

DPRK Nuclear Capabilities

1. DPRK is producing nuclear fuel for nuclear weapons.
2. DPRK is producing advanced nuclear weapons.
3. DPRK is producing inter-continental ballistic missiles.



Rob Goldston

Producing Plutonium and Tritium Fuel for Nuclear Weapons



5 MWe reactor requires natural U.
Light Water Reactor requires enriched U.
Both require uranium mining & milling.

Both can be used to produce Pu and/or
(for advanced weapons) tritium.
Tritium decays by 5% per year.

DPRK claims to have use alternative fuels
(Pu → U?) and “mastered” fusion.

Reactors are hard to hide.

Activity has been reduced, may be restarting?
Focusing on uranium?

Producing U Fuel for Nuclear Weapons



Yongbyon
~ 80 kg HEU / year ?



Kangson Site?
~ 100 kg HEU / year ?

Likely have dozens of weapons,
producing ~1/2 dozen per year?

DPRK's Nuclear Weapons



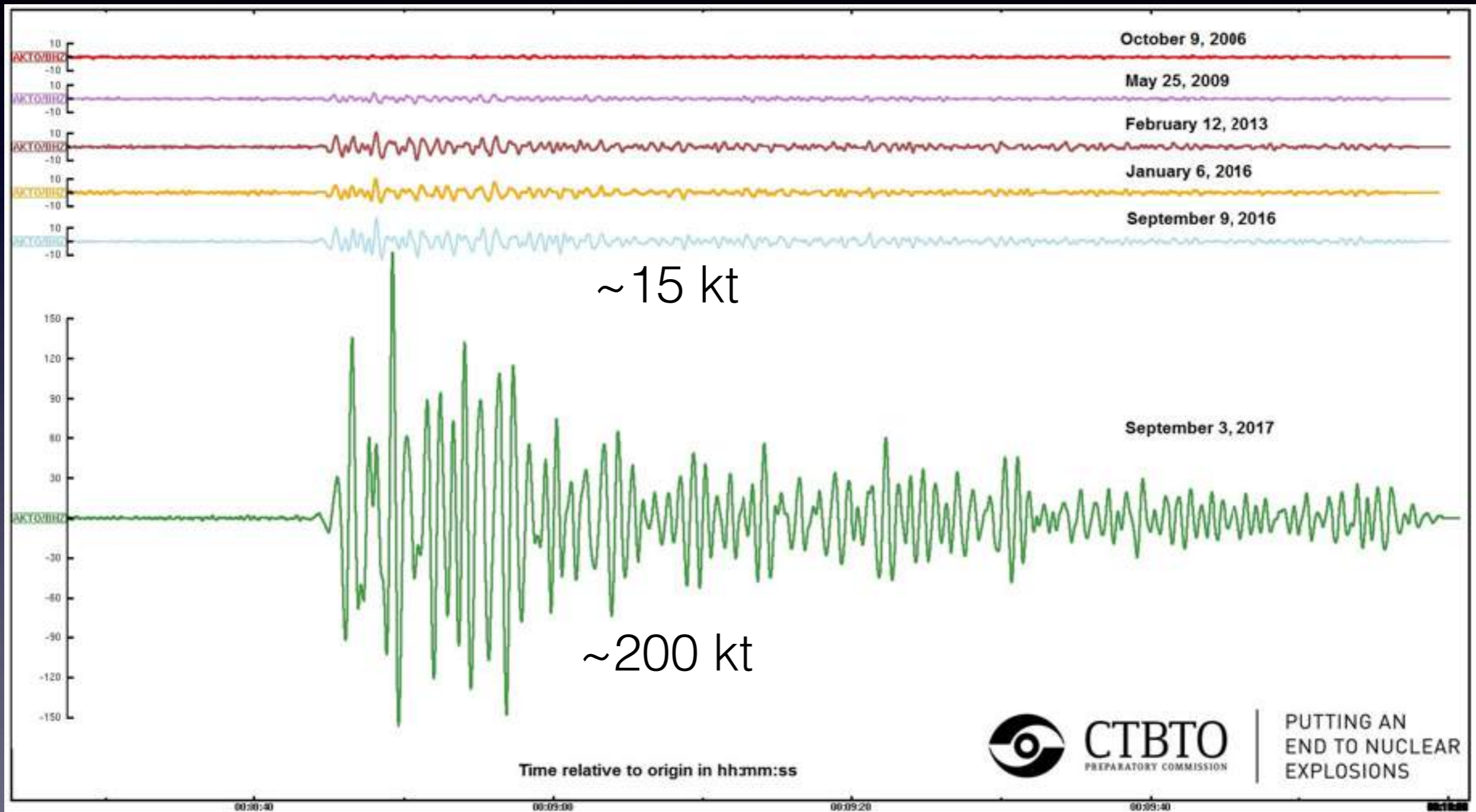
Tritium-boosted
Primary?



