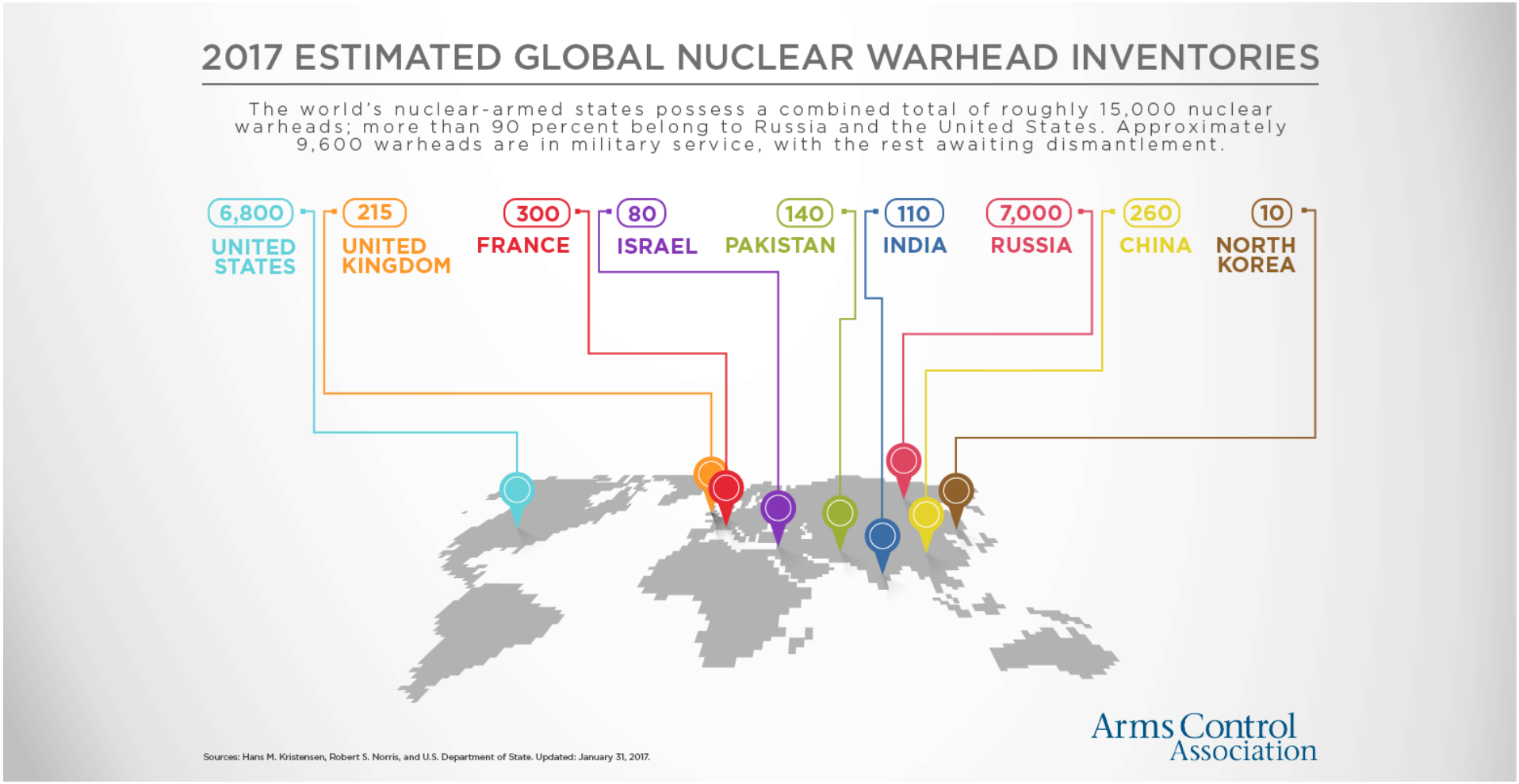
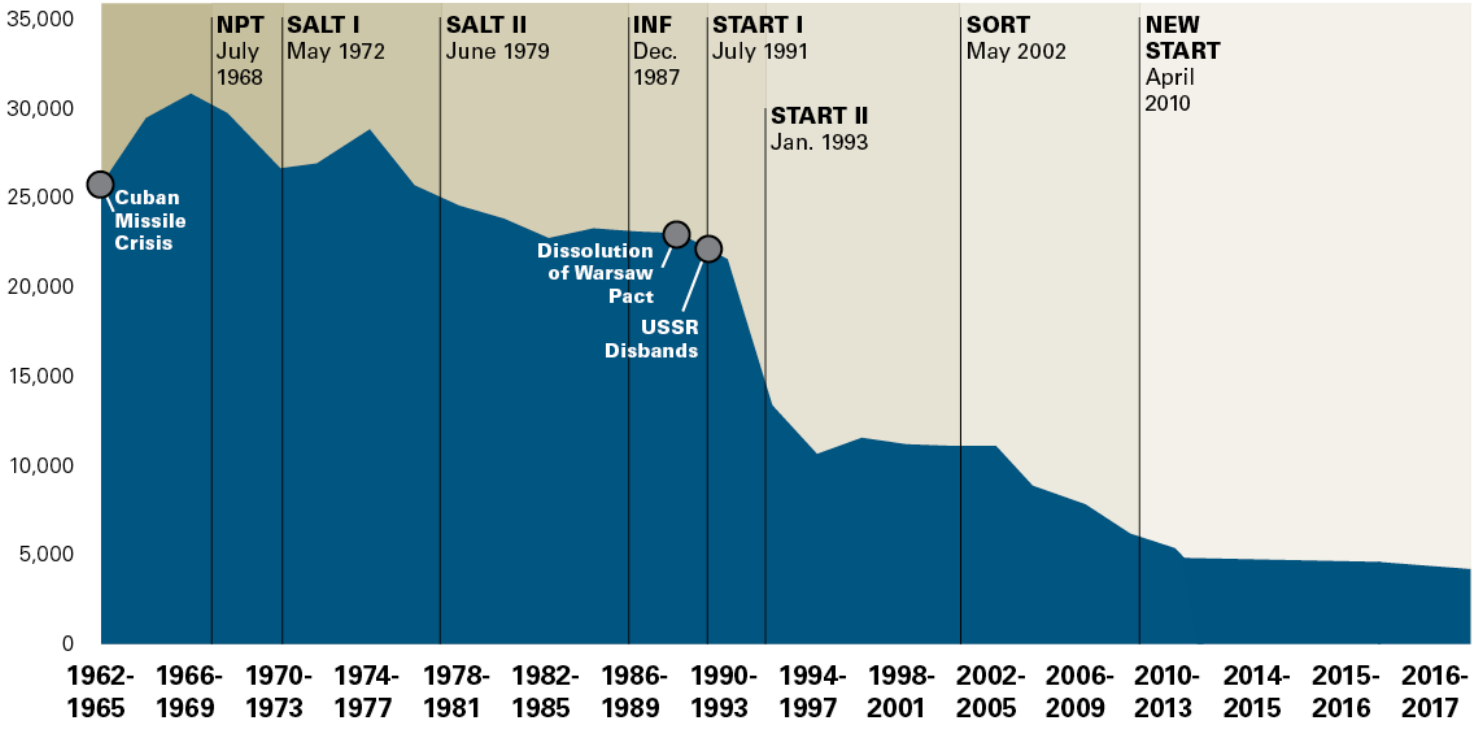
Nuclear Weapons in the World




