

Nuclear Weapons

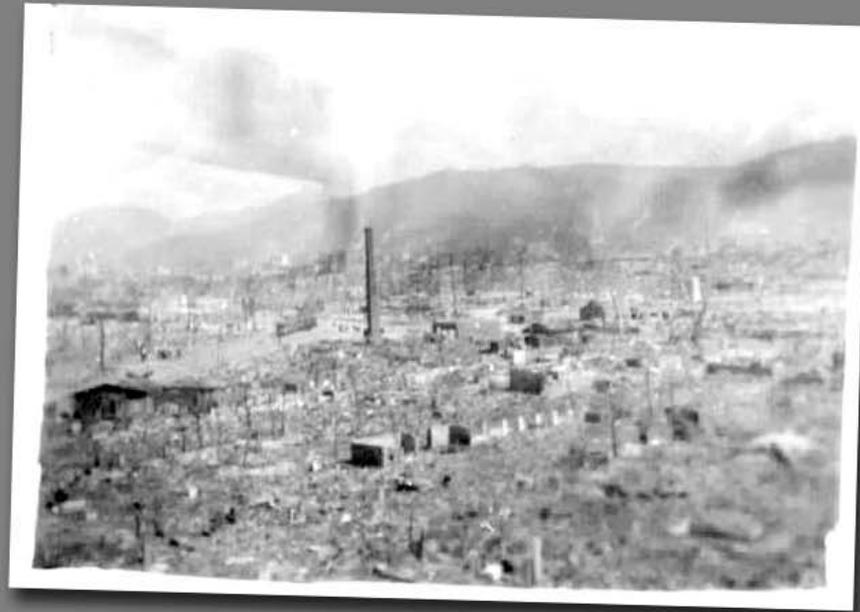
NKS NordThreat
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Hiroshima 1945



Nuclear weapons

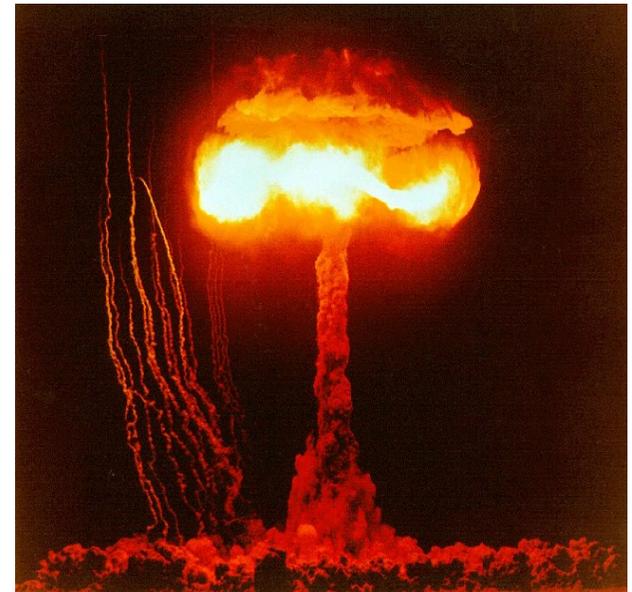
- What are nuclear weapons?
- How are they relevant today?
- Nuclear arsenals
 - Old and new nuclear weapons states
- Are Nordic interests threatened?
- Verifiable disarmament
- Final comments

*“The only real weapons
of mass destruction”*



What is a nuclear weapon?

