Others

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Implementation Challenges

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Regional Agreements (Nuclear Free Zones for example)

SOFT

UN General Assembly resolutions:
- Global Strategy and Plan of Action
- 60/73 on radiological terrorism
- 60/78 on preventing terrorists from acquiring WMD
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UN Security Council Resolution 1887
*

Resolutions, guidelines, standards and codes of UN specialized agencies (e.g., the IAEA)
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Implementation Challenges

negotiations
drafting

SOFT

Global Initiative to Combat

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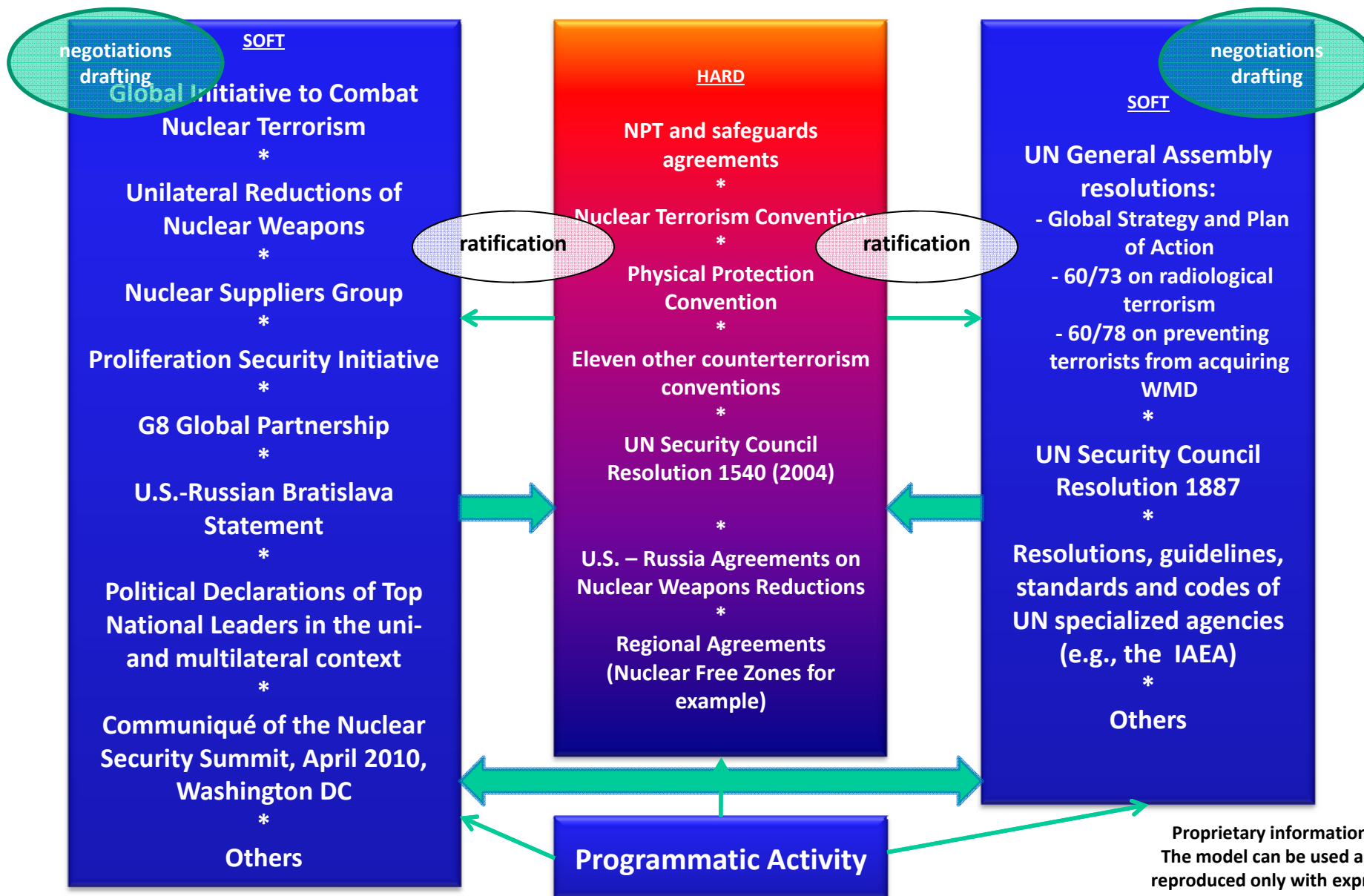
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Implementation Challenges



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Implementation Challenge

- The Human Factor

“The need for capacity building for nuclear security and cooperation at bilateral, regional, and multilateral levels for the promotion of **nuclear security culture** through technology development, education, and training.