Estimated Locations of Nuclear Weapons
Operationally deployed
Long-term storage
Design, production, dismantlement
SSBN deployment area (notional)
Federation of American Scientists/Natural Resources Defense Council, 2009

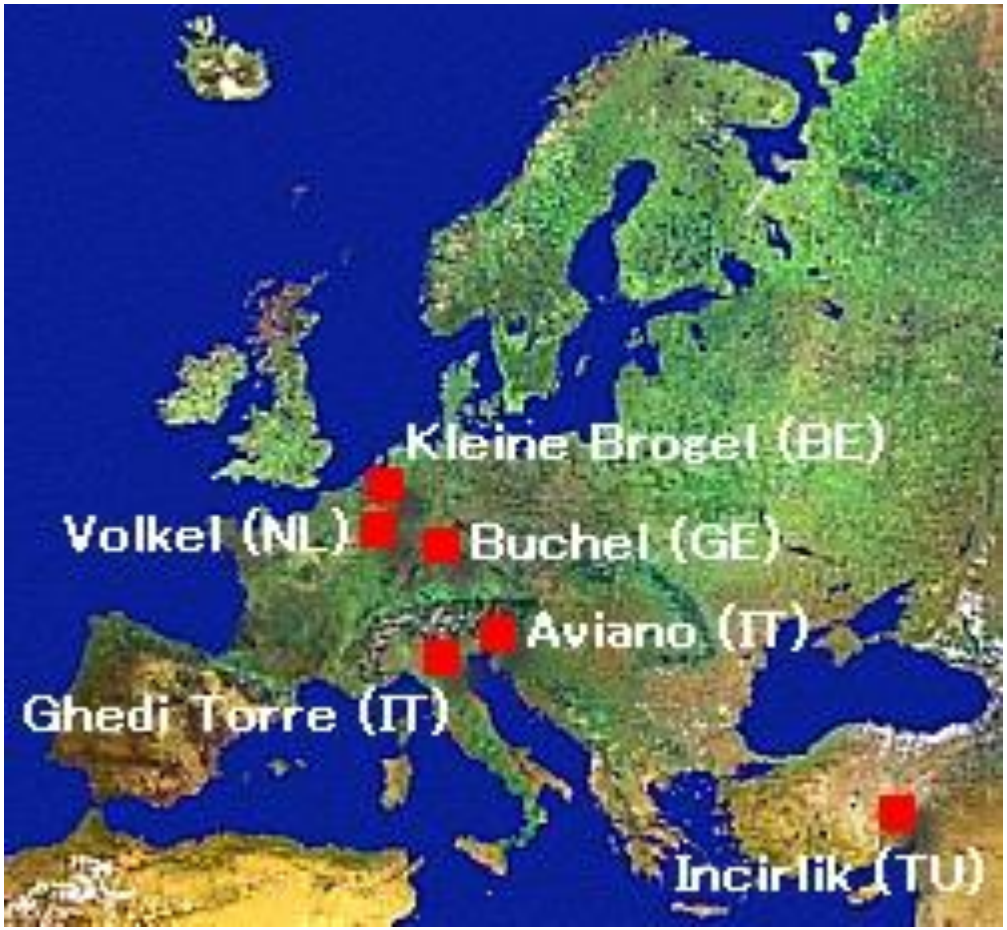
U.S. Nuclear Weapons Stockpile, 1962-2017

Since the late-1960s, the United States and Russia have signed a series of nuclear arms treaties that have contributed to steep cuts in their active and inactive nuclear warhead stockpiles.



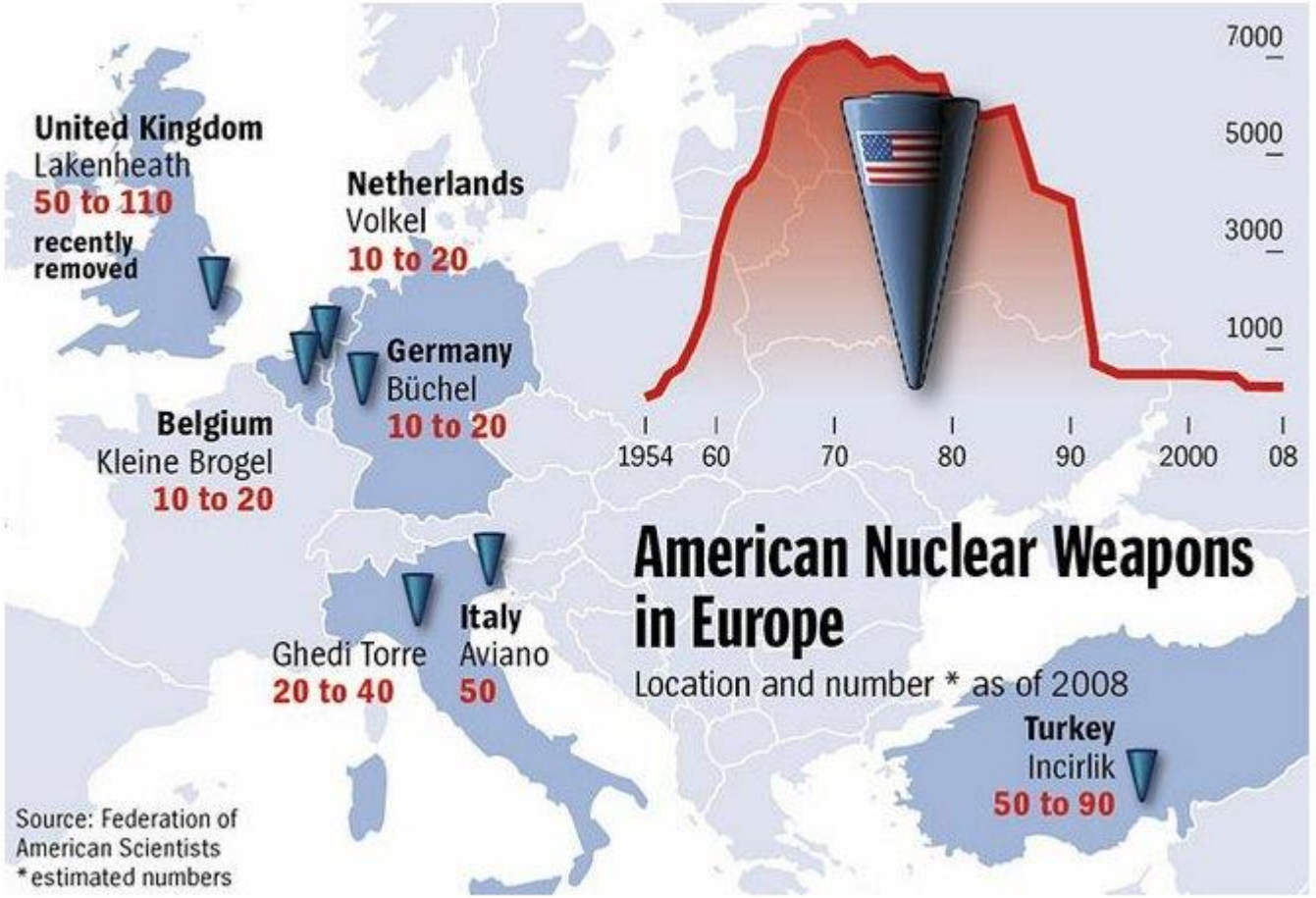
Sources: U.S. Department of State, U.S. Department of Defense, Arms Control Association. Updated: January 19, 2017.