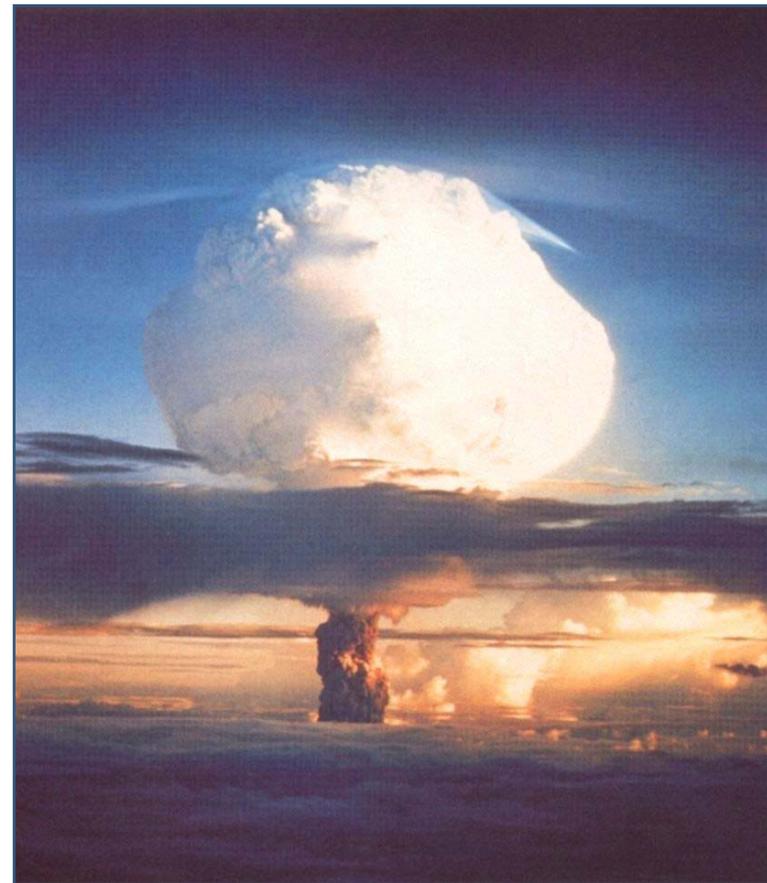
- Nuclear weapons get their yield from processes in atomic nuclei
 - Nuclear fission (chain reaction in uranium or plutonium)
 - Nuclear fusion (hydrogen isotopes)
- The yield of a fission weapon is limited to a few hundred kilotonnes, while fusion weapons may have an almost unlimited yield
 - "City blasters"
- A "nuclear weapon" consists of one or more warheads plus a means of delivery
 - Missile, airplane, submarine, ...
- Most nuclear weapons are strategic weapons, but some may be used tactically
- So far only national states have possessed nuclear weapons



Effects of nuclear weapons

For air and ground detonations:

- 85 % **heat** and **pressure**
- 15 % **ionising radiation**
 - Fallout
- **Electromagnetic pulse**
 - Disables electric and electronic equipment in a large area
- The flash may cause temporary blindness
- Fireball
 - Millions of degrees hot
 - Becomes a mushroom cloud





