UKNI

UNITED KINGDOM – NORWAY
INITIATIVE

The United Kingdom – Norway Initiative on the Verification of Nuclear Warhead Dismantlement

On behalf of the UKNI Collaboration

UKNI Presentation, NPT PrepCom, Vienna, May 2012

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UKNI Strategic Context

NPT Article VI

"Each of the Parties to the Treaty undertakes …effective measures relating to … nuclear disarmament … under strict and effective international control."

NPT Articles I and II

"Each nuclear-weapon State Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons…"

"Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons…"

- Promoting understanding between NWS and NNWS on issues faced by the other party
- Promoting discussions on how a NNWS should participate in a nuclear dismantlement verification process

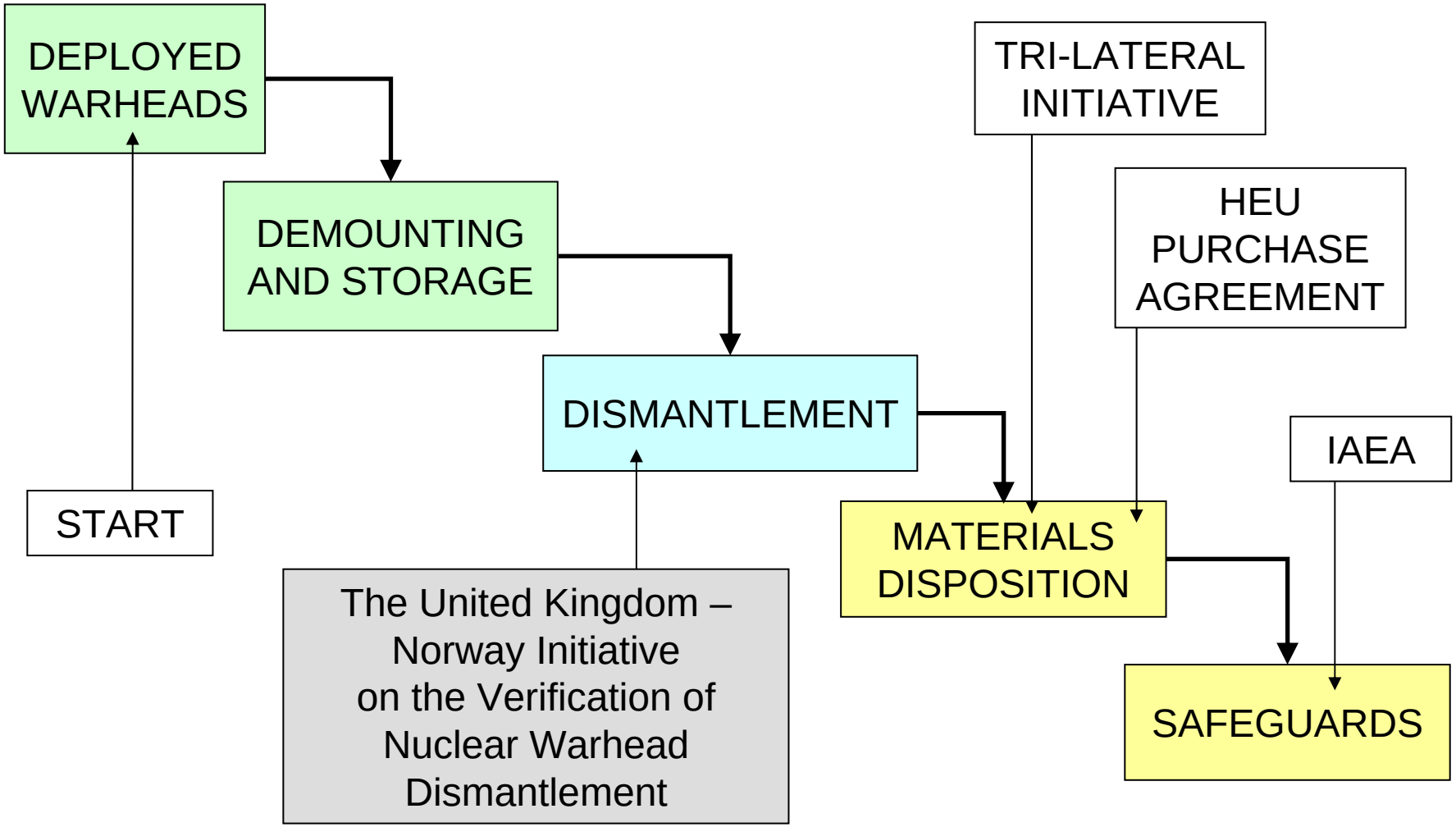
UKNI: Scope, Purpose and Aim

SCOPE: Bilateral collaboration between UK and Norwegian technical experts to address the technical and procedural challenges of verifying (with confidence and without proliferating) nuclear warhead dismantlement.

PURPOSE: Use fictional and generic scenarios to identify challenges to verifying nuclear warhead dismantlement. Outcomes could be used to assist any possible future multilateral disarmament regime, supporting the ultimate long term goal of a world without nuclear weapons.

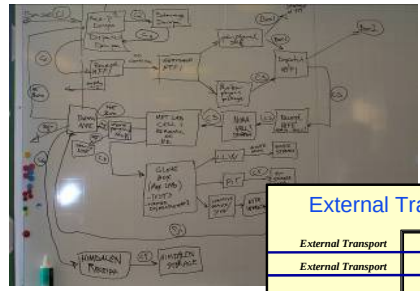
AIM: To research, develop, and test possible tools, techniques and methodologies for possible future use in verification of nuclear warhead dismantlement. Identify opportunities for research by other interested parties.

