

# THE NEXT ARMS RACE

WHAT'S DRIVING GLOBAL STRATEGIC COMPETITIONS:  
IT ISN'T NUCLEAR WEAPONS

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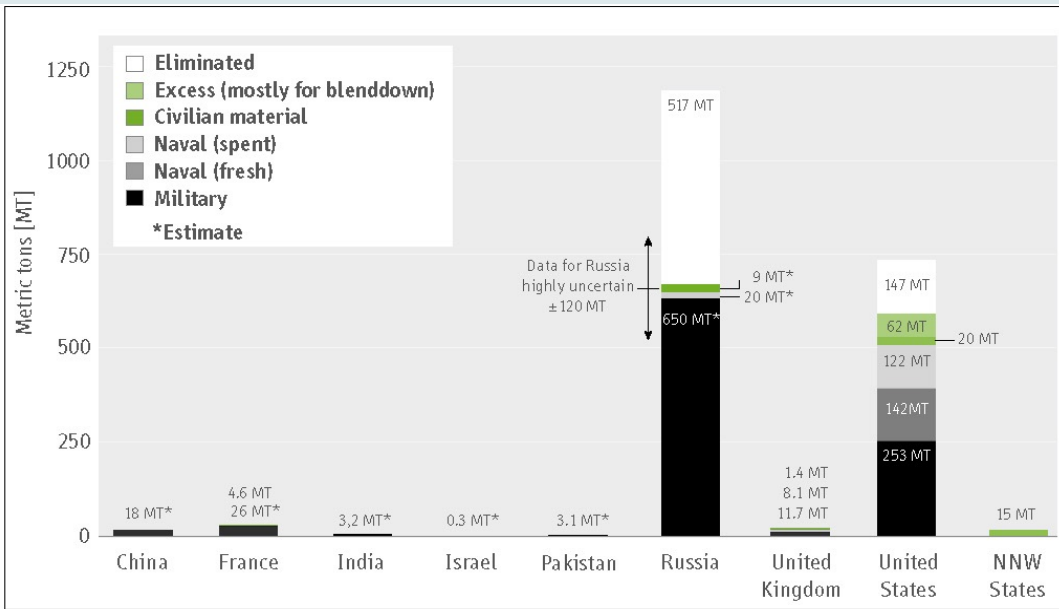
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# **3 TRENDS SHAPING FUTURE NUCLEAR COMPETITIONS**

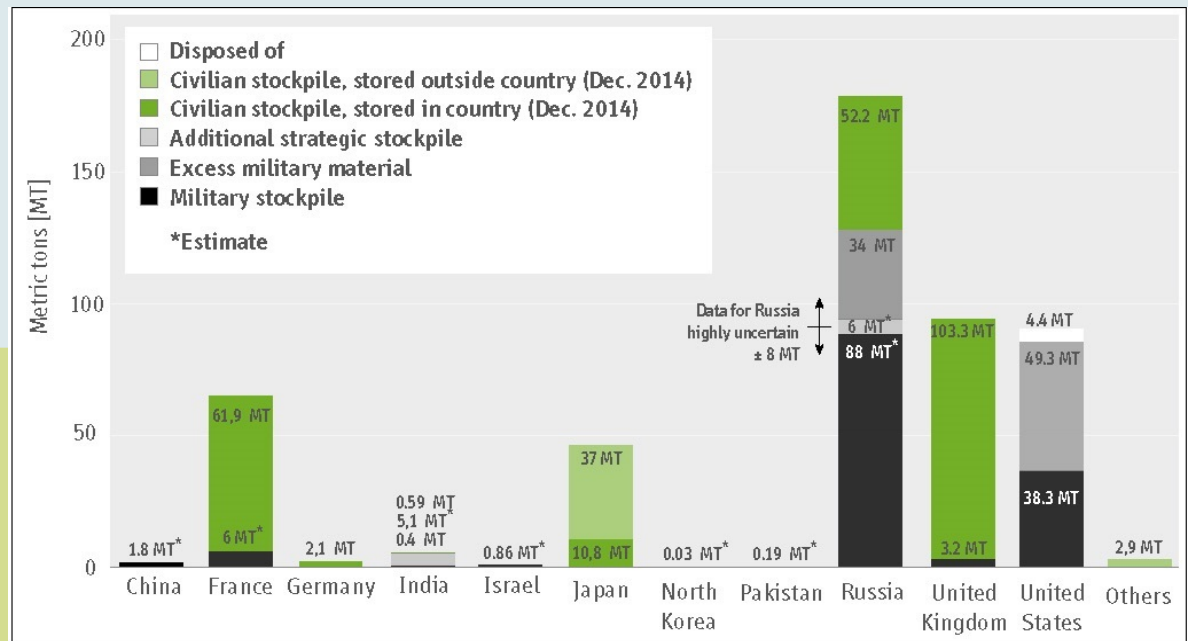
- 1. States' military exploitation of civilian nuclear infrastructure either to break out or ramp up**
- 2. Faster, more accurate missiles: mostly non-nuclear**
- 3. Vulnerability of NATO satellites to dual-purpose rendezvous spacecraft that refuel, repair, and reposition other satellites**

# 1. EXPLOITATION OF CIVILIAN NUCLEAR INFRASTRUCTURE

# EXISTING FISSILE STOCKPILES: GRIST FOR NUCLEAR RAMP-UPS AND BREAKOUTS

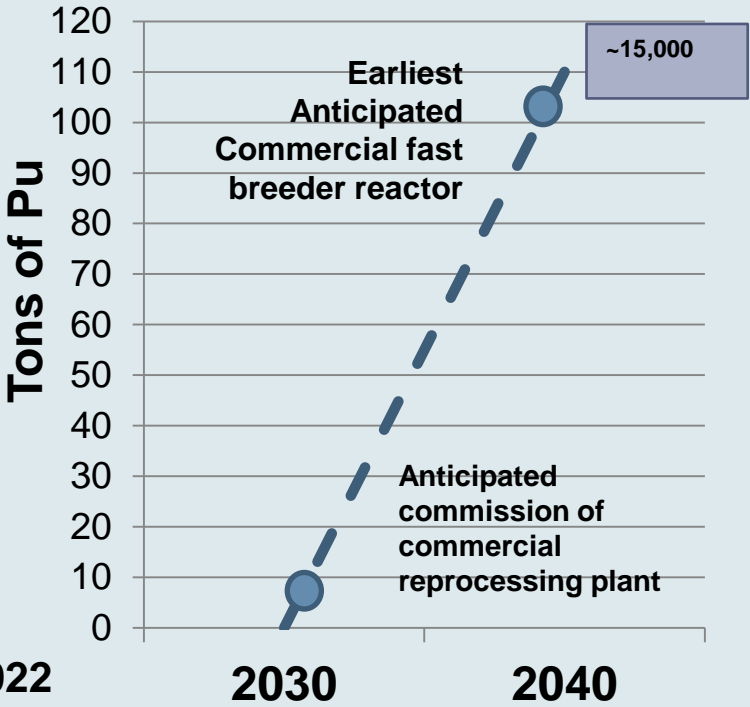
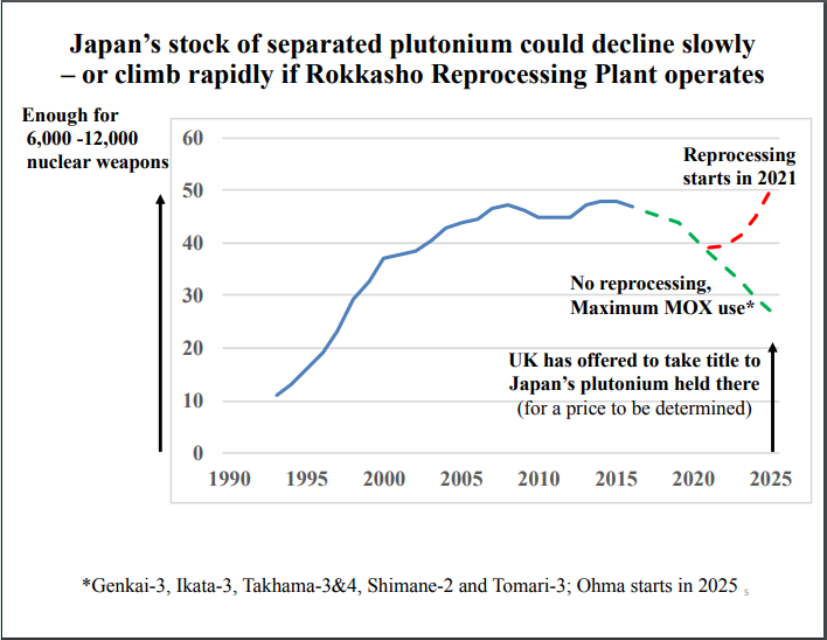