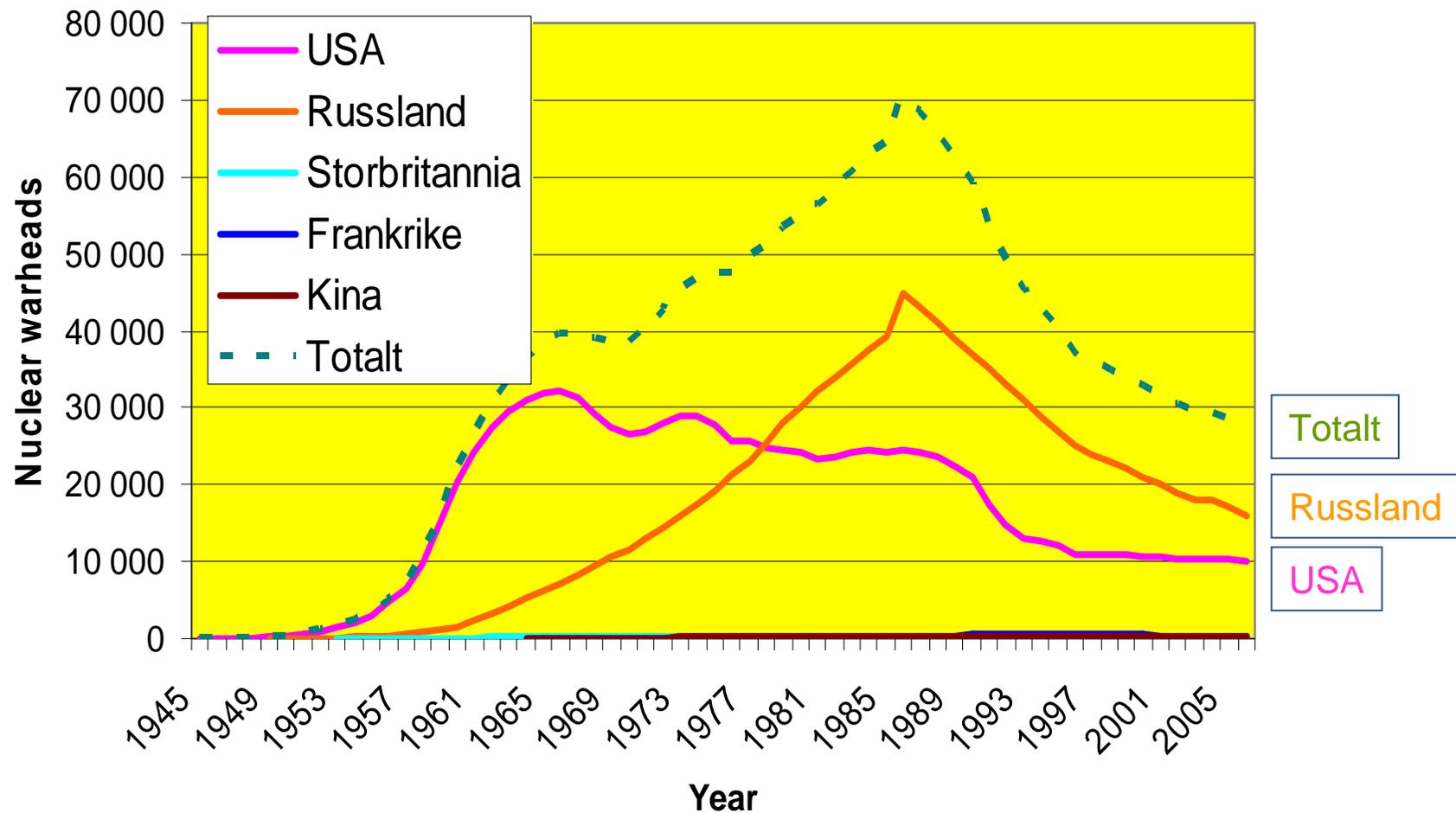
Are nuclear weapons relevant today?

- Nuclear weapons states show increased interest in nuclear weapons
 - Modernising their arsenals
 - Advocating bunkerbusters (small, ground-penetrating weapons)
 - Permitting first use also to protect against non-nuclear threats
 - Emphasising the use of nuclear submarines
- Little progress towards complete nuclear disarmament
- States get away with nuclear test explosions
 - India, Pakistan, North Korea
 - May encourage other states to go nuclear
- Small bombs, regional conflicts may encourage going nuclear
 - Lowering the nuclear threshold