US Nuclear Weapons in Europe



Source: https://www.indymedia.org.uk/images/2010/04/450055.jpg

NATO‘s nuclear deterrence



US Nuclear Weapons Storage Sites In Europe (2015)				
Country	**Air Base**	**WS3 Vaults**	**Weapons (B61)**	**Remarks**
Belgium	Kleine Brogel AB	11	20	For Belgian F-16s
Germany	Büchel AB	11	20	For German Tornados
Italy	Aviano AB	18	50*	For U.S. F-16s
	Ghedi AB	11	20	For Italian Tornados
Netherlands	Volkel AB	11	20	For Dutch F-16s
Turkey	Incirlik AB	25	50	For US rotational aircraft
Total	**6 bases**	**87**	**180**	
* The security upgrade at Aviano AB indicates that the number of operational nuclear weapons storage vaults at the base might have been reduced and the B61 bombs reduced from 50 to 25-35.				

Source: Hans Kristensen, FAS 2009

Illegality of nuclear Sharing

- NPT Article II: “Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly ….”

- U.S. interpretation: Weapons at national bases are under control of U.S. military “unless and until a decision were made to go to war, at which time the treaty would no longer be controlling.” “Rusk Letter”, U.S. State Department, 1968

- NATO interpretation: When the NPT was negotiated, nuclear sharing arrangements were already in place. Their nature was made clear to key delegations and subsequently made public. They were not challenged.

NATO – nuclear alliance

- Strategic Concept 2010, Preamble
  - It [the strategic concept] commits NATO to the goal of creating the conditions for a world without nuclear weapons – but reconfirms that, as long as there are nuclear weapons in the world, NATO will remain a nuclear Alliance.

Nuclear Deterrence

- Warsaw Summit Declaration
  - Therefore, deterrence and defence, based on an appropriate mix of nuclear, conventional, and missile defence capabilities, remains a core element of our overall strategy. […]

First Strike Policy

- Warsaw Summit Declaration
  - The circumstances in which NATO might have to use nuclear weapons are extremely remote. If the fundamental security of any of its members were to be threatened however, NATO has the capabilities and resolve to impose costs on an adversary that would be unacceptable and far outweigh the benefits that an adversary could hope to achieve.

Nuclear Weapons Modernization

All the nuclear weapon states, include the five that have signed the NPT, continue to modernize their nuclear forces with no declared or apparent end in sight:

United States: Trident II D5LE SLBM production; New SSBN(X), bomber and ICBM development, warhead life-extension programs (W76-1, W61-12, W78/W88 common warhead, other warheads later), warhead pit (plutonium core) production, F-35 fighter-bomber development, cruise missile development, production complex modernization, command and control modernization, war plan upgrades

Russia: Borey-class SSBN production, Bulava/Sineva/Liner SLBM production, SS-27/RS-24 ICBM production, new "heavy" ICBM development, bomber upgrades, new cruise missile production, warship/submarine production, warhead production, Su-35 fighter-bomber deployment, tactical missile deployment, command and control modernization, war plan upgrades

China: New Jin-class SSBN deployment, JL-2 SLBM development, DF-31/31A ICBM deployment, DF-21 MRBM deployment, DH-10 cruise missile deployment, command and control modernization, war plan updates

France: M51 SLBM deployment, ASMPA cruise missile deployment, Rafale fighter-bomber deployment, TNO warhead production, production complex modernization, command and control modernization, war plan upgrades

Britain: New SSBN development, W76-1/Mk4A warhead upgrade, war plan upgrades

India: New SSBN development, Agni-2/3/5 MRBM/ICBM development, Sagarika/K15 SLBM development, Dhanush SSM development, command and control modernization, war plan upgrades