National Stockpiles of Highly-Enriched Uranium



National Stockpiles of Separated Plutonium

# E. Asian Plutonium Production Potential: 1000s of Bombs Per Year



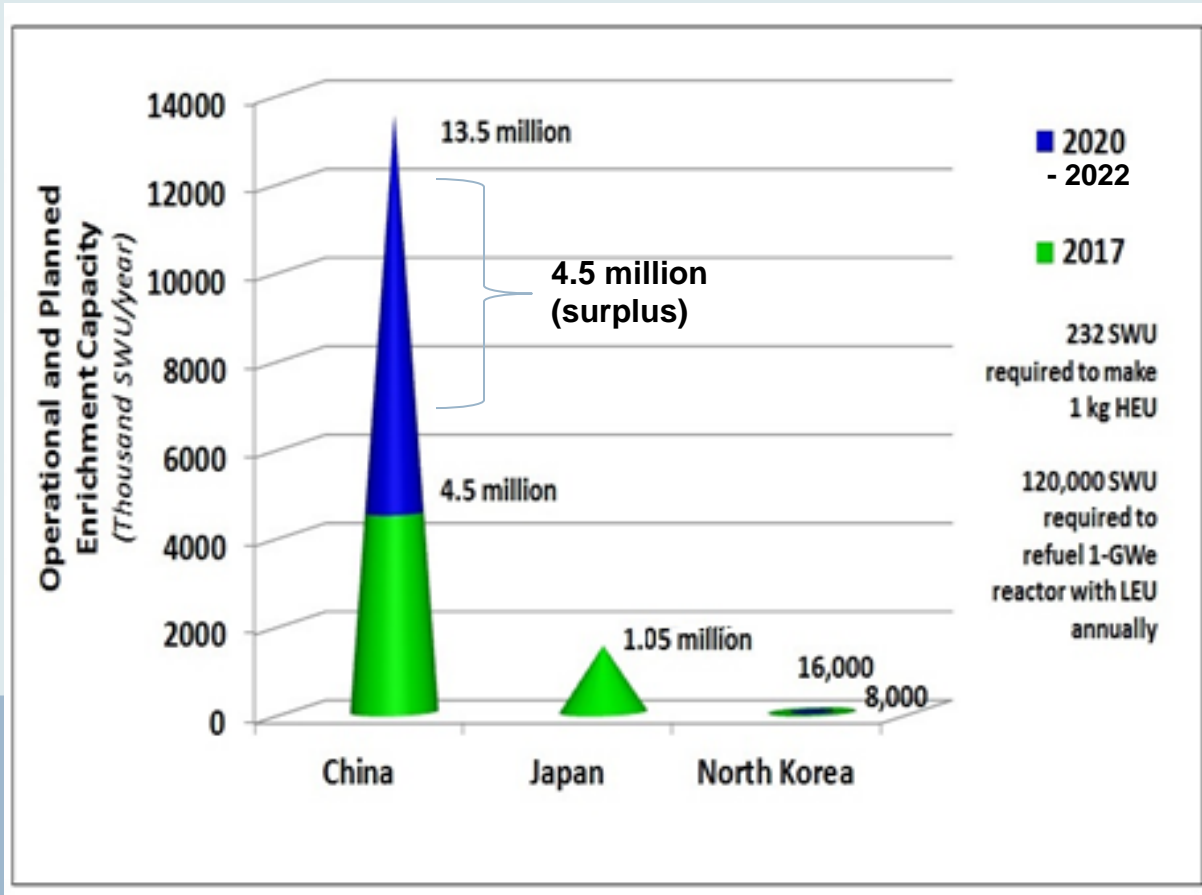
Rokkasho Uranium Enrichment Plant

Japan by 2022 could produce up to ~6,400 kg HEU/year or **more than 500 bombs worth per year**



ROK pyro-reprocessing plant

# URANIUM ENRICHMENT FOR PEACE?



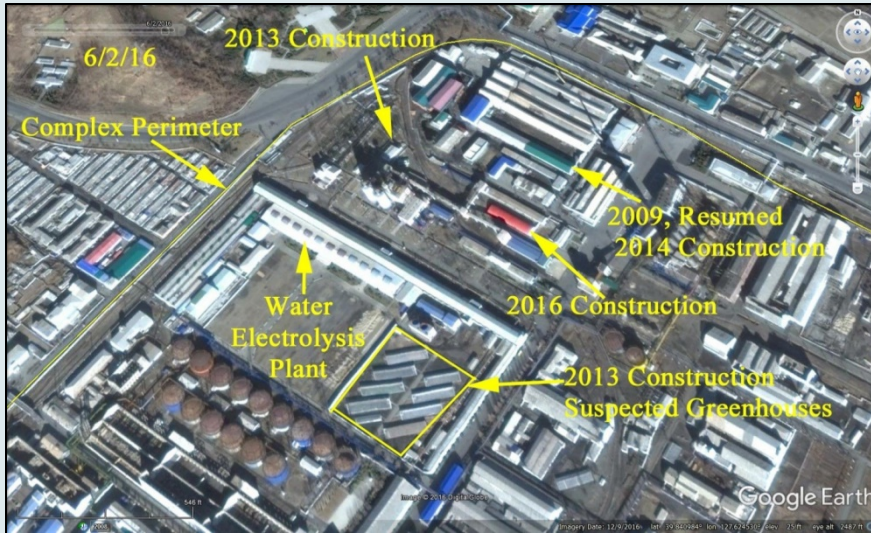
Rokkasho Uranium Enrichment Plant



Hanzhong and Lanzhou



# N. KOREAN TRITIUM PRODUCTION



Suspected DPRK Li6 production plant



Reactors N. Korea could use to irradiate Li6 to produce Tritium

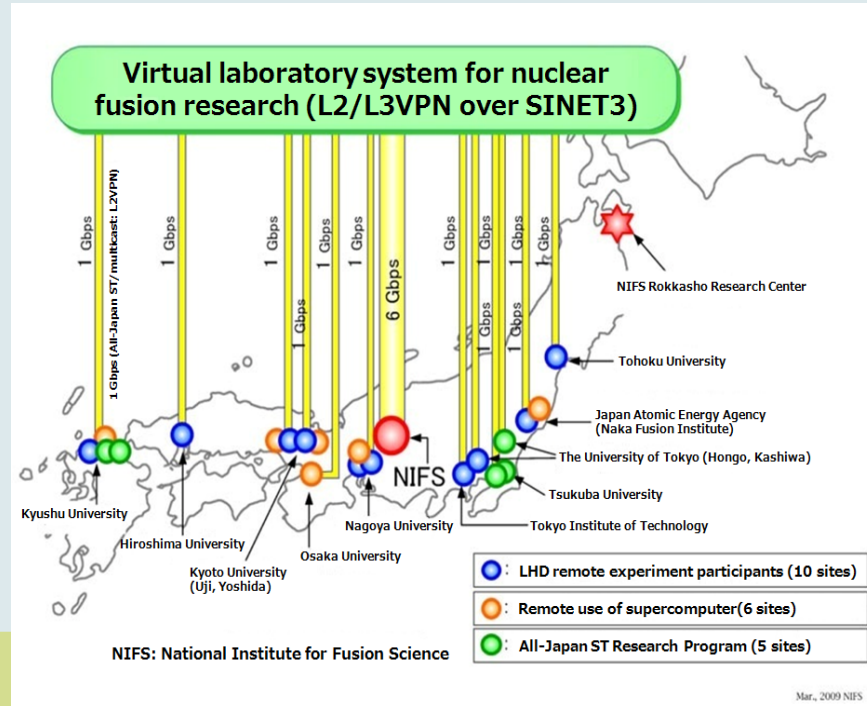


Suspected DPRK tritium extraction plant

# ROK & Japanese Thermonuclear Potential



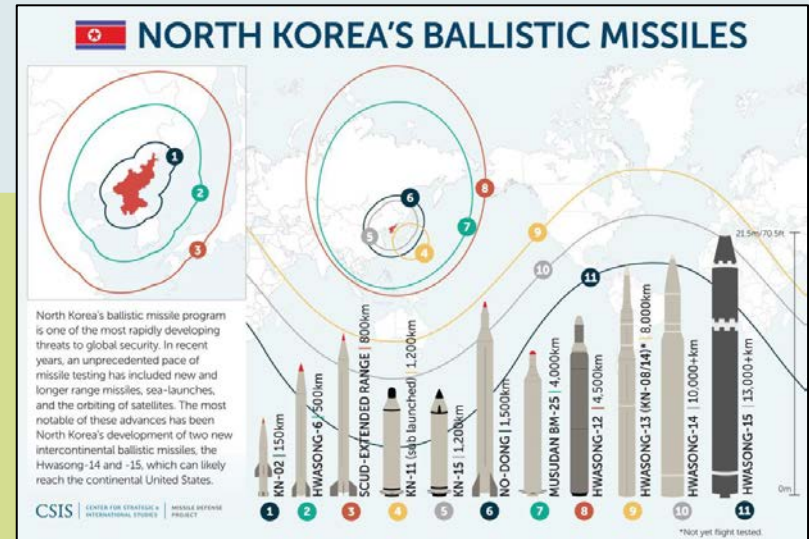
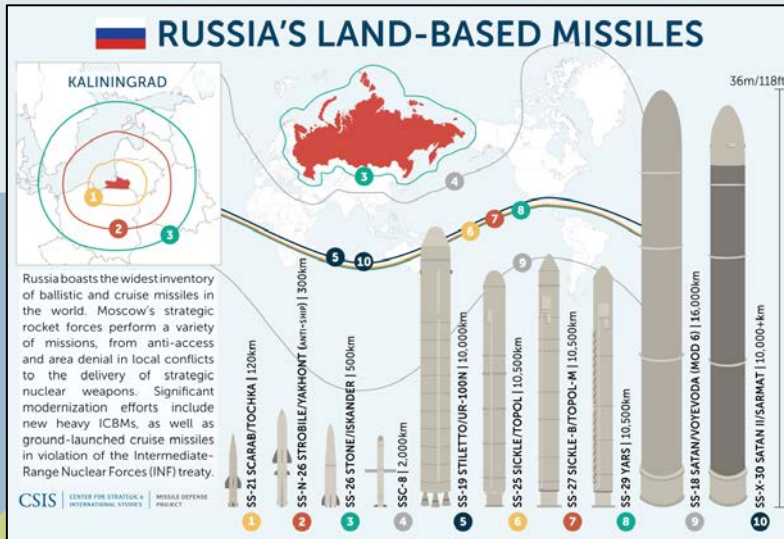
**Wosong Tritium Removal Facility**  
*Tritium (4 kgs) to boost 1,000 weapons*