-Washington Summit Communiqué

“The importance of the human dimension of nuclear security, the need to enhance security culture, and the need to maintain a well-trained cadre of technical experts”

-Washington Summit Work Plan



Implementation Challenges

- **Pelindaba Nuclear Research Facility**
 - In November 2007, a group of armed men broke into the Pelindaba nuclear facility 18 miles west of Pretoria, a site at which hundreds of kilograms of weapon-grade uranium – enough for 25 bombs – are stored. Perpetrators deactivated several layers of security, including a 10,000-volt electrical fence, suggesting insider knowledge of the system. Though their images were captured on closed-circuit television, they were not detected by security officers because no one was monitoring the cameras at the time. The intruders broke into the emergency control center in the middle of the facility and only after running into an off-duty emergency services officer who was there by chance, had to retreat, leaving the facility via the same route used for their entry.
 - This dangerous lapse in security at the nation's most sensitive nuclear facility did not stem from inadequate physical protection equipment but rather a breakdown of the “human factor” within the security force and beyond.



Implementation Challenges

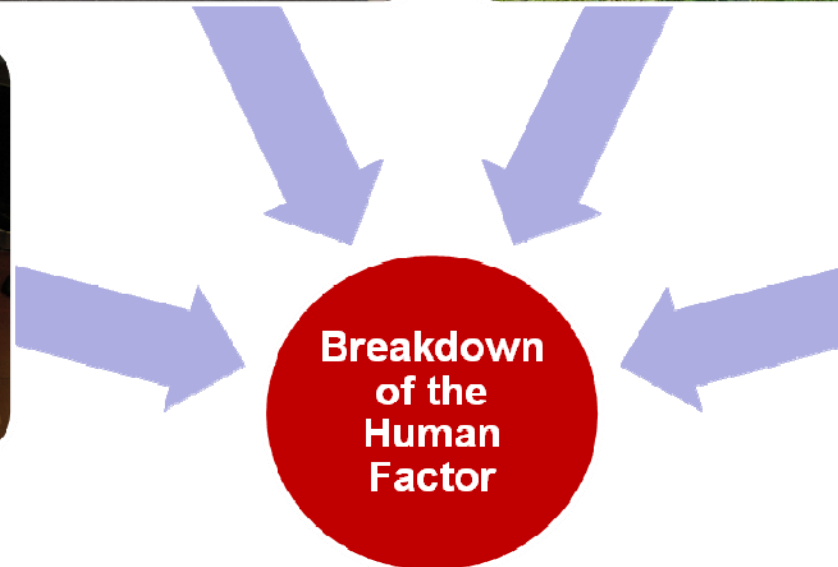
- Pelindaba Nuclear Research Facility





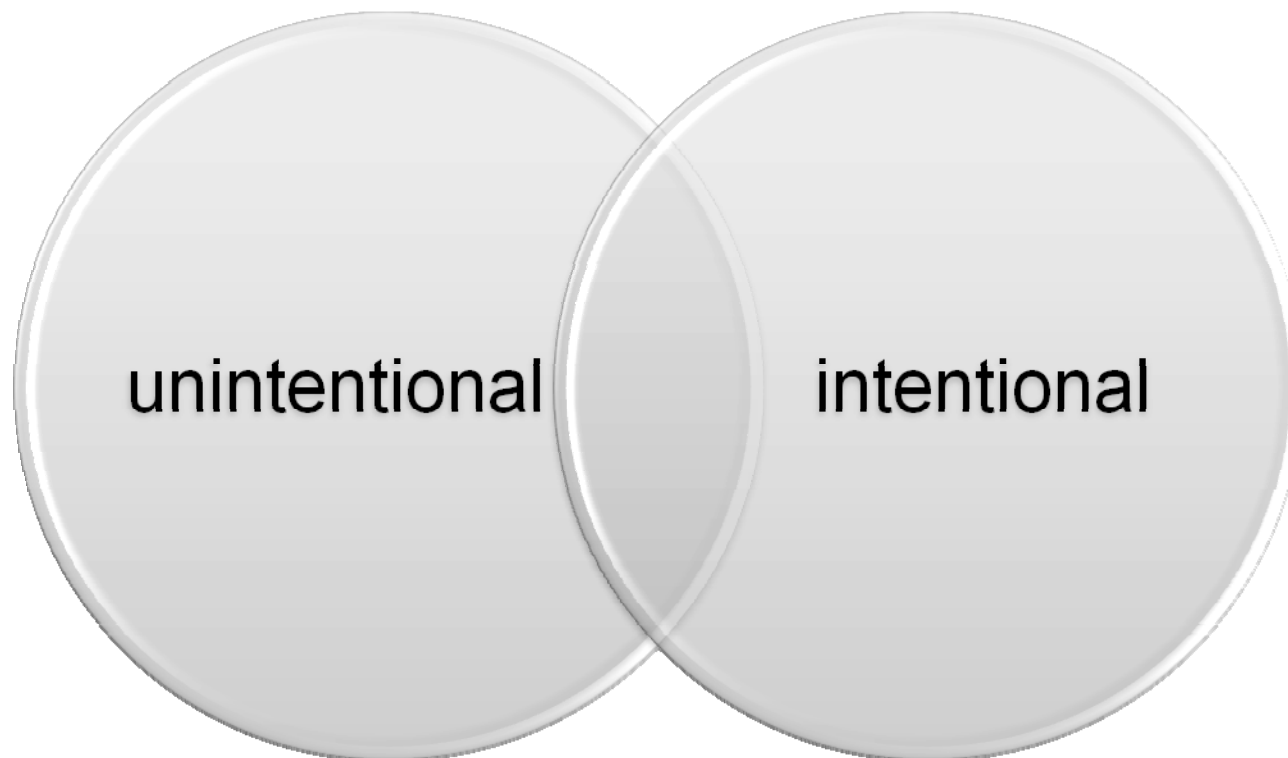
Implementation Challenges

- Common Causes of Most Security Breaches





Unintentional vs. Intentional



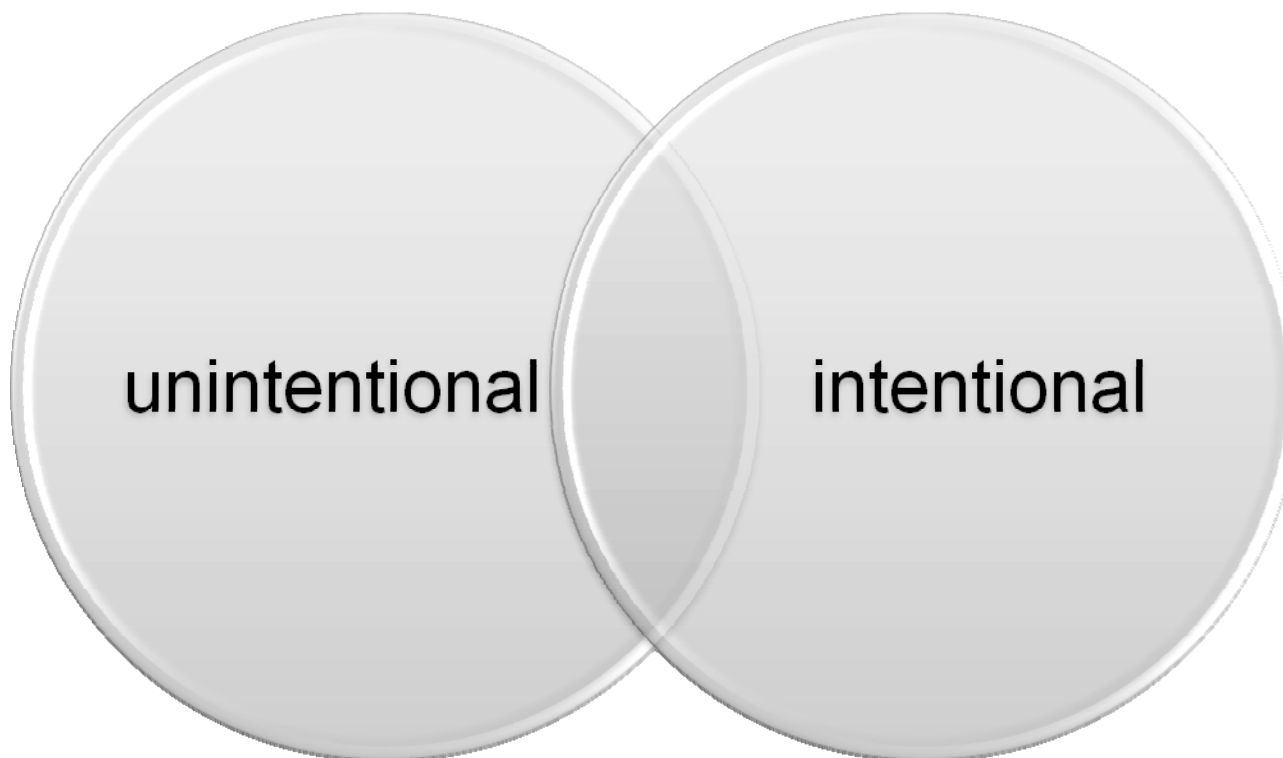
- Errors in trained skills (slowness)
- Errors in learned rules (forgetfulness)
- Errors in creative thinking (incorrect interpretation of an event)