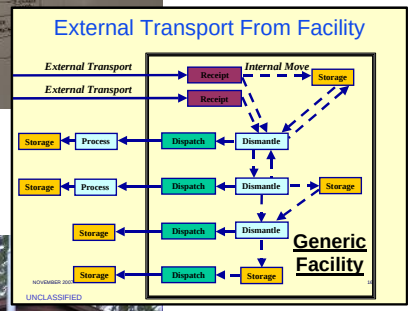
The Current Scope of UKNI

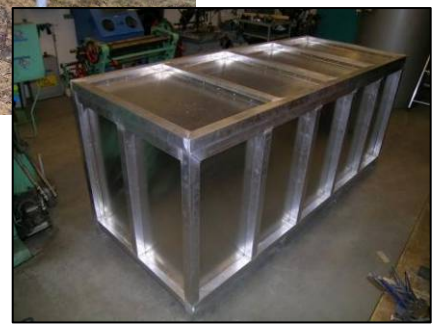


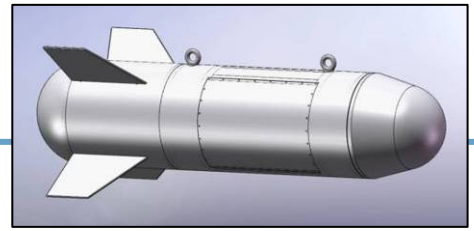
Overview of Collaboration (I)

- 2005 NPT Review Conference:
  - Report on previous UK work
  - UK offer to work with other countries
- 2006 UK/Norway initial contact
- 2007 Commenced two areas of research:
  - Information Barrier system and Managed Access
  - Within these two areas, began development of technology, exercise infrastructure, inspection procedures and associated documentation









Overview of Collaboration (II)

- 2008/2009 Managed Access:
  - Familiarisation Visit exercise
  - Monitoring Visit exercise
- 2009/2010 Information Barrier system:
  - 2009: Two prototypes of the Information Barrier system were built, one in the UK and one in Norway, based on a jointly agreed design. 2010: Second jointly agreed system successfully built
- 2010 Managed Access:
  - Focused exercise
- 2011 UKNI workshop on nuclear disarmament verification

Managed Access Exercise December 2010

The Managed Access Project

- Managed Access:
  - The process by which ‘uncleared’ visitors are given access to sensitive facilities
  - Protection of sensitive and proliferative information
- Managed Access Project:
  - Create scenarios in which participants can explore issues relating to nuclear arms control verification without the risk of proliferation
  - Understanding:
    - The Inspection process
    - Managed Access
    - Host/Inspector interaction
    - ‘Confidence’ in the verification regime
    - The role of a NNWS