Nuclear arsenals 1945-2006

Recognised nuclear weapons states

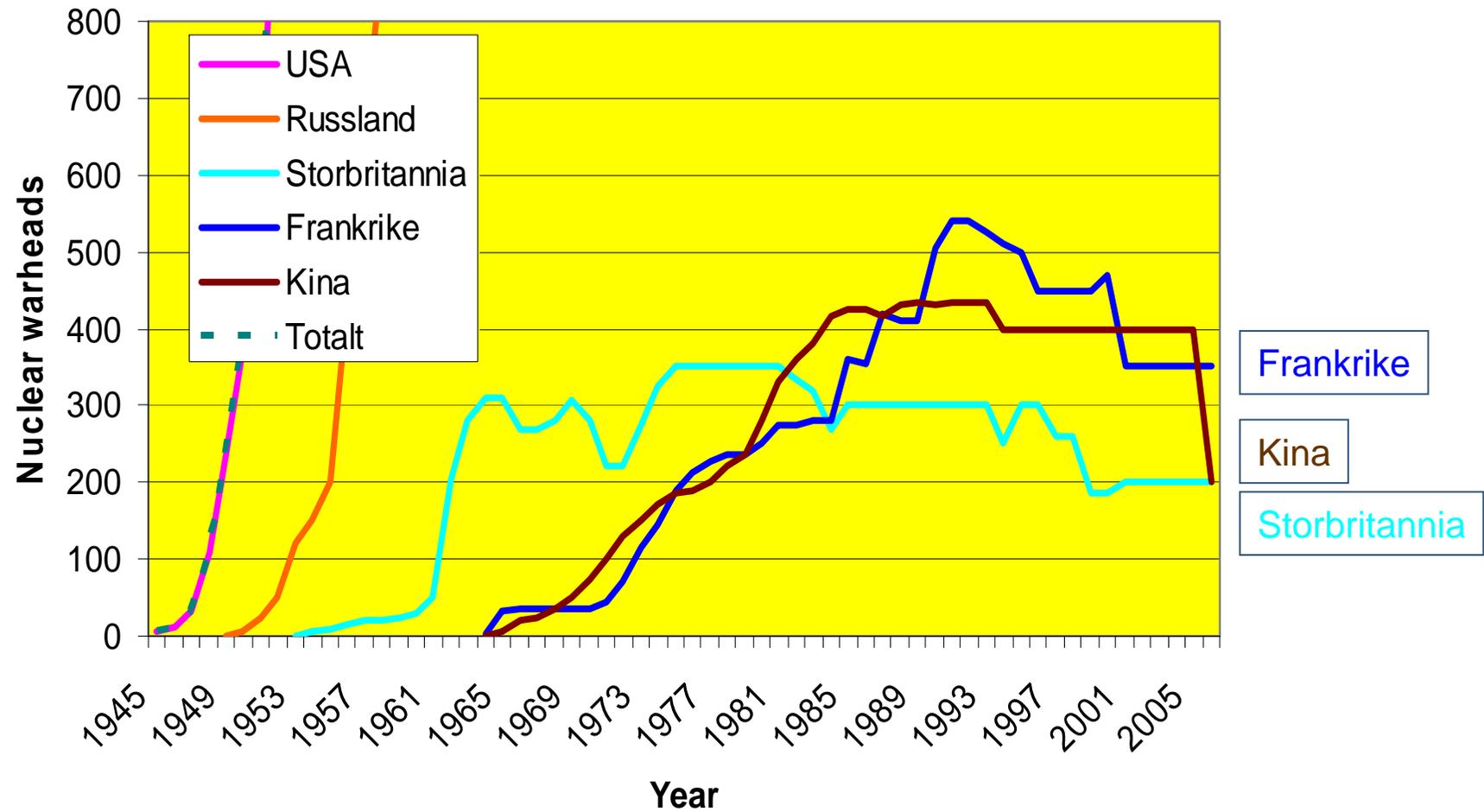
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Source: Nuclear Notebook, Bulletin of the Atomic Scientists