- Non-malicious intentional lapses of discipline or compliance
- Malicious acts (insider threat alone or in collusion with outsider threat)



Implementation Challenges

- **Unintentional vs. Intentional**



- Errors in trained skills (slowness)
- Errors in learned rules (forgetfulness)
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- Non-malicious intentional lapses of discipline or compliance
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Implementation Challenges

Unintentional Breaches: Root Causes

Most security lapses in human-designed, -managed, and -operated systems present in the chemical sector are ultimately the result of *low motivation, human miscalculations or errors*, either through direct action or the failure to recognize a hazard and design a system to control that hazard. The more sophisticated security technologies and arrangements are, the more important the human factor.

Multiple root causes:

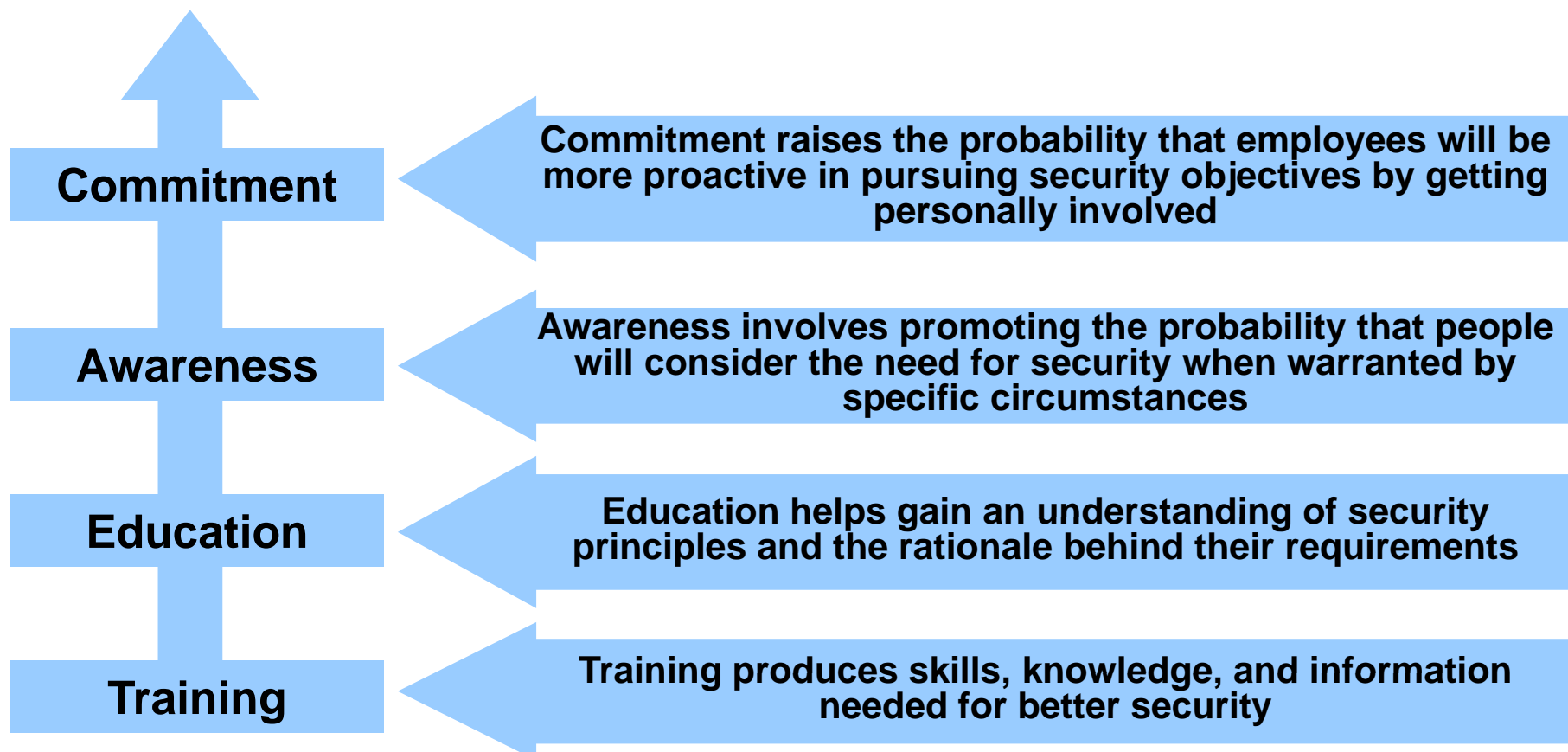
- noncompliance with existing procedures and lax discipline;
- inadequate organizational procedures and processes;
- leadership and management failures;
- personnel errors; and
- ergonomic issues related to design and layout of software and hardware