- Why Managed Access Exercises?
  - To understand the Inspection and Managed Access processes
  - To understand the complexities and issues faced by each party
  - To trial technologies and procedures
  - To assess Host/Inspector confidence

Managed Access Project 2008/2009

- 2008/2009 Exercise Scenario:
  - Hypothetical Treaty between Torland (NWS) and Luvania (NNWS)
  - Torland invited Inspectors from Luvania to monitor the dismantlement of one of its Odin nuclear gravity bombs under a Bilateral Protocol
  - Luvanian Inspectors:
    - Establish confidence in the declaration
    - Verify Chain of Custody through the dismantlement process
  - Torland Host:
    - Demonstrate compliance (co-operative process)
    - Protect national security and proliferation sensitive information
- Article I and II Obligations:
  - Scenario based on a generic facility
  - Use of a surrogate material
  - Norwegian facilities
- Understanding the NWS and NNWS perspectives:
  - Swapped roles (Norway NWS; UK NNWS)

2010: Moving On

Two of the many lessons from the 2009 Monitoring Visit Exercise:

- National security and proliferation concerns permeate through everything
- Health and Safety regulations must not be underestimated

BUT…

- Security was only played lightly

THEREFORE…

- Decision to explore more fully the impact of security on Inspection activities

HOW…

- A focused exercise looking at the impact of security

A Focused Exercise

- Creating the scenario:
  - Sub-scenario of the 2008/9 exercises
  - Familiarisation Visit to the initial storage/receipt facility
- Changing the emphasis:
  - 2008/2009:
    - Co-operative Host/Inspector interaction
  - 2010:
    - Increased level of confrontation to maximise the interaction between Host security and the Inspection process
- Re-creating Torland Host Party (UK):
  - Simulated facilities within the UK (AWE)
  - Use of UK experts in security, safety and facility management
  - Generic security concepts
  - Touch on safety issues
- Re-creating Luvania Inspecting Party (Norway)
- Successful Conclusion:
  - Impact of security on the Inspection process fully explored