## 2. MISSILES

# Many More Missiles

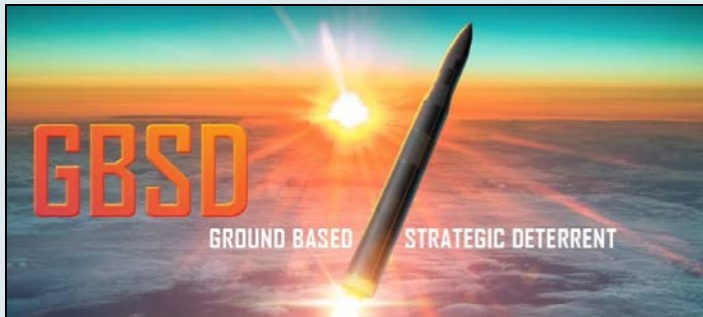


# Accurate Conventional Missiles: Nearly as Lethal as Nuclear Missiles





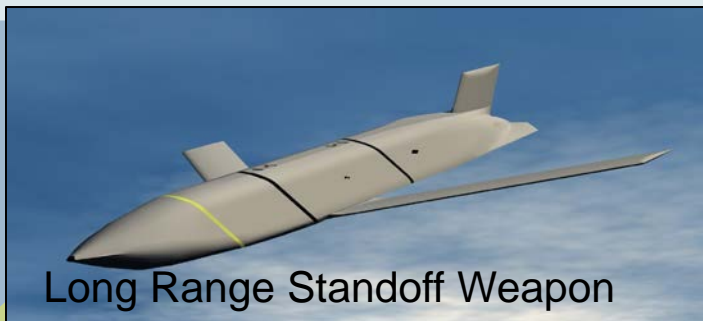
# 1<sup>ST</sup> MILITARY RESPONSE: NEW LONG-RANGE COUNTER-OFFENSIVE MISSILES



BREAKING **DEFENSE**

**Army Seeks 1,000-Mile Missiles vs. Russia, China**

*Breaking Defense*  
September 10, 2018



**Falcon - Hypersonics**

**Program Goals and Objectives**  
Demonstrate key Hypersonic Cruise Vehicle Technologies in-flight through a series of Hypersonic Technology Vehicles (HTVs)

HTV-1      HTV-2      HTV-3X      HCV

Ground Demonstrations      First Flight - May 2009      Conceptual Design/ Risk Reduction      Vision Vehicle

**Technical Approach**  
Aero-Thermal Dynamics  
High-Temperature Materials & Structures  
Navigation Guidance and Control  
Communications through Plasma  
Combined Cycle Propulsion

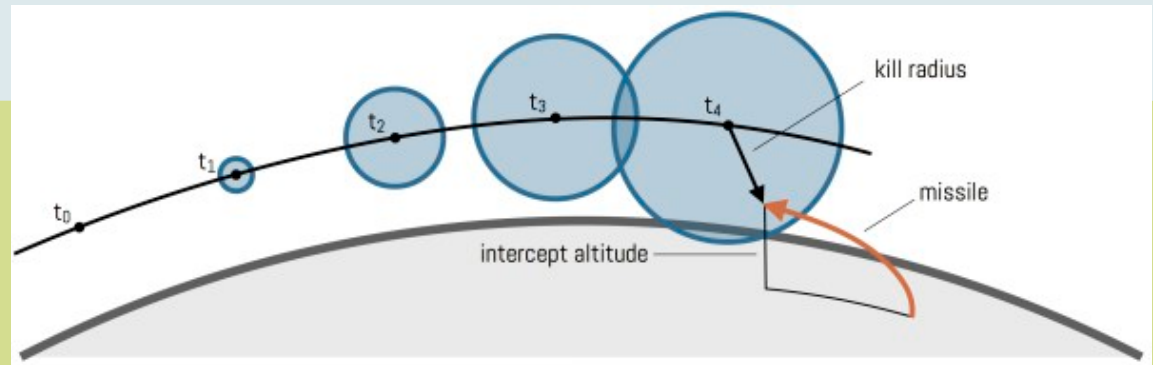
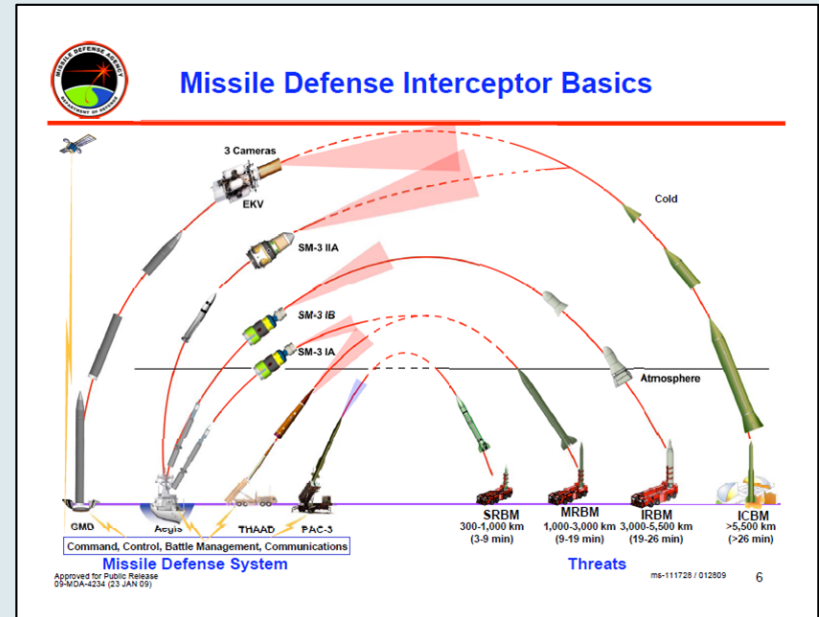
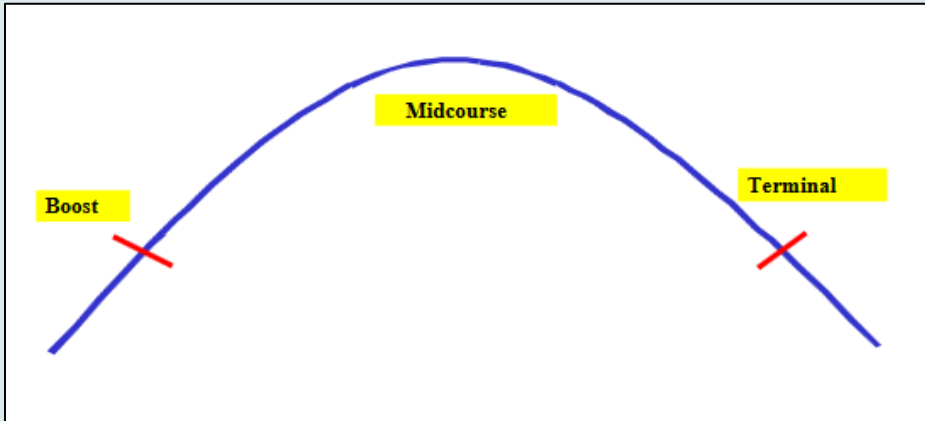
**Military Utility**  
**Prompt Global Reach from CONUS**  
- Reconnaissance  
- Anti-access capability  
**Reusable Space Access**  
- Aircraft-like operations

**Demonstrating Long-Duration Hypersonic Flight**  
Approved for Public Release, Distribution Unlimited



Boeing X-51 hypersonic cruise missile

# 2<sup>ND</sup> MILITARY RESPONSE: BOOST-PHASE MISSILE DEFENSES AND MORE



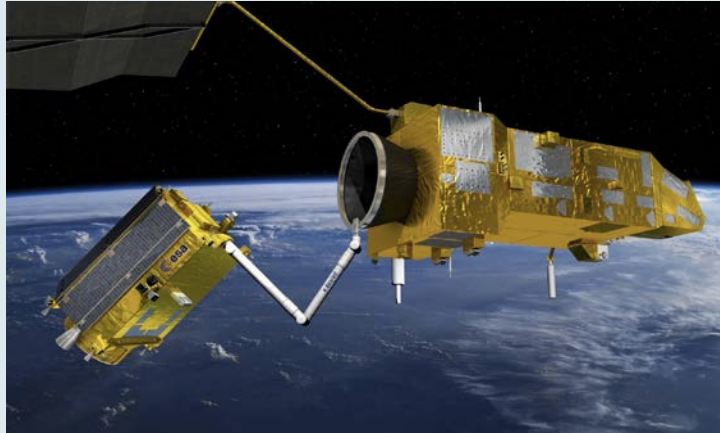


# **BUT THESE MILITARY RESPONSES ALONE WON'T SUFFICE**

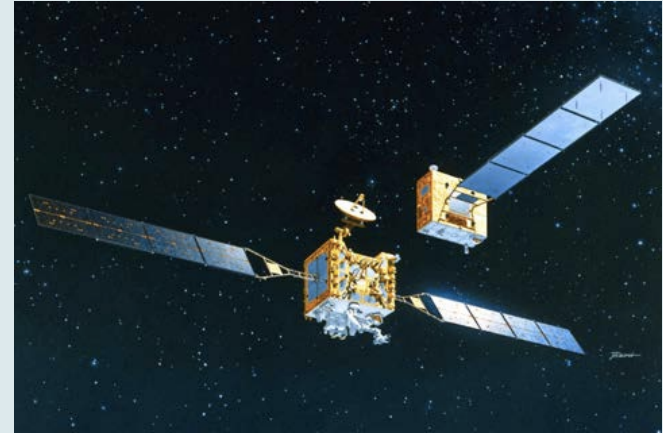
- ▶ **Current missile defenses can be overwhelmed by numbers**
- ▶ **Effective boost-phase intercepts may entail violating international law**
- ▶ **Russia and China are developing advanced missiles and hypersonics too**