Implementation Challenges

Road to Security Culture

Security Culture





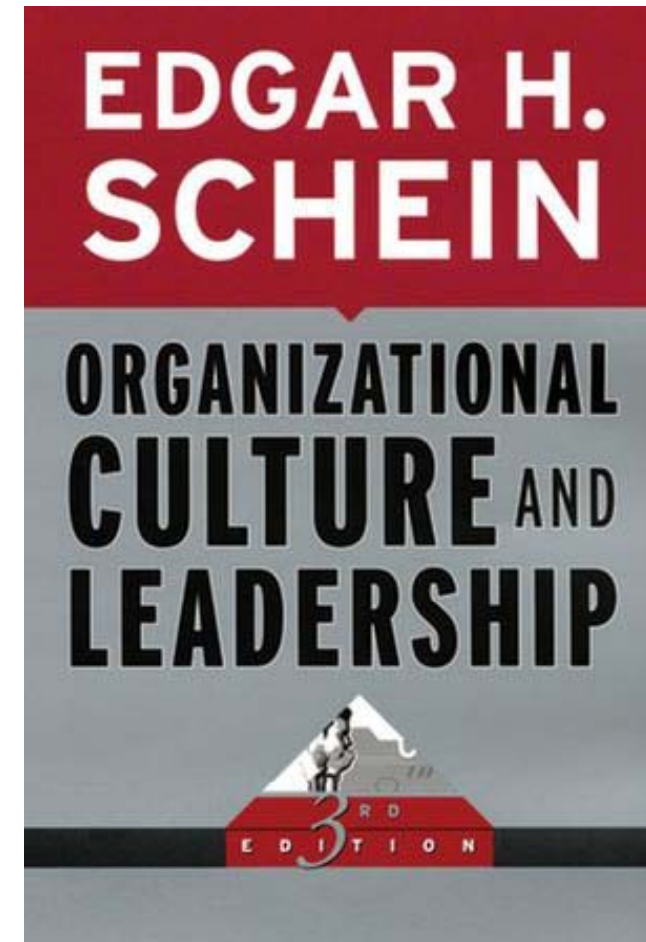
Implementation Challenges

- **The Human Factor and Security Culture**
 - A final product of the transformation of the human factor for adequately responding to security threats through appropriate use of technology and other tools is “*security culture*,” a concept that encompasses in the nuclear sector a set of physical, psychological, organizational and political and other arrangements.
 - “The assembly of characteristics, attitudes, and behavior of individuals, organizations, and institutions which serves as a means to support and enhance nuclear security”
 - Nuclear Security Culture Implementing Guide, IAEA Nuclear Security Series #7, 2008