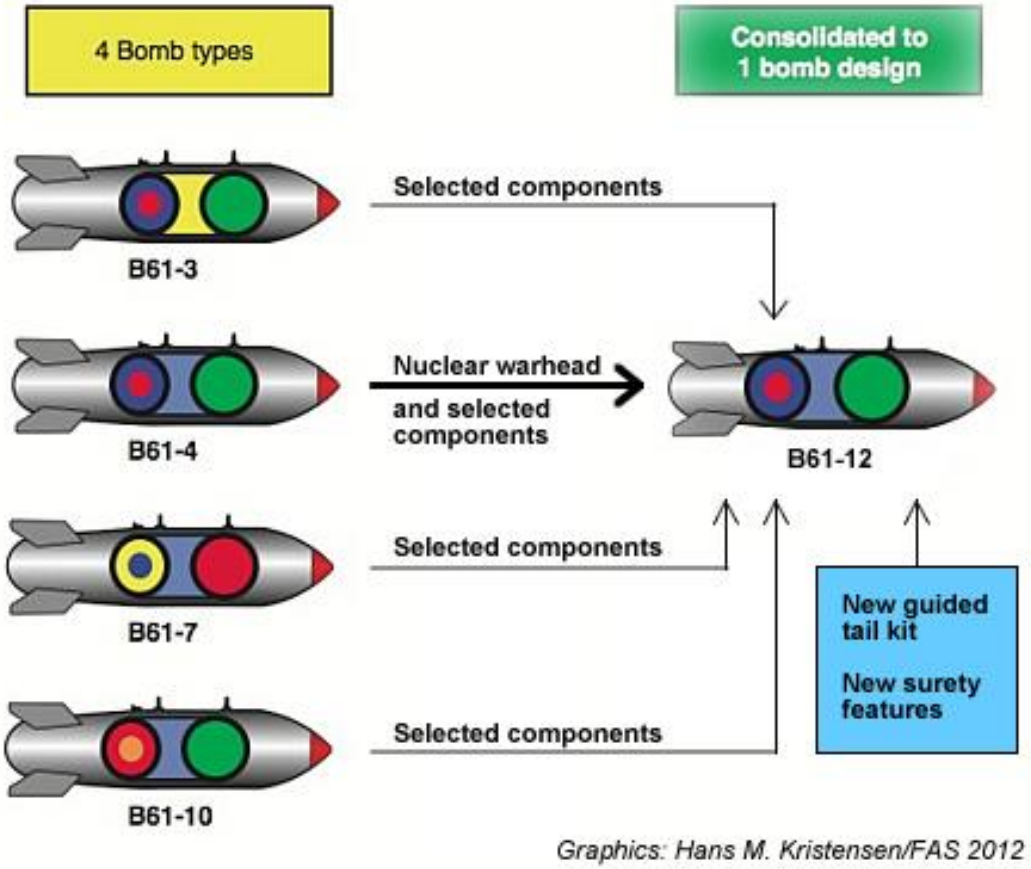
Pakistan: Shaheen-1A and -2 MRBM development, Abdali and NASR SRBM development, Babur and Ra'ad cruise missile development, warhead production, production complex modernization, command and control modernization, war plan upgrades

Israel: Jericho-3 MRBM development, possible cruise missile development for Dolphin-class submarines, command and control modernization, war plan upgrades

NATO: Planned B61-12 deployment, fighter-bomber upgrade, storage facility upgrade, command and control upgrade

Source: FAS, Hans Kristensen

B61-12


4 Bomb types
Consolidated to 1 bomb design
B61-3
Selected components
B61-4
Nuclear warhead and selected components
B61-12
B61-7
Selected components
New guided tail kit
New surety features
B61-10
Selected components
Graphics: Hans M. Kristensen/FAS 2012

A more accurate atom bomb

The United States military is replacing the fixed tail section of the B61 bomb with steerable fins and adding other advanced technology. The result is a bomb that can make more accurate nuclear strikes and a warhead whose destructive power can be adjusted to minimize collateral damage and radioactive fallout.

Source: Federation of American Scientists

The New York Times

US B61-12 “steerable” nuclear bomb

The US plans to deploy 180 precision-guided thermonuclear bombs to five European countries from 2020

Size

Length: 3.6m

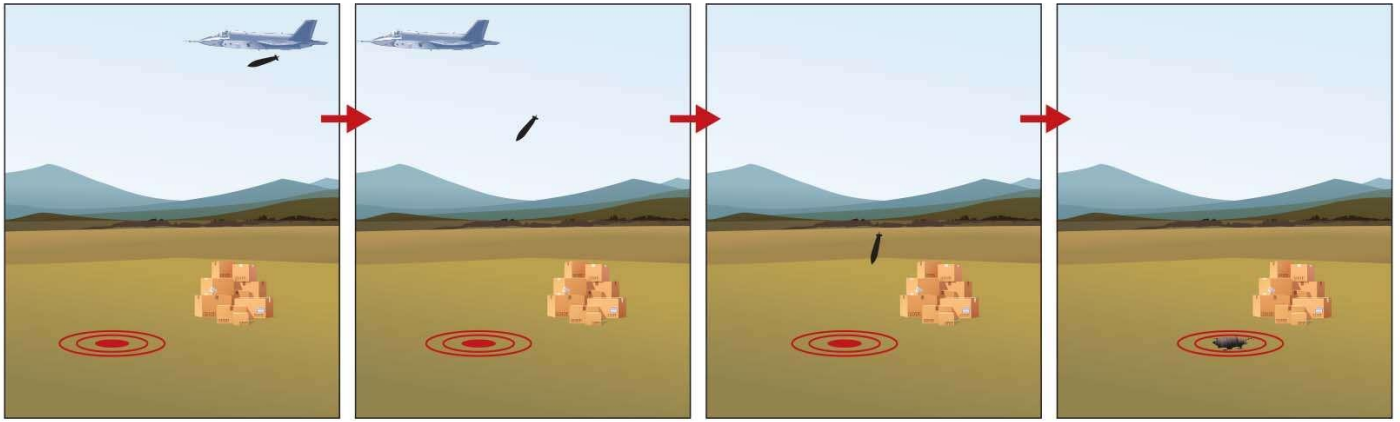
Diameter: 340mm

Weight: 350kg

Where bombs will be based

Belgium	Kleine Brogel	**20**
Germany	Büchel	**20**
Italy	Aviano, Ghedi Torre	**70**
Netherlands	Volkel	**20**
Turkey	Incirlik	**50**

Stages



The B61-12 is deliverable by six aircraft: the B-2A, B-52H, F-15, F-16, Tornado and F-35

GPS and laser guidance embedded in its nose guide the bomb to within 30m of its target