Nuclear arsenals 1945-2006

Recognised nuclear weapons states



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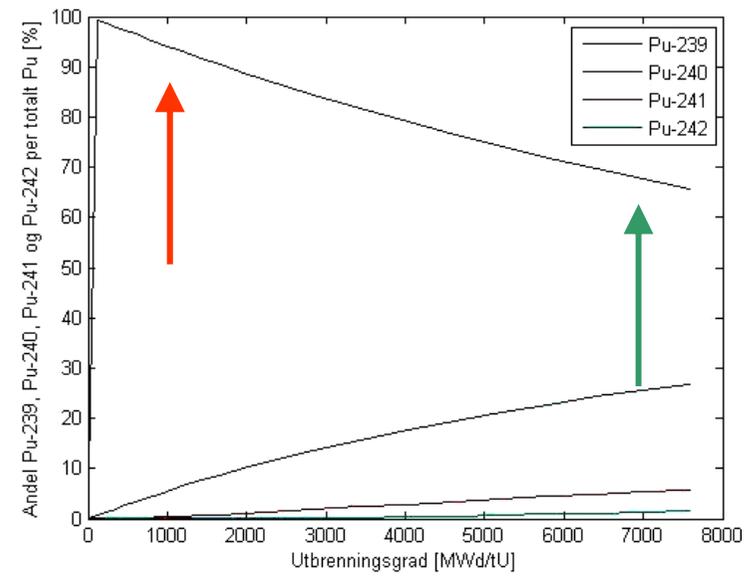
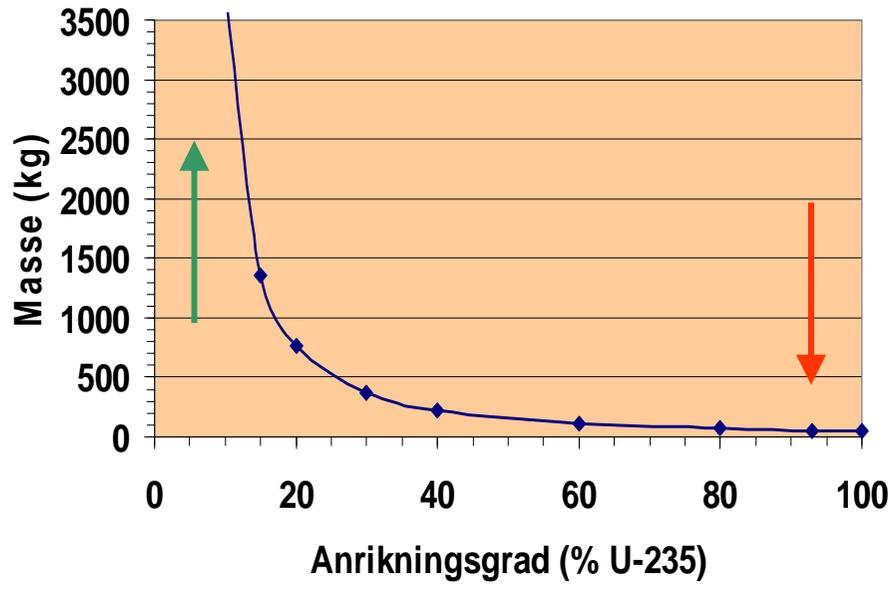
Non-recognised nuclear weapons states and candidates



- India: Capability demonstrated 1974 and 1998 50–60
- Pakistan: Capability demonstrated 1998 ~60
- North Korea: Capability demonstrated 2006 <10
- Israel: Most likely, but never confirmed 60–85
- South Africa: Built six nuclear bombs; programme ended 1989
- Iraq: Programme destroyed by UN in the 1990s
- Iran: Claims peaceful intentions, but situation unclear
- A number of other countries have shown interest in nuclear weapons development at some point
 - For example Sweden ...

The main obstacle

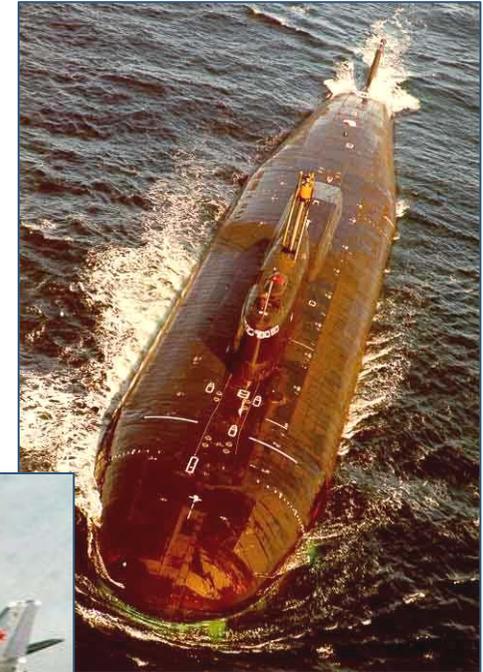
- Most difficult to get hold of weapons grade uranium or plutonium
 - Must have very highly enriched uranium (>60 %) or very pure plutonium-239 (~93%)



- NGOs must buy or steal any weapons grade materials
 - Safeguards and export control are very important

Nuclear weapons in our neighbourhood

- Increased use of nuclear submarines in the north
 - Russian Northern Fleet expanding again
 - Allied submarines visit Norwegian waters
- A number of nuclear weapons are handled on the Kola Peninsula
 - Mostly for submarines
- Russian bombers are again challenging western air space
- UK submarines about to get new nuclear weapons
- About 200 old NATO nuclear bombs in Europe



Is there a need for new nuclear weapons?