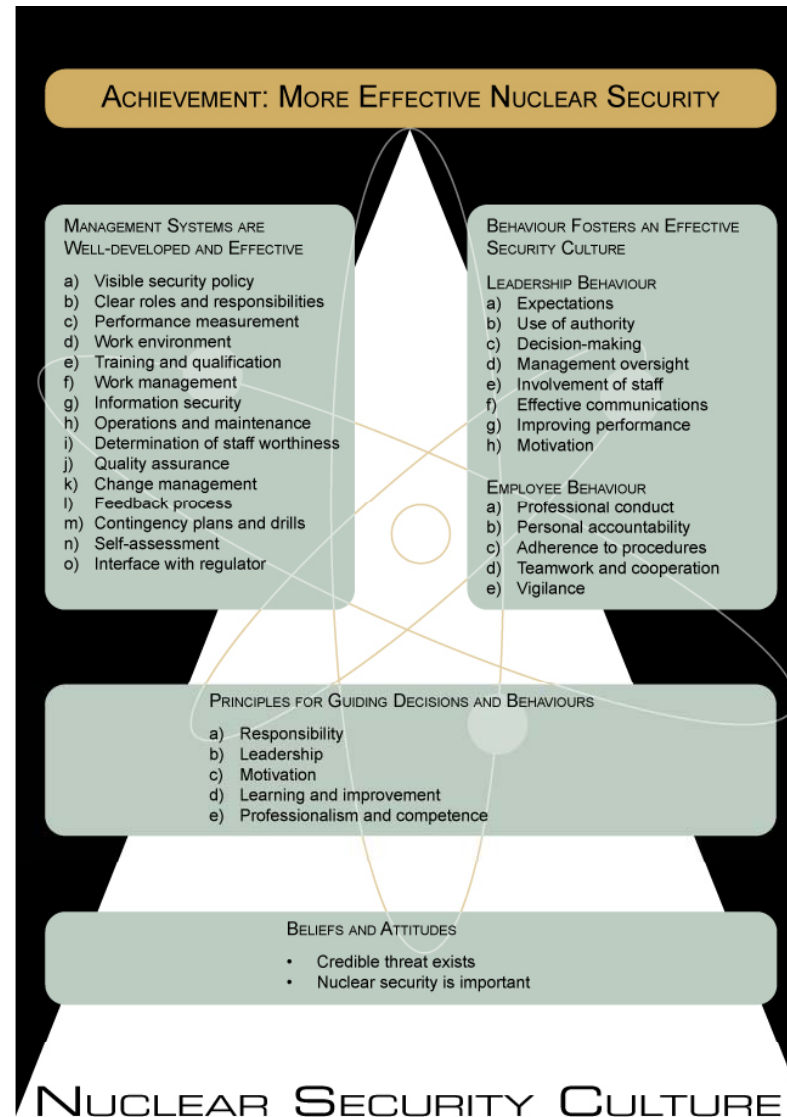
Implementation Challenges

- **Edgar Schien Model of “Organizational Culture and Leadership” (1997)**
- **Layers range from invisible and non-measurable to visible and measurable**
 - Visible layers have performance indicators
 - Must infer what is invisible from the visible
- **Bottom layer is the base for other characteristics (invisible)**
 - Credible threat exists
 - Nuclear security is important