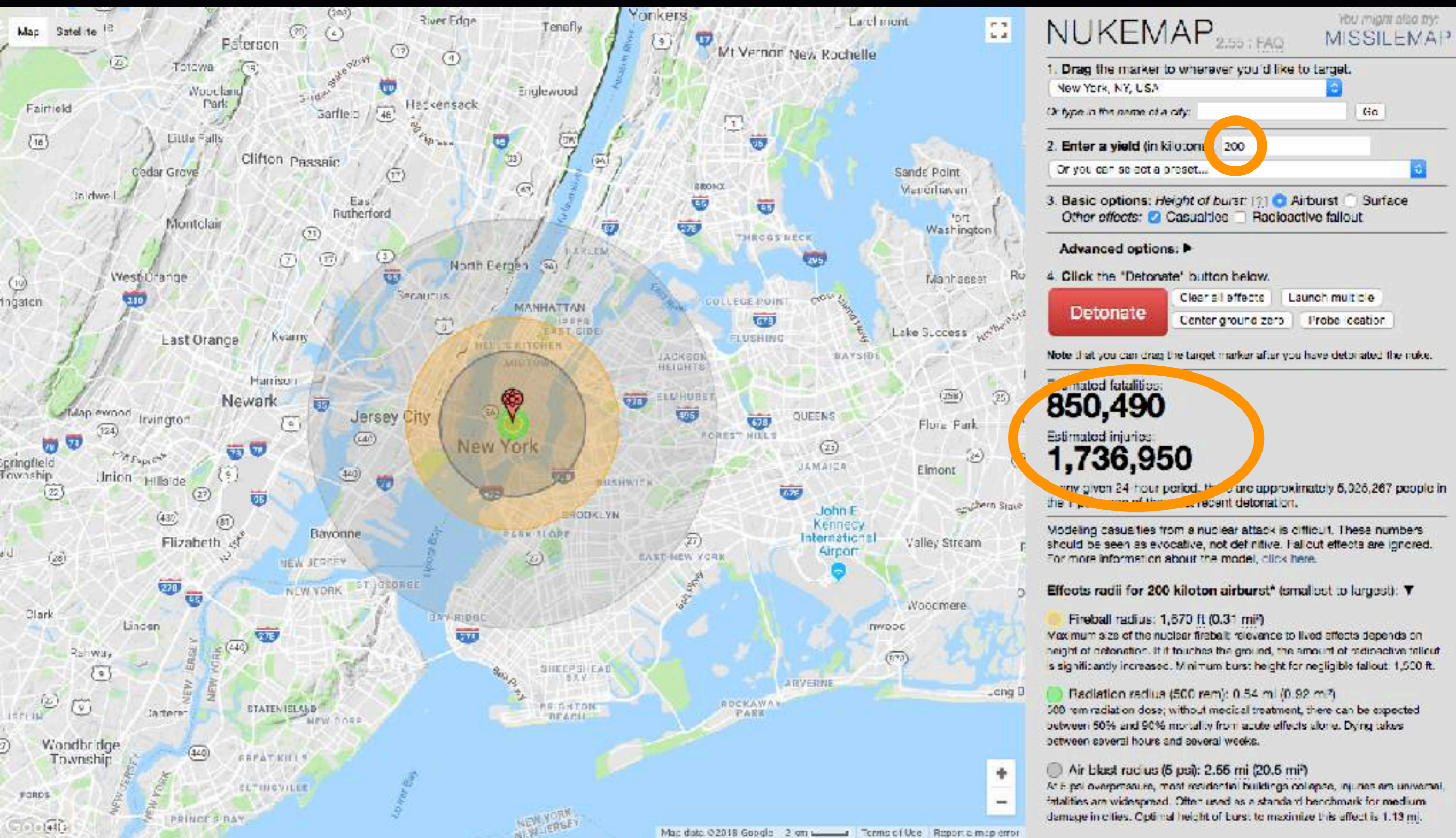
Two-stage
Thermonuclear Weapon?