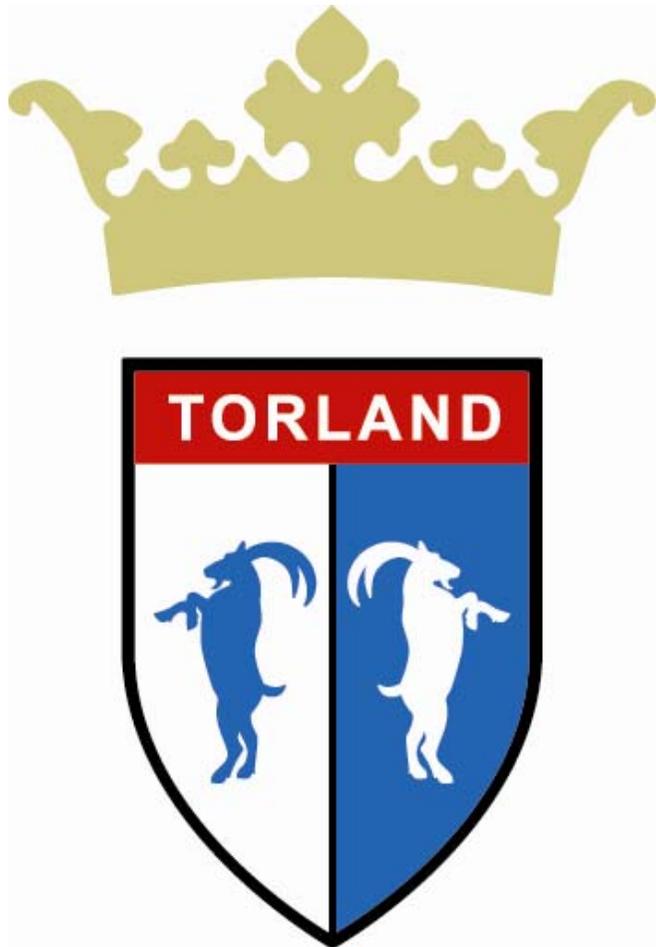
- Technologically:
 - Aging weapons are less reliable
 - Modernise with same or similar weapons
 - New technology offer new possibilities
 - Higher precision, for example
- Politically:
 - Desire to be the strongest and have the most options
- Can maybe do with fewer modern weapons than those they replace
- This all could lead to a future resumption of nuclear testing



Verifiable disarmament

- Verifiable disarmament requires a cooperation between nuclear weapons states and non-nuclear weapons states
 - How can a non-nuclear weapons state verify nuclear disarmament in a nuclear weapons state?
- Interesting cooperation between the UK and Norway
 - IFE, NORSAR, NRPA and FFI
 - *Atomic Weapons Establishment* and British MOD
 - VERTIC
- Will first do a British “inspection” of a Norwegian “weapons facility”
- Project very visible in the UK





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- "What Norway could have been without the Scandinavian unions"
- Constitutional kingdom
 - Norwegian language
- Regional great power financially and militarily
- Recognized nuclear weapons state and permanent member of the UNSC ("P6")
 - Neutral state
 - Follows up its obligations under the various treaties which it is part of

Final remarks

- Fewer nuclear weapons today than during the cold war, but there are more de facto nuclear weapons states
- **The main obstacle to nuclear proliferation is to closely guard all weapons grade nuclear materials**
- Also Nordic territories and Nordic interests abroad may suffer from the consequences of a nuclear event
- Cannot ignore the possibility of new nuclear weapons development and maybe new nuclear tests