### 3. STALKER RENDEZVOUS SATELLITES

# “Peaceful” Rendezvous Satellites Could Presage a Silent Strategic Apocalypse



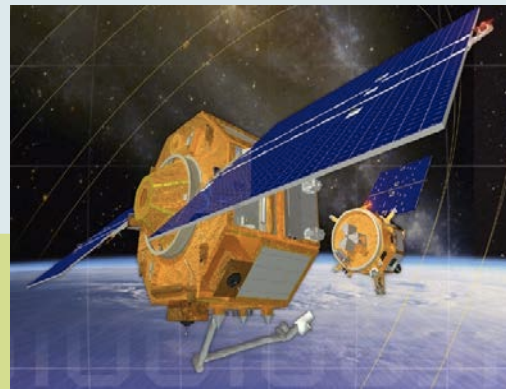
ESA's e.Deorbit



Japan's KIKU-7 "Chaser" & "Target"



NASA's Restore-L



China's SJ-12 & SJ-06F  
Also Aolong-1



Russia's Olimp-K

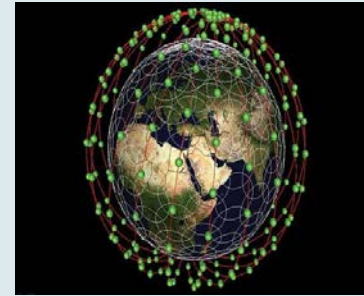
# US/NATO RESPONSE: STEALTHY, RESILIENT, REPLENISHABLE, MANEUVERING, & DEFENSIVE SATELLITE SYSTEMS



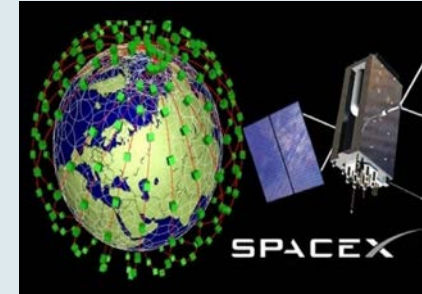
US Airforce autonomous space shuttle X-37



SPACEEX launch and reentry



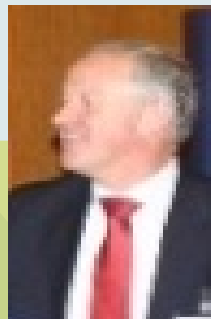
DARPA BLACKJACK Program



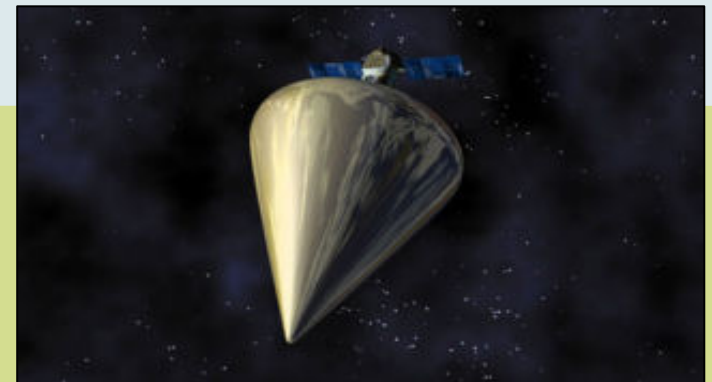
Eldon Musk's Satellite Internet Program



US Airforce maneuvering satellite



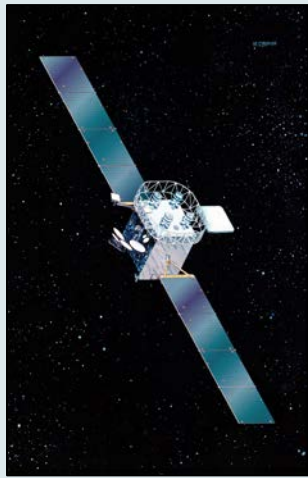
Erwin Duhamel  
ESA. Bodyguard  
Sats



Misty US Stealthy Satellite Program

# BUT EVEN WITH SUCH SPACECRAFT, NATO IS STILL IN A BIND

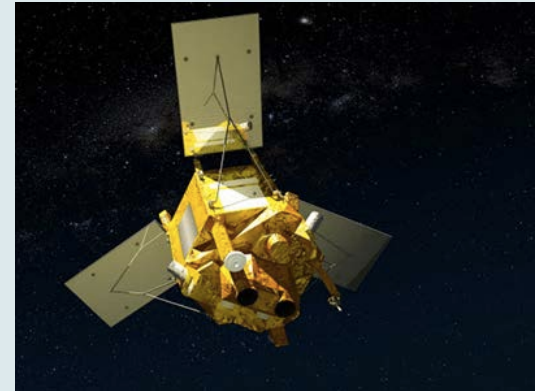
None of these systems alone can prevent our major satellites from being knocked out without public clarity on what an act of war in space is & what self-defense entails



U.S. MIL-SAT



ESA Galileo Navigation  
Satellite



French Spot-6



**CYBER**

# **IF THESE THREATS GO UNADDRESSED:**

- **Traditional and new nuclear threats against NATO will grow and be far more uncertain**
- **Hostile missiles will eclipse NATO/US missile defenses, NATO/US counterforce strikes against nuclear missiles will become extremely difficult**
- **NATO military and civilian satellites critical to nuclear C3 and surveillance will be at risk – deterring military actions generally**

**ADDITIONAL SLIDES**

# ***Underestimated: Our Not So Peaceful Nuclear Future***

By Henry D. Sokolski

Executive Director, Nonproliferation Policy Education  
Center

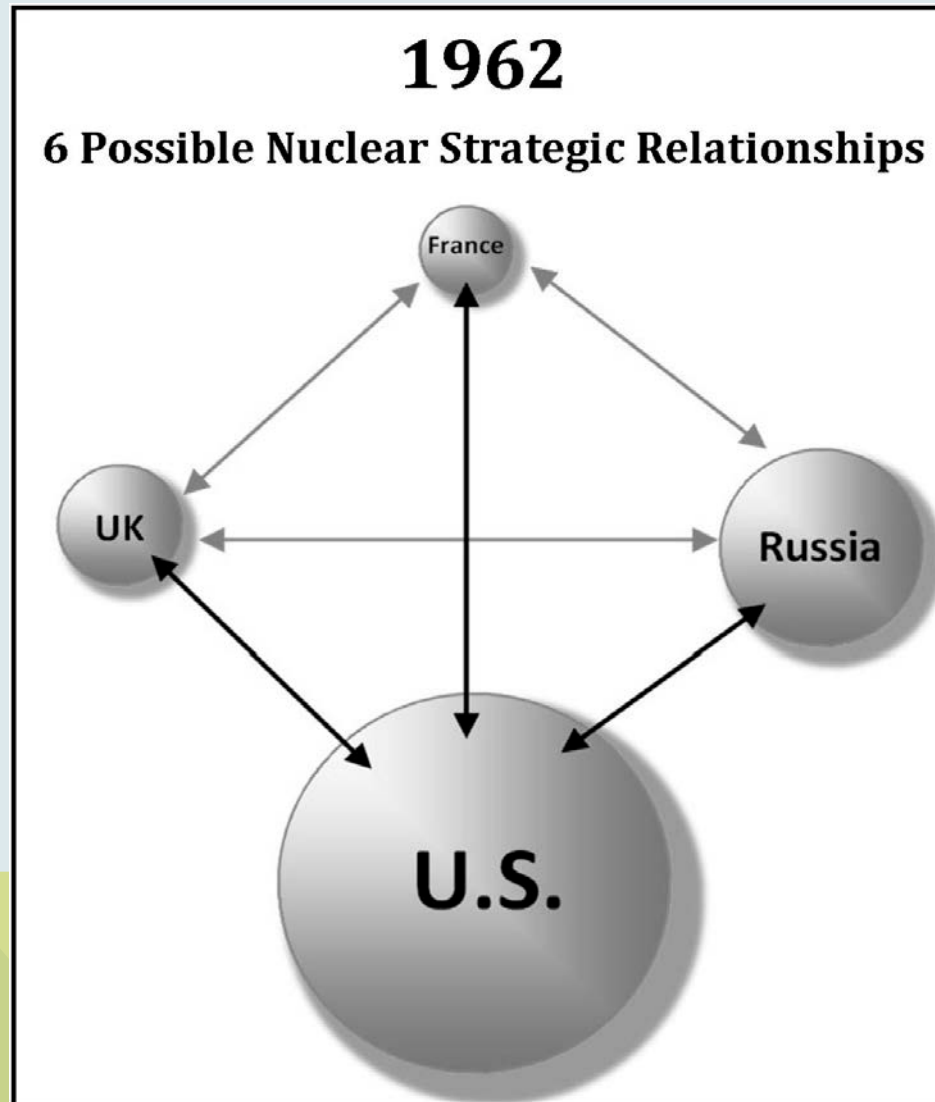
[www.npolicy.org](http://www.npolicy.org)