Somewhat physically larger than modern
U.S. 2-stage weapons, but similar yield.

DPRK has Tested an Advanced Nuclear Explosive



Estimate of Fatalities & Injuries, NYC



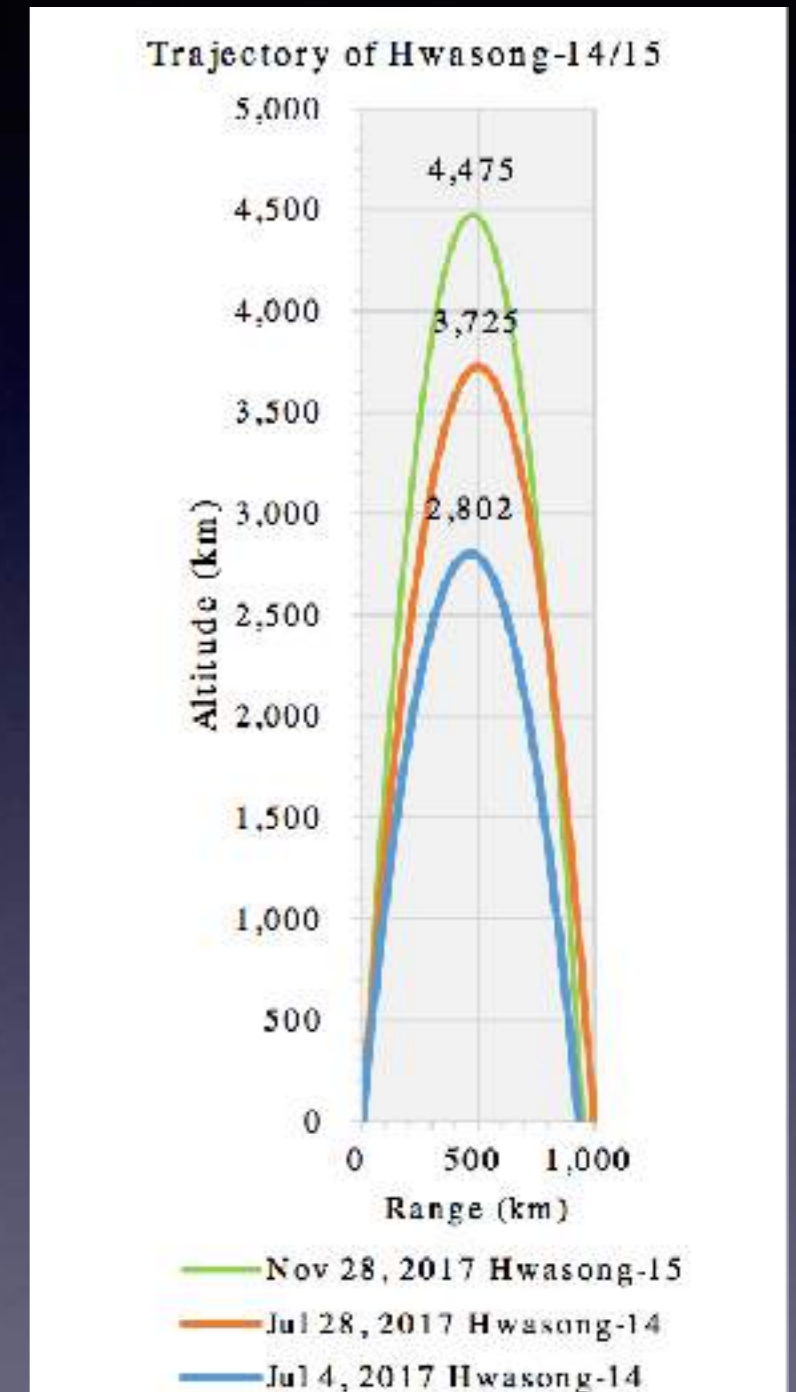
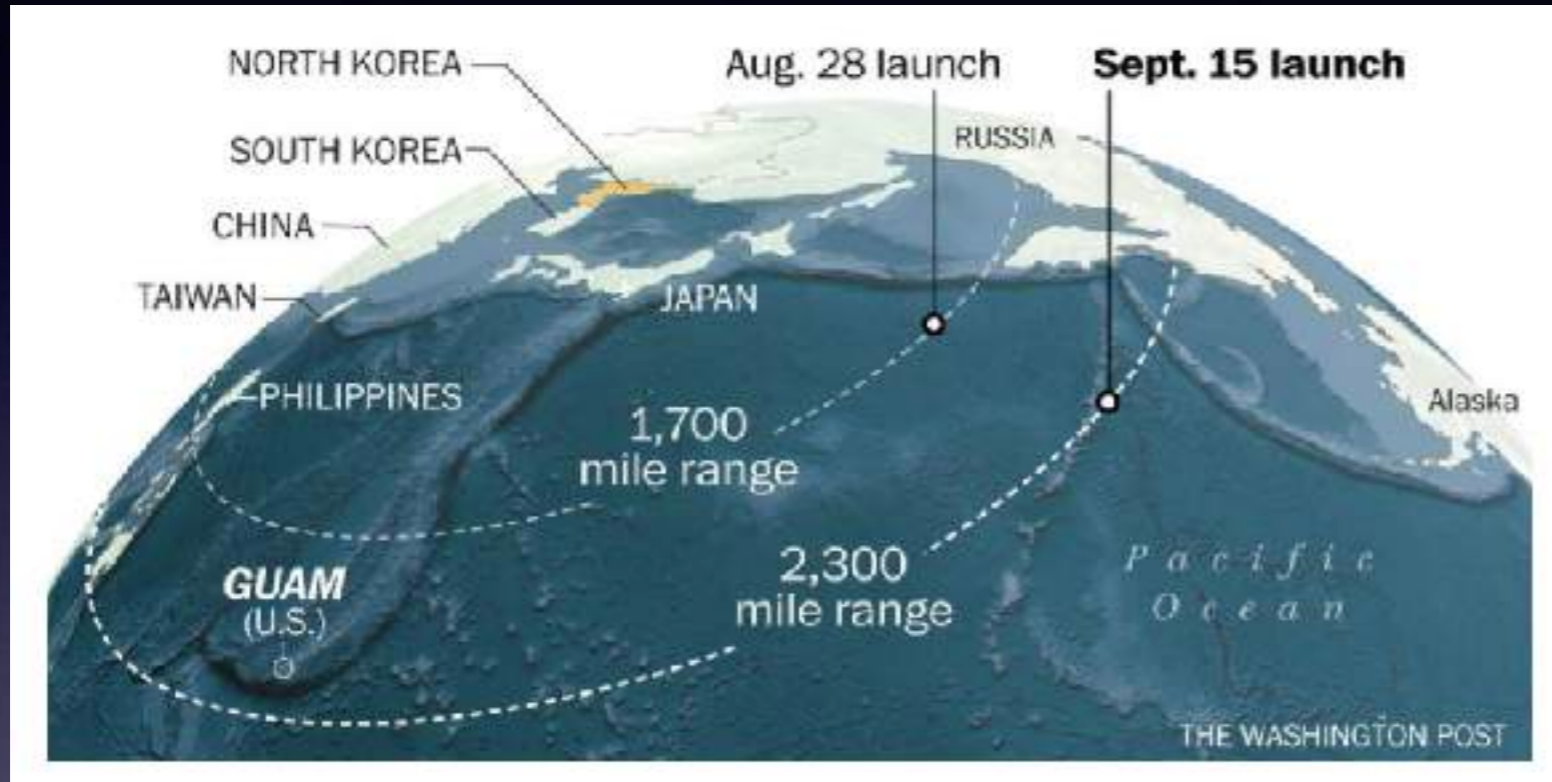
DPRK Blew up Entrances to Tunnels for Testing Nuclear Weapons