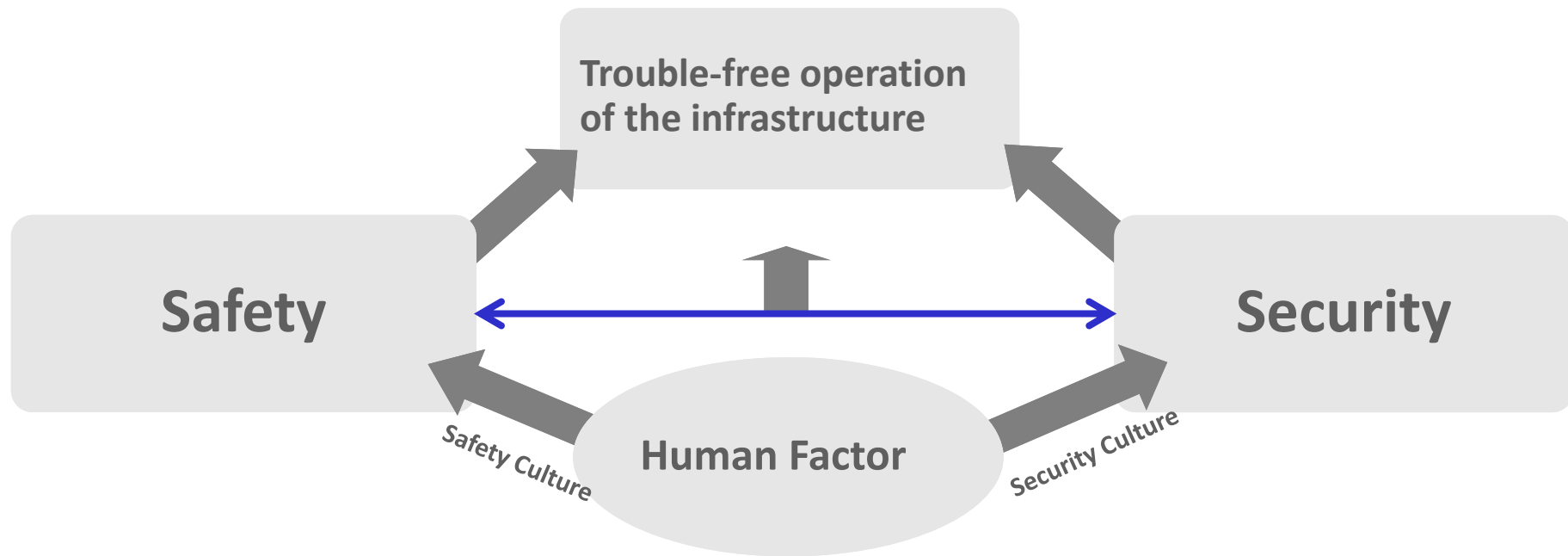
Implementation Challenges





Implementation Challenges

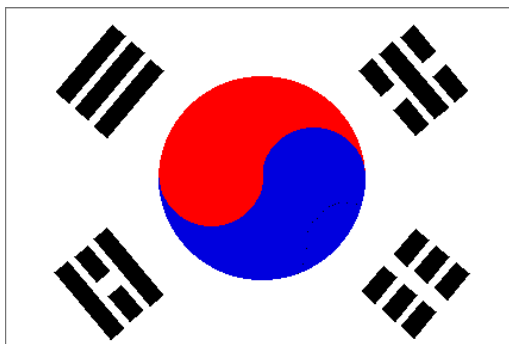
Safety and Security Cultures





A Road to the 2012 Summit

- For further promoting the decisions of the Washington Nuclear Summit, incorporate its communiqué in a resolution of the UN General Assembly and/or UN Security Council
- Develop score cards to track the implementation of the individual national commitments made at the Washington Summit.
- Explore the possibility and appropriateness of codifying nuclear security as the “fourth pillar” of the NPT (the three legally recognized pillars are: nuclear disarmament, nonproliferation and access to nuclear energy).





A Road to the 2012 Summit (continued)

- Evaluate security implications of “nuclear renaissance” from legal and regulatory point of view particularly as applied to countries that do not have nuclear power infrastructure but are determined to rapidly move in this direction
- Consider options for introducing into the international legal framework clear and specific provisions that would encourage rendering comprehensive assistance to victims of nuclear terrorism with a view to facilitating their transition to dignified and fruitful lives
- Enhance means to monitoring implementation of the relevant nuclear security instruments and sharing best practices among state parties by encouraging a maximum level of transparency and cooperation to improve compliance standards, and establish appropriate benchmarks



A Road to the 2012 Summit

- Make the preparation for the 2012 summit more transparent than before and ensure that all stakeholders, including the industry and the public have a chance to provide their inputs and obtain a “buy-in”
- Make an effort to revive the original concept of nuclear security summits as global forums by closing the gaps in the threat assessment of individual countries and providing incentives for their active participation and subsequent implementation
- Include in the agenda of the 2012 summit several items that were left outside the Washington Summit, primarily export control, radiological terrorism, and probably enrichment



Thank You

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