# THE NUCLEAR STATE OF PLAY IN 1962





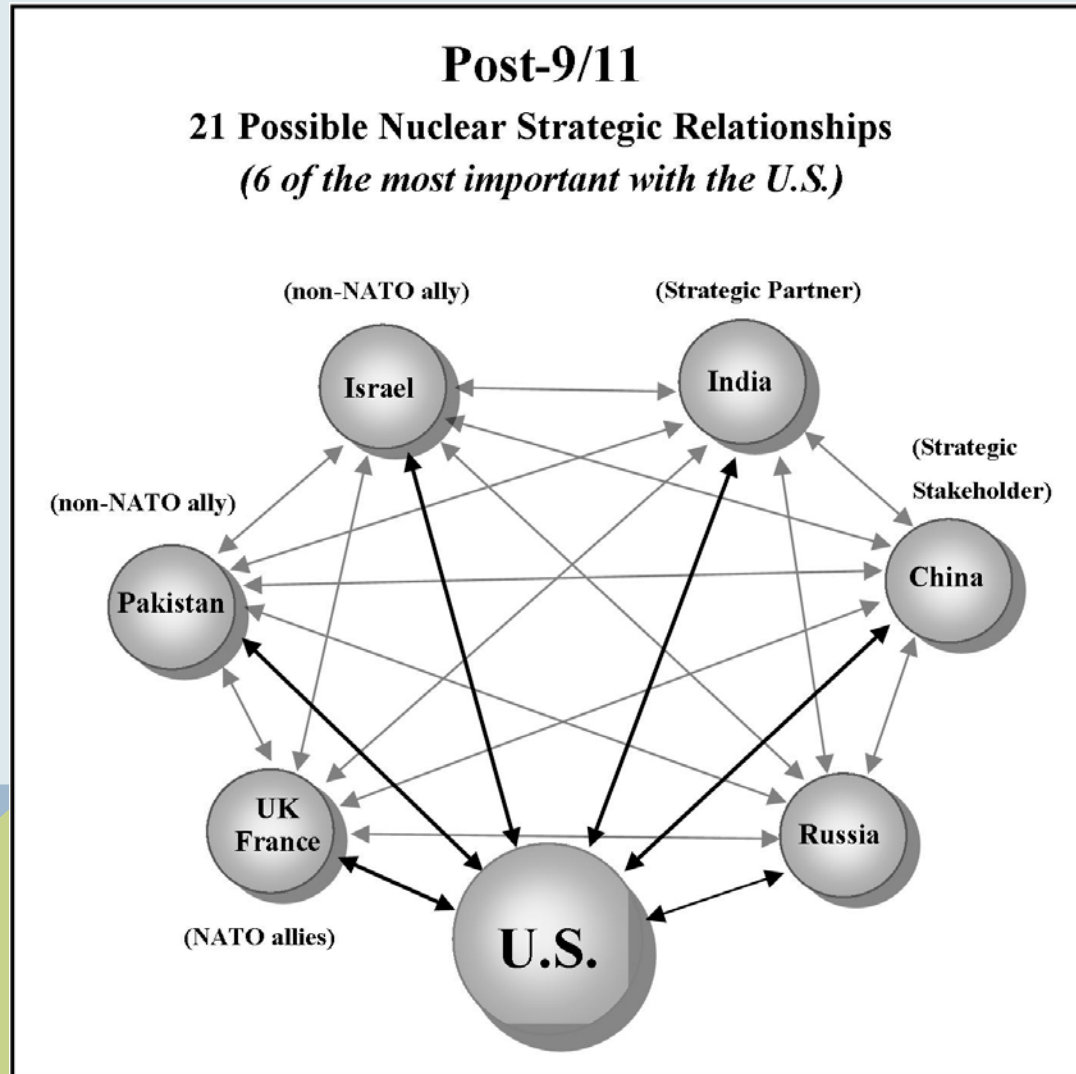
# FOUR NUCLEAR WEAPONS STATES IN 1962



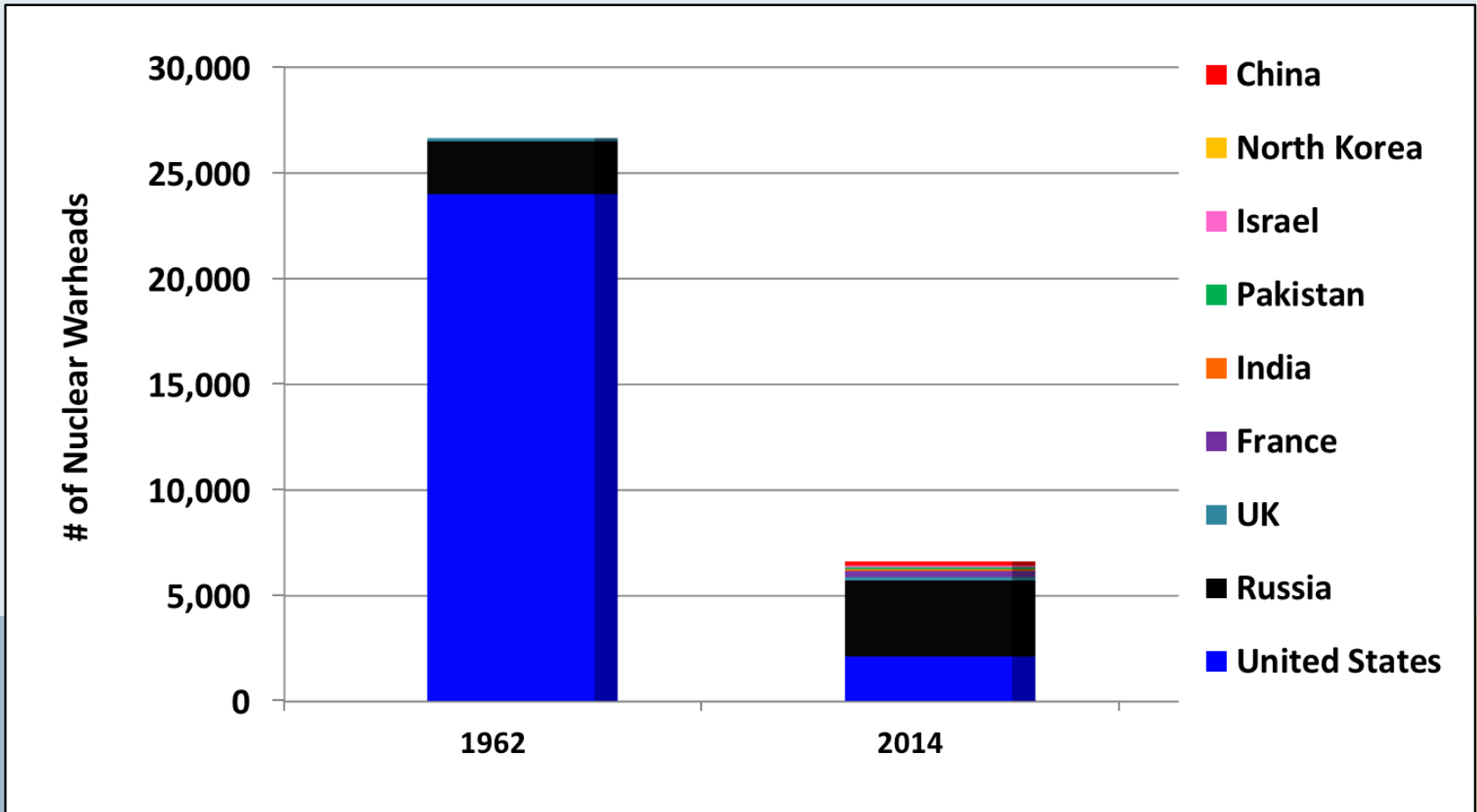
# THE CURRENT NUCLEAR STATE OF PLAY



# PROLIFERATION PRESENT: AN OFFICIAL VIEW



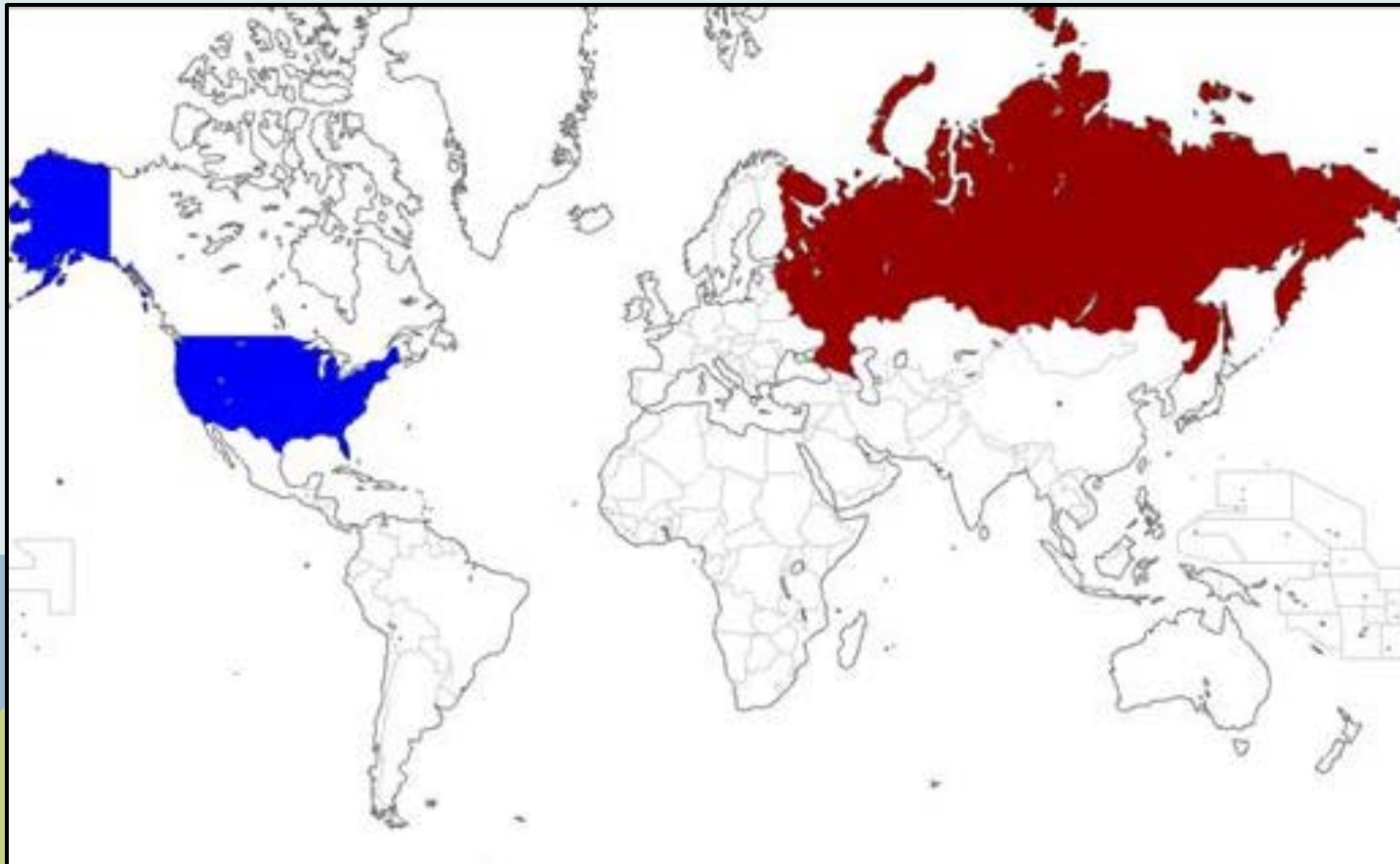
# FROM U.S. STRATEGIC DOMINANCE TO A COMPRESSED NUCLEAR CROWD



# FROM 2 NUCLEAR CAPABLE MISSILE STATES TO AT LEAST 26

1962