Not complete, not verified, not irreversible.
Is DPRK satisfied with its tests, as it states?
Did it get external help with weapons design?
It surely got exterior help with ICBM design.

DPRK has Missiles to Target Japan, Guam and All Continental U.S.

Hwasong-12



They have not demonstrated re-entry vehicles for ICBMs... Hwasong 14 & 15 based on Russian RD-250 rocket engines. How many do they have?

4500 m up
⇒ 13,000 m across

What would DPRK Denuclearization Look Like?

Sig Hecker's list provides a comprehensive benchmark.

Current freeze-for-freeze + deterrence is a start.

Patience required.
Continue gift-for-gift?

	Specific facilities or activities	HALT - short term < 1 year	ROLL BACK- medium term 2 to 5 years	ELIMINATE or SET LIMITS - long term - 6 to 10 years
Nuclear weapons	Nuclear arsenal	Cap	Declare & reduce	Eliminate & verify. Join NPT
Nuclear personnel	Scientists, engineers, techs	Assist in halting operations	Assist in roll back	Redirect to civilian programs
Nuclear tests	Nuclear tests	Moratorium/suspend	Ban	Ban (sign CTBT)
	Tunnels	Suspend activity	Close	Destroy
	Test infrastructure	Suspend activity	Dismantle	Dismantle & verify
Missile tests	IRBM & ICBM	Moratorium/suspend	Declare, disable & monitor	Destroy missiles; no developm.
	SLBM & Solid rocket motors	Moratorium/suspend	Declare, disable & monitor	Destroy missiles; no developm.
	New engine tests	Suspend	Halt & monitor	Ban tests and development
	SR & MR Missiles	Short term suspension	TBD - set allowable limits	TBD - set allowable limits
	Space Launch Vehicles	Short term suspension	TBD - establish protocol	TBD - establish acceptable limits
Plutonium	Inventory	Cap	Cap, declare & monitor	Eliminate
	5MWe reactor	Halt	Dismantle	Decommission
	ELWR	Halt or don't start	Inspect & future TBD	TBD
	IRT-2000	Halt	Dismantle	Decommission, possibly replace
	Reprocessing facility	Don't operate	Dismantle front end (no new fuel)	Dismantle & decommission
	Metal fuel fab facilities	Don't operate	Dismantle	Decommission
Fusion (H-bomb) fuels	Tritium	Halt reactors (as above)	Dismantle reactors & hot cells	Eliminate
	Lithium-6	Halt production	Dismantle production facilities	Eliminate
Uranium enrichment	HEU inventory	Limit (halt support facilities)	Cap, declare & monitor	Eliminate
	YB centrifuge facility	Halt & inspect	Inspect & future TBD	TBD
	Covert centrifuge facilities	Limit (halt support facilities)	Declare & inspect	Eliminate
No export	Nuclear & missile technology	No export pledge	No nuclear export. Join MTCR	No nuclear export. Join MTCR

50 – 100 sites to verify?

Possible Gifts for Gifts?

US	DPRK
No Military Exercises	No Nuclear & Missile Tests
Security Guarantees by U.S. & China	No Pu Reprocessing (at declared & verified facilities)
Peace Treaty & Normalized Relations	No Enrichment to HEU (at declared & verified facilities)
Expanded Trade	Declare and Verify all Fissile Material Production Stopped
Major Infrastructure Investment	Declare and Verify all Missile Production Stopped
Major Infrastructure Construction	Begin Drawdown of Warheads and Missiles
Joint Infrastructure Operation	Verified Nuclear Disarmament