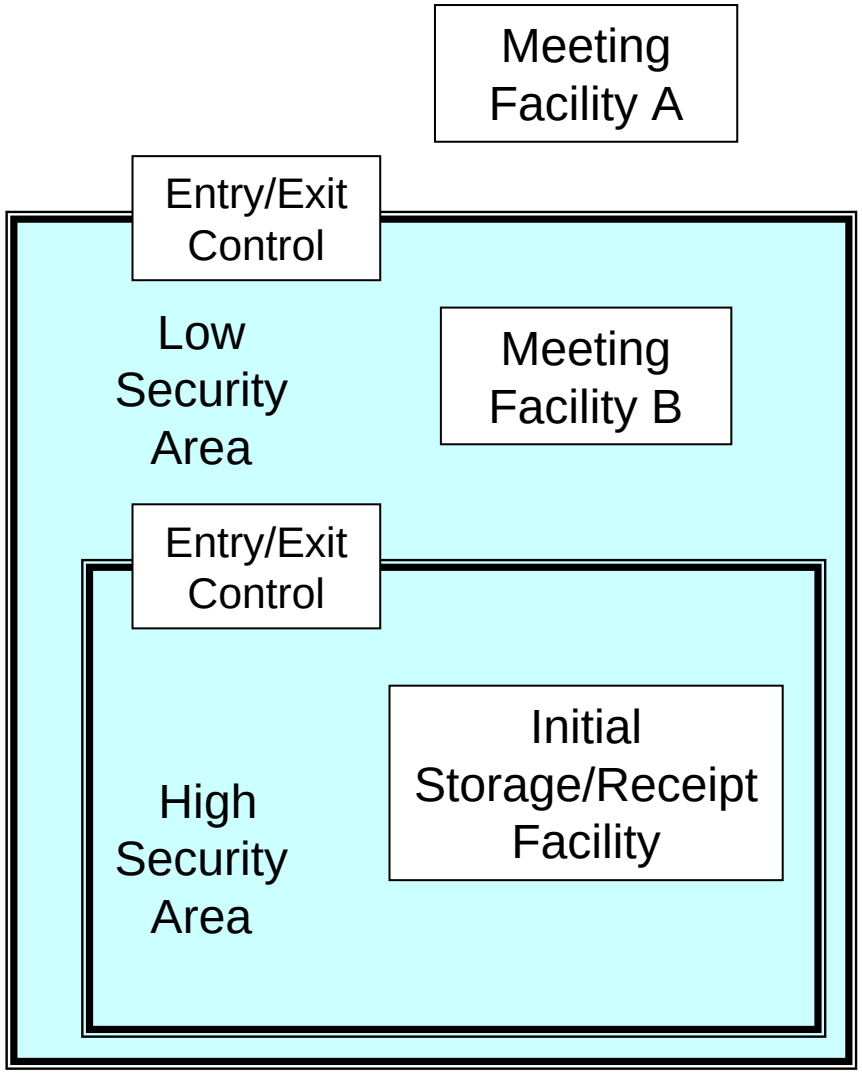
2010 Player Objectives

- Torland Host (UK):
  - Emphasis:
    - Safety, security and non proliferation
  - Compliance:
    - Where it doesn't conflict with safety, security or proliferation concerns
    - With the Verification Procedure
  - Discuss options:
    - In principle only
    - Within the above constraints

- Luvanian Inspectors (Norway):
  - Understand relevant processes, routes and facilities:
    - Obtain access to the initial storage/receipt facility
    - Familiarisation with container types
  - Consider future monitoring strategy:
    - Trial of sealing technology
  - Maintain safety and security of the team
  - Comply with the NPT

The 2010 Exercise

- Day 1: In Play
  - Meeting Facility A
  - Negotiations
- Day 2: In Play
  - Visit to the initial storage/receipt facility
  - Inspection activities
- Day 3: Out of Play
  - Review



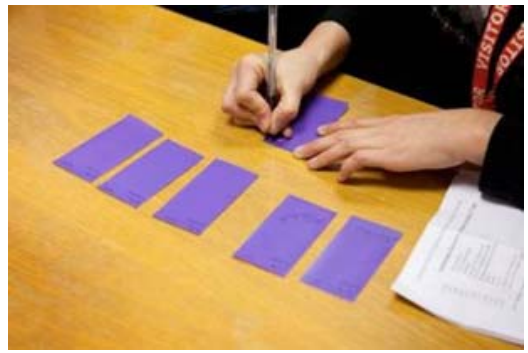
Day 1 – ‘In Play’ Negotiations

Inspectors		Host
• Detailed information on facilities, containers, processes and transport phases	→	• Limited information (protect security; prevent proliferation)
• Transport phases	→	• No access (protect security)
• Access to facilities	→	• Managed Access, time limits and ‘man limits’ (protect security; adhere to safety legislation)
• Inspection equipment on-site (sealing trial)	→	• Host supply and Host Operation (protect security) but agreed to – Random selection – Confirmatory Inspection
• Measurements to confirm information within declaration	→	• Information Barrier (prevent proliferation)

Day 2 – ‘In Play’ Facility Visit (I)

Inspection Activities

- Undertook random selection of seals for deployment
- Two shifts into the Storage/Receipt facility
  - Viewed the facility
  - Viewed the ODIN container
  - Trialed seals on the container. Host placed the seals and the Inspectors checked to make sure the seals were secure.