2 missile states

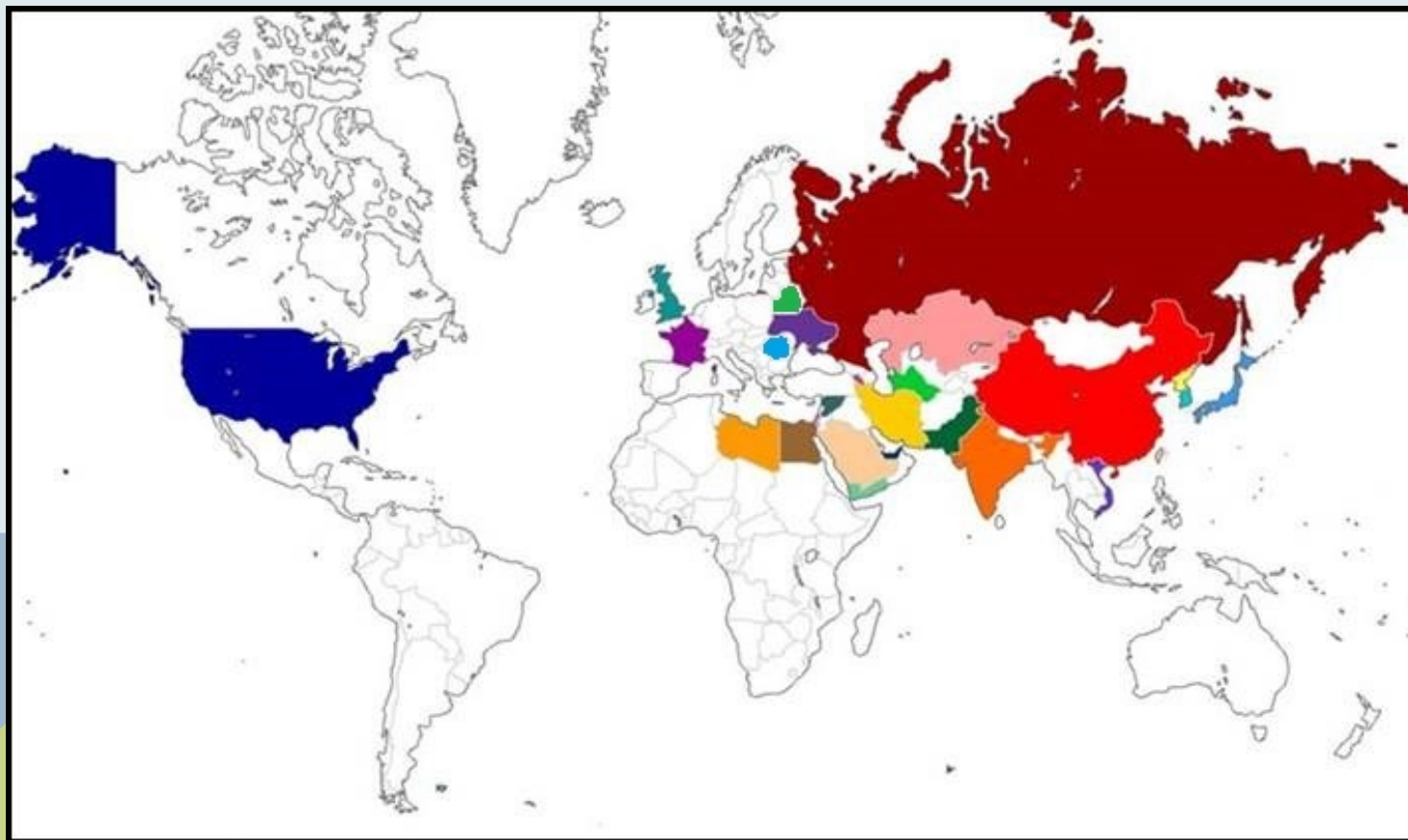




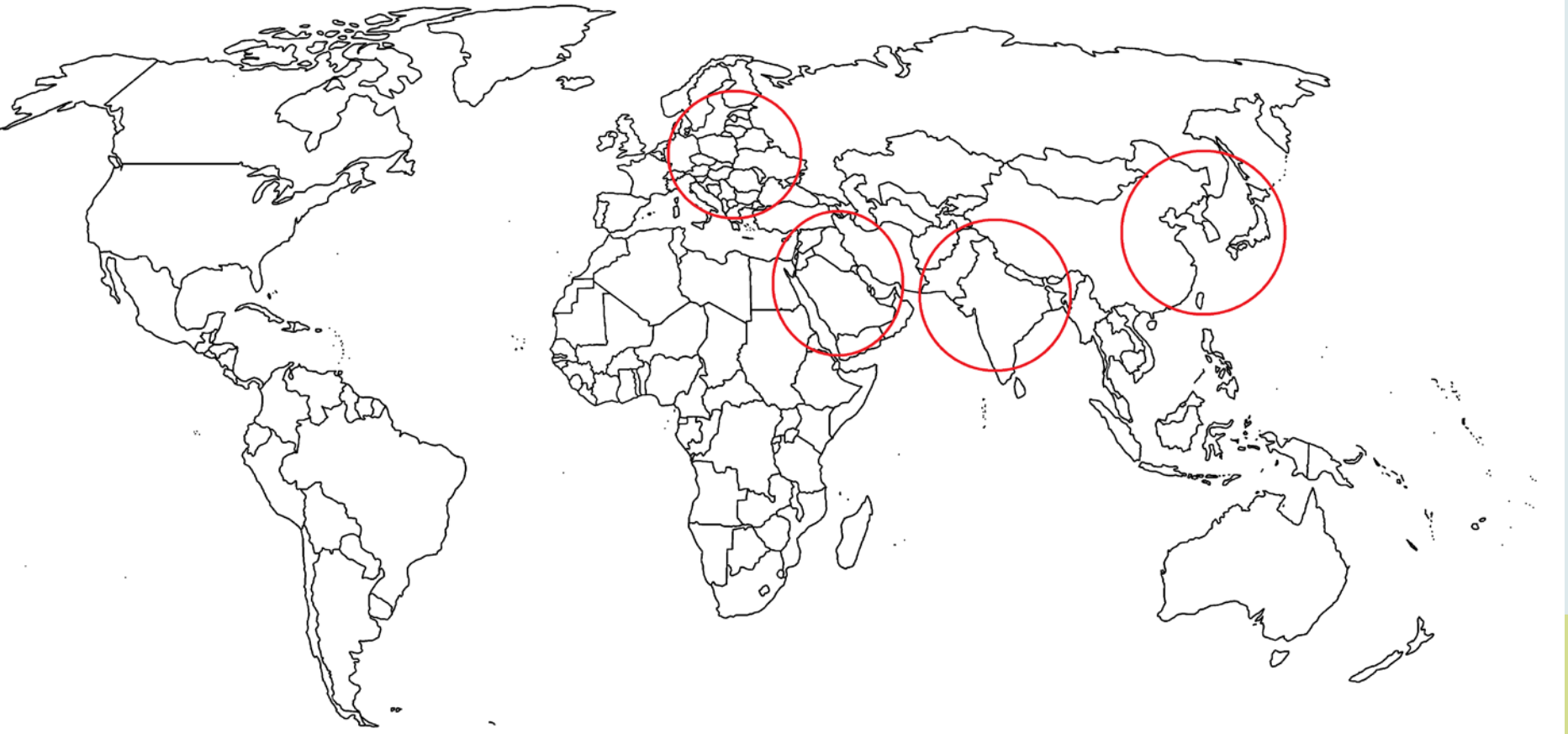
# FROM 2 NUCLEAR CAPABLE MISSILE STATES TO AT LEAST 26

2017

26 missile states

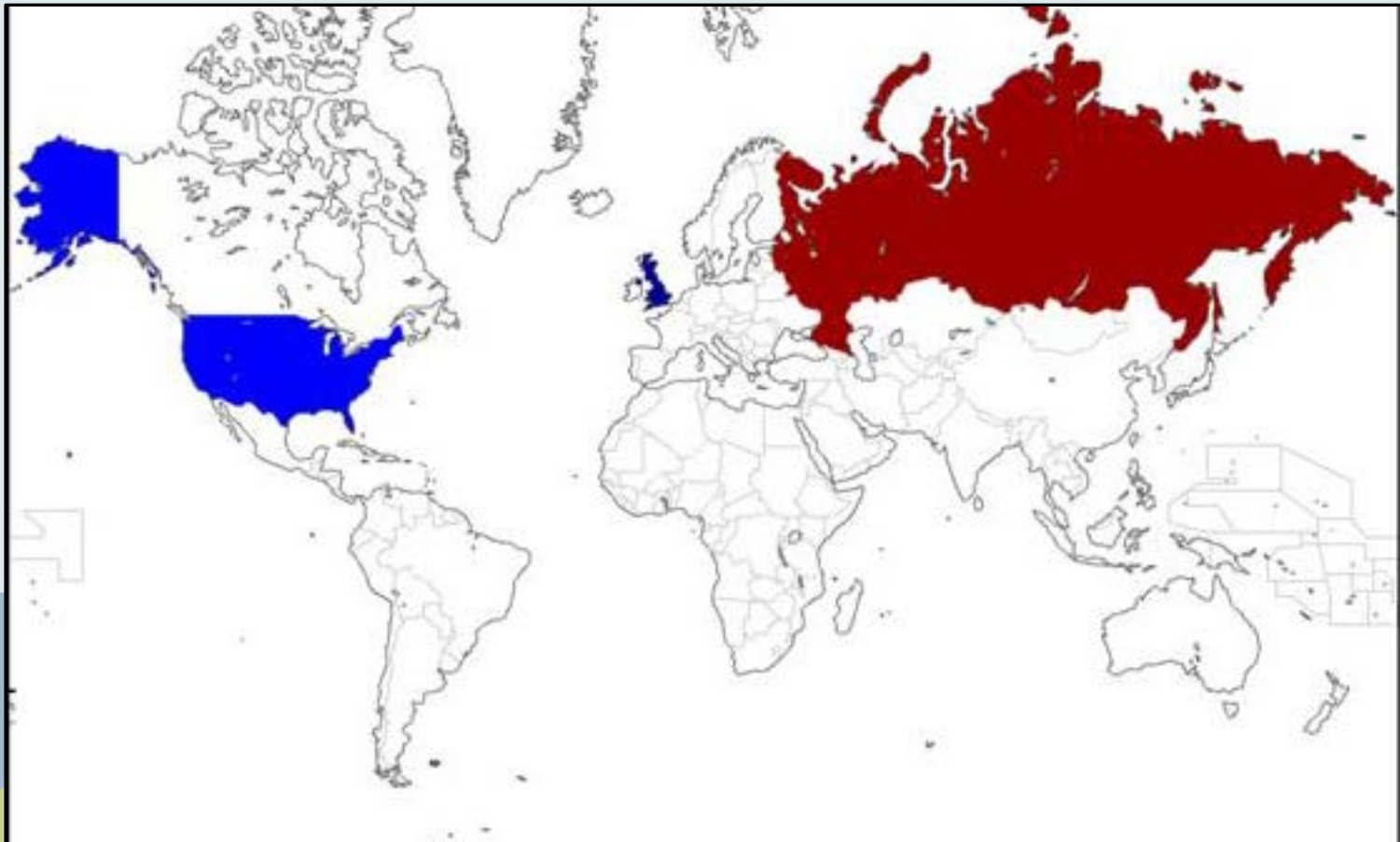


# WHERE OVERLAPPING MISSILE RANGE ARCS CONCENTRATE



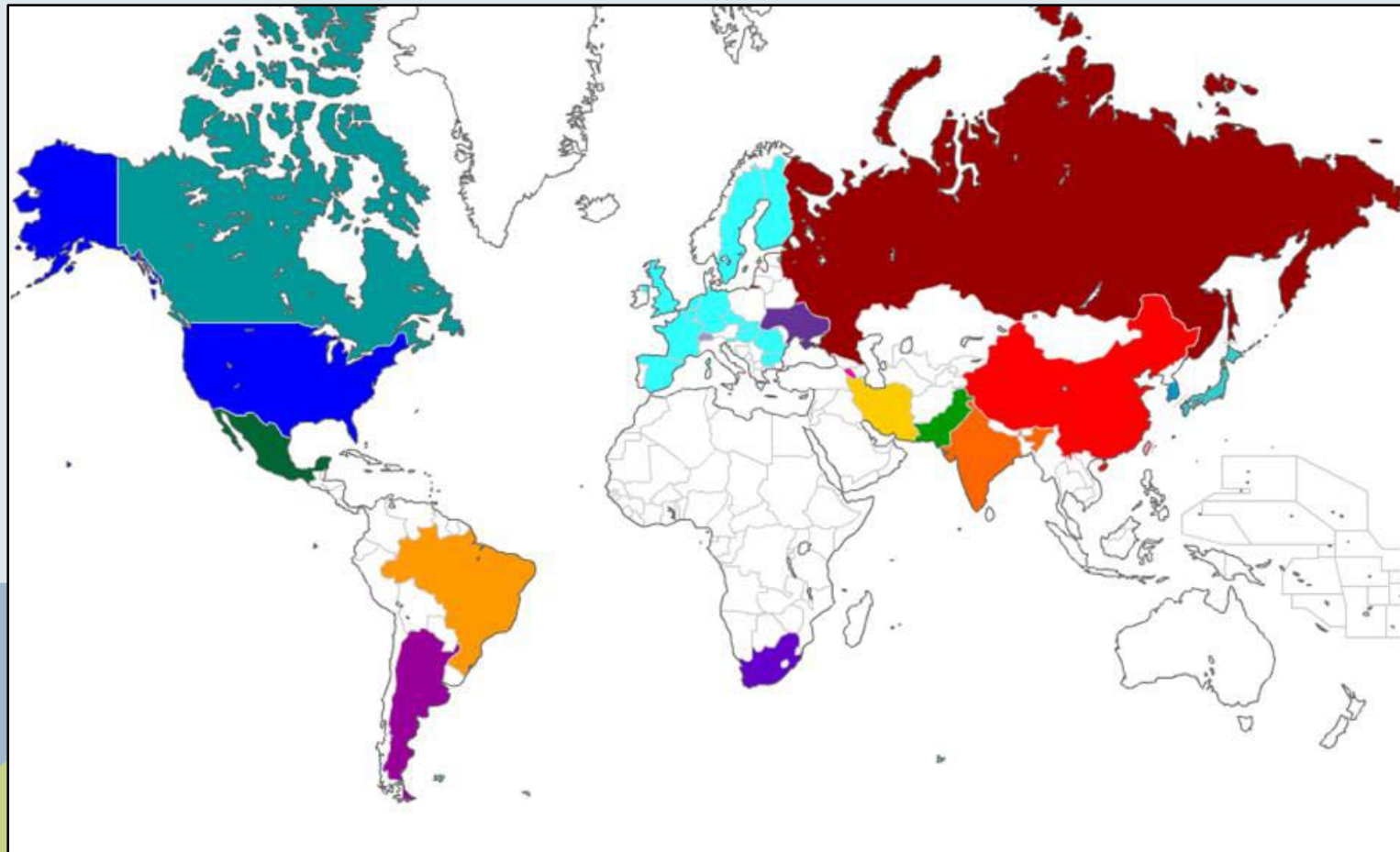
# ESTABLISHED NUCLEAR POWER PROGRAMS

1962 – 3 countries



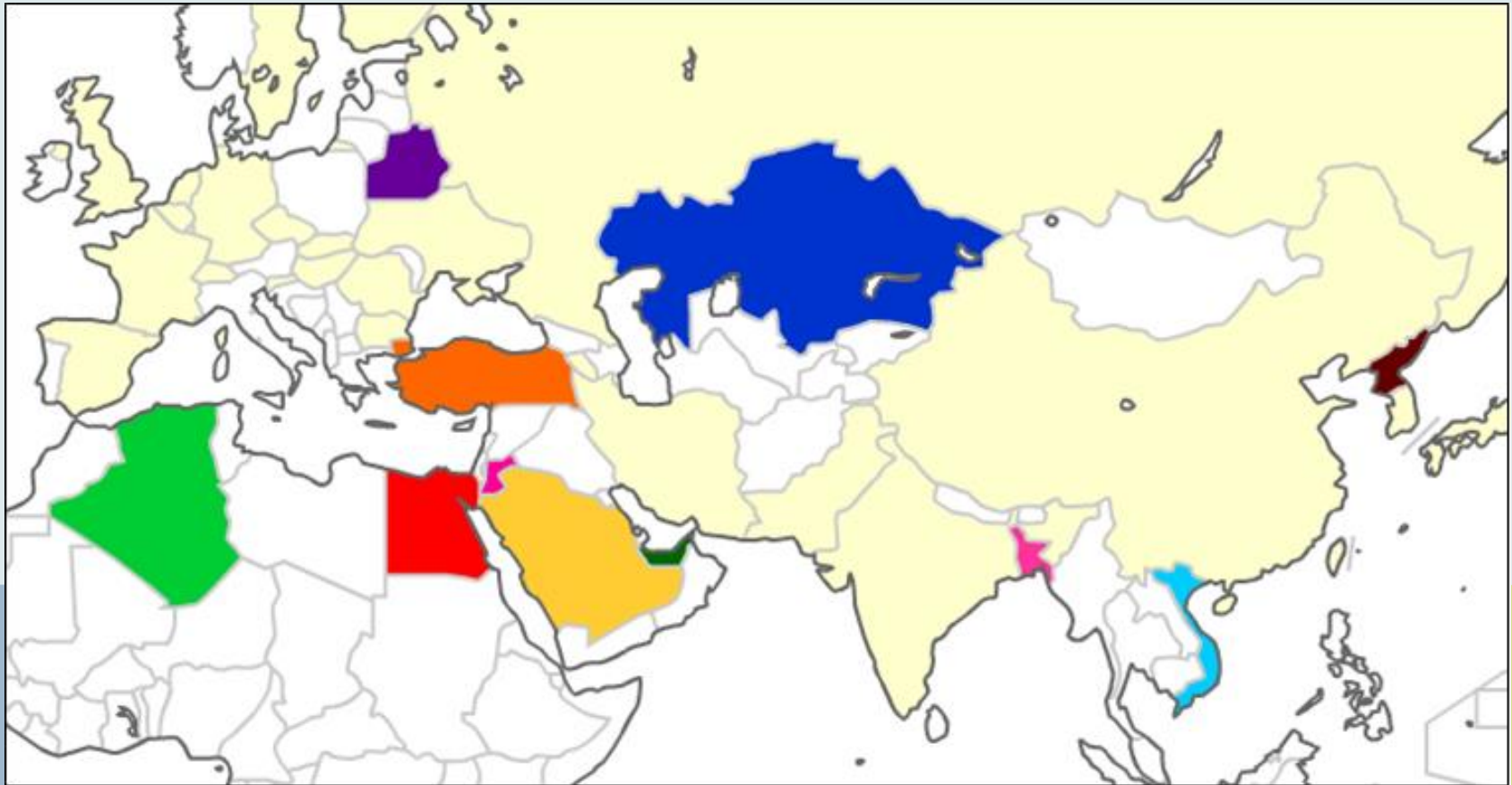