Steerable tail fins and a spin rocket rotor fly the bomb to its precise target

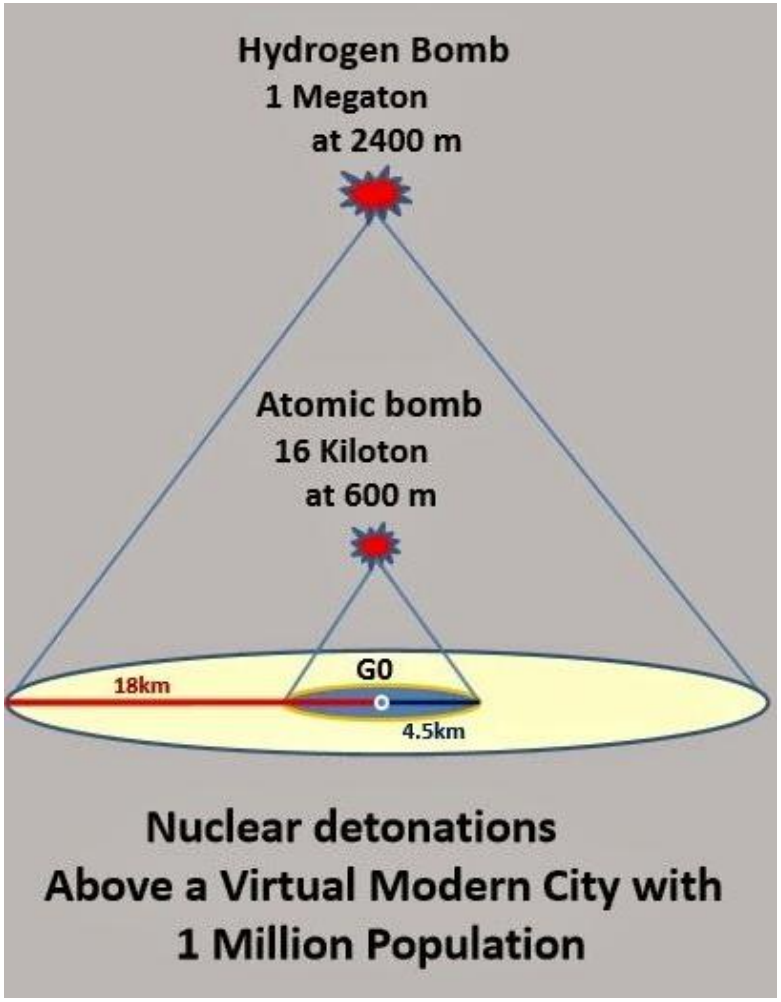
AMAC systems enable selectable detonation magnitudes of 5, 10, or 50Kt, either by air or ground burst

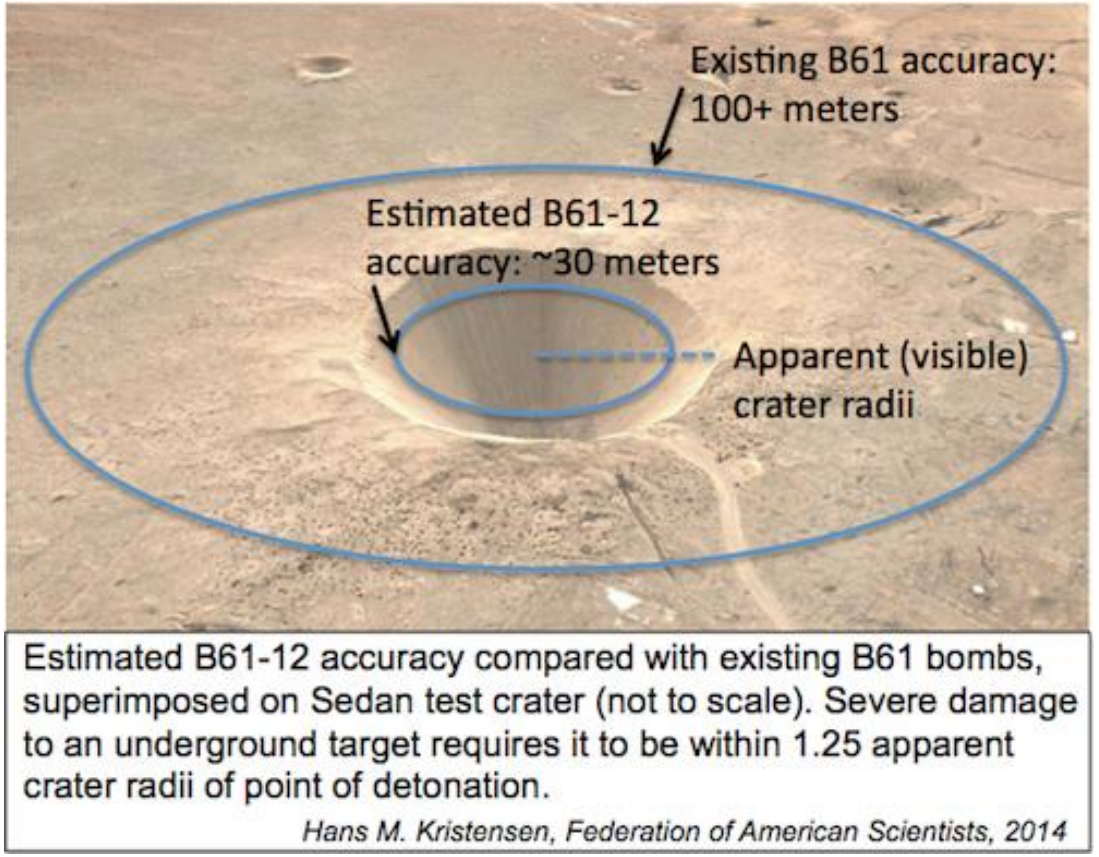
Sources: Federation of American Scientists, IHS Jane’s

