

# **Tools and Procedures for Verifying the Absence of Nuclear Weapons**

Practical Aspects of Nuclear Disarmament Verification

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# Setting the context...

- Cooperative process with reasonable access to bases or facilities that may contain nuclear weapons
- Looking for nuclear weapons, not materials.
- What technologies and procedures of verification can provide this assurance?

# There are three aspects to verifying absence...

- Absence of nuclear weapons
  - Missile base, submarine base, or air base
  - Nuclear weapon storage facility
  - Surface ship or a submarine
- Confidence that the facility cannot support permanent deployment of nuclear weapons
- Confidence that delivery systems cannot support nuclear missions

# Confirming absence of weapons...

- Deployed weapons
  - For example, warheads on ballistic missiles
- Weapons in storage (not deployed)
  - Warheads in containers, bombs or cruise missiles in storage
- Confirming that it is nonnuclear
  - Can do active interrogation: neutrons, x-rays
- START/New START procedures

# START/New START

- Detailed provisions for inspections
- Tools exist to confirm nonnuclear nature of objects

- (e) 2 Pocket calculators with spare batteries;
- (f) 2 Magnetic compasses;
- (g) 3 Rolls of tamper-indicating tape seals;
- (h) 100 Unique tamper-proof seals;
- (i) 2 Sets of tools for applying unique tamper-proof seals;
- (j) 10 Flashlights (safety approved) with spare batteries and spare bulb; and
- (k) 10 Dosimeters.

2. List of equipment to be provided by the inspected Party at the request of the inspecting Party for making linear measurements (quantity for one inspection team):

- (a) 1 3-meter range pole;
- (b) 4 Plumb bobs;
- (c) 2 Plumb bob cords;



Source: <http://military.people.com.cn/GB/6702068.html>

# Confirming no permanent deployment...

- Support equipment
- Agreement on equipment that is essential
  - Climate control?
  - Security perimeter?
- Difficult to eliminate capability for temporary /emergency deployment
  - Landing strip



Hans Kristensen. "Estimated Nuclear Weapons Locations 2009," November 25, 2009. Source: <https://fas.org/blogs/security/2009/11/locations/>



Olmstead, Kathryn. "Have You Seen the Nuclear Weapons Storage Igloos in Limestone?" The Bangor Daily News. Source: <http://bangordailynews.com/2015/11/05/living/tour-recalls-storage-of-nuclear-weapons-at-secret-sitein-limestone/>

# Confirming that nuclear missions are not supported...

- Might be possible for some delivery systems (mostly aircraft)
- This has been done in the past
  - Aircraft based in Sevastopol
  - B-1B bombers
- Difficult and maybe impossible for missiles, ships
- Might be useful in some circumstances if a state wants to demonstrate that it doesn't have nuclear capability



Source: <https://commons.wikimedia.org/wiki/File:F16-Hangar.jpg>

# Conclusion

- For the purposes of verifying the absence of nuclear weapons, we seem to have the tools
- Some adjustments to the New START procedures may be necessary, but appear possible.
- Procedures can be developed for a range of scenarios