Day 2 – ‘In Play’ Facility Visit (II)

- Managed Access – generic security concepts:
  - ‘Guards, guns and gates’
  - Identity checks, searches, removal of prohibited items
  - Shrouding, exclusion zones and walkways
    - Protect facilities, objects, information
  - Search and detection equipment
  - Escorting and monitoring
  - Change barrier
  - Notepad check/redaction process
  - Time and ‘man’ limits
  - Control of Inspection equipment

Exercise Observations (I)

- General:
  - Challenging, particularly for a NNWS, to inspect such an unfamiliar environment and process
    - Demonstrated the importance of training
  - Hybrid of ‘Routine’ and ‘Challenge’ Inspection concepts
  - Clearer definitions regarding the facilities and processes required
  - Adversarial environment
    - Decrease in Inspector confidence

- Impact of Safety:
  - More intrusive than expected
  - Change barrier
    - Restrictive clothing
  - The limit on the number of Inspectors resulted from a combination of fire and explosives regulations:
    - Impact on timescales and communication

Exercise Observations (II)

- Impact of Security:
  - Impact of restricted facility information and restricted access to the facility
    - Overview of facility and related operations acquired by Inspectors, but not how this linked to the overall dismantlement process
    - Potential material diversion routes were not fully explored
  - Trial of sealing options
    - Restricted information on the container design meant that it was hard to assess the effectiveness of potential sealing technologies
    - Random selection went some way to compensate for Host supply of equipment
    - Host operation followed by Inspector check – process was ‘awkward’
    - The management of equipment and data movement was unsatisfactory
  - Discussion of measurements to confirm information within the declaration
    - Information Barrier
    - Restrictions on facility and container information – questions over vulnerability of the measurement system

Summary

- Security and safety concerns will potentially affect:
  - The level of information released by the Host
  - The time that Inspection activities will take
  - The number of Inspectors that can be deployed within a given facility
  - Communication and coordination between Inspecting Teams
  - Deployment of equipment within sensitive facilities
- The 2010 focused exercise:
  - Despite the obstacles the Inspecting party did complete the objectives of the visit, albeit with a low level of confidence in the outputs
  - The security/safety regime implemented by the Host impacted on the Inspectors ability to:
    - Understand the dismantlement process
    - Assess threats and vulnerabilities
    - Plan a robust monitoring regime

Conclusions

- Collaborative environment - a proactive Host helps to facilitate the process
- The exercise provided a common understanding of the impact Host security can have on Inspection activities
- Exercise findings form an essential basis for technology and procedural development in the future
- Found that it should be possible for foreign Inspectors to access a high-security facility:
  - Rigorous and highly structured procedures required

UK Norway Workshop on Nuclear Disarmament Verification

London, December 2011

Workshop Aims

- Demonstrate how Nuclear Weapon States (NWS) and Non-Nuclear Weapons States (NNWS) can work together to make significant contributions to nuclear disarmament verification research, in support of Nuclear Non Proliferation Treaty obligations
- Increase trust between NWS and NNWS
  - Increase awareness of the technical complexities and proliferation concerns
  - Enhance transparency and build mutual confidence through openness, co-operation, education and outreach
- Obtain constructive feedback on the UKNI

Workshop Attendance

- Invitations issued to states that had demonstrated an active interest in UKNI
- Opened by UK Armed Forces Minister and Norwegian Ambassador to the UK
- Senior officials from both countries chaired plenary sessions
- 12 NNWS (Australia, Brazil, Egypt, Germany, Indonesia, Japan, Kazakhstan, Mexico, Poland, Republic of Korea, Sweden, United Arab Emirates)

  Plus US as expert delegates
- 63 delegates, policy and technical officials

Workshop Format

- Plenary presentations
- Plenary question and answer sessions
- Discussion sessions (groups)
- Poster session
- Technology demonstrations

Workshop Agenda

- Day 1 ‘Understanding the Problem’:
  - Understand the scope of the UKNI
  - Generic facility concept
  - Host and Inspector Viewpoints
  - Challenge of Security and Proliferation concerns
- Day 2 ‘Technical Approaches’:
  - Using the UKNI to explore some technical approaches to Managed Access and Information Barrier research
  - Poster session
- Day 3 ‘Future Research’:
  - Within the UKNI
  - NNWS contribution

Principal Discussion Topics (I)