# ESTABLISHED NUCLEAR POWER PROGRAMS

2017 – 31 countries



# WHAT'S NEXT: MORE NUCLEAR POWERED STATES, MOSTLY IN SCARY PLACES

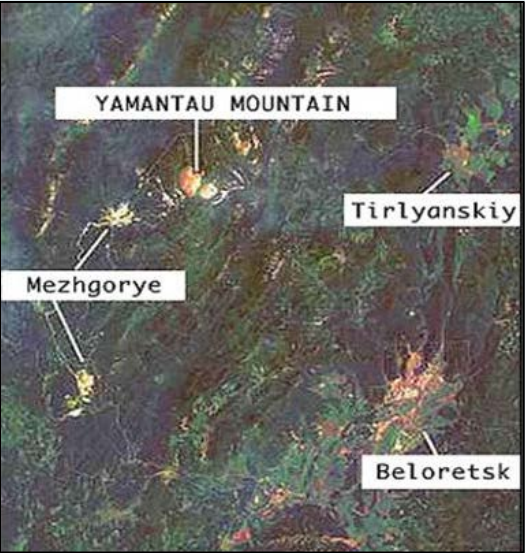
States Planning to Have Their First Nuclear Power Reactor by 2032



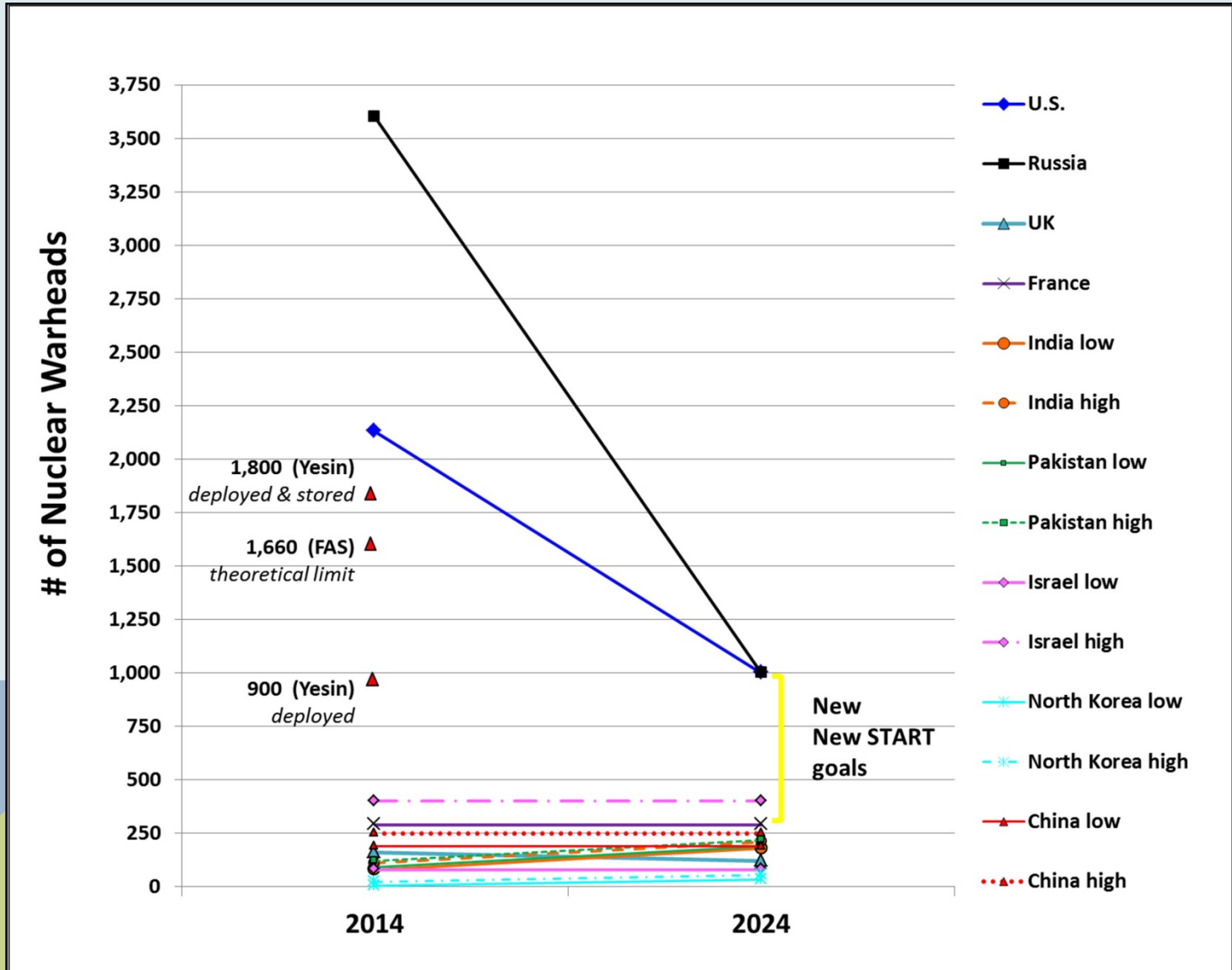
Countries shown in beige already have established nuclear power programs



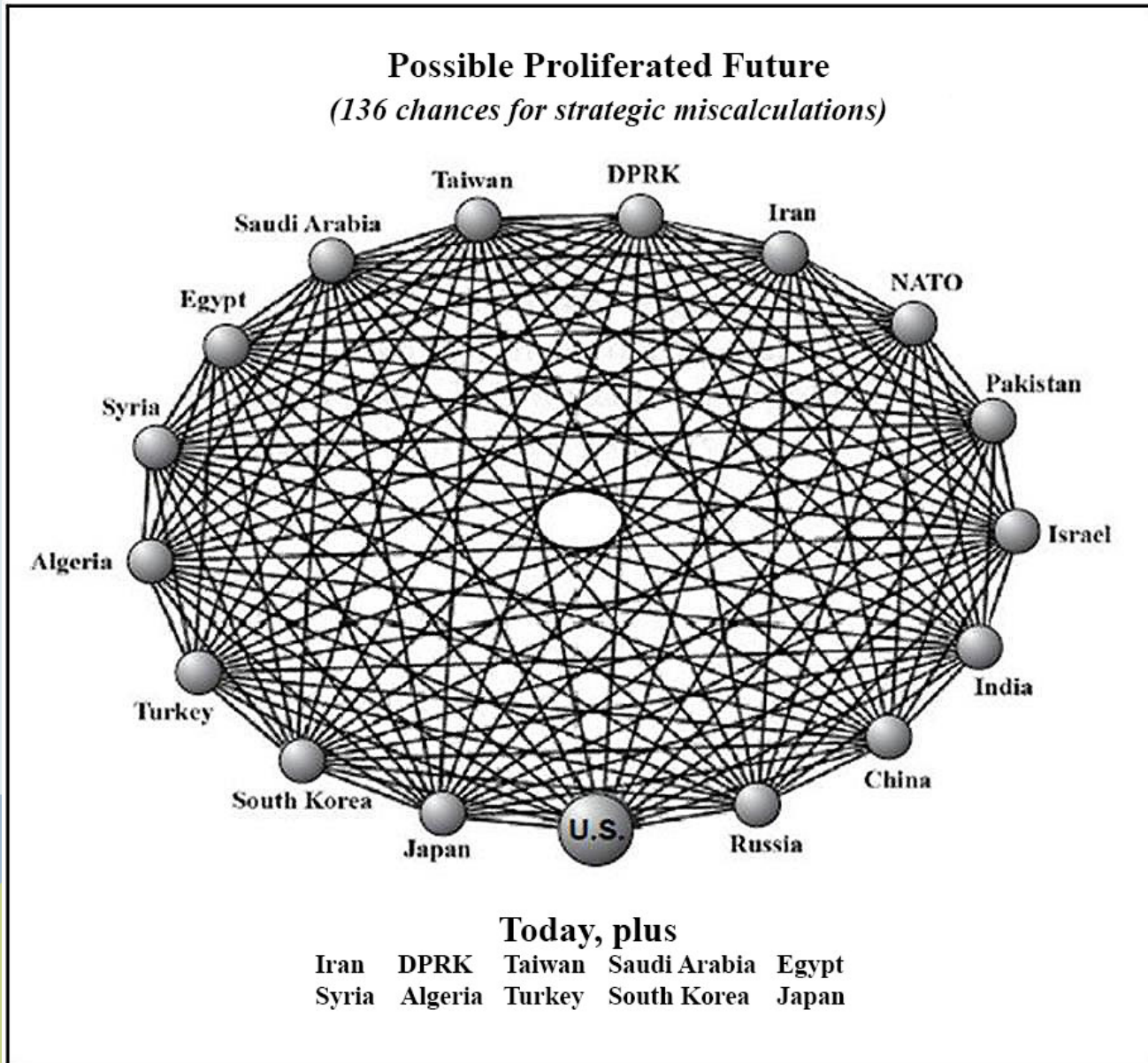
# YAMANTAU, UNDERGROUND GREAT WALL, DPRK TUNNELS & IRAN



# THE NEXT DECADE: FURTHER NUCLEAR WEAPONS COMPRESSION?



# OUR PROLIFERATION FUTURE?





# **PAY GREATER ATTENTION TO:**

**PRC strategic capabilities and their future security implications**

**Missile proliferation**

**The further spread of “peaceful” nuclear technology and nuclear explosive materials**

**Our general approach to preventing further proliferation**