SCMP / Graphic News

http://www.scmp.com/author/scmp-graphics

A more usable bomb



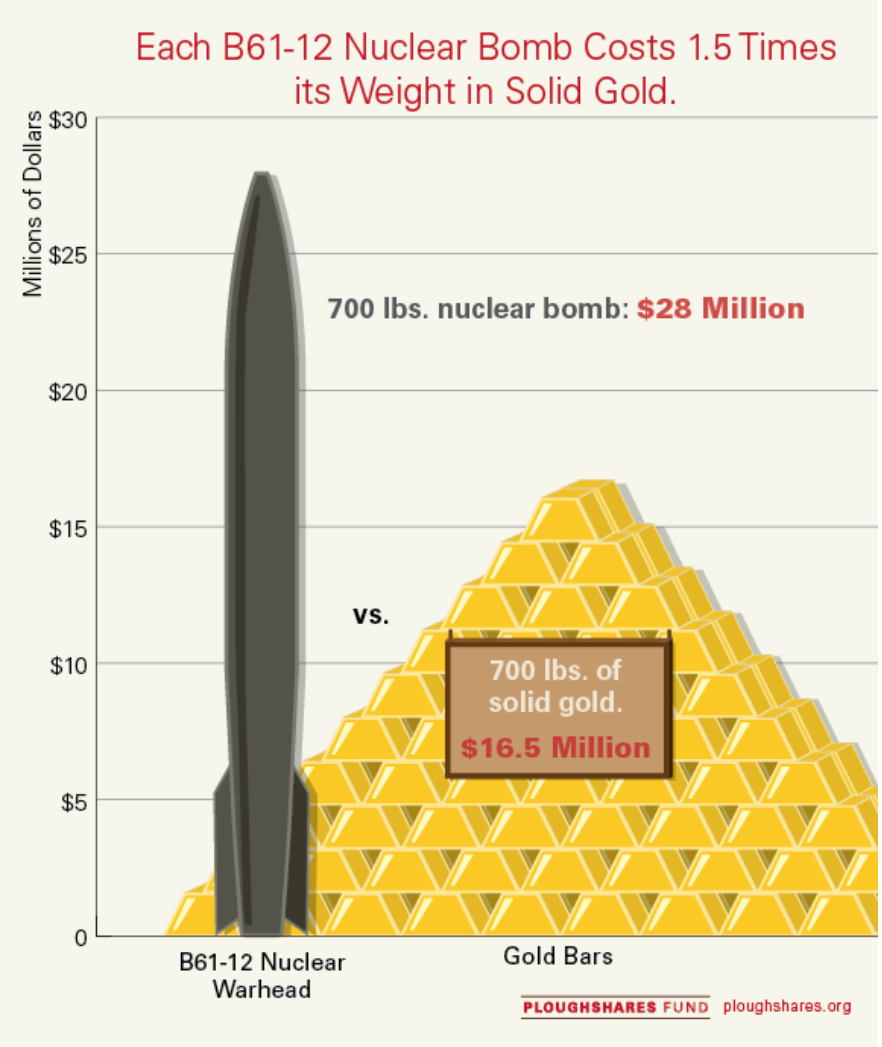


Estimated B61-12 accuracy compared with existing B61 bombs, superimposed on Sedan test crater (not to scale). Severe damage to an underground target requires it to be within 1.25 apparent crater radii of point of detonation.

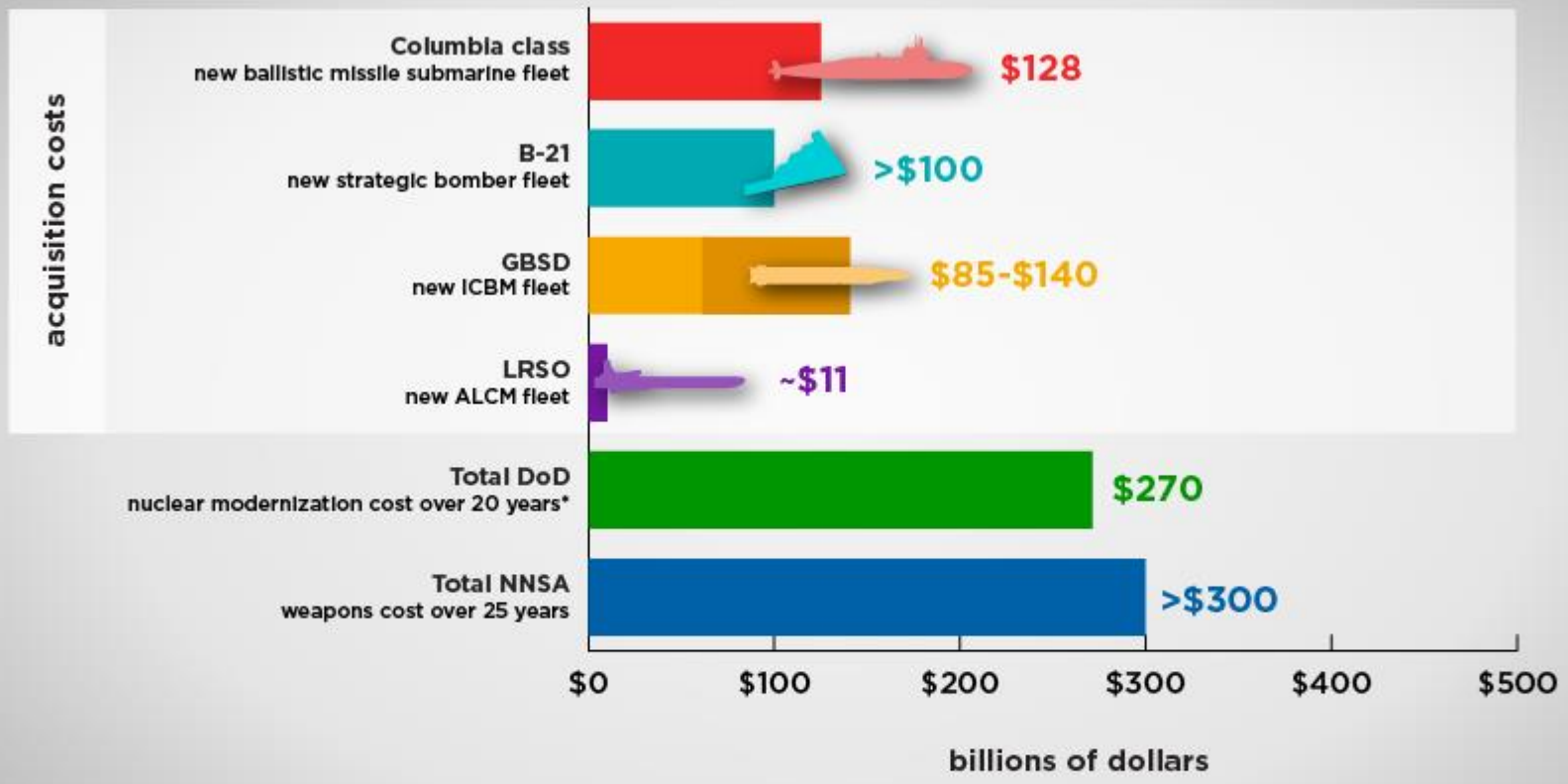
Hans M. Kristensen, Federation of American Scientists, 2014

Source: joescarry.blogspot.co.uk

Financial costs of modernization



Estimated Costs for Nuclear Triad Modernization



* In FY2017 constant dollars; includes only a small portion of the cost of the B-21

Note: All figures in then-year dollars unless otherwise noted

Sources: U.S. Navy, U.S. Air Force, Center for Strategic and International Studies, NNSA, DoD Cost Assessment and Program Evaluation (CAPE) office

Updated April 7, 2017.