- Initialisation problem
  - How to ensure that the object is what it is declared to be?
- Declarations
  - Inspectors reliant on Host provided information
  - Inspector “needs” vs. Host “restrictions”
- Confidence
  - 100% is not achievable
  - How much is enough?
  - Impacts at all levels – from negotiation to equipment
  - Layered approach
- Host/Inspector relationship
  - Agreed objectives and requirements?
  - Proactive Host aids Inspector confidence
  - Both sides have an incentive for the regime to succeed

Principal Discussion Topics (II)

- National security and non-proliferation
  - Non-proliferation is a legal obligation
  - How to better understand proliferation without proliferating?
  - NWS role?
  - Communicating role and effect of NP and NS in a regime is important
- Exercises – the best way to identify issues?
  - Different criteria can yield different results
  - Help minimise risk of failure in the future
  - Need to include requirement to resolve disputes
  - Role of a third party?
- Information Barrier and other technical issues
  - UKNI staged approach to IB development
- Credibility of the UKNI
  - Delegates from other regimes endorsed this approach

Principal Discussion Topics (III)

- Language/culture/understanding
  - Impact on regimes; even impact on exercise outcomes
- Dedicated disarmament facility
  - Cost vs Benefit
- Lessons from other regimes and organisations
- The role of ‘trust’ and confidence
- Credibility of any future regime with the international community
  - Needs political buy in
  - NWS and NNWS participation
  - Major technological development still required e.g. trusted systems

UKNI Workshop: Summary

- Recognised that all States Parties under the NPT have an obligation under Article VI to contribute to the development of verification regimes:
  - NNWS involvement brings benefits and risks
  - NNWS involvement brings international credibility and transparency
  - UKNI demonstrates that NNWS and NWS collaboration is possible
- Technical development still required:
  - Collaborative research into jointly trusted equipment
  - Understanding ‘confidence’
- UKNI viewed as an effective means of advancing UK and Norwegian work in this area:
  - UKNI workshop important for outreach and education
  - NNWS peer review gives important feedback for the future direction of the UKNI

Where Next for the UKNI?

Where Next?

- Remain a bilateral cooperation between the United Kingdom and Norway which will continue to develop and test relevant tools and methods for their application in any future dismantlement verification undertakings
- Continue to inform the international community about its findings
- Continue to encourage, and where possible support innovative efforts on verification by:
  - Other NPT States Parties
  - Other organisations, the NGO community, and educational institutions

Deepening the Bilateral Cooperation

The Information Barrier system

- Testing of the technology
- Procedures for trusted deployment

Continued development of the verification process based on lessons learned from the exercises:

- Understanding confidence levels and where confidence was won and lost during UKNI exercises
- Focussed exercises to explore the above issues

Continue to learn lessons from other international regimes

Report on future work at NPT PrepComs and the 2015 NPT Rev Con

Encouraging New Initiatives

States can do more R&D into verification

- Many remaining issues need to be resolved…
- New partnerships? - Norway and UK may be consulted

Opportunity for testing out new verification tools…

- Norway to continue development of its disarmament verification workshop/facility with advice of UK
- Possibilities for re-running the 2009 scenario with Inspectors/Hosts from other states or international organisations

Supporting and informing other initiatives

- UK hosted P5 UKNI brief in London, 2012
- Wilton Park Africa Conference, Mar 2012
- Norway funded Vertic research

Engaging the Academic Community

- Disarmament is not only an issue for government officials and experts: it is a global issue
- Welcome engagement of academic community
- Innovative efforts are needed in education and research
  - June 2011 IFE Students exercise showed the value of practical experience – cooperation between University of Oslo and King's College, London
- Need to develop relationships with research institutions
- Presentations and papers at technical conferences, including INMM

Summary

- NNWS cooperation in nuclear disarmament verification research is necessary in order to achieve effective and mutually trusted technical and procedural solutions to support verifiable multilateral nuclear disarmament
- Most States parties have the scientific and technical capabilities to undertake research and development in these areas
- Verification research is an opportunity for all States Parties to contribute to their NPT Article VI obligations
- Currently, the UKNI is only addressing a fraction of the technical areas necessary to achieve high confidence dismantlement verification, which in itself is only one part of the disarmament process
- Work will continue within the Initiative; new innovative efforts on verification research within the international community will be encouraged