Arms Control Association

Further costs

- Delivery system: Eurofighter or F-35
  - Selling price: more than 100 million each
- Security measures/ upgrades at Air Bases

Shield and Sword

- http://www.funnyjunk.com/European+missile+defense+system/funny-pictures/5973760/
  - Gurmann on funnyjunk.com
- http://www.politicalcartoons.com/cartoon/b810229b-ddf7-469e-930e-444d1cf09df3.html
  - Paresh Nath - The National Herald, India. Politicalcartoons.com

Phased Adaptive Approach

Phase 1 (2011)

Deploy existing / maturing systems against SRBM/ MRBM threat

Aegis BMD 3.6.1 with SM-3 IA

AN/TPY-2 (FBM)

C2BMC AOC
Ramstein

Phase 2 (2015)

Enhanced systems against SRBM/MRBM threat

Aegis Ashore 5.0
with SM-3 IB
(one site)

Aegis BMD 4.0.1/5.0 with SM-3 IB

THAAD

C2BMC Updates

ALTBMD Lower Tier

Enhanced
Sensors

Phase 3 (2018)

Improved area coverage against MRBM/IRBM threat

Aegis Ashore 5.1
with SM-3 IB/IIA
(two sites)

Aegis BMD 5.1 with SM-3 IIA

THAAD

C2BMC Updates

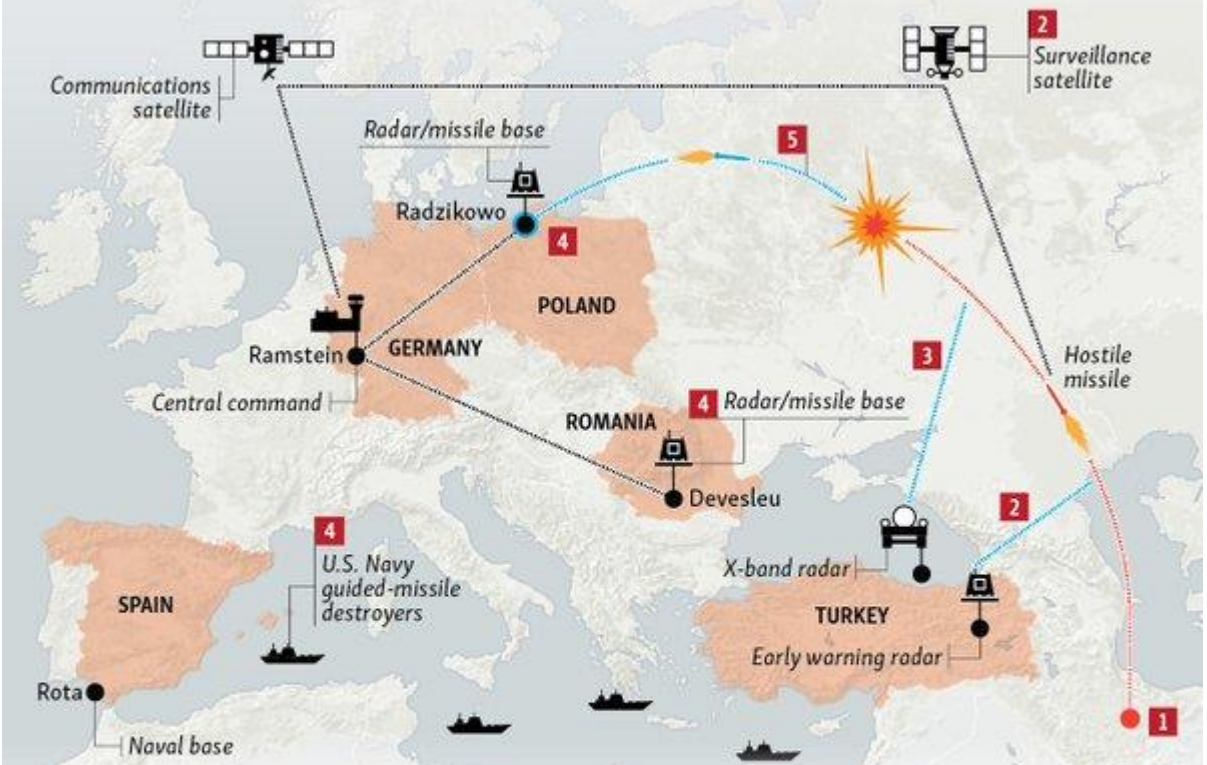
ALTBMD Upper Tier

Enhanced
Sensors

Source: Missile Defense Agency

EUROPEAN MISSILE DEFENSE SYSTEM

A high-tech 'shield' aimed at protecting Europe from **ballistic missile threats** is a step closer to being established. This is how it will work:



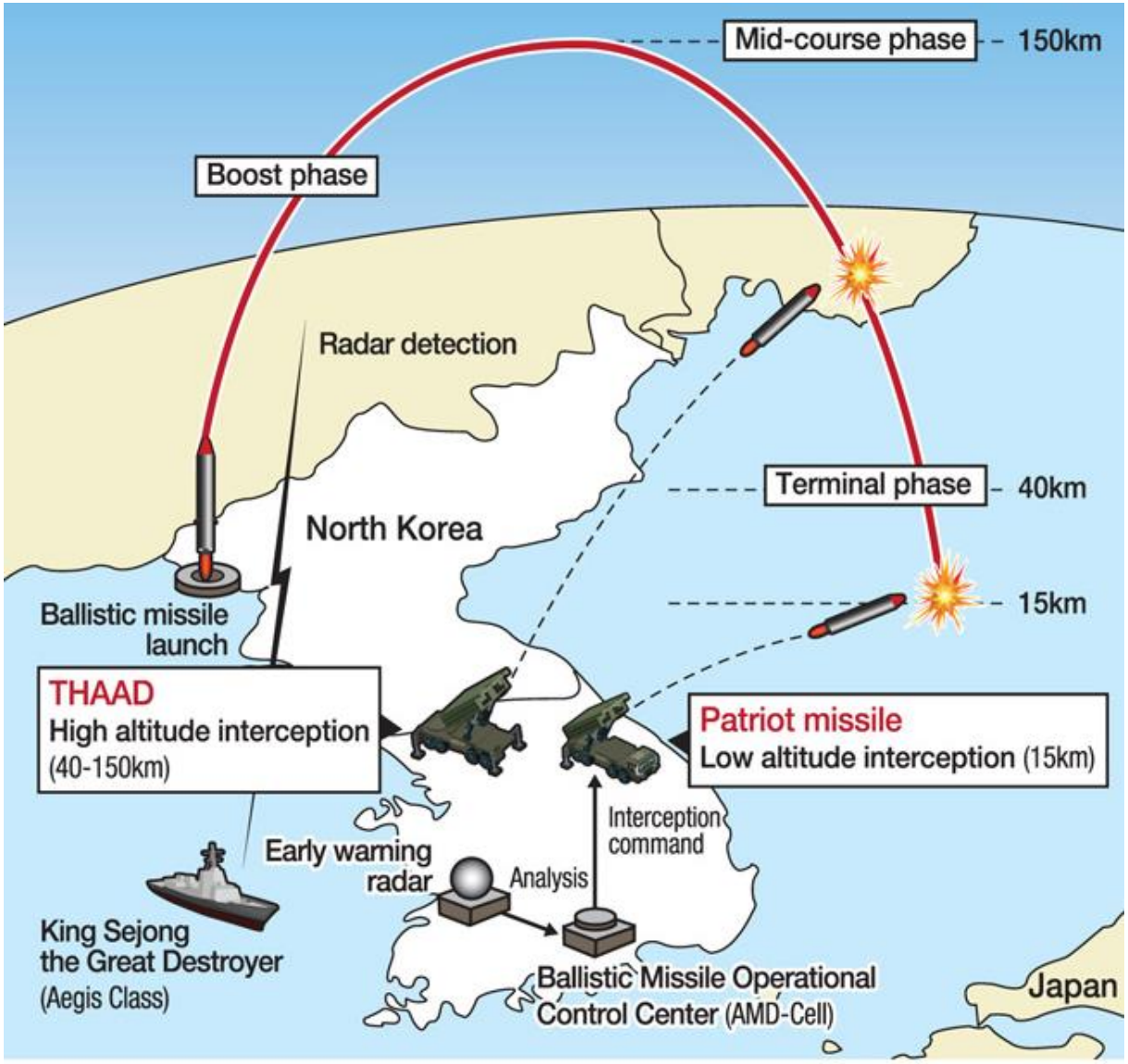
HOW IT WORKS

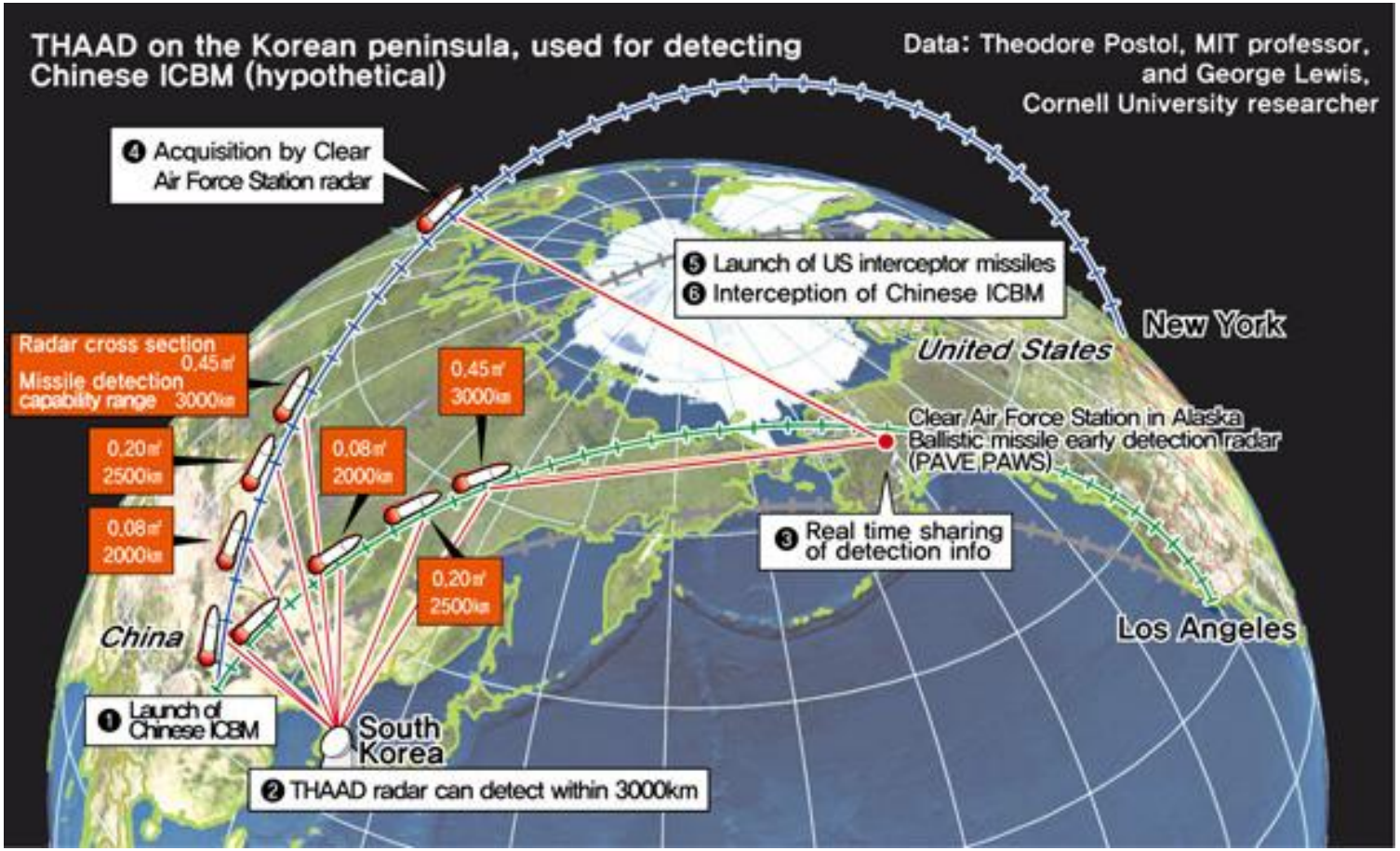
1. *Hostile ballistic missile is launched.*
2. *Early warning radars and surveilance satellites detect and track missile.*
3. *X-band radar tracks missile and decoys.*
4. *One or more interceptors are launched from ground sites or sea.*
5. *Interceptor locks on warhead, isolates it from decoys, and destroys it.*

RadioFreeEurope RadioLiberty

Source: Missile Defense Agency, Stars and Stripes

Terminal High Altitude Area Defense





Source: http://english.hani.co.kr/arti/english_edition/e_international/693913.htm

*„If we have nuclear weapons why can‘t we use them?“**

- Presidential memorandum for „a new Nuclear Posture Review to ensure that the United States‘ nuclear deterrent is modern, robust, flexible, resilient, ready, and appropriately taiilored to deter 21st-century threats and reassure our alliances.“

*Allegedly, Donald Trump asked this question three times in a row to an security advisor